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NATIONAL HEALTH & MORBIDITY SURVEY 2022

ADOLESCENT HEALTH SURVEY 2022

PULAU PINANG

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LIST OF ABBREVIATIONS

AHS	Adolescent Health Survey
BOD	Burden of Disease
CDC	Centers for Disease Control and Prevention
GSHS	Global School-based Student Health survey
IPH	Institute for Public Health
NMRR	National Medical Research Register
UNICEF	United Nations Children's Fund
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNODC	United Nation Office on Drug and Crime
WHO	World Health Organization

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EXECUTIVE SUMMARY

The Adolescent Health Survey (AHS) 2022 was conducted from June to July 2022 with the aim of determining the prevalence of health risk behaviours and protective factors among adolescents in Malaysia. This nationwide cross-sectional survey used a two-stage stratified sampling design and a validated self-administered questionnaire. Out of 2798 secondary schools under the Ministry of Education (MOE) and the Ministry of Rural and Regional Development (MARA), 240 schools were randomly selected and a total of 37,479 students were eligible to participate in the survey. The findings showed that a total of 239 schools with 33,523 adolescents were involved in this study, resulting in an overall response rate of 89.0%. In Pulau Pinang, 16 secondary schools were randomly selected, and out of 2300 eligible students, 2044 students completed the survey, yielding a response rate of 88.9%.

Pulau Pinang Key Findings

The study revealed that the prevalence of current use of any tobacco products, current tobacco smokers, current cigarette smokers and current e-cig/vape users among adolescents in Pulau Pinang was 14.3%, 7.5%, 4.6% and 11.1% respectively. The prevalence of current alcohol drinkers among adolescents was 9.6%. While the prevalence of ever-alcohol drinkers among adolescents in Pulau Pinang was 30.4%, 71.5% of them had their first alcoholic beverage before the age of 14 years. The prevalence of ever having sex and had sex in the past 30 days among adolescents was 8.9% and 6.6%, respectively. Of those who ever had sex, 37.8% had their first sexual experience before age 14, and 8.4% had at least two sexual partners. Only 18.6% of respondents or their partners had used condoms, while 12.4% used other birth control methods. A total of 17.3% of adolescents had been seriously injured in the past 12 months, with the two most common causes of injury being falls and motor vehicle accidents. Among respondents, 12.8% claimed to have been physically attacked in the past 12 months, while 14.5% of adolescents claimed to have been involved in physical fights. With regards to bullying, 7.2% reported having been bullied in the past 30 days. A total of 14.3% of adolescents in Pulau Pinang reported feeling lonely, and 12.6% reported being unable to sleep "most of the time or always" due to worry in the 12 months prior to the survey. Prevalence of suicidal ideation, plan and attempt were 12.0%, 9.5%, and 9.3%, respectively. Overall, 26.9% of adolescents reported being depressed. The prevalence of truancy among adolescents in the past 30 days was 19.8%, and only 47.6% claimed to have peer support. Adolescents who reported having parental or guardian supervision, parental or guardian connectedness and parental or guardian bonding were 9.6%, 25.9% and 35.7%, respectively. Overall, 79.9% of adolescents reported brushing their teeth twice a day in the past 30 days. A total of 52.8% of adolescents reported not knowing whether their toothpaste contained fluoride while only 22.1% used dental floss. In the past 30 days, 71.6% always used soap when washing their hands, 79.6% always washed their hands before eating, and 90.2% reported that they always washed their hands after using the toilet. In relation to dietary behaviours, 2.0% reported being hungry most of the time or always in the past 30 days because there was not enough food at home. The consumption of fruits at least twice daily was 31.6% and vegetables at least thrice daily was 26.1% in the past 30 days. Consumption of carbonated drinks at least once daily in the past 30 days was reported at 21.5%, while 9.7% consumed food from fast food restaurants for at least three days in the past seven days. The prevalence of stunting and thinness among adolescents was 5.3% and 9.8%, respectively, while the prevalence of overweight was 14.5% and obesity was 14.5%. Prevalence of being physically active was 19.4% and 22.7% of adolescents reported active transportation to school. In addition, 69.6% of adolescents had spent at least three hours on a typical or usual day in sitting activities. Overall, 5.5% reported had ever used drug and the prevalence of current drug users was 3.0%.

Malaysia Key Findings

The study revealed that the prevalence of current use of any tobacco products, current tobacco smokers, current cigarette smokers and current e-cig/vape users among adolescents in Malaysia was 18.5%, 9.0%, 6.2% and 14.9% respectively. Among those who smoked cigarettes and among those who used e-cig/vape, 65.7% had initiated cigarette smoking, and 48.5% had initiated e-cig/vape use, respectively, before the age of 14 years. The prevalence of current alcohol drinkers among adolescents was 7.4%. While the prevalence of ever-alcohol drinkers among adolescents in Malaysia was 18.6%, 64.6% of them had their first alcoholic beverage before the age of 14 years.

The prevalence of ever having sex and had sex in the past 30 days among adolescents was 7.6% and 5.7%, respectively. Of those who ever had sex, 32.8% had their first sexual experience before age 14, and 10.7% had at least two sexual partners. Only 11.8% of respondents or their partners had used condoms, while 11.9% used other birth control methods. A total of 20.4% of adolescents had been seriously injured in the past 12 months, with the two most common causes of injury being falls and motor vehicle accidents. Among respondents, 14.8% claimed to have been physically attacked in the past 12 months, while 16.0% of adolescents claimed to have been involved in physical fights. With regards to bullying, 8.6% reported having been bullied in the past 30 days.

A total of 16.2% of adolescents in Malaysia reported feeling lonely, and 4.2% said that they had no close friends. A total of 12.9% reported being unable to sleep "most of the time or always" due to worry in the 12 months prior to the survey. Prevalence of suicidal ideation, plan and attempt were 13.1%, 10.0%, and 9.5%, respectively. Overall, 26.9% of adolescents reported being depressed. The prevalence of truancy among adolescents in the past 30 days was 25.6%, and only 46.0% claimed to have peer support. Adolescents who reported having parental or guardian supervision, parental or guardian connectedness and parental or guardian bonding were 9.9%, 24.2% and 33.4%, respectively. Overall, 82.2% of adolescents reported brushing their teeth twice a day in the past 30 days. A total of 43.3% of adolescents reported not knowing whether their toothpaste contained fluoride while only 21.4% used dental floss. In the past 30 days, 69.3% always used soap when washing their hands, 84.5% always washed their hands before eating, and 86.5% reported that they always washed their hands after using the toilet.

In relation to dietary behaviours, 2.5% reported being hungry most of the time or always in the past 30 days because there was not enough food at home. The consumption of fruits at least twice daily was 37.3% and vegetables at least thrice daily was 27.1% in the past 30 days. Consumption of carbonated drinks at least once daily in the past 30 days was reported at 32.4%, while 10.6% consumed food from fast food restaurants for at least three days in the past seven days. The prevalence of stunting and thinness among adolescents was 6.8% and 8.3%, respectively, while the prevalence of overweight was 16.2% and obesity was 14.3%. Prevalence of being physically active for a total of at least 60 minutes daily for five days or more in the past seven days was 21.4% and 27.0% of adolescents reported active transportation to school. In addition, 66.7% of adolescents had spent at least three hours on a typical or usual day in sitting activities.

Recommendations:

In view of the above findings, the following recommendations are suggested:

- Strengthening the multi-approach school-based nutrition and physical activity intervention to motivate behaviour modification for improving healthy eating and lifestyle amongst adolescents.
- Improving the national school curriculum that teaches life skills such as effective coping strategies as part of "Program Minda Sihat".
- A more comprehensive sexual and reproductive health education programmes should be planned and executed among adolescents.
- Strengthening the current law and taking legal action in controlling the accessibility of tobacco products.

1.0 INTRODUCTION

Adolescence is a life phase in which the opportunities for health are great and future patterns of adult health are established; it is a critical stage in life with significant physical, emotional, cognitive, and social development and other disruptions in their communities.[1] As much as one-third of the global Burden of Disease (BOD) is attributable to adolescent behavioural choices and events.[2] In order to improve adolescent health globally, the World Health Organization (WHO) has initiated the development of the health risk behaviours measurement tools known as the Global School-based Student Health Survey (GSHS).[3] More than 140 countries have used the GSHS to periodically monitor the prevalence of important health risk behaviours and protective factors among adolescents.[4] In Malaysia, adolescents comprise approximately 15.6% of the total Malaysian population, and the national data on health risks and behaviours are fundamental in developing policies and programmes for adolescents. Thus, the Ministry of Health, Malaysia took a step forward in collaborating with the WHO to conduct the first GSHS Malaysia in 2012 among adolescents aged 13 to 17 years, which aimed to determine the baseline of the health status of adolescents in Malaysia.[5] In 2017, the second adolescent health study (AHS) using the GSHS methods and questionnaire was conducted in the country.[6] These surveys revealed an increasing trend of health risk behaviours among adolescents in Malaysia.[5,6] With the increasing trend of non-communicable disease risk factors and other behaviour-related risks, it is timely for the survey to be repeated in 2022 to further monitor the health status of adolescents in the country. The Ministry of Health conducted this third national survey on adolescents with the co-operation from the Ministry of Education to determine the prevalence of health risk behaviours and protective factors among adolescents in Malaysia.

1.1 Objectives

1.1.1 General Objectives

To determine the prevalence of health risk behaviours and protective factors among adolescents in Malaysia.

1.1.2 Specific Objectives

To determine the prevalence of:

i. Alcohol use
ii. Dietary behaviours
iii. Drug use
iv. Hygiene (including oral health)
v. Mental health problems
vi. Physical activity
vii. Protective factors
viii. Sexual behaviours
ix. Tobacco use
x. Violence and unintentional injury
xi. Adolescents' perspectives on the impact of the COVID-19 pandemic on their families

2.0 METHODOLOGY

2.1 Study Design

The National School-Based Student Health Survey 2022 was a nationwide cross-sectional study of secondary school adolescents in Malaysia.

2.2 Sampling Frame and Target Population

The sampling frame comprised national secondary schools registered in 2021, which include government schools and private schools under the purview of the Ministry of Education (MOE) and the Ministry of Rural and Regional Development (MARA). According to the frame, there were 2798 secondary schools in Malaysia **(Table 2.1)**. An equal proportion was sampled from 13 States and three Federal Territories to represent adolescents in each State / Federal Territories. The target population was secondary school adolescents aged between 13 to 17 years studying in form 1 until form 5 based on the local school categorization.

2.3 Sample Size Calculation

The sample size was calculated based on the objectives of each module using the sample size calculation formula for a single proportion. The sample size calculation was based on a few criteria, as stated below:

$$n_0 = \frac{z_{\alpha/2}\, p(1-p)}{e^2}$$

Where:

i. Variance of proportion of the variable of interest (Based on AHS 2017 survey)
ii. Margin of error (e) (Between 0.01 to 0.05)
iii. Confidence interval of 95%

To ensure optimum sample size to estimate the prevalence of the health conditions specified in the survey with acceptable precision, a few adjustments were made to the sample size calculation as follows:

i. design effect (deff) of 2,
ii. nonresponse rates of 20%, and
iii. The sample size was then adjusted according to the need of the analysis, whether the estimates were going to be done at the national or the state level.

Thus, the final sample sizes for adolescents at national and state levels were 36,000 and 2250, respectively **(Table 2.1)**

Table 2.1: Distribution of secondary schools sampled, by state

No.	State / Federal Territories	Total Number of Schools	Number of Schools Sampled	Number of adolescents sampled
1	Johor	328	16	2250
2	Kedah	219	16	2250
3	Kelantan	189	16	2250
4	Melaka	88	16	2250
5	N. Sembilan	142	16	2250
6	Pahang	211	16	2250
7	Pulau Pinang	148	16	2250
8	Perak	276	16	2250
9	Perlis	33	16	2250
10	Selangor	380	16	2250
11	Terengganu	166	16	2250
12	Sabah	245	16	2250
13	Sarawak	214	16	2250
14	WP Kuala Lumpur	135	16	2250
15	WP Labuan	12	8	2250
16	WP Putrajaya	12	8	2250
	Total	2798	240	36000

2.4 Sampling Design

The country was stratified according to the 16 states, including federal territories, for the sampling. A multistage stratified cluster sampling method was used, and it involved two stages. The first stage was the selection of secondary schools from all eligible schools in Malaysia. Subsequently, the 240 schools were selected randomly with probability proportional to enrolment (PPS) in forms 1, 2, 3, 4, and 5. In each state, 16 secondary schools were selected, except for 2 smaller federal territories (Labuan, Putrajaya - 8 schools each) **(Table 2.1)**. The second stage involved the selection of classes (secondary sampling units). All classes in forms 1, 2, 3, 4, and 5 were included in the sampling frame. Systematic probability sampling with a random start was used to select classes from each selected school. All adolescents in the selected classes were invited to involve in the survey.

2.5 Ethical Approval and Consent Forms

Ethical approval was obtained from the Medical and Research Ethics Committee (MREC), Ministry of Health, Malaysian (NMRR-21-157-58261). The permission to conduct the study was obtained from the Ministry of Education at the national, state and school levels. Only consented adolescents with consented parents were included in the study. Their participation in the study was voluntary.

2.6 Study Instrument

A validated self-administered questionnaire was used for data collection in NHMS 2022. The questionnaires were translated into the Malay, Chinese and Tamil languages and back-translated to English to ensure the quality of the translation. The questionnaires were then field-tested, revised, finalised, and approved by the NHMS 2022 Questionnaire Review Committee. The questionnaire consisted of 10 core modules and 1 additional module, which included the following topics:

- Alcohol use
- Dietary behaviours
- Drug use
- Hygiene (including oral health)
- Mental health problems
- Physical activity
- Protective factors
- Sexual behaviours
- Tobacco use
- Violence and unintentional injury
- Adolescents' perspectives on the impact of the COVID-19 pandemic on their families

2.7 Data Collection

This cross-sectional survey was conducted from June to July 2022 among adolescents in forms 1, 2, 3, 4, and 5 across Malaysia by 34 data collection teams: two teams for each state in Peninsular Malaysia, including Labuan and three teams for Sabah and Sarawak. Each state was assigned a field supervisor to oversee survey activities. A one-week training workshop was conducted for the field supervisor and 133 temporary data collectors before data collection. After completing the training, the assigned field supervisor and data collection teams travelled to their respective sites to conduct the survey at the selected schools. The adolescents answered the questionnaires on the optical mark recognition (OMR) answer sheet. The team leader verified the OMR sheets before posting them to Institute for Public Health (IPH).

2.8 Quality Control

Quality control of the whole survey was done at various stages. During the planning stage, quality was ensured through a robust survey design, validated questionnaires and tools, manuals, and standardised training. In the field, the team leader and field supervisor checked the quality of the data collected. At the same time, members of the Central Coordinating Team (CCT) at IPH monitored data collection progress and conducted data quality control on a weekly basis. Figure 1 detailed the organization chart at Institute for Public Health level.

2.9 Data Processing and Quality Centre

All data processing and quality activities were centralised at IPH, starting from receiving the OMR bundles from the field until the handover of the dataset to the data analysis team. Four stations were set up at this Centre to ensure the activity ran smoothly (**Figure 2**).

2.10 Data Analysis

SPSS version 26.0 was used for data analysis. The data was examined for quality control and cleaned for any inconsistencies. Analysis was done according to objectives, working definition and dummy tables prepared by each research team. A complex sample analysis procedure was performed with a 95% confidence interval. Prevalence and percentages were used to illustrate the findings of each scope.

2.11 References

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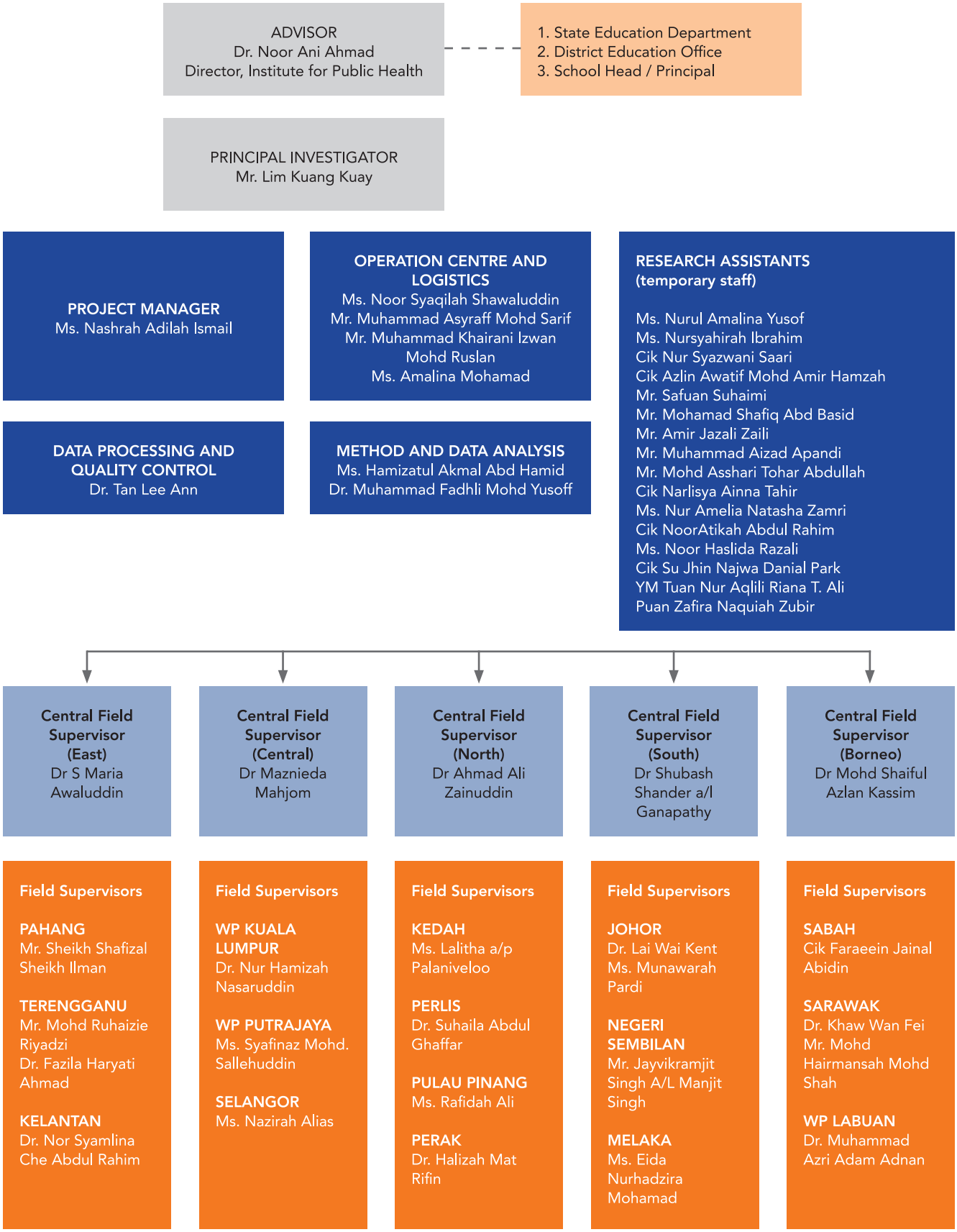

Figure 1: Organisation chart for data collection team NHMS 2022

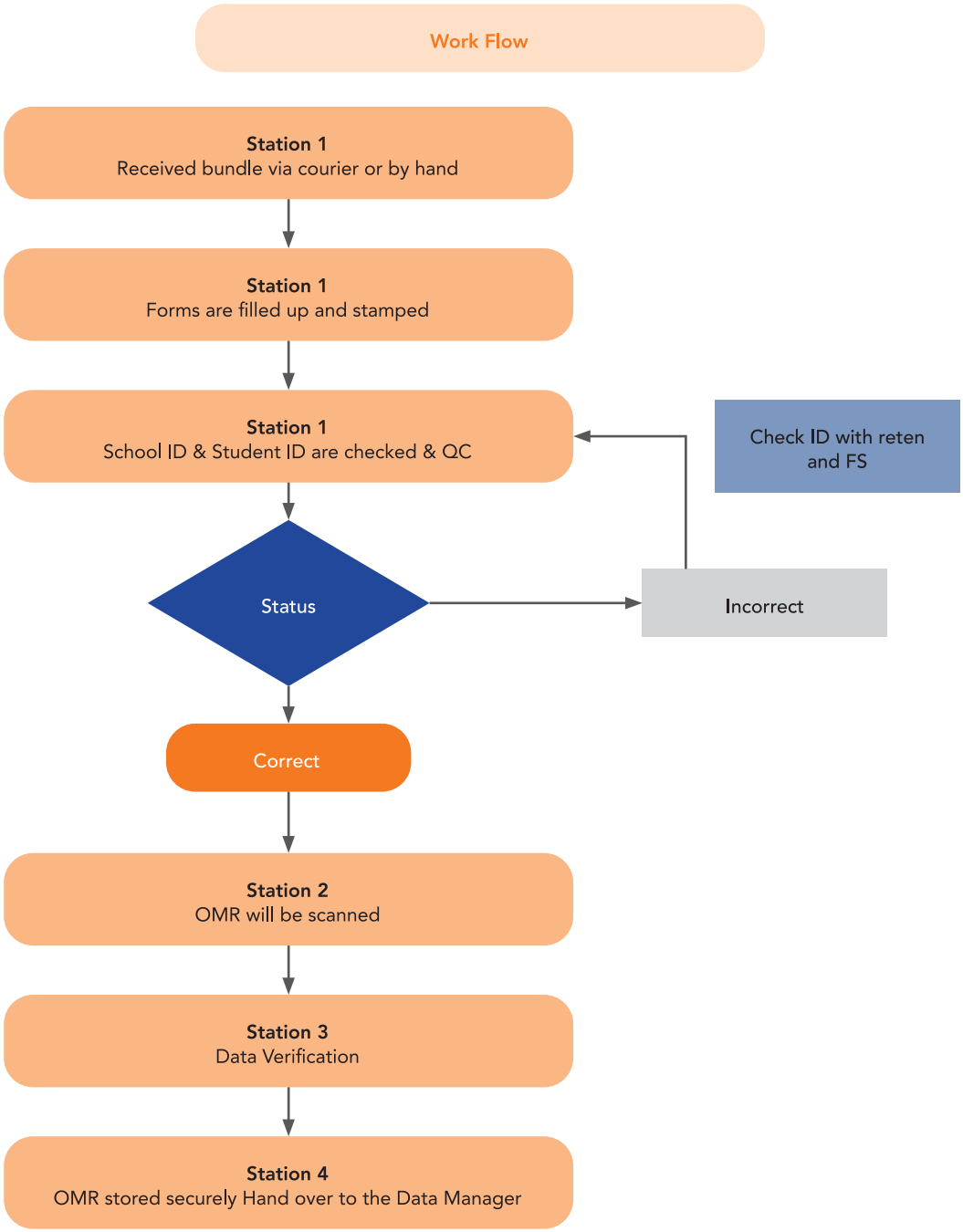

Figure 2: Workflow of Data Processing NHMS 2022

3.0 FINDINGS

3.1 General Findings

Overall, 239 out of 240 schools participated in the survey, resulting in a 99.6% school response rate. The response rate for classes was 100% and the student's response rate was 89.4% (n=33,523). Thus, the overall response rate was 89.0%. Based on the state, the highest number of adolescents who participated in the survey were from Terengganu (95.9%), and the lowest was WP Putrajaya (83.4%) **(Table 3.1.1)**. The geographic information system (GIS) on the mapping of selected secondary schools is shown in **Figure 3.**

Table 3.1.1: Response rate at student level, by state, 2022

State	Selected Schools	Eligible Adolescents	Completed OMR forms	Response Rate (%)
Johor	16	2336	2005	85.83
Kedah	16	2312	2172	93.94
Kelantan	16	2368	2138	90.29
Melaka	16	2373	1986	83.69
N. Sembilan	16	2422	2210	91.25
Pahang	16	2382	2171	91.14
Pulau Pinang	16	2300	2044	88.87
Perak	16	2384	2126	89.18
Perlis	16	2160	2004	92.78
Selangor	16	2366	2048	86.56
Terengganu	16	2314	2219	95.89
Sabah	16	2342	2086	89.07
Sarawak	16	2442	2189	89.64
WP Kuala Lumpur	16	2338	2114	90.42
WP Labuan	8	2267	2033	89.68
WP Putrajaya	8	2373	1978	83.35
Total	**240**	**37479**	**33523**	**89.44**

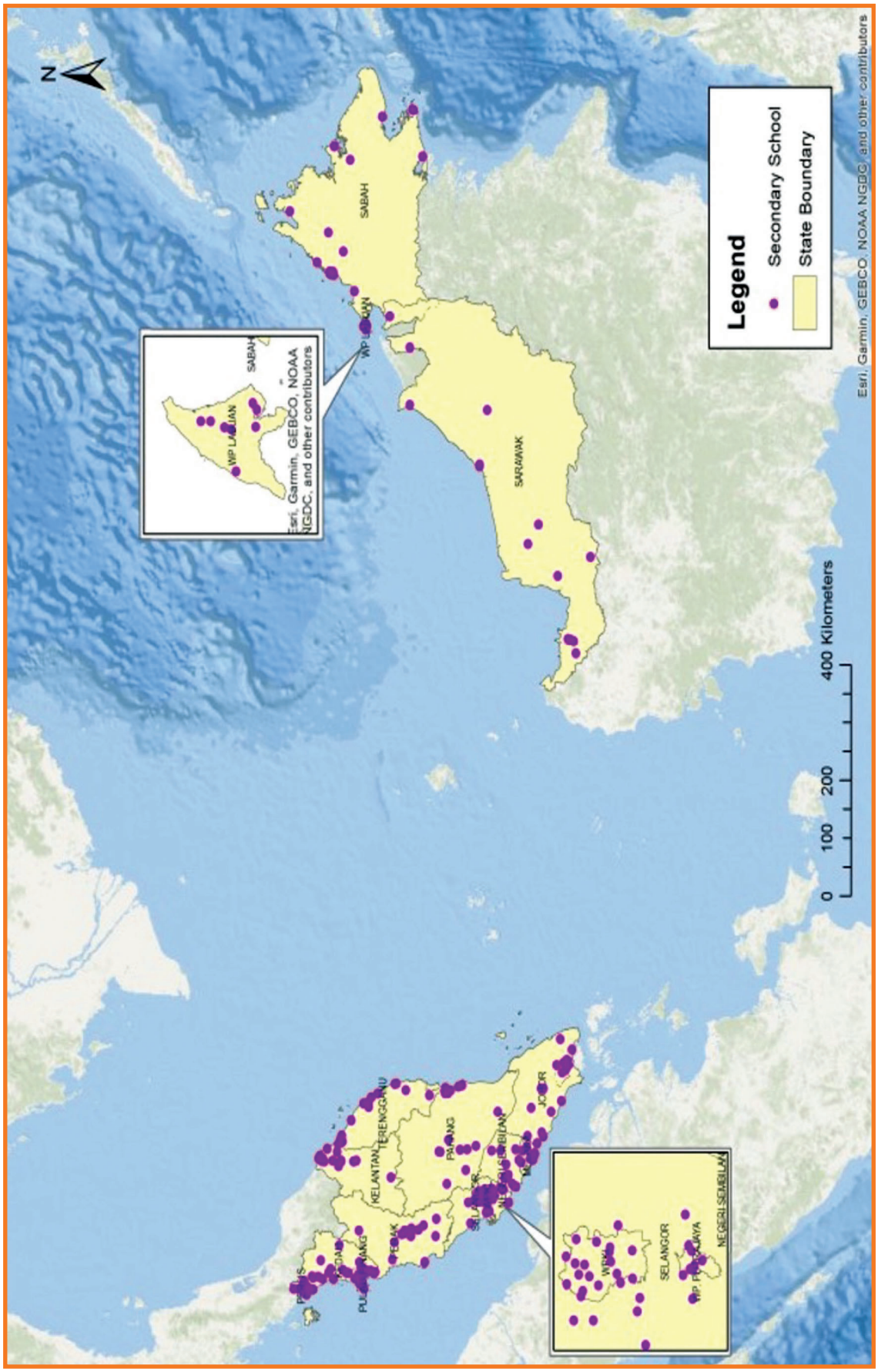

Figure 3: GIS mapping of the selected secondary schools

3.2 Alcohol Consumption

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3.2.1 Introduction

Annually, the harmful use of alcohol results in approximately 3 million deaths worldwide[1]. Alcohol is responsible for 5.1% of the global burden of disease and injury, as measured by disability-adjusted life years (DALYs)[1]. It is the main cause of premature death and disability in individuals aged 15 to 49, accounting for 10% of all deaths in this age group[2].

3.2.2 Objectives

i. To determine the prevalence of ever and current drinkers among adolescents
ii. To describe the socio-demographic characteristics of ever and current drinkers among adolescents
iii. To identify the age of alcohol drinking initiation among adolescents
iv. To identify the sources of obtaining alcoholic beverages among adolescents
v. To identify the prevalence of drunkenness among adolescents who consume alcohol
vi. To determine the frequency of social problems related to alcohol consumption among adolescents

3.2.3 Variable definitions

- **Drinking alcohol**: A "drink" is a glass of wine, tuak, lihing, bahar, ijuk or toddy; a can of beer, a small glass of liquor' or mixed drink. Drinking alcohol does not include drinking a few sips of wine for religious purposes.
- **Ever drinkers**: Those who had a history of alcohol consumption in their lifetime.
- **Current drinkers**: Those who had at least a "drink" of alcohol in the past 30 days.
- **Drunkenness**: When someone demonstrates signs such as staggering when walking, not being able to speak right and throwing up after consuming alcohol in a lifetime.
- **Social problems**: Having trouble with family or friends, missed school or got into fights as a result of drinking alcohol in a lifetime.

3.2.4 Findings

Ever Alcohol Drinkers
The prevalence of ever alcohol drinkers among adolescents in Pulau Pinang was 30.4% (95% CI: 18.55, 45.55). Females had a higher prevalence at 30.8% (95% CI: 18.30, 46.90) followed by males at 30.0% (95% CI: 16.47, 48.20). **(Table 3.2.1)**

Current Alcohol Drinkers
The prevalence of current alcohol drinkers among adolescents in Pulau Pinang was 9.6% (95% CI: 6.05, 15.05) where females had a higher prevalence of 10.4% (95% CI: 6.23, 16.84) followed by males at 8.9% (95% CI: 4.78, 15.96). **(Table 3.2.2)**

Initiation of First Alcohol Use Before 14 years old
Among ever alcohol drinkers, 71.5% had their first alcoholic beverage before the age of 14 years. **(Table 3.2.3)**

Sources of Obtaining Alcoholic Beverages Among Current Alcohol Drinkers
Among current alcohol drinkers, 61.9% of adolescents obtained their alcoholic beverages from their family, followed by 16.9% of them bought it from a store, shop or from a street vendor. **(Table 3.2.4)**

Social Problems as a Result of Alcohol Drinking
Overall, the majority (92.8%) of the adolescents did not get into trouble with family or friends, missed school or got into a fight as a result of drinking alcohol among ever alcohol drinkers. **(Table 3.2.5)**

Parental and peer drinking
Parental drinking among current alcohol drinkers in Pulau Pinang was as 80.2%, while peer drinking was 81.4%.

Drunkenness
Among ever alcohol drinkers, only 14.7% reported drunkenness.

3.2.5 Discussion / Conclusion

According to this study, there has been an increase in the prevalence of adolescents who were ever alcohol drinkers in Pulau Pinang from 2017 to 2022 (24.7% to 30.4%). However, the prevalence of current alcohol drinkers noted a decline from 11.5% to 9.6% from 2017 to 2022.

3.2.6 Recommendations

Given that adolescence is the age when adult habits and social standards are formed, it is essential to look into the issue of adolescent drinking. The detrimental effects of alcohol drinking at a young age should be made clear to parents and other caregivers through mass media. Enhance school-based prevention programmes in school with high rates of alcohol consumption to enable teachers to assess pupils for alcohol consumption and launch early intervention for such adolescents.

3.2.7 References

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Table 3.2.1: Prevalence of ever alcohol drinkers among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	636	31656	30.4	18.55	45.55
Sex					
Male	300	15577	30.0	16.47	48.20
Female	336	16079	30.8	18.30	46.90
Form					
Form 1	92	5185	23.0	14.13	35.15
Form 2	133	7168	32.5	20.00	48.19
Form 3	143	6591	31.2	18.15	48.09
Form 4	122	-	-	-	-
Form 5	146	7253	37.8	20.54	58.81
Ethnicity					
Malay	34	1738	3.7	2.50	5.38
Chinese	557	27410	59.3	55.70	62.88
Indian	39	2167	21.9	13.24	34.11
Bumiputera Sabah	2	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	4	-	-	-	-

-Prevalence with high RSE, not reported

Table 3.2.2: Prevalence of current alcohol drinkers among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	201	10051	9.6	6.05	15.05
Sex					
Male	89	4621	8.9	4.78	15.96
Female	112	5430	10.4	6.23	16.84
Form					
Form 1	20	1152	5.1	2.70	9.46
Form 2	41	2252	10.2	6.18	16.45
Form 3	40	1901	9.0	5.03	15.59
Form 4	41	-	-	-	-
Form 5	59	2937	15.3	8.03	27.24
Ethnicity					
Malay	9	-	-	-	-
Chinese	176	8680	18.8	16.08	21.84
Indian	15	832	8.4	5.91	11.85
Bumiputera Sabah	0	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	1	-	-	-	-

-Prevalence with high RSE, not reported

Table 3.2.3: Proportion of ever alcohol drinkers according to alcohol initiation age among adolescents in Pulau Pinang, 2022

Initiation age of alcohol drinking	Unweighted count	Percentage (%)
Below 14 years old	421	71.5
14 years old and above	175	28.5

Table 3.2.4: Usual sources of obtaining alcohol in the past 30 days among current drinkers among adolescents in Pulau Pinang, 2022

Sources of obtaining alcohol	Unweighted count	Percentage (%)
I bought from a store, shop or from a street vendor	30	16.9
I gave someone else money to buy it for me	1	-
I got it from my friend	16	9.0
I got it from my family	118	61.9
I stole it or got it without permission	1	-
I got it some other way	22	11.2

-Prevalence with high RSE, not reported

Table 3.2.5: Number of times (got into trouble with family or friends, missed school or got into a fight as a result of drinking alcohol) among ever alcohol drinkers (proportion) among adolescents in Pulau Pinang, 2022

Number of times	Unweighted count	Percentage (%)
0 times	592	92.8
1 to 2 times	25	-
3 to 9 times	9	-
10 or more times	9	-

-Prevalence with high RSE, not reported

3.3 Dietary Behaviours

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3.3.1 Introduction

The changes in dietary practices are required across all age ranges, but adolescence should be a focus of particular attention because the changes in lifestyle and the development of dietary habits during that stage of life have striking effects[1]. Poor dietary intake during this life stage is closely related to overweight and obesity, and unhealthy eating practices which lead to detrimental health effects later in life[2]. Therefore, a study was conducted to examine dietary practices with regards to fruit and vegetable intakes, carbonated drinks, plain water, milk and milk products intake and fast-food consumption among adolescents in Pulau Pinang. Establishing and consuming a nutrient-dense diet during the transition from adolescence into young adulthood may protect against future chronic diseases, promote optimal health outcomes and to prevent excess weight gain[3].

3.3.2 Objectives

i. To describe the prevalence of adolescents who had gone hungry in the past 30 days
ii. To describe the prevalence of fruit intakes of at least twice daily in the past 30 days among adolescents
iii. To identify the prevalence of vegetable consumption of at least three times daily in the past 30 days
iv. To identify the prevalence of fruit and vegetables consumption of at least five times daily in the past 30 days
v. To describe the prevalence of carbonated drink intake of at least once a day in the past 30 days
vi. To describe the prevalence of plain water intake of less than 6 glasses per day in the past 30 days
vii. To identify the prevalence of milk and milk product intakes of at least two times daily in the past 30 days
viii. To identify the prevalence of fast-food consumption of at least three days in the past 7 days

3.3.3 Variable definitions

- **Gone Hungry**: Adolescents who had gone hungry most of the time or always because there was not enough food at home for the past 30 days, or living without financial means to access enough food for active and healthy living.
- **Fruit intakes**: Fruits intake of at least twice daily in the past 30 days, inclusive all types of fruits.
- **Vegetable intakes**: Vegetable intakes of at least three times daily in the past 30 days.
- **Plain water intake**: Includes mineral water, boiled water or tap water
- **Carbonated drinks intake**: carbonated drinks consumption of at least once daily in the past 30 days.
- **Dairy product intake**: milk and milk product intakes at least two times daily in the past 30 days.
- **Fast food intake**: Consuming food from fast food outlets at least three days in the past seven days.

3.3.4 Findings

Gone hungry
About 2.0% (95% CI: 1.41, 2.85) of adolescents reported being hungry most of the time or always because there was not enough food at home in the past 30 days **(Table 3.3.1)**. Prevalence of being hungry was higher among females (2.3%, 95% CI: 1.31, 3.88) as compared to male counterparts (1.8%, 95% CI: 1.10, 2.79).

Fruit consumption
A total of 31.6% (95% CI: 26.20, 37.60) of adolescents consumed fruit at least twice daily in the past 30 days **(Table 3.3.2)**. There were 32.9% (95% CI: 26.94, 39.37) of males and 30.4% (95% CI: 23.36, 38.47) of females who reported consuming fruit at least twice daily.

Vegetable consumption
About 26.1% (95% CI: 23.05, 29.44) of adolescents consumed vegetables at least three times daily in the past 30 days **(Table 3.3.3)**. Males reported significantly higher vegetable intake (30.8%, 95% CI: 26.20, 35.78) compared to females (21.4%, 95% CI: 18.88, 24.24).

Fruits and vegetables intake
About 13.9% (95% CI: 11.71, 16.47) of adolescents consumed fruits and vegetables at least five times daily in the past 30 days **(Table 3.3.4)**. There were 16.2% (95% CI: 13.13, 19.80) of males and 11.6% (95% CI: 9.18, 14.66) of females who reported consuming fruits and vegetables of at least five times daily.

Never Consume Fruit
About 7.3% (95% CI: 5.64, 9.30) of adolescents reported never consume fruit in the past 30 days **(Table 3.3.5)**. Prevalence of never consume fruit was 8.3% (95% CI: 6.51, 10.42) among males and 6.3% (95% CI: 4.04, 9.59) among females.

Never Consume Vegetable
About 7.2% (95% CI: 4.93, 10.50) of adolescents never consume vegetable in the past 30 days **(Table 3.3.5)**. Prevalence of never consume vegetable was 7.4% (95% CI: 5.02, 10.83) among males and 7.1% (95% CI: 4.55, 10.79) among females.

Never Consume Fruit and Vegetable
A total of 1.9% (95% CI: 1.35, 2.79) of adolescents never consume fruit and vegetable in the past 30 days **(Table 3.3.5)**. Prevalence of never consume fruit and vegetable was 2.5% (95% CI: 1.76, 3.43) among males.

Carbonated soft drinks intake

Overall, 21.5% (95% CI: 16.82, 27.17) of adolescents consumed carbonated soft drinks at least once daily in the past 30 days **(Table 3.3.6)**. There were 23.7% (95% CI: 18.17, 30.36) of males and 19.4% (95% CI: 14.03, 26.09) of females who reported consuming carbonated soft drinks of at least once daily.

Plain water intake

About 45.6% (95% CI: 40.41, 50.96) adolescents drank plain water less than six glasses per day in the past 30 days **(Table 3.3.7)**. The prevalence of plain water intake of less than six glasses per day among females (54.7%, 95% CI: 50.13, 59.28) was significantly higher than males (36.5%, 95% CI: 30.09, 43.53).

Milk and milk products intake

About 21.4% (95% CI: 18.27, 24.97) of adolescents consumed milk/milk products at least two times per day in the past 30 days **(Table 3.3.8)**. There were 21.3% (95% CI: 17.84, 25.33) of males and 21.5% (95% CI: 17.21, 26.55) of females who reported consuming milk/milk products at least two times daily.

Fast food intake

About 9.7% (95% CI: 7.93, 11.87) of adolescents consumed fast food at least three days in the past seven days **(Table 3.3.9)**. The prevalence of fast-food intake was higher among female (10.2%, 95% CI: 8.40, 12.41) compared to male (9.2%, 95% CI: 6.90, 12.20).

3.3.5 Discussions / Conclusion

Overall, there were 2.0% of adolescents who reported being hungry due to lack of food at homes. Prevalence of adolescents reported consuming fruits at least twice daily and vegetables at least three times daily was 31.6% and 26.1%, respectively. However, only 13.9% of them consumed fruits and vegetables five times daily. About 45.6% of adolescents reported drinking plain water less than 6 glasses and 21.4% consumed milk/milk products at least two times daily. The consumption of carbonated soft drinks of at least once daily in the past 30 days was reported at 21.5% while 9.7% consumed food from fast food restaurants for at least three days in the past seven days.

3.3.6 Recommendations

The research finding shows that there is a crucial need to alter the behaviours of Pulau Pinang adolescents in order to prepare them for healthier adulthood. Poor dietary behaviours developed during adolescence may lead to diet related diseases in later years. Behaviour modification is the key recommendation suggested for improving healthy eating and lifestyle. It is necessary to improve dietary behaviour by encouraging them to consume nutritious foods such as fruits, vegetables, milk and milk products. This may be achieved through strengthening school-based nutrition interventions, using social marketing approach and mobilising families and communities into support. It is crucial to extend school-based nutrition intervention programmes, such as *Program Hidangan Berkhasiat di Sekolah* (HiTS) to all schools. Aggressive promotion of healthy foods and the benefits of eating it should be made in all platforms, including social media. Intersectoral collaboration through various sectors is essential for the implementation of these strategies, so that nutrition programmes could be incorporated into their policies and improve access and availability of healthy foods in schools, food premises and the community.

Table: Dietary behaviour trend among adolescents in Pulau Pinang

	NHMS 2012	NHMS 2017	NHMS 2022
Most of the time or always went hungry	5.5	4.5	2.0
Fruits intake of at least twice daily	38.4	36.2	31.6
Vegetables intake of at least three times daily	25.1	26.5	26.1
Fruits and vegetables intake of at least five times daily	23.0	15.5	13.9
Carbonated soft drinks consumption at least once daily	20.4	22.8	21.5
Milk/milk products intake of at least two times daily	Not reported	34.2	24.8
Fast food intake of at least three days in the past seven days	6.6	11.3	10.2

3.3.7 References

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Table 3.3.1: Prevalence of adolescents in Pulau Pinang who most of the time or always went hungry in the past 30 days because there was not enough food in his/her home, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	40	2103	2.0	1.41	2.85
Sex					
Male	17	921	1.8	1.10	2.79
Female	23	1182	2.3	1.31	3.88
Form					
Form 1	6	-	-	-	-
Form 2	7	-	-	-	-
Form 3	12	-	-	-	-
Form 4	8	-	-	-	-
Form 5	7	-	-	-	-
Ethnicity					
Malay	27	1381	2.9	2.43	3.47
Chinese	8	-	-	-	-
Indian	5	309	3.1	2.02	4.67
Bumiputera Sabah	0	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	0	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.3.2: Prevalence of fruit intake of at least twice daily in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	627	33096	31.6	26.20	37.60
Sex					
Male	314	17211	32.9	26.94	39.37
Female	313	15885	30.4	23.36	38.47
Form					
Form 1	162	9447	41.7	33.87	49.93
Form 2	114	6497	29.4	21.81	38.23
Form 3	134	6410	30.3	23.88	37.66
Form 4	108	4905	25.3	21.17	29.95
Form 5	109	5838	30.2	20.98	41.32
Ethnicity					
Malay	357	19050	40.1	34.84	45.61
Chinese	194	9618	20.8	16.93	25.19
Indian	71	4134	41.5	38.33	44.72
Bumiputera Sabah	1	-	-	-	-
Bumiputera Sarawak	1	-	-	-	-
Others	3	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.3.3: Prevalence of vegetables intake of at least three times daily in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	521	27337	26.1	23.05	29.44
Sex					
Male	298	16140	30.8	26.20	35.78
Female	223	11196	21.4	18.88	24.24
Form					
Form 1	112	6464	28.5	23.31	34.37
Form 2	103	5908	26.7	20.23	34.45
Form 3	114	5496	26.0	22.27	30.12
Form 4	95	4273	22.0	19.74	24.43
Form 5	97	5196	26.9	20.80	33.94
Ethnicity					
Malay	217	11542	24.3	21.05	27.82
Chinese	239	12010	25.9	19.91	33.05
Indian	60	3496	35.1	30.34	40.15
Bumiputera Sabah	2	-	-	-	-
Bumiputera Sarawak	1	-	-	-	-
Others	2	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.3.4: Prevalence of fruits and vegetables intake of at least five times daily in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	277	14624	13.9	11.71	16.47
Sex					
Male	157	8527	16.2	13.13	19.80
Female	120	6097	11.6	9.18	14.66
Form					
Form 1	72	4180	18.4	13.90	23.92
Form 2	47	2694	12.1	8.65	16.67
Form 3	58	2740	12.9	9.97	16.61
Form 4	43	1928	9.9	7.85	12.35
Form 5	57	3083	15.9	11.34	21.95
Ethnicity					
Malay	141	7572	15.9	13.06	19.13
Chinese	97	4793	10.3	7.48	14.07
Indian	36	2079	20.8	18.15	23.64
Bumiputera Sabah	1	-	-	-	-
Bumiputera Sarawak	1	-	-	-	-
Others	1	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.3.5: Prevalence of adolescents who did not consume fruit, vegetable or both in the past 30 days in Pulau Pinang, 2022

Socio-demographic characteristics	Never consume fruit					Never consume vegetable					Never consume fruit and vegetable				
	Unweighted count	Estimated population	Prevalence (%)	95 % CI		Unweighted count	Estimated population	Prevalence (%)	95 % CI		Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper				Lower	Upper				Lower	Upper
PULAU PINANG	142	7599	7.3	5.64	9.30	144	7573	7.2	4.93	10.50	39	2031	1.9	1.35	2.79
Sex															
Male	80	4325	8.3	6.51	10.42	73	3887	7.4	5.02	10.83	25	1290	2.5	1.76	3.43
Female	62	3274	6.3	4.04	9.59	71	3686	7.1	4.55	10.79	14	-	-	-	-
Form															
Form 1	34	2008	8.9	5.83	13.25	23	1386	6.1	3.51	10.44	5	-	-	-	-
Form 2	28	1617	7.3	4.96	10.63	17	-	-	-	-	3	-	-	-	-
Form 3	32	1620	7.7	4.55	12.63	33	1656	7.8	4.84	12.44	11	588	2.8	1.55	4.93
Form 4	29	1370	7.1	4.99	9.92	46	2156	11.1	7.67	15.80	14	647	3.3	1.91	5.73
Form 5	19	984	5.1	3.04	8.41	25	1369	7.1	4.03	12.14	6	-	-	-	-
Ethnicity															
Malay	80	4342	9.1	6.73	12.30	115	6071	12.8	10.91	14.89	28	1455	3.1	2.41	3.87
Chinese	46	2362	5.1	3.57	7.23	17	-	-	-	-	6	-	-	-	-
Indian	14	802	8.0	5.25	12.13	10	554	5.6	3.84	7.98	4	212	2.1	1.15	3.87
Bumiputera Sabah	1	-	-	-	-	0	-	-	-	-	0	-	-	-	-
Bumiputera Sarawak	1	-	-	-	-	1	-	-	-	-	1	-	-	-	-
Others	0	-	-	-	-	1	-	-	-	-	0	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.3.6 : Prevalence of carbonated soft drinks intake of at least once a day in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	428	22556	21.5	16.82	27.17
Sex					
Male	229	12441	23.7	18.17	30.36
Female	199	10115	19.4	14.03	26.09
Form					
Form 1	103	5992	26.4	20.23	33.75
Form 2	88	5162	23.3	14.93	34.51
Form 3	88	4171	19.7	13.47	27.97
Form 4	95	4370	22.5	17.47	28.48
Form 5	54	2860	14.8	9.05	23.24
Ethnicity					
Malay	252	13282	27.9	24.31	31.88
Chinese	107	5264	11.4	7.43	16.98
Indian	65	3804	38.2	27.28	50.40
Bumiputera Sabah	0	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	4	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.3.7: Prevalence of plain water intake of less than 6 glasses per day in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	935	47756	45.6	40.41	50.96
Sex					
Male	358	19142	36.5	30.09	43.53
Female	577	28615	54.7	50.13	59.28
Form					
Form 1	170	9670	42.8	36.05	49.75
Form 2	200	11175	50.5	41.38	59.57
Form 3	216	10113	47.9	38.53	57.33
Form 4	198	9115	46.9	39.80	54.18
Form 5	151	7684	39.7	33.29	46.55
Ethnicity					
Malay	452	23737	50.0	46.22	53.74
Chinese	391	18762	40.5	30.65	51.15
Indian	85	4909	49.3	41.54	57.04
Bumiputera Sabah	1	-	-	-	-
Bumiputera Sarawak	1	-	-	-	-
Others	5	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.3.8: Prevalence of milk and milk products intake of at least two servings per day in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	435	22437	21.4	18.27	24.97
Sex					
Male	212	11193	21.3	17.84	25.33
Female	223	11243	21.5	17.21	26.55
Form					
Form 1	106	6158	27.2	21.36	33.88
Form 2	70	3927	17.7	14.21	21.94
Form 3	99	4677	22.1	16.82	28.54
Form 4	95	4214	21.7	17.33	26.81
Form 5	65	3460	17.9	13.34	23.58
Ethnicity					
Malay	229	11830	24.9	21.11	29.08
Chinese	143	7003	15.1	10.94	20.50
Indian	58	3332	33.4	31.87	35.06
Bumiputera Sabah	1	-	-	-	-
Bumiputera Sarawak	1	-	-	-	-
Others	3	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.3.9: Prevalence of fast-food intake of at least three days in the past 7 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	194	10178	9.7	7.93	11.87
Sex					
Male	88	4829	9.2	6.90	12.20
Female	106	5348	10.2	8.40	12.41
Form					
Form 1	40	2401	10.6	6.22	17.47
Form 2	31	1825	8.2	5.31	12.59
Form 3	39	1866	8.8	6.35	12.14
Form 4	48	2232	11.5	9.51	13.82
Form 5	36	1855	9.6	6.28	14.37
Ethnicity					
Malay	107	5586	11.7	9.94	13.84
Chinese	54	2605	5.6	3.87	8.09
Indian	31	1857	18.6	14.89	23.07
Bumiputera Sabah	0	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	2	-	-	-	-

- Prevalence with high RSE, not reported

3.4 Nutritional Status

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3.4.1 Introduction

Adolescence is a unique phase of human development for individuals between the ages of 10 and 19 years old, as it caters to rapid growth, as well as sexual and behavioural changes. Good nutrition during adolescence is critical to address current nutritional needs and to fill nutrient gaps that have occurred during childhood[1]. The nutritional status of adolescents is assessed using anthropometric measurements (weight and height) and interpreted using WHO 2007 Growth Reference Data for 5-19 years[2]. The indicators include stunting, thinness, overweight and obesity.

3.4.2 Objectives

i. To determine the prevalence of stunting among adolescents
ii. To determine the prevalence of thinness among adolescents
iii. To determine the prevalence of overweight and obesity among adolescents

3.4.3 Variable definitions

- **Body mass index (BMI)**: commonly used to determine weight status. BMI is calculated by dividing a person's weight in kilograms by the square of height in meters.
- **Height for age z-score (HAZ)**: an index used to assess how a child's height compares to the expected height of a healthy child of the same age and sex based on the WHO 2007 Growth reference data for 5-19 years.
- **BMI for age z-score (BAZ)**: an index used to assess BMI is age- and sex-specific compares to the BMI of a healthy child of the same age and sex based on the WHO 2007 Growth reference data for 5-19 years.
- **Stunting**: Those who have their HAZ more than two standard deviations below the WHO Child Growth Standards median(<-2SD).
- **Thinness**: Those who have their BAZ more than two standard deviations below the WHO Child Growth Standards median(<-2SD).
- **Overweight**: Those who have their BAZ is more than one standard deviations to two standard deviations above the WHO Child Growth Standards median (>+1SD to ≤+2SD).
- **Obesity**: Those who have their BAZ more than two standard deviations above the WHO Child Growth Standards median(>+2SD).

3.4.4 Findings

Height-for-Age z-score
The prevalence of stunting among adolescents was 5.3% (95% CI: 3.78, 7.40). Females [7.2%, (95% CI: 4.63, 11.14)] showed higher prevalence compared to males [3.4%, (95% CI: 2.00, 5.64)]. **(Table 3.4.1)**.

BMI -for-Age z-score
According to the WHO 2007 Growth Reference Data for 5-19 years, the prevalence of thinness among adolescents was 9.8% (95% CI: 7.78, 12.19). The data showed that the prevalence of thinness was significantly higher among males [12.0%, (95% CI: 9.68, 14.84)] compared to females [7.5%, (95% CI: 4.98, 11.17)]. **(Table 3.4.2)**.

Overweight and Obesity
The prevalence of overweight was 14.5% (95% CI: 12.98, 16.15). Comparing the sexes, females had a higher prevalence at 14.8% (95% CI: 12.04, 18.05)] compared to males [14.2% (95% CI: 11.06, 18.03]. **(Table 3.4.3)**. For obesity, the prevalence was 14.5 (95% CI: 11.52, 18.12). Between the sexes, males had a higher prevalence of obesity at 18.9% (95% CI: 14.88, 23.65) compared to females [10.1% (95% CI: 6.92, 14.61)]. **(Table 3.4.3)**.

3.4.5 Discussion / Conclusion

Overall, the prevalence of overweight and obesity totalling 29% was higher than thinness (9.8%) and stunting (5.3%). It can be concluded that adolescents in Pulau Pinang is facing a dual burden of malnutrition, with overnutrition appearing to be a larger problem than undernutrition.

3.4.6 Recommendations

Based on the findings, the integration of targeted interventions and policies is required to simultaneously address both undernutrition and the increasing rates of overweight and obesity among adolescents. Evidence-based nutrition-sensitive interventions, inclusive of diet counselling and nutrition education provided through school-based platforms, adolescent youth centres/ peer education and technology-based platforms should be strengthened. A comprehensive intervention such as MyBFF@school (an intervention consisting of nutrition education, physical activity and motivational component) could be implemented nationwide with the support of the Ministry of Education.

3.4.7 References

1. Das JK, Salam RA, Thornburg KL, et al. Nutrition in adolescents: physiology, metabolism, and nutritional needs. Ann. N. Y. Acad. Sci.. 2017 Apr;1393(1):21-33
2. World Health Organization 2007. Growth reference data for 5-19 years. Geneva: WHO

Table 3.4.1: Prevalence of stunting (HAZ <-2SD) among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	111	5547	5.3	3.78	7.40
Sex					
Male	34	1764	3.4	2.00	5.64
Female	77	3782	7.2	4.63	11.14
Form					
Form 1	15	-	-	-	-
Form 2	12	681	3.1	1.69	5.54
Form 3	34	1540	7.3	4.79	10.94
Form 4	28	1299	6.7	4.32	10.22
Form 5	22	1180	6.1	3.04	11.87
Ethnicity					
Malay	79	3959	8.3	6.24	11.07
Chinese	24	1141	2.5	1.59	3.81
Indian	8	446	4.5	2.78	7.07
Bumiputera Sabah	0	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	0	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.4.2: Prevalence of thinness (BAZ <-2SD) among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	199	10202	9.8	7.78	12.19
Sex					
Male	121	6285	12.0	9.68	14.84
Female	78	3918	7.5	4.98	11.17
Form					
Form 1	27	1566	6.9	4.77	10.01
Form 2	39	2221	10.0	6.33	15.54
Form 3	41	1970	9.3	6.43	13.38
Form 4	54	2414	12.4	9.13	16.69
Form 5	38	2032	10.6	7.23	15.19
Ethnicity					
Malay	107	5557	11.7	9.79	13.98
Chinese	60	2866	6.2	4.16	9.16
Indian	31	1730	17.3	13.66	21.62
Bumiputera Sabah	0	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	1	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.4.3: Prevalence of overweight (BAZ >+1SD to ≤+2SD) and obesity (BAZ >+2SD) among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Overweight (>+1SD to ≤+2SD)					Obese (>+2SD)				
	Unweighted count	Estimated population	Prevalence (%)	95 % CI		Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper				Lower	Upper
PULAU PINANG	295	15136	14.5	12.98	16.15	283	15152	14.5	11.52	18.12
Sex										
Male	143	7417	14.2	11.06	18.03	180	9865	18.9	14.88	23.65
Female	152	7718	14.8	12.04	18.05	103	5287	10.1	6.92	14.61
Form										
Form 1	54	3162	14.0	9.71	19.80	59	3483	15.4	11.50	20.42
Form 2	56	3107	14.0	10.61	18.35	60	3491	15.8	10.79	22.49
Form 3	71	3353	15.9	12.08	20.66	54	2727	12.9	9.40	17.54
Form 4	60	2696	13.9	10.33	18.39	57	2583	13.3	9.31	18.65
Form 5	54	2817	14.7	11.37	18.69	53	2866	14.9	10.62	20.53
Ethnicity										
Malay	112	5854	12.4	10.40	14.61	167	8950	18.9	16.69	21.29
Chinese	149	7354	15.9	13.56	18.62	84	4313	9.3	5.58	15.22
Indian	30	1726	17.2	13.66	21.52	31	1823	18.2	15.20	21.65
Bumiputera Sabah	1	-	-	-	-	1	-	-	-	-
Bumiputera Sarawak	1	-	-	-	-	0	-	-	-	-
Others	2	-	-	-	-	0	-	-	-	-

- Prevalence with high RSE, not reported

3.5 Drug Use

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3.5.1 Introduction

According to the World Drug Report 2022 (WDR 2022) by the United Nations Office on Drugs and Crime (UNODC), an estimated 284 million people had used drugs within the previous year, which accounts for a 26% increase over the previous decade.[1] Drug use accounts for 5% of all substance related death and 9% of substance-use-related DALYs. Despite the report showing that young people continue to use more drugs than adults, it was found that drug use by adolescents decreased during the COVID-19 pandemic, which coincided with the lockdown periods.[1] Marijuana or cannabis remains the world's most widely used drug, with an annual prevalence of 4% of the adult population, or an estimated 209 million users in the past year.[1] Amphetamines remain the second most commonly used drug worldwide, with an estimated 34 million in 2020, representing 0.7% of the global population. NHMS 2019 showed that marijuana is the highest taken in Malaysia, followed by kratom.[2] Based on the statistics provided by the National Anti-Drug Agency in 2020 showed that ATS is the most commonly used drug among adolescents in Malaysia aged 13 to 18 years old, followed by marijuana and opiate.[3] In this survey, we have added new questions, which include kratom and inhalant, to get baseline data on adolescent usage in Malaysia, as we don't have preliminary national data on these drugs.

3.5.2 Objectives

i. To determine the prevalence and sociodemographic characteristics of ever and current drug use among adolescents
ii. To determine the prevalence and sociodemographic characteristics of ever and current marijuana use among adolescents in Malaysia
iii. To determine the prevalence and sociodemographic characteristics of ever and current amphetamines or methamphetamines use among adolescents in Malaysia
iv. To determine the prevalence and sociodemographic characteristics of ever and current inhalant use among adolescents in Malaysia
v. To determine the prevalence and sociodemographic characteristics of ever and current kratom use among adolescents in Malaysia
vi. To identify the age of initiation and the sources of obtaining drugs among adolescents in Malaysia

3.5.3 Variable Definitions

- **Drug use:**
  i. **2017** definition: taking heroin, morphine, glue, amphetamine, or methamphetamines (ecstasy, syabu, ice), marijuana (except prescribed medicine).
  ii. **2022** definition: taking opiates, amphetamine-type stimulants, marijuana, psychotropic pill, cocaine, inhalant and others (depressants, hallucinogens).
- **Ever drug use**: adolescents who had a history of drug use in their lifetime
- **Current drug use**: adolescents who used drugs in the past 30 days
- **Ever marijuana use**: adolescents who had a history of marijuana use in their lifetime
- **Current marijuana use**: adolescents who used marijuana in the past 30 days
- **Ever amphetamine or methamphetamine use**: adolescents with a history of amphetamine or methamphetamines use in their lifetime
- **Ever inhalant use**: adolescents who had a history of inhalant use in their lifetime
- **Current inhalant use**: adolescents who used an inhalant in the past 30 days
- **Ever kratom use**: adolescents who had a history of kratom use in their lifetime
- **Current kratom use**: adolescents who used kratom in the past 30 days

3.5.4 Findings

Overall, 5.5% (95% CI: 3.86, 7.70) of adolescents reported that they had ever used drug during their lifetime and it was significantly higher among males [7.5% (95%CI: 4.89, 11.22)] as compared to females [3.5% (95%CI: 2.27, 5.41)] **(Table 3.5.1)**. The prevalence of current drug users was 3.0% (95%CI: 1.74, 5.29) and about half of it were females [1.7% (95%CI: 0.94, 2.96)] **(Table 3.5.2)**.

Overall, 2.0% (95% CI: 1.15, 3.55) of adolescents reported had current used inhalant in the past 30 days and about half females [1.2% (95% CI: 0.71, 1.93)] **(Table 3.5.3)**. Among current users, about 30.8% had stolen or got it without permission **(Table 3.5.4)**. Among ever drug users, 82.2% (95% CI: 58.69, 93.78) of them had initiated before the age of 14 years old **(Table 3.5.5)**.

3.5.5 Discussion / Conclusion

From this survey found that inhalant use was most common among female adolescents.

3.5.6 Recommendations

The effectiveness of drug education at primary schools plays a vital role in reducing current drug use prevalence in 2022 compared to 2017. Drug prevention among adolescents should be improved and regularly reviewed to meet the ever-changing trend of drug use locally and globally. New strategies and approaches can be developed to address issues of inhalant and kratom use among adolescents by focusing more on the danger of inhalant and kratom use. An adolescent who has been exposed to and involved in drug abuse must be given access to treatment and provided educational opportunities, vocational skills training and other socioeconomic support needed. School drug prevention programs developed for adolescents can be integrated with technology, such as web-based intervention, to make it more interesting in increasing awareness and help build self-resilience among adolescents through:

- Conducting early detection of an adolescent with problems or who are at risk of drug abuse
- Increasing the knowledge, understanding and awareness of the dangers of drug abuse
- Increasing life skills such as assertiveness, coping skills and stress management
- Reinforcing positive attitudes and healthy lifestyles among school children

3.5.7 References

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Table 3.5.1: Prevalence of ever drug use among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Ever used drug* based on 2017					Ever used drug**				
	Unweighted count	Estimated population	Prevalence (%)	95 % CI		Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper				Lower	Upper
PULAU PINANG	78	4114	4.1	2.75	5.95	107	5567	5.5	3.86	7.70
Sex										
Male	54	2971	5.9	3.65	9.41	70	3764	7.5	4.89	11.22
Female	24	1143	2.2	1.37	3.64	37	1803	3.5	2.27	5.41
Form										
Form 1	10	-	-	-	-	12	-	-	-	-
Form 2	24	1381	6.4	3.67	11.02	27	1540	7.1	4.22	11.81
Form 3	13	-	-	-	-	28	1291	6.2	3.89	9.71
Form 4	19	-	-	-	-	26	-	-	-	-
Form 5	12	666	3.6	2.05	6.08	14	779	4.2	2.36	7.21
Ethnicity										
Malay	28	1475	3.2	2.16	4.63	51	2606	5.6	4.28	7.24
Chinese	27	-	-	-	-	28	-	-	-	-
Indian	22	-	-	-	-	27	1564	16.6	8.91	28.70
Bumiputera Sabah	1	-	-	-	-	1	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-	0	-	-	-	-
Others	0	-	-	-	-	0	-	-	-	-

- Prevalence with high RSE, not reported

**Drug includes heroin, morphine, glue, amphetamine, ecstasy, methamphetamine, ice and marijuana.*

Table 3.5.2: Prevalence of current drug use among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Current used drug* based on 2017					Current used drug** based on 2022				
	Unweighted count	Estimated population	Prevalence (%)	95 % CI		Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper				Lower	Upper
PULAU PINANG	51	2752	2.7	1.53	4.75	58	3103	3.0	1.74	5.29
Sex										
Male	36	-	-	-	-	41	-	-	-	-
Female	15	764	1.5	0.83	2.67	17	861	1.7	0.94	2.96
Form										
Form 1	9	-	-	-	-	10	-	-	-	-
Form 2	16	-	-	-	-	16	-	-	-	-
Form 3	7	-	-	-	-	12	-	-	-	-
Form 4	14	-	-	-	-	15	-	-	-	-
Form 5	5	-	-	-	-	5	-	-	-	-
Ethnicity										
Malay	18	945	2.0	1.10	3.71	23	1189	2.5	1.38	4.66
Chinese	10	-	-	-	-	10	-	-	-	-
Indian	22	-	-	-	-	24	1404	14.9	7.66	26.87
Bumiputera Sabah	1	-	-	-	-	1	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-	0	-	-	-	-
Others	0	-	-	-	-	0	-	-	-	-

- Prevalence with high RSE, not reported

**Drug includes heroin, morphine, glue, amphetamine, ecstasy, methamphetamine, ice and marijuana.*

***Drug includes opiate, amphetamine, marijuana, psychotropic pill, cocaine, inhalant, kratom and others.*

Table 3.5.3: Prevalence of inhalant use among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Ever used inhalant in a lifetime					Current used inhalant in the past 30 days				
	Unweighted count	Estimated population	Prevalence (%)	95 % CI		Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper				Lower	Upper
PULAU PINANG	65	3395	3.3	2.36	4.70	38	2063	2.0	1.15	3.55
Sex										
Male	43	2324	4.6	3.02	6.96	26	-	-	-	-
Female	22	1072	2.1	1.31	3.31	12	603	1.2	0.71	1.93
Form										
Form 1	8	-	-	-	-	5	-	-	-	-
Form 2	22	1255	5.8	3.41	9.74	14	-	-	-	-
Form 3	9	-	-	-	-	4	-	-	-	-
Form 4	17	-	-	-	-	10	-	-	-	-
Form 5	9	479	2.6	1.43	4.53	5	-	-	-	-
Ethnicity										
Malay	23	1198	2.6	1.65	3.96	17	909	1.9	1.09	3.45
Chinese	24	1142	2.5	1.42	4.53	6	-	-	-	-
Indian	17	-	-	-	-	14	-	-	-	-
Bumiputera Sabah	1	-	-	-	-	1	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-	0	-	-	-	-
Others	0	-	-	-	-	0	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.5.4: Source of getting drugs in the past 30 days among current drug users among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Percentage (%)
I bought them form someone	6	-
I give someone else money to buy it for me	3	-
I stole it or got it without permission	7	30.8
I got it from my friend	4	-
I got it from my family	0	-
I got it some other ways	4	15.8

- Prevalence with high RSE, not reported

Table 3.5.5: Prevalence of first use of drug before the age of 14 years among ever used drug among adolescents in Pulau Pinang, 2022

Prevalence	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
Yes	15	815	82.2	58.69	93.78
No	3	-	-	-	-

- Prevalence with high RSE, not reported

3.6 Oral and Hand Hygiene

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3.6.1 Introduction

Oral health is integral to general health as it promotes a positive quality of life and social self-confidence. Currently, oral diseases affect close to 3.5 billion people worldwide, and their prevalence is noted to be increasing globally. A resolution on oral health in 2021 by the WHO recommends a more preventive approach towards oral health, including oral health promotions at schools[1]. Empowering good oral hygiene habits during adolescence is important in sustaining this behaviour into adulthood[2]. Therefore, early and adequate plaque control is key in preventing oral health diseases such as dental caries and periodontal diseases, which may affect school performance and attendance, as well as permanent dental problems in adulthood. This can be achieved via regular tooth brushing with fluoridated toothpaste, dental flossing, tongue cleaning, and a minimum yearly dental check-up[3]. Appropriate hand hygiene practices using soap, especially before eating and after using the toilet, are protective against a multitude of infections. These practices will enable adolescents to thrive and contribute actively to learning and reduce the rate of absenteeism[4]. Assessing practices on good hand washing among adolescents will help detect at-risk groups among school attendees[4].

3.6.2 Objectives

3.6.2.1 General objective

To determine the prevalence of oral and hand hygiene behaviour among adolescents in Malaysia.

3.6.2.2 Specific objectives for oral hygiene

To describe the prevalence of:

i. Self-oral health perception
ii. Tooth brushing frequency in the past 30 days
iii. Tongue cleaning practice
iv. Fluoridated toothpaste usage
v. Dental floss usage
vi. Timing of the last visit to a dentist or dental nurse
vii. Having missed class or not participating in online learning due to toothache in the past 12 months
viii. Avoidance of smile or laughing due to the appearance of their teeth

3.6.2.3 Specific objectives for hand washing

To describe the prevalence of:

i. Hand washing with soap in the past 30 days
ii. Hand washing before eating in the past 30 days
iii. Hand washing after using the toilet in the past 30 days
iv. Hand washing method before eating at school in the past 30 days

3.6.3 Variable definitions

- **Clean or brush teeth**: Regular tooth brushing using toothbrush and toothpaste to keep the mouth, teeth and gums clean and healthy
- **Last saw a dentist or dental nurse**: Seen a dentist or dental nurse for a check-up, scaling or other dental treatment

3.6.4 Findings

4.4% (95%CI: 3.03, 6.25) of adolescents in Pulau Pinang perceived their oral health as poor or very poor **(Table 3.6.1)**. 79.9% (95%CI: 77.36, 82.23) brushed their teeth twice daily which was significantly higher in females [86.3% (95%CI: 82.98, 89.04)] **(Table 3.6.2)**, 9.5% (95% CI: 7.60, 11.79) never performed daily tongue cleaning **(Table 3.6.3)**, 52.8% (95%CI: 45.29, 60.09) reported not knowing whether their toothpaste contained fluoride **(Table 3.6.4)** and only 22.1% (95%CI: 19.37, 24.99) used dental floss for cleaning their teeth **(Table 3.6.5)**. Only 41.5% (95%CI: 34.69, 48.75) reported to have their last dental visit in the past 12 months **(Table 3.6.6)**, 10.0% (95% CI: 7.02, 14.18) had toothache in the past 12 months and had missed class or not participated with online learning (PdPR) **(Table 3.6.7)**. 28.0% (95%CI: 25.55, 30.58) reported that they had avoided smiling or laughing due to the appearance of their teeth which was significanty higher among females [33.5% (95%CI: 29.56, 37.68)] **(Table 3.6.8)**. The prevalence of Pulau Pinang adolescents who used soap most of the time or always was 71.6% (95%CI: 68.93, 74.06) which was significantly higher among females [75.7% (95%CI: 73.01, 78.19)] **(Table 3.6.9)**. About 79.6% (95%CI: 72.69, 85.08) and 90.2% (95%CI: 87.19, 92.55) of adolescents washed their hands most of the time or always before eating **(Table 3.6.10)** or after using the toilet respectively **(Table 3.6.11)**. Only 45.3% (95%CI: 40.29, 50.47) washed hands with running water before eating at school **(Table 3.6.12)**.

3.6.5 Discussion / Conclusion

In general, oral hygiene behaviour among adolescents may be related to the COVID-19 pandemic that reduces school dental programs and attendance for dental checkups, which in turn may cause inadequate knowledge regarding best oral health practice among adolescents. Ironically, hand hygiene practice appear to be good which may also reflect the effect of COVID-19 pandemic that promotes frequent handwashing practice in general.

3.6.6 Recommendations

Taking cognizance of these findings, there is a need for continuous emphasis on promoting good personal oral and hand hygiene among adolescents through knowledge, attitude and behavioural improvements with these following recommendations:

- Oral health education at schools need to deliver captivating methods that can be easily assimilated into the adolescents' daily school and home routines which will enhance their retention of oral health care knowledge. Effective oral health education should be regularly revised, updated and tailored specifically for young adults to improve and empower their decision making in maintaining good oral health. Adolescents at high risk of developing oral diseases should be identified early and oral health intervention delivered and tailored to these targeted groups to enhance engagement and personalisation of oral care needs.
- Interventions to promote hand washing need to be tailored to the adolescent's understanding and relevant social norms to trigger and reinforce good and ideal handwashing practice and habit formation according to their environment and social situations. Schools should have policies that inculcate good handwashing behavior including adequate infrastructures to support regular and ideal handwashing practices, and readily available information visual aids about the correct hand washing technique at key times and places in schools. School health education unit with regular hygiene education programs should be included in the formal and non-formal curricular, preferably starting from pre and primary schools. Further studies are needed to develop an understanding and knowledge gap of the cultural context of handwashing habits in various ethnic and cultural groups.

3.6.7 References

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Table 3.6.1: Prevalence of poor or very poor perception of oral health among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	90	4569	4.4	3.03	6.25
Sex					
Male	52	2671	5.1	3.14	8.15
Female	38	1898	3.6	2.30	5.68
Form					
Form 1	16	923	4.1	2.69	6.11
Form 2	24	1257	5.7	3.12	10.13
Form 3	26	-	-	-	-
Form 4	12	-	-	-	-
Form 5	12	-	-	-	-
Ethnicity					
Malay	21	1087	2.3	1.23	4.20
Chinese	64	3183	6.9	5.21	9.01
Indian	5	-	-	-	-
Bumiputera Sabah	0	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	0	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.6.2: Prevalence of teeth brushing 2 times a day in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	1630	83661	79.9	77.36	82.23
Sex					
Male	724	38561	73.5	69.51	77.23
Female	906	45100	86.3	82.98	89.04
Form					
Form 1	307	17677	78.0	73.33	82.03
Form 2	310	17148	77.5	71.65	82.40
Form 3	359	16902	80.0	76.57	82.99
Form 4	348	15923	82.0	77.30	85.87
Form 5	306	16011	82.8	74.79	88.64
Ethnicity					
Malay	737	38598	81.2	77.58	84.32
Chinese	737	36248	78.2	74.74	81.34
Indian	146	8320	83.5	77.88	87.91
Bumiputera Sabah	2	-	-	-	-
Bumiputera Sarawak	1	-	-	-	-
Others	7	357	60.1	29.32	84.49

Table 3.6.3: Prevalence of never did tongue cleaning among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	191	9935	9.5	7.60	11.79
Sex					
Male	110	5923	11.3	8.69	14.57
Female	81	4012	7.7	5.10	11.40
Form					
Form 1	32	1795	7.9	5.64	11.02
Form 2	47	2641	11.9	8.62	16.30
Form 3	38	1813	8.6	5.84	12.43
Form 4	36	1649	8.5	4.72	14.81
Form 5	38	2036	10.5	7.33	14.90
Ethnicity					
Malay	52	2879	6.1	4.65	7.85
Chinese	125	6232	13.4	11.34	15.88
Indian	11	-	-	-	-
Bumiputera Sabah	1	-	-	-	-
Bumiputera Sarawak	1	-	-	-	-
Others	1	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.6.4: Prevalence of did not know if their toothpaste is fluoridated among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	1085	55109	52.8	45.29	60.09
Sex					
Male	490	25951	49.6	42.16	57.06
Female	595	29158	55.9	46.57	64.86
Form					
Form 1	205	11600	51.6	40.58	62.40
Form 2	234	12755	57.6	47.03	67.57
Form 3	260	12107	57.5	47.47	66.86
Form 4	208	9532	49.1	39.85	58.37
Form 5	178	9115	47.1	36.13	58.42
Ethnicity					
Malay	432	22688	47.8	45.25	50.30
Chinese	579	28242	61.0	44.23	75.55
Indian	68	3877	39.4	31.08	48.37
Bumiputera Sabah	2	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	4	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.6.5: Prevalence of use of dental floss among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	444	23075	22.1	19.37	24.99
Sex					
Male	200	10826	20.6	16.60	25.39
Female	244	12249	23.5	21.25	25.83
Form					
Form 1	102	5929	26.2	18.72	35.27
Form 2	83	4608	20.8	17.24	24.92
Form 3	93	4422	20.9	16.56	26.07
Form 4	84	3816	19.6	14.69	25.77
Form 5	82	4300	22.3	17.02	28.66
Ethnicity					
Malay	161	8442	17.8	16.49	19.14
Chinese	210	10359	22.4	19.91	25.00
Indian	69	4049	40.6	29.24	53.15
Bumiputera Sabah	1	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	3	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.6.6: Prevalence of last dental visit in the past 12 months among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	849	43439	41.5	34.69	48.75
Sex					
Male	405	21654	41.4	31.96	51.47
Female	444	21784	41.7	33.71	50.20
Form					
Form 1	164	9531	42.2	34.94	49.92
Form 2	151	8410	38.0	26.75	50.71
Form 3	189	8927	42.2	32.69	52.41
Form 4	185	8274	42.7	32.61	53.43
Form 5	160	8296	42.9	36.84	49.17
Ethnicity					
Malay	363	19031	40.1	32.69	47.93
Chinese	418	20573	44.4	31.71	57.95
Indian	62	3515	35.3	29.92	41.03
Bumiputera Sabah	1	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	5	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.6.7: Prevalence of having missed classes or online learning among adolescents with toothache among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	106	5753	10.0	7.02	14.18
Sex					
Male	58	3278	11.3	6.54	18.89
Female	48	2476	8.7	6.13	12.33
Form					
Form 1	20	1252	9.5	5.34	16.46
Form 2	15	-	-	-	-
Form 3	20	1019	8.3	4.50	14.94
Form 4	26	-	-	-	-
Form 5	25	1358	14.2	9.17	21.28
Ethnicity					
Malay	50	2713	10.7	6.62	16.72
Chinese	22	1074	4.5	2.57	7.79
Indian	32	1832	24.2	16.82	33.40
Bumiputera Sabah	1	-	-	-	-
Bumiputera Sarawak	1	-	-	-	-
Others	106	5753	10.0	6.81	14.57

- Prevalence with high RSE, not reported

Table 3.6.8: Prevalence of avoidance of smiling due to teeth appearance among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	575	29243	28.0	25.55	30.58
Sex					
Male	223	11753	22.5	20.22	24.96
Female	352	17490	33.5	29.56	37.68
Form					
Form 1	107	6153	27.2	22.04	33.06
Form 2	111	6078	27.5	22.64	32.87
Form 3	137	6412	30.3	23.64	37.99
Form 4	113	5133	26.6	21.20	32.86
Form 5	107	5467	28.3	23.14	34.20
Ethnicity					
Malay	275	14328	30.2	26.78	33.93
Chinese	255	12415	26.8	22.95	31.02
Indian	42	2326	23.5	13.57	37.42
Bumiputera Sabah	0	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	3	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.6.9: Prevalence of using soap most of the time or always during handwashing in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95% CI	
				Lower	Upper
PULAU PINANG	1457	74823	71.6	68.93	74.06
Sex					
Male	662	35262	67.4	63.42	71.22
Female	795	39561	75.7	73.01	78.19
Form					
Form 1	279	15998	70.7	65.69	75.32
Form 2	273	15151	68.5	62.06	74.22
Form 3	324	15296	72.4	68.06	76.30
Form 4	290	13256	68.6	63.03	73.65
Form 5	291	15122	78.2	73.22	82.46
Ethnicity					
Malay	652	33987	71.6	66.09	76.46
Chinese	642	31575	68.1	65.20	70.93
Indian	149	8505	85.8	81.29	89.34
Bumiputera Sabah	3	-	-	-	-
Bumiputera Sarawak	1	-	-	-	-
Others	10	550	92.5	52.65	99.28

Table 3.6.10: Prevalence of handwashing most of the time or always before eating in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	1609	83196	79.6	72.69	85.08
Sex					
Male	778	41577	79.5	70.27	86.45
Female	831	41619	79.6	71.26	86.04
Form					
Form 1	321	18536	82.0	74.55	87.58
Form 2	296	16656	75.3	67.22	81.85
Form 3	355	16886	79.9	70.61	86.80
Form 4	343	15623	80.8	70.14	88.32
Form 5	294	15495	80.1	66.87	88.95
Ethnicity					
Malay	820	43148	90.8	89.34	92.16
Chinese	621	30549	65.9	60.60	70.86
Indian	155	8811	88.9	83.54	92.62
Bumiputera Sabah	2	-	-	-	-
Bumiputera Sarawak	1	-	-	-	-
Others	10	549	92.3	51.84	99.26

- Prevalence with high RSE, not reported

Table 3.6.11: Prevalence of handwashing most of the time or always after using the toilet in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	1841	94207	90.2	87.19	92.55
Sex					
Male	857	45383	87.0	83.05	90.09
Female	984	48824	93.4	90.00	95.72
Form					
Form 1	349	20083	88.8	82.19	93.16
Form 2	356	19675	89.1	83.13	93.13
Form 3	409	19277	91.2	86.19	94.52
Form 4	381	17214	89.3	84.79	92.56
Form 5	346	17959	92.9	88.64	95.59
Ethnicity					
Malay	771	40467	85.2	82.93	87.22
Chinese	898	43921	94.8	92.37	96.46
Indian	159	9116	92.4	87.33	95.57
Bumiputera Sabah	2	-	-	-	-
Bumiputera Sarawak	1	-	-	-	-
Others	10	546	91.8	61.00	98.78

- Prevalence with high RSE, not reported

Table 3.6.12: Prevalence of handwashing using running water before eating at school in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	926	47234	45.3	40.29	50.47
Sex					
Male	448	23522	45.2	39.12	51.36
Female	478	23712	45.5	38.47	52.68
Form					
Form 1	142	8117	36.0	30.45	41.91
Form 2	166	9270	42.0	34.21	50.16
Form 3	203	9654	45.8	37.34	54.51
Form 4	226	10212	53.2	42.75	63.36
Form 5	189	9980	51.7	42.35	61.03
Ethnicity					
Malay	504	26287	55.5	51.24	59.62
Chinese	363	17637	38.2	32.53	44.16
Indian	54	3054	31.0	23.27	39.85
Bumiputera Sabah	0	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	5	256	43.0	25.58	62.41

- Prevalence with high RSE, not reported

3.7 Mental Health Problems

3.7.1 Mental Health Problems

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3.7.1.1 Introduction

According to the World Health Organization (WHO), one in every seven children and adolescents suffers from mental health problems, accounting for 13.0% of the global disease burden in this age group.[1] In Malaysia, the National Health and Morbidity Survey (NHMS) 2015 found that the prevalence of mental health problems was 34.7% among those aged 16 to 19, and 11.4% among those aged 10 to 15.[2] However, findings from the NHMS 2019 revealed that the prevalence of mental health problems had decreased to 9.5% among those aged 10 to 15 years old.[3] In particular, WHO reported that suicide is the fourth leading cause of death among 15-19 year-olds.[1] In 2017, 10.0% of secondary school adolescents reported suicidal ideation, according to the NHMS.[4]

3.7.1.2 Objectives

i. To identify the prevalence of loneliness in the past 12 months
ii. To identify the prevalence of inability to sleep due to worry in the past 12 months
iii. To identify the prevalence of suicidal ideation in the past 12 months
iv. To identify the prevalence of suicidal plan in the past 12 months
v. To identify the prevalence of suicidal attempt in the past 12 months
vi. To identify the prevalence of not having close friends

3.7.1.3 Variable definitions

- **Lonely "most of the time or always"**: Responded either "most of the time" or "always" for felt lonely during the past 12 months prior to the survey.
- **Unable to sleep "most of the time or always" due to worry**: Responded either "most of the time" or "always" for being worried about something that he/she could not sleep at night during the past 12 months prior to the survey.
- **Suicidal ideation**: ever seriously considered attempting suicide in the past 12 months prior to the survey.
- **Suicidal plan**: made a plan of attempted suicide in the past 12 months prior to the survey.
- **Suicidal attempt**: attempted suicide at least once in the past 12 months prior to the survey.
- **No close friend**: Do not have any close friend.

3.7.1.4 Findings

Overall, 14.3% (95%CI: 11.82, 17.25) of adolescents in Pulau Pinang reported feeling lonely "most of the time or always" **(Table 3.7.1)**. A total of 12.6% (95% CI: 10.58, 14.89) of adolescents reported being unable to sleep "most of the time or always" due to worry **(Table 3.7 2)**.

In the past 12 months prior to the survey, suicidal ideation, suicidal plan, and suicidal attempt, were reported 12.0% (95% CI: 10.05, 14.16), 9.5% (95% CI: 7.75, 11.52), and 9.3% (95% CI: 7.58, 11.29), respectively. **(Table 3.7.3)**, **(Table 3.7.4)**, **(Table 3.7.5)**. The survey also observed that 4.4% (95% CI: 3.38, 5.65) of the adolescents had no close friends **(Table 3.7.6)**.

3.7.1.5 Discussion / Conclusion

The trend of suicidal ideation among secondary school students in Pulau Pinang (12.0%) was higher than GSHS 2012 (8.2%) and GSHS 2017 (9.5%). However, this figure was lower in comparison to national prevalence of 13.1%. Prevalence of suicidal plan in this survey (9.5%) was also higher compared to the prevalence in GSHS 2012 (5.5%) and GSHS 2017 (7.0%). Nonetheless, this prevalence was slightly lower compared to the national prevalence of 10.0%. Prevalence of suicidal attempts in this survey (9.3%) was reported higher compared to the prevalence in GSHS 2012 (5.7%) and GSHS 2017 (6.0%). This prevalence was slightly lower compared to national prevalence (9.5%). In addition to these, more students (4.4%) in Pulau Pinang reported having no close friends as compared to previous GSHS 2012 (4.1%) and GSHS 2017 (3.3%). This figure was also higher compared to national prevalence (4.2%).

3.7.1.6 Recommendations

1. Enhanced the screening of at-risk adolescents by School Health Teams and referral for further management.
2. Intensify efforts to prevent suicide among student especially among high-risk group (attempt suicide).
3. Strengthen adolescents coping skills and resilience through interactive health promotion activities.
4. To introduce culturally competent programmes in school that upskill teachers and educate parents about risk of suicide among adolescents.
5. To improve the National school curriculum that teaches life skills such as effective coping strategies and develops mental resilience.
6. To review workplace policies with the aim of strengthening family ties such as the introduction of flexible working hours or the provision of options to work from home to increase quality time among parents and children.
7. To review school curriculum and teaching hours to optimize more time for physical activity and quality time for social and professional interaction among adolescents to improve adolescents' life skills.

Table: Mental Health Problems Trend in Pulau Pinang

	NHMS 2012	NHMS 2017	NHMS 2022
Loneliness	9.4	9.2	14.3
Inability to sleep due to worry	4.7	7.0	12.6
Suicidal ideation	8.2	9.5	12.0
Suicidal plan	5.5	7.0	9.5
Suicidal attempt	5.7	6.0	9.3
Not having any close friend	4.1	3.3	4.4

3.7.1.7 References

1. WHO Fact Sheet. Adolescent mental health. https://www.who.int/news-room/fact-sheets/detail/adolescent-mental-health. Updated on 17 November 2021
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3.7.2 Depression

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3.7.2.1 Introduction

Depression is a common mental health problem among adolescents worldwide. Depression can manifest as symptoms such as sadness, guilt, low self-esteem, a lack of happiness, and dissatisfaction with their surroundings.[1] Furthermore, depression can cause individual problems such as difficulty sleeping, loss of appetite, lack of energy, and easy despair, leading to suicidal ideation.[2] According to the World Health Organization (WHO), depression affects 1.1% of adolescents aged 10-14 years and 2.8% of those aged 15-19 years.[3] In Malaysia, the National Health and Morbidity Survey (NHMS) 2019 found that the prevalence of depression was 2.1% among those aged 15 to 19 years old.[4]

3.7.2.2 Objectives

To determine the prevalence of depression among Malaysian adolescents.

3.7.2.3 Variable definitions

Depression: A positive score was defined as a score of 10 and above for Patient Health Questionnaire (PHQ-9), and participants with these scores were categorized as having depression.

3.7.2.4 Findings

Overall, 24.5% (95% CI: 21.27, 28.00) of Pulau Pinang adolescents reported depression. By state, the prevalence was highest in WP Labuan, 34.4% (95% CI: 28.89, 40.40), followed by WP Kuala Lumpur, 32.4% (95% CI: 29.11,35.86). The prevalence of depression was significantly higher in female students 29.9% (95% CI: 24.54, 35.91) compared to males 19.1% (95% CI: 14.76,24.28) **(Table 3.7.7)**.

3.7.2.5 Discussion / Conclusion

This survey indicated a lower prevalence of depression than research done by Normala et al. among 1800 Malaysian secondary school students aged 13 to 17 years old, which reported a 32.7% prevalence of depression among adolescents. Normala's study employed the same depression-measuring tool, the PHQ-9, but it was limited to 10 of 37 randomly chosen secondary schools in the Hulu Langat district area in the state of Selangor. Furthermore, the prevalence of depression in Pulau Pinang was lower compared to the national figure 26.9%.

3.7.2.6 Recommendations

1. Enhanced the screening of at-risk adolescents by School Health Teams and referral for further management.
2. Holistic intervention programmes targeted to adolescents at risk of depression.
3. Strengthen adolescents coping skills and resilience through interactive health promotion activities.
4. To introduce culturally competent programmes in school that upskill teachers and educate parents about discipline style and pro social parenting techniques.
5. To improve the National school curriculum that teaches life skills such as effective coping strategies and develops mental resilience.
6. To review workplace policies with the aim of strengthening family ties, such as the introduction of flexible working hours or the provision of options to work from home to increase quality time among parents and children.
7. To review school curriculum and teaching hours to optimize more time for physical activity and quality time for social and professional interaction among adolescents to improve adolescents' life skills.

3.7.2.7 References

1. Aquino JP, Londono A, Carvalho AF. An update on the epidemiology of major depressive disorder across cultures. In Understanding depression 2018 (pp. 309-315). Springer, Singapore
2. Kaur J, Cheong SM, Mahadir Naidu B, Kaur G, Manickam MA, Mat Noor M, Ibrahim N, Rosman A. Prevalence and correlates of depression among adolescents in Malaysia. Asia Pac J Public Health. 2014 Sep;26(5_suppl):53S-62S
3. WHO Fact Sheet. Adolescent mental health. https://www.who.int/news-room/fact-sheets/detail/adolescent-mental-health. Updated on 17 November 2021
4. Institute for Public Health (IPH). 2019. National Health and Morbidity Survey, NHMS 2019. Ministry of Health Malaysia

Table 3.7.1: Prevalence of loneliness "most of the time or always" in the past 12 months among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	295	15048	14.3	11.82	17.25
Sex					
Male	111	5768	11.0	9.16	13.04
Female	184	9280	17.7	13.55	22.82
Form					
Form 1	51	3020	13.3	8.79	19.59
Form 2	43	2414	10.8	7.32	15.77
Form 3	75	3483	16.4	10.62	24.56
Form 4	67	3055	15.7	12.88	18.89
Form 5	59	3075	15.9	13.61	18.49
Ethnicity					
Malay	167	8468	17.7	13.86	22.42
Chinese	94	4673	10.1	7.53	13.33
Indian	31	1733	17.3	12.90	22.84
Bumiputera Sabah	1	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	2	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.7.2: Prevalence of inability to sleep "most of the time or always" due to worry in the past 12 months among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	258	13213	12.6	10.58	14.89
Sex					
Male	99	5229	9.9	7.33	13.32
Female	159	7984	15.2	11.46	19.99
Form					
Form 1	42	2459	10.8	7.08	16.19
Form 2	31	1741	7.8	4.91	12.23
Form 3	61	2811	13.3	8.17	20.81
Form 4	59	2738	14.0	10.87	17.91
Form 5	65	3464	17.9	12.41	25.15
Ethnicity					
Malay	134	6644	13.9	11.13	17.25
Chinese	86	4368	9.4	7.05	12.44
Indian	34	1979	19.8	15.39	25.02
Bumiputera Sabah	1	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	3	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.7.3: Prevalence of suicidal ideation in the past 12 months among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	249	12559	12.0	10.05	14.16
Sex					
Male	68	3565	6.8	5.17	8.82
Female	181	8994	17.2	14.57	20.13
Form					
Form 1	53	3016	13.3	10.11	17.23
Form 2	52	2845	12.8	8.94	17.92
Form 3	59	2583	12.2	8.15	17.84
Form 4	52	2417	12.4	7.74	19.21
Form 5	33	1699	8.8	6.42	11.92
Ethnicity					
Malay	102	5174	10.8	7.67	15.09
Chinese	121	5890	12.7	9.77	16.30
Indian	21	1242	12.4	9.42	16.16
Bumiputera Sabah	1	-	-	-	-
Bumiputera Sarawak	1	-	-	-	-
Others	3	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.7.4: Prevalence of suicidal plan in the past 12 months among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	196	9951	9.5	7.75	11.52
Sex					
Male	55	2829	5.4	3.50	8.16
Female	141	7122	13.6	10.95	16.76
Form					
Form 1	31	1756	7.7	4.37	13.31
Form 2	43	2395	10.8	6.83	16.54
Form 3	43	1923	9.1	6.03	13.44
Form 4	46	2133	10.9	7.16	16.32
Form 5	33	1744	9.0	6.48	12.42
Ethnicity					
Malay	92	4712	9.9	7.52	12.85
Chinese	86	4231	9.1	5.94	13.72
Indian	13	755	7.5	4.28	12.96
Bumiputera Sabah	1	-	-	-	-
Bumiputera Sarawak	1	-	-	-	-
Others	3	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.7.5: Prevalence of suicidal attempt "at least once" in the past 12 months among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	189	9736	9.3	7.58	11.29
Sex					
Male	56	3009	5.7	4.34	7.49
Female	133	6727	12.8	10.17	16.09
Form					
Form 1	43	2451	10.8	7.32	15.61
Form 2	43	2413	10.8	7.27	15.85
Form 3	43	1923	9.1	6.77	12.06
Form 4	27	1217	6.2	3.44	11.04
Form 5	33	1732	9.0	6.08	13.00
Ethnicity					
Malay	85	4388	9.2	6.88	12.17
Chinese	85	4239	9.1	6.23	13.18
Indian	16	957	9.6	6.21	14.43
Bumiputera Sabah	1	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	2	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.7.6: Prevalence of not having any close friends among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	88	4596	4.4	3.38	5.65
Sex					
Male	40	2224	4.2	3.04	5.84
Female	48	2372	4.5	3.20	6.38
Form					
Form 1	11	-	-	-	-
Form 2	15	835	3.8	2.26	6.16
Form 3	23	1111	5.2	3.22	8.44
Form 4	18	823	4.2	2.97	5.95
Form 5	21	1135	5.9	3.68	9.23
Ethnicity					
Malay	47	2484	5.2	3.70	7.27
Chinese	31	1544	3.3	2.25	4.90
Indian	8	-	-	-	-
Bumiputera Sabah	0	-	-	-	-
Bumiputera Sarawak	1	-	-	-	-
Others	1	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.7.7: Prevalence of depression among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	501	25628	24.5	21.27	28.00
Sex					
Male	192	10010	19.1	14.76	24.28
Female	309	15619	29.9	24.54	35.91
Form					
Form 1	82	4806	21.3	15.62	28.38
Form 2	92	5184	23.3	16.82	31.45
Form 3	119	5551	26.2	20.27	33.13
Form 4	109	4937	25.4	20.33	31.31
Form 5	99	5150	26.6	21.33	32.70
Ethnicity					
Malay	256	13176	27.8	24.12	31.73
Chinese	192	9457	20.4	15.50	26.27
Indian	46	2608	26.2	19.29	34.55
Bumiputera Sabah	1	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	6	-	-	-	-

- Prevalence with high RSE, not reported

3.8 Physical Activity

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3.8.1 Introduction

World Health Organization (WHO) defines physical activity as any bodily movement produced by skeletal muscles that require energy expenditure.[1] Based on WHO, at least 60 minutes per day of moderate-to-vigorous intensity physical activity were recommended for children and adolescents aged 5–17 years.[1] Sufficient physical activity has substantial health benefits for children and adolescents in terms of improving cardio-metabolic health, better musculoskeletal health, increased psychosocial well-being and academic performance.[2] Despite these established benefits, a substantial proportion of young people fail to meet physical activity guidelines. In addition, adolescents are also exposed to sedentary behaviours, as most of them spend greater time engaged in recreational activities, such as screen-based entertainment and digital communications.[3] Agenda National Malaysia Sihat (ANMS) and National Strategic Plan for Active Living (NASPAL) targeted to increase the adoption of healthy lifestyles among Malaysians which includes reducing the prevalence of physical inactivity among the general population, including adolescents by 10% within 10 years of implementation.[4] Thus, this study will provide more information regarding physical activity among adolescents in Pulau Pinang.

3.8.2 Objectives

i. To identify the prevalence of being physically active for a total of at least 60 minutes daily for five days or more in the past seven days among adolescents in Pulau Pinang
ii. To identify the prevalence of active transportation or commuting among adolescents in Pulau Pinang
iii. To identify the prevalence of sitting behavior among adolescents in Pulau Pinang

3.8.3 Variable Definitions

- **Physically active**: physically active for at least 60 minutes per day, for a minimum of five days per week (sum of all the time spent in any kind of physical activity each day).
- **Active transportation/ commuting**: walking or riding a bicycle for at least three days a week to or from school.
- **Sitting behaviour**: Spending time sitting for 3 hours or more in a typical or usual day for leisure activities such as watching television, playing computer games, talking with friends, or surfing the internet.

3.8.4 Findings

Physically active
The prevalence of being physically active was 19.4% (95% CI: 16.84, 22.19) among adolescents in Pulau Pinang. The prevalence was significantly higher in males [26.5% (95% CI: 22.30,31.28)] than in females [12.2% (95% CI: 10.12,14.64). **(Table 3.8.1)**.

Active Transportation / Commuting
Overall, 22.7% (95% CI: 16.00, 31.10) adolescents reported active transportation to school. The prevalence was higher in males [25.4% (95% CI: 16.92, 36.18)] compared to females **(Table 3.8.2)**.

Sitting behaviour
A total of 69.6% (95% CI: 64.29, 74.52) had spent at least three hours in a typical or usual day engaging in sitting activities. The higher prevalence was observed in females [71.8% (95% CI: 63.78,78.71)] compared to males **(Table 3.8.3)**.

3.8.5 Discussion / Conclusion

The prevalence of being physically active and active commuting among school adolescents in Pulau Pinang were lower than national findings (19.4% vs. 21.4%, 22.7% vs. 27.0%, respectively). In addition, the prevalence of sitting behavior was higher than the national finding (69.6% vs. 66.7%). Compared to previous NHMS findings, the prevalence of being physically active in the current study was lower than in the previous Pulau Pinang AHS 2017 (19.4% vs. 21.5%). The prevalence of sitting behavior among school adolescents in Pulau Pinang increased from 2012 to the current survey (49.9% in 2012, 56.8% in 2017, and 69.6% in 2022).

3.8.6 Recommendations

A comprehensive, integrated, intersectoral approach is required to increase the prevalence of physical activity among secondary school adolescents. Those initiatives and collaborative efforts jointly implemented across diverse ministries, agencies, private sectors, and civil service societies seem very effective, realizing that the social determinants of active living are beyond the health sectors. The recommendations are as below:

1. To explore more behavioral science and behavioral insights into physical inactivity and sedentary behavior among adolescents in Pulau Pinang to help us to design evidence-based health promotion and education initiatives with underlying effective 'nudging' techniques.

2. To examine the association between the frequency of use of online-related behaviors (time spent on social media, online communication, and e-games) with a sufficient level of physical activity and sedentary behavior in a more specific manner.
3. To include parents in the interventions and health promotion programs on physical activity among adolescents to encourage and support their children's participation in physical activity.

Table: Physical Activity trend in Pulau Pinang

	NHMS 2012	NHMS 2017	NHMS 2022
Physical activity	22.4%	21.5%	19.4%
Active commuting	-	-	22.7%
Sitting behavior	49.9%	56.8%	69.6%

3.8.7 References

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Table 3.8.1: Prevalence of being physically active (at least 60 minutes daily) for a total of 5 days or more in the past 7 days in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	391	20260	19.4	16.84	22.19
Sex					
Male	262	13882	26.5	22.30	31.28
Female	129	6378	12.2	10.12	14.64
Form					
Form 1	69	3991	17.6	14.65	21.02
Form 2	54	3149	14.3	10.20	19.72
Form 3	101	4980	23.6	18.59	29.39
Form 4	90	3961	20.4	16.06	25.54
Form 5	77	4179	21.6	16.39	27.93
Ethnicity					
Malay	177	9384	19.8	16.40	23.69
Chinese	161	7906	17.1	13.06	21.98
Indian	51	2879	28.9	20.17	39.52
Bumiputera Sabah	0	-	-	-	-
Bumiputera Sarawak	1	-	-	-	-
Others	1	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.8.2: Prevalence of active commuting to school (walk or ride a bicycle to or from school for at least 3 days or more in the past 7 days) in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	463	23722	22.7	16.00	31.10
Sex					
Male	254	13280	25.4	16.92	36.18
Female	209	10442	20.0	12.64	30.10
Form					
Form 1	86	4962	21.9	14.37	31.89
Form 2	78	4362	19.8	11.58	31.69
Form 3	82	3898	18.4	11.74	27.77
Form 4	132	5950	30.6	18.23	46.66
Form 5	85	4549	23.5	15.86	33.41
Ethnicity					
Malay	308	15887	33.5	24.85	43.34
Chinese	92	4230	9.1	5.35	15.14
Indian	58	3344	33.6	22.79	46.35
Bumiputera Sabah	1	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	4	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.8.3: Prevalence of spending at least 3 hours in sitting activities in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	1438	72850	69.6	64.29	74.52
Sex					
Male	675	35299	67.5	60.04	74.08
Female	763	37550	71.8	63.78	78.71
Form					
Form 1	234	13383	59.0	53.55	64.32
Form 2	271	14853	67.1	57.79	75.25
Form 3	330	15471	73.2	65.17	79.95
Form 4	320	14532	75.2	68.60	80.80
Form 5	283	14611	75.5	68.17	81.68
Ethnicity					
Malay	596	31012	65.2	60.03	70.09
Chinese	746	36409	78.6	74.22	82.35
Indian	85	4835	49.0	41.04	57.03
Bumiputera Sabah	2	-	-	-	-
Bumiputera Sarawak	2	-	-	-	-
Others	7	-	-	-	-

- Prevalence with high RSE, not reported

3.9 Protective Factors

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3.9.1 Introduction

Protective factors are individual or environmental characteristics or conditions that promote adolescent health and well-being[1]. The role of protective factors in adolescents is to improve the likelihood of positive health behaviours or outcomes (such as healthy diet, exercise, hygiene practices) and to reduce the negative impacts of risk factors (for example tobacco, alcohol and drug use, violence). Multiple protective factors at the school, peer and family levels can foster healthy behaviours and promote mental health[2]. At the school level, truancy is seen as an indicator that is monitored by lower prevalence, as truancy often acts as a precursor of many harmful behaviours. During adolescence, peer support and parental factors can be fundamental aspects of establishing positive health behaviours to prevent chronic diseases. In line with the strategies stated in the National Adolescent Health Policy, this study focuses on identifying protective factors at family, school, and peer levels that influence adolescent health and integrating these protective factors into health promotion among adolescents in Pulau Pinang.

3.9.2 Objectives

i. To determine the prevalence of truancy in the past 30 days among adolescents
ii. To determine the prevalence of peer support in the past 30 days among adolescents
iii. To determine the prevalence of parental or guardian supervision in the past 30 days among adolescents
iv. To determine the prevalence of parental or guardian connectedness in the past 30 days among adolescents
v. To determine the prevalence of parental or guardian bonding in the past 30 days among adolescents
vi. To determine the prevalence of parental or guardian respect for privacy in the past 30 days among adolescents

3.9.3 Variable definitions

- **Truancy:** Missed class or school without permission for at least one day in the past 30 days. (This variable is monitored with lower prevalence to define as protective factors).
- **Peer support:** Adolescents in their school were kind and helpful most of the time or always during the past 30 days.
- **Parental or guardian supervision:** Parents or guardians had always or most of the time, checked to see if their homework was done in the past 30 days.
- **Parental or guardian connectedness:** Parents or guardians had always or most of the time, understood their problems and worries in the past 30 days.
- **Parental or guardian bonding:** Parents or guardians had always or most of the time, really knew what they were doing with their free time in the past 30 days.
- **Parental or guardian respect for privacy:** Parents or guardians had never or rarely gone through their things without their approval in the past 30 days.

3.9.4 Findings

Truancy

The prevalence of truancy in the past 30 days among adolescents was 19.8% (95% CI: 13.58, 27.86). It was higher in males (21.8%, 95% CI: 15.38, 29.84) compared to females (17.8%, 95% CI: 10.57, 28.39). Truancy was highest among Form 5 students with 24.3% (95% CI: 16.02, 35.00) **(Table 3.9.1)**.

Having Peer Support

The prevalence of having peer support in the past 30 days among adolescents was 47.6% (95% CI: 41.67, 53.69). It was higher in females (52.7%, 95% CI: 46.23, 58.99) compared to males (42.6%, 95% CI: 35.50, 49.97). Having peer support was highest among Form 5 students with 52.3% (95% CI: 43.20, 61.30) **(Table 3.9.2)**.

Having Parental or Guardian Supervision

The prevalence of having parental or guardian supervision in the past 30 days among adolescents was 9.6% (95% CI: 7.72, 11.85). It was higher in males (10.6%, 95% CI: 8.02, 13.91) compared to females (8.6%, 95% CI: 5.98, 12.15). Having parental or guardian supervision was highest among Form 1 students with 17.6% (95% CI: 13.63, 22.43) **(Table 3.9.3)**.

Having Parental or Guardian Connectedness

The prevalence of having parental or guardian connectedness in the past 30 days among adolescents was 25.9% (95% CI: 23.74, 28.15). It was higher in males (26.7%, 95% CI: 23.83, 29.69) compared to females (25.1%, 95% CI: 21.03, 29.69). Having parental or guardian connectedness was highest among Form 1 students with 31.7% (95% CI: 24.82, 39.43). **(Table 3.9.4)**.

Having Parental or Guardian Bonding

The prevalence of having parental or guardian bonding in the past 30 days among adolescents was 35.7% (95% CI: 33.52, 37.98). It was higher in males (36.8%, 95% CI: 33.01, 40.69) compared to females (34.7%, 95% CI: 31.19, 38.35). Having parental or guardian bonding was highest among Form 2 students with 37.0% (95% CI: 32.14, 42.07) **(Table 3.9.5)**.

Having Parental or Guardian Respect for Privacy

The prevalence of having parental or guardian respect for privacy in the past 30 days among adolescents was 80.8% (95% CI: 79.20, 82.30). It was higher in females (82.1%, 95% CI: 79.78, 84.13) compared to males (79.5%, 95% CI: 76.37, 82.36). Having parental or guardian respect for privacy was highest among Form 5 students with 86.1% (95% CI: 80.04, 9.53) **(Table 3.9.6)**.

3.9.5 Discussion / Conclusion

Parental protective factors which were parent or guardian supervision, connectedness and bonding showed a decreasing trend. This is quite worrisome because parent/guardian-adolescent relation is a strong protective factor by providing a secure base for them especially in social support and might determine their children's lives and behaviour during adolescence. Therefore, a comprehensive intervention policies or programmes must be further designed to address and to tackle this issue.

3.9.6 Recommendations

Development of interventions that strengthen the protective factors among school adolescents is important and more effective in reducing risk in order to improve the outcomes experienced by the adolescents. Among the interventions that can be implemented are:

1. Monitoring attendance closely by participation of schools, parent and local organizations through enforcement of mandatory attendance law allows identification of at risk and truancy behaviour among school adolescents.
2. Establishment of school programs that need parent's supervision will help in improving the parenting skills especially in parental attachment.

Table: Protective Factors Trend in Pulau Pinang

	NHMS 2012	NHMS 2017	NHMS 2022
Truancy	22.5	24.2	19.8
Having peer support	50.7	48.1	47.6
Having parental or guardian supervision	13.1	11.8	9.6
Having parental or guardian connectedness	30.5	33.8	25.9
Having parental or guardian bonding	48.7	46.1	35.7
Having parental or guardian respect for privacy	77.0	74.2	80.8

3.9.7 References

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Table 3.9.1: Prevalence of truancy in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	385	20325	19.8	13.58	27.86
Sex					
Male	205	11131	21.8	15.38	29.84
Female	180	9193	17.8	10.57	28.39
Form					
Form 1	57	3377	15.1	9.46	23.32
Form 2	56	3384	15.5	7.95	27.99
Form 3	97	4753	22.6	13.76	34.75
Form 4	91	4238	22.6	14.83	32.84
Form 5	84	4573	24.3	16.02	35.00
Ethnicity					
Malay	287	15204	32.3	26.24	39.04
Chinese	58	2793	6.1	3.30	11.18
Indian	38	2217	23.2	18.10	29.30
Bumiputera Sabah	0	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	2	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.9.2: Prevalence of having peer support in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	961	48995	47.6	41.67	53.69
Sex					
Male	411	21766	42.6	35.50	49.97
Female	550	27229	52.7	46.23	58.99
Form					
Form 1	175	9820	44.0	35.47	52.89
Form 2	185	10223	46.9	37.87	56.12
Form 3	214	9961	47.3	37.15	57.69
Form 4	198	9108	48.5	39.56	57.61
Form 5	189	9881	52.3	43.20	61.30
Ethnicity					
Malay	385	20047	42.6	38.59	46.72
Chinese	508	25112	55.3	46.74	63.48
Indian	59	3381	35.4	26.89	45.03
Bumiputera Sabah	1	-	-	-	-
Bumiputera Sarawak	1	-	-	-	-
Others	7	363	61.1	32.78	83.52

- Prevalence with high RSE, not reported

Table 3.9.3: Prevalence of having parental or guardian supervision in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	184	9826	9.6	7.72	11.85
Sex					
Male	100	5405	10.6	8.02	13.91
Female	84	4421	8.6	5.98	12.15
Form					
Form 1	68	3929	17.6	13.63	22.43
Form 2	27	1575	7.2	4.68	10.98
Form 3	32	1598	7.6	5.10	11.18
Form 4	37	1653	8.9	6.43	12.11
Form 5	20	1071	5.7	3.73	8.68
Ethnicity					
Malay	87	4565	9.7	7.56	12.45
Chinese	54	2762	6.1	4.54	8.13
Indian	41	2385	25.2	20.34	30.88
Bumiputera Sabah	0	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	2	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.9.4: Prevalence of having parental or guardian connectedness in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	508	26568	25.9	23.74	28.15
Sex					
Male	253	13591	26.7	23.83	29.69
Female	255	12976	25.1	21.03	29.69
Form					
Form 1	123	7070	31.7	24.82	39.43
Form 2	93	5152	23.6	18.56	29.58
Form 3	100	4761	22.7	18.06	28.01
Form 4	92	4230	22.6	19.13	26.45
Form 5	100	5354	28.5	22.50	35.41
Ethnicity					
Malay	216	11509	24.5	20.90	28.54
Chinese	229	11465	25.3	21.73	29.17
Indian	58	3329	34.9	31.58	38.34
Bumiputera Sabah	0	-	-	-	-
Bumiputera Sarawak	1	-	-	-	-
Others	4	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.9.5: Prevalence of having parental or guardian bonding in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	705	36586	35.7	33.52	37.98
Sex					
Male	347	18695	36.8	33.01	40.69
Female	358	17892	34.7	31.19	38.35
Form					
Form 1	140	8034	36.0	31.40	40.87
Form 2	146	8038	37.0	32.14	42.07
Form 3	156	7517	35.9	30.42	41.74
Form 4	136	6235	33.4	28.40	38.88
Form 5	127	6762	36.0	29.88	42.66
Ethnicity					
Malay	308	16334	34.8	31.86	37.95
Chinese	314	15540	34.3	29.71	39.26
Indian	77	4407	46.5	38.50	54.59
Bumiputera Sabah	0	-	-	-	-
Bumiputera Sarawak	1	-	-	-	-
Others	5	259	43.5	25.82	63.02

- Prevalence with high RSE, not reported

Table 3.9.6: Prevalence of having parental or guardian respect for privacy in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	1603	82679	80.8	79.20	82.30
Sex					
Male	753	40438	79.5	76.37	82.36
Female	850	42241	82.1	79.78	84.13
Form					
Form 1	301	17314	77.6	72.67	81.81
Form 2	310	17264	79.8	75.09	83.81
Form 3	360	17184	82.0	76.87	86.25
Form 4	321	14755	79.1	75.05	82.69
Form 5	311	16163	86.1	80.04	90.53
Ethnicity					
Malay	719	38031	81.1	78.07	83.84
Chinese	746	36834	81.6	79.38	83.54
Indian	126	7196	75.9	71.75	79.63
Bumiputera Sabah	1	-	-	-	-
Bumiputera Sarawak	2	-	-	-	-
Others	9	484	81.3	38.82	96.76

- Prevalence with high RSE, not reported

3.10 Sexual Behaviours

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3.10.1 Introduction

Adolescent sexual behaviour contributes to various sexual and reproductive health issues. The Global Summary HIV Epidemic Report, there were 150,000 adolescents aged 10-19 that were newly infected with HIV while 1,750,000 adolescents were already living with HIV[1]. It was also reported that the highest rate of sexual transmitted illness (STI) worldwide is among young people aged 15 to 24 years[2]. In Malaysia, the incidence of HIV reported among adolescents aged 13 to 19 was 2.4 per 100,000 population in 2021 and this trend has been steadily increasing in the past 10 years[2]. The WHO reported that 50% of young unmarried girls aged 15 to 19 years in low- and middle-income countries had an unintended pregnancy in 2019[3]. Globally, there were 41 births per 1000 girls aged 15-19 years in 2020 and 14% of maternal deaths. Good knowledge of HIV would help in reducing the transmission as shown in a study that a person with inadequate knowledge of HIV is more vulnerable to acquire the infection and may spread the disease throughout the population[4]. Good knowledge on HIV transmission was also associated with intention to engage in low-risk sexual behaviour[5]. Therefore, this study also aims to assess the knowledge of HIV transmission based on United Nation General Assembly Special Session (UNGASS) indicators among the school adolescents to determine the prevalence of HIV knowledge among them.

3.10.2 Objectives

To determine:

i. the prevalence of ever having sexual intercourse among adolescents in Malaysia
ii. the prevalence of current sexual intercourse in the past 30 days among adolescents in Malaysia
iii. the percentage of first sexual experience before the age 14 years among those who ever had sex
iv. the percentage of having at least two sexual partners among those who ever had sex
v. the percentage of condom usage during the last sexual intercourse among those who ever had sex
vi. the percentage of "other birth control methods" usage during the last sexual intercourse among those who ever had sex
vii. the prevalence of adequate HIV knowledge among adolescents in Malaysia
viii. the percentage of correct responses in each of UNGASS indicators among adolescents in Malaysia

3.10.3 Variable Definitions

- **Sexual intercourse**: sexual acts of penile penetration into the vagina or anus.
- **Risky sexual behaviour**: behaviours such as early sex debut, multiple sex partners and unprotected sex that could lead to health problems.
- **Other birth control methods**: pregnancy prevention methods other than barrier methods (condom usage) including withdrawal, birth control pills or any other non-barrier methods.
- **Ever had sex**: any positive answer for first sexual intercourse.
- **Current sexual intercourse**: sexual intercourse in the past 30 days.
- **Adequate HIV Knowledge**: provided correct responses to all five items of UNGASS indicators/ questions.

3.10.4 Findings

Prevalence of ever had sex among adolescents in Pulau Pinang was 8.9% (95% CI: 6.63, 11.88), male adolescents showed significantly higher prevalence 11.1% (95% CI: 6.91, 17.28) compared to females, 6.8% (95% CI: 4.95, 9.20). **(Table 3.10.1)**. Prevalence of current sexual intercourse among adolescents in Pulau Pinang was 6.6% (95% CI: 4.92, 8.78), male adolescents had significantly higher prevalence of currently having sexual intercourse which was 8.5% (95% CI: 5.38, 13.10) compared to female; 4.7% (95% CI: 3.43, 6.49) **(Table 3.10.2)**. Of those who ever had sex, 37.8% had sex before the age of 14. It was noted that 18.6% of them used condom during their last sexual intercourse and 12.4% used other birth control methods while 8.4% of them who ever had sex, had at least two sexual partners. **(Table 3.10.3)**

The percentage of correct responses by each item was highest for question "Can a healthy-looking person have HIV?" with 33.0%. Followed by question "Can a person get HIV from mosquito bites?" with 28.5%. Next item was "Can a person get HIV by sharing food with someone who is infected?" with the percentage of 23.7%. For the question "Can a person reduce the risk of getting HIV using a condom every time they have sex?" the percentage was only 22.4%. While the least was 17.4% for "Can the risk of HIV transmission be reduced by having sex with only one uninfected partner who has no other partners?". **(Table 3.10.4)**

3.10.5 Discussion / Conclusion

This study found that majority of sexually active adolescents are engaging in risky sexual behaviour, i.e., sex debut before age 14 years, having multiple sexual partners and unprotected sex. While from the UNGASS indicators, adequate knowledge on HIV transmission among adolescents are still low.

3.10.6 Recommendations

1. To strengthen sexual and reproductive health education to be more effective and comprehensive in empowering adolescents with appropriate knowledge, attitude, and skills.
2. To enhance the promotion of various existing sexual and reproductive health modules designed to guide and assist parents / guardians / caregivers to talk about sexuality at home and institutions.
3. To improve on parenting skills and effective communication in sexual and reproductive health related matters.
4. To conduct more studies especially qualitative studies in exploring the determinants of risky sexual behaviours among adolescents.
5. To reactivate the Healthy Programme Without AIDS for Adolescents (PROSTAR) to increase HIV/STI awareness and knowledge.
6. To utilise creative and innovative approaches through social media, peer educator programmes, public-private-NGO (triparty) partnerships and etc.
7. To utilise creative and innovative approaches through social media, peer educator programmes, public-private-NGO (triparty) partnerships and etc.

3.10.7 References

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Table 3.10.1: Prevalence of ever had sexual intercourse among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	169	9144	8.9	6.63	11.88
Sex					
Male	101	5650	11.1	6.91	17.28
Female	68	3494	6.8	4.95	9.20
Form					
Form 1	56	3265	14.6	10.02	20.86
Form 2	33	1961	9.0	5.48	14.47
Form 3	31	1552	7.4	4.86	11.07
Form 4	28	1292	6.9	3.65	12.74
Form 5	21	1075	5.7	3.50	9.16
Ethnicity					
Malay	80	4193	8.9	6.52	12.11
Chinese	50	2596	5.7	4.25	7.68
Indian	37	2222	23.3	15.79	32.96
Bumiputera Sabah	1	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	1	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.10.2: Prevalence of current sexual intercourse in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	125	6762	6.6	4.92	8.78
Sex					
Male	77	4322	8.5	5.38	13.10
Female	48	2439	4.7	3.43	6.49
Form					
Form 1	43	2550	11.4	7.37	17.29
Form 2	24	1405	6.5	4.26	9.66
Form 3	22	1069	5.1	3.23	7.93
Form 4	19	870	4.7	2.48	8.59
Form 5	17	868	4.6	2.77	7.58
Ethnicity					
Malay	54	2817	6.0	3.94	9.03
Chinese	45	2346	5.2	3.62	7.36
Indian	25	1533	16.1	9.84	25.12
Bumiputera Sabah	1	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	0	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.10.3: Proportion of sexual practices among those who ever had sex among adolescents in Pulau Pinang, 2022

Sexual Practices	Unweighted count	Percentage (%)
Percentage of first sex before the age 14 years	63	37.8
Percentage of having at least two sexual partners	14	8.4
Percentage of reported condom use during last sexual intercourse	30	18.6
Percentage of reported using other birth control method during last sexual intercourse	20	12.4

Table 3.10.4: Percentage of Correct Responses by item of UNGASS Indicator among adolescents in Pulau Pinang, 2022

Sexual Practices	Unweighted count	Percentage (%)
Can the risk of HIV transmission be reduced by having sex with only one uninfected partner who has no other partners?	354	17.4
Can a person reduce the risk of getting HIV using a condom every time they have sex?	467	22.4
Can a healthy-looking person have HIV?	687	33.0
Can a person get HIV from mosquito bites?	588	28.5
Can a person get HIV by sharing food with someone who is infected?	492	23.7

3.11 Tobacco Use

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3.11.1 Introduction

Tobacco use including cigarette and e-cig/vape is predominantly an issue for male adolescents. Malaysia is committed to achieve smoke free generation by 2040[1]. Various anti-tobacco programs for youths have been established especially at school level. Continuous surveillance of tobacco use among adolescents is essential in monitoring the progress of tobacco control programs in Malaysia generally and at state level of Pulau Pinang, specifically.

3.11.2 Objectives

General objective:

To determine the use of tobacco among adolescents in Pulau Pinang.

Specific objectives:

i. To identify the prevalence of the current use of any tobacco product adolescents in Pulau Pinang
ii. To identify the prevalence of the current tobacco smoking (current smoking) among adolescent in Pulau Pinang
iii. To identify the prevalence of the current cigarette smoking among adolescent in Pulau Pinang
iv. To identify the prevalence of the current e-cig/vape use among adolescent in Pulau Pinang
v. To determine the latest source of cigarette obtained among adolescent cigarette smokers in Pulau Pinang
vi. To determine the latest source of e-cig/vape obtained among adolescent e-cig/vape users in Pulau Pinang
vii. To determine the prevalence of exposure to second-hand smoke among adolescent in Pulau Pinang
viii. To determine the prevalence of exposure to tobacco products advertisement or promotion in the point of sales among adolescents in Pulau Pinang

3.11.3 Variable Definitions

- **Current any tobacco use** - the use any of the following tobacco product during the last 30 days: manufactured cigarette, traditional hand rolled cigarettes, roll-your-own cigarettes with cigarette papers, cigar/cigarillos, tobacco pipe (pipe smoking), shisha/hookah, electronic cigarette/ vape, heated tobacco product, snuff or chewed tobacco
- **Current tobacco smoker or current smoker** - the use of any of the following tobacco products during the last 30 days: manufactured cigarette, traditional hand rolled cigarettes, roll-your-own cigarettes with cigarette papers, cigar/cigarillos, tobacco pipe (pipe smoking) or shisha/hookah
- **Current cigarette smoker** - the use of any of the following tobacco products during the last 30 days: manufactured cigarettes, traditional hand rolled cigarettes, roll-your-own cigarettes with cigarette papers or cigar/cigarillos
- **Current e-cig/vape user** - the use of e-cig/vape during the last 30 days

3.11.4 Findings

In Pulau Pinang, the prevalence of current use of any tobacco products was 14.3% (95%CI: 9.63, 20.64), which was lower as compared to the national level [18.5% (95%CI: 17.09, 19.92)]. Males have almost four times higher prevalence [22.6% (95%CI: 13.85, 34.69)] as compared to females [5.9% (95%CI: 3.86, 9.02)] **(Table 3.11.1)**. The prevalence of current smokers in Pulau Pinang was 7.5% (95%CI: 5.13, 10.70) with males dominating the prevalence for nearly four times higher as compared to females [11.9% (95%CI: 7.42, 18.43) vs. 3.0% (95%CI: 1.68, 5.44)] **(Table 3.11.2)**, while the current cigarette smoker prevalence was 4.6% (95%CI: 2.89, 7.21) **(Table 3.11.3).** The prevalence of the e-cig/vape user among adolescents in Pulau Pinang was 11.1% (95%CI: 7.46, 16.21) with the prevalence of males was five times higher compared to females [18.6% (95%CI: 11.45, 28.63) vs. 3.7% (95%CI: 2.32, 5.71)] **(Table 3.11.4)**.

Most of the cigarettes obtained by buying them from static premises (39.6%), followed by getting them from friends (25.4%) **(Table 3.11.5)**. Most of the e-cig/vape were obtained by buying them from specific e-cig/vape shops (36.0%) and by getting them from friends (34.0%) **(Table 3.11.6)**. More than three out of ten adolescents [34.6% (95%CI: 28.13, 41.63)] reported they have parent or guardian who smoked or used any type of tobacco products, with half of them [15.0% (95%CI: 10.88, 20.31)] reported they have e-cig/vape used parent or guardians, while nearly two-fifth [39.1% (95%CI: 35.38, 43.02)] of the adolescents reported they're exposed to secondhand smoke when someone else smoking nearby in their presence within the past 7 days **(Table 3.11.7)**. Nearly one-fifth of the adolescents claimed they were exposed to the tobacco products point-of-sale advertising and promotion for the past 30 days [18.5% (95%CI:15.25, 22.31)] **(Table 3.11.8)**.

3.11.5 Discussion / Conclusion

The prevalence of tobacco use among adolescents in Pulau Pinang just has some narrow difference as compared with the prevalence in Malaysia. There was a significant increase in the prevalence of e-cig/vape use among adolescents, as compared with findings in 2017[2]. This indicates a switch in the preference of nicotine delivery among adolescents in Malaysia, as well as in Pulau Pinang within the past five years. Various factors could have contributed to these recent findings. Special concern should also be given to female adolescents as the prevalence of e-cig/vape users has doubled since 2017[2].

3.11.6 Recommendation

Tobacco use, which includes vaping, is a major harmful determinant for human health. It is worrying that the current anti-tobacco programs seem to have not diminished Malaysian adolescents' interest in vaping. A smokefree generation requires participation and dedication from all sectors, including family institutions, education sector, politicians, government and non-governmental organizations. Moving forward, it is high time for all sectors to come together and agree on banning tobacco use among future Malaysian generations. Strengthening the current law and taking legal action are vital in controlling the accessibility of tobacco products, especially e-cig/vape by adolescents. For those who have developed a nicotine addiction, the visibility of quit smoking services should be increased more aggressively to attract more adolescents to seek help. All screening, prevention, and intervention programs among adolescents must be strengthened and delivered in synergy by all governmental and nongovernmental agencies.

3.11.7 References

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Table 3.11.1: Prevalence of current any tobacco use among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	280	14912	14.3	9.63	20.64
Sex					
Male	221	11811	22.6	13.85	34.69
Female	59	3101	5.9	3.86	9.02
Form					
Form 1	41	2448	10.8	6.24	18.13
Form 2	49	2990	13.5	7.17	24.00
Form 3	61	3108	14.7	8.17	25.04
Form 4	79	-	-	-	-
Form 5	50	2780	14.4	9.69	20.94
Ethnicity					
Malay	202	10605	22.4	17.47	28.15
Chinese	36	-	-	-	-
Indian	40	2350	23.7	16.88	32.21
Bumiputera Sabah	2	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	0	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.11.2: Prevalence of current tobacco smoker* among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	143	7784	7.5	5.13	10.70
Sex					
Male	114	6195	11.9	7.42	18.43
Female	29	1589	3.0	1.68	5.44
Form					
Form 1	24	1456	6.4	3.45	11.68
Form 2	31	-	-	-	-
Form 3	24	1246	5.9	3.60	9.50
Form 4	36	1665	8.6	4.71	15.27
Form 5	28	1544	8.0	4.52	13.81
Ethnicity					
Malay	93	5046	10.6	7.60	14.70
Chinese	24	-	-	-	-
Indian	25	1464	14.8	11.40	18.91
Bumiputera Sabah	1	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	0	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.11.3: Prevalence of current cigarette smoker among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	88	4789	4.6	2.89	7.21
Sex					
Male	73	3956	7.6	4.20	13.27
Female	15	-	-	-	-
Form					
Form 1	12	-	-	-	-
Form 2	21	-	-	-	-
Form 3	10	-	-	-	-
Form 4	23	1067	5.5	3.20	9.38
Form 5	22	-	-	-	-
Ethnicity					
Malay	62	3380	7.1	4.80	10.46
Chinese	11	-	-	-	-
Indian	15	850	8.6	5.27	13.63
Bumiputera Sabah	0	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	0	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.11.4: Prevalence of current e-cigarette/vape user among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	218	11591	11.1	7.46	16.21
Sex					
Male	181	9684	18.6	11.45	28.63
Female	37	1908	3.7	2.32	5.71
Form					
Form 1	29	1727	7.6	4.11	13.75
Form 2	38	2319	10.5	5.57	18.83
Form 3	46	2367	11.2	6.36	18.97
Form 4	67	-	-	-	-
Form 5	38	2117	11.0	7.49	15.84
Ethnicity					
Malay	156	8206	17.3	13.07	22.55
Chinese	30	-	-	-	-
Indian	30	1760	17.8	11.74	26.12
Bumiputera Sabah	2	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	0	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.11.5: Proportion of source of cigarette obtaining during the last time smoking in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Percentage (%)
Bought from static premises	37	39.6
Bought from non-static premises	11	-
Food establishment	4	-
Bought online	4	-
Get from friends	24	25.4
Get from family members	6	-
Got some other ways	9	8.8

- Prevalence with high RSE, not reported

Table 3.11.6: Proportion of source of e-cigarette/vape obtaining during the last time smoking in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Percentage (%)
Bought from static premises	61	36.0
Bought from non-static premises	4	-
Food establishment	9	-
Bought online	12	-
Get from friends	59	34.0
Get from family members	15	8.1
Got some other ways	12	-

- Prevalence with high RSE, not reported

Table 3.11.7: Prevalence of exposure to second hand smoke among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
Having parent or guardian who smoked/used any type of tobacco products	661	33956	34.6	28.13	41.63
Having e-cigarette/vape use parent or guardian	284	14835	15.0	10.88	20.31
Someone smoking nearby in the presence of respondent in the past 7 days	800	40856	39.1	35.38	43.02

Table 3.11.8: Prevalence of currently see or notice any tobacco products advertising or promotion in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
Currently see or notice any tobacco product advertising or promotion in the point of sales in the past 30 days	374	19312	18.5	15.25	22.31

3.12 Violence and Unintentional Injury

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3.12.1 Introduction

Malaysia supports the mandate under resolutions WHA67.15 (2014) and WHA69.5 (2016) on implementing the WHO global plan of action to strengthen the role of the health system within a national multisectoral response to address interpersonal violence in particular against women and girls, and against children. Global school-based health surveys have shown that up to 42% of adolescent boys and 37% of adolescent girls were exposed to bullying[1]. Due to lockdowns caused by the ongoing COVID-19 pandemic, adolescents may be subjected to mistreatment and violence when they are forced to remain at home with their aggressors[2]. In addition, cyberbullying is another issue of concern that is closely related to adolescents' mental health and development[3].

3.12.2 Objectives

To describe the prevalence of:

i. Having been physically attacked at least once in the past 12 months
ii. Involvement in a physical fight at least once in the past 12 months
iii. Having had a serious injury at least once in the past 12 months
iv. Physical abuse at home at least once in the past 30 days
v. Verbal abuse at home at least once in the past 30 days
vi. Having been bullied at least once in the past 30 days
vii. Involvement in the perpetration of cyberbullying a few times within a year or more

3.12.3 Variable Definitions

- **Physical attack**: when one or more persons hurt another person with or without a weapon such as sticks or knives in the past 12 months. It is NOT a physical attack when two individuals or adolescents of about the same strength or power choose to fight each other.
- **Physical fight**: when two individuals or adolescents of about the same strength or power choose to fight each other in the past 12 months.
- **Unintentional injury**: a serious injury which makes the student miss at least one full day of usual activity (such as school, sports or a job) OR requires treatment by doctor or medical personnel in the past 12 months.
- **Physical abuse at home**: when someone is hit so hard that it left a mark OR caused an injury in the past 30 days.
- **Verbal abuse at home**: when someone has had hurtful or insulting things said to them in the past 30 days.
- **Bullying**: when a student or group of adolescents say or do bad and unpleasant things to another student, such as teasing a lot in an unpleasant way or leaving out things on purpose in the past 30 days. It is NOT bullying when two adolescents of about the same strength or power argue or fight or when teasing is done in a friendly and fun way.
- **Cyberbullying (perpetrator)**: bullying or harassment through the internet, cell phones, or other electronic devices (ie, sending insulting messages, posting digitally altered photos, engaging in online fighting, making aggressive comments, sharing someone's embarrassing information, or sending messages that include threats of harm through e-mail, instant messaging, in a chat room, on a website, or sent to a cell phone).

3.12.4 Findings

The prevalence of adolescents who had been physically attacked in the past 12 months was 12.8% (95% CI: 11.04, 14.80) and this was significantly higher in male [15.4% (95% CI: 12.33, 18.96)] compared to female [10.3% (95% CI: 8.59, 12.24)]. **(Table 3.12.1)**. Overall, 14.5% (95% CI: 12.28, 17.13) adolescents claimed to have been involved in a physical fight, which was higher in male [17.4% (95% CI: 13.73, 21.79)] compared to female [11.7% (95% CI: 9.91, 13.77)]. **(Table 3.12.1)**.

The prevalence of adolescents who had a serious injury in the past 12 months was 17.3% (95% CI: 14.44, 20.56). Male adolescents showed a higher prevalence [20.2% (95% CI: 16.41, 24.50)] compared to female [14.4% (95% CI: 11.30, 18.29)]. **(Table 3.12.2)**. However, among those who had been seriously injured, the two most common causes of serious injury were falls [6.7% (95% CI: 5.40, 8.38)] and motor vehicle accidents [3.9% (95% CI: 2.49, 5.99)]. **(Table 3.12.3)**.

The prevalence of adolescents reported had experienced physical abuse at home was 6.5% (95% CI: 4.71, 8.85) which was higher among male at 7.9% (95% CI: 4.98, 12.25) compared to female at 5.1% (95% CI: 3.76, 6.85)]. **(Table 3.12.4)**. Overall, 33.3% (95% CI: 27.77, 39.31) adolescents reported being abused verbally at home and it was higher among female [39.3% (95% CI: 30.75, 48.46)] compared to male [27.3% (95% CI: 22.67, 32.43)]. **(Table 3.12.4)**.

In terms of bullying, 7.2% (95% CI: 5.36, 9.66) adolescents reported having been bullied. This was higher among male [8.2% (95% CI: 5.27, 12.65)] compared to female [6.2% (95% CI: 4.70, 8.16)]. **(Table 3.12.5)**. The most common form of bullying was, 'Making fun of how my body or face looks' [1.3% (95% CI: 0.78, 2.05)]. **(Table 3.12.6)**.

With regards to involvement in cyberbullying activities from the perspective of the perpetrator, 15.3% (95% CI: 12.96, 18.08) of adolescents reported that they had been involved in cyberbullying activities a few times within the past year or more. Male adolescents showed a significantly higher prevalence [20.7% (95% CI: 17.29, 24.57)] compared to female [10.0% (95% CI: 8.33, 11.90)]. **(Table 3.12.7)**. The two most common forms of adolescents' involvement in cyberbullying activities were 'Ever made rude comments to anyone online' [10.2% (95% CI: 8.26, 12.57)] and 'Ever spread rumours about someone online' [5.2% (95% CI: 3.90, 6.84)]. **(Table 3.12.8)**.

3.12.5 Discussion / Conclusion

Pandemic situations reduced the prevalence of violence significantly through restricted movement, reduced social exposure, and reduced exposure to physical violence. The prevalence of perpetration of cyberbullying found in this survey is consistent with only a few countries in the world. Despite the reduction in all domains, further strategic steps should be taken to improve the outcome of the survey.

3.12.6 Recommendations

In the previous two surveys, recommendations touched on identifying the risk factors that contributed to the problems. The recommendations in this survey are more focused on dealing with abuse, bullying, cyberbullying, and falling. Approaches should be comprehensive with the involvement of relevant agencies.

i. Promotion of "Bystander Revolution" as part of a bully cessation program, where adolescents are empowered to stop and report a bullying event.
ii. Awareness programmes for cyberbullying should now focus on the perpetrator, as there are already approaches to manage victims of cyberbully.
iii. In schools, life skills education and the implementation of programmes to strengthen the communication between adolescents and teachers.
iv. The overall approach to cyber safety emphasises media watch, written policies and laws to control media contents (violence acts and pornography) and enhancing tele-health and digitalization for accessibility to get help.

3.12.7 References

1. WHO. (2022) Fact sheet: Adolescent and young adult health
1. Garstang, J. et al. (2020) Effect of COVID-19 lockdown on child protection medical assessments: A retrospective observational study in Birmingham, UK. BMJ Open 10, 1–6
2. Vaillancourt, T. et al. (2021) School bullying before and during COVID-19: Results from a population based randomized design. Aggress. Behav. 47, 557–569

Table 3.12.1: Prevalence of involvement in violence at least once in the past 12 months among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Having been physically attacked at least once					Involvement in physical fight at least once				
	Unweighted count	Estimated population	Prevalence (%)	95 % CI		Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper				Lower	Upper
PULAU PINANG	252	13233	12.8	11.04	14.80	284	15026	14.5	12.28	17.13
Sex										
Male	147	7907	15.4	12.33	18.96	165	8958	17.4	13.73	21.79
Female	105	5326	10.3	8.59	12.24	119	6068	11.7	9.91	13.77
Form										
Form 1	64	3669	16.4	14.22	18.84	71	4092	18.3	15.48	21.49
Form 2	57	3288	15.0	11.74	19.09	69	3930	18.0	12.84	24.59
Form 3	50	2386	11.3	7.68	16.29	61	3004	14.2	10.68	18.67
Form 4	53	2408	12.7	9.16	17.37	49	2216	11.7	7.52	17.76
Form 5	28	1482	7.8	5.66	10.60	34	1785	9.4	6.12	14.09
Ethnicity										
Malay	118	6077	12.9	10.58	15.65	149	7831	16.6	14.16	19.43
Chinese	99	5136	11.2	8.92	13.97	96	4950	10.8	8.71	13.30
Indian	33	1894	19.8	10.48	34.38	36	2066	21.7	13.95	32.03
Bumiputera Sabah	0	-	-	-	-	1	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-	0	-	-	-	-
Others	2	-	-	-	-	2	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.12.2: Prevalence of had serious injury at least once in the past 12 months among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	345	17860	17.3	14.44	20.56
Sex					
Male	193	10367	20.2	16.41	24.50
Female	152	7492	14.4	11.30	18.29
Form					
Form 1	71	4101	18.4	12.23	26.67
Form 2	50	2898	13.3	9.29	18.58
Form 3	83	3916	18.5	14.83	22.91
Form 4	69	3128	16.5	12.45	21.56
Form 5	72	3816	20.0	15.57	25.40
Ethnicity					
Malay	185	9735	20.7	17.92	23.76
Chinese	112	5461	11.9	9.59	14.69
Indian	44	2435	25.5	17.03	36.38
Bumiputera Sabah	2	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	2	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.12.3: Major cause of the most serious injury sustained in the past 12 months among adolescents who were injured in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
In a motor vehicle accident or hit by a motor vehicle	68	3565	3.9	2.49	5.99
Fell	120	6202	6.7	5.40	8.38
Something fell or hit him/her	26	1374	1.5	1.00	2.22
Attacked of abused or fighting with someone	7	-	-	-	-
In a fire or too near a flame or something hot	0	-	-	-	-
Inhaled or swallowed something bad	4	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.12.4: Prevalence of being abused at least once in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Physical abuse at home at least once					Verbal abuse at home at least once				
	Unweighted count	Estimated population	Prevalence (%)	95 % CI		Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper				Lower	Upper
PULAU PINANG	125	6690	6.5	4.71	8.85	671	34344	33.3	27.77	39.31
Sex										
Male	72	4052	7.9	4.98	12.25	264	14003	27.3	22.67	32.43
Female	53	2639	5.1	3.76	6.85	407	20341	39.3	30.75	48.46
Form										
Form 1	35	2042	9.1	5.93	13.86	118	6798	30.5	24.06	37.71
Form 2	21	-	-	-	-	120	6715	30.7	23.07	39.62
Form 3	33	1601	7.6	5.24	10.88	162	7537	35.8	27.41	45.15
Form 4	22	-	-	-	-	152	6989	37.0	29.31	45.44
Form 5	14	741	3.9	2.48	6.06	119	6306	33.1	24.69	42.77
Ethnicity										
Malay	69	3678	7.8	6.30	9.65	396	20341	43.2	37.31	49.26
Chinese	32	1659	3.6	2.49	5.25	211	10362	22.7	17.99	28.19
Indian	21	-	-	-	-	57	3259	34.2	25.78	43.65
Bumiputera Sabah	1	-	-	-	-	2	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-	0	-	-	-	-
Others	2	-	-	-	-	5	268	45.0	14.68	79.58

- Prevalence with high RSE, not reported

Table 3.12.5: Prevalence of experience in being bullied at least once in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	139	7456	7.2	5.36	9.66
Sex					
Male	76	4236	8.2	5.27	12.65
Female	63	3220	6.2	4.70	8.16
Form					
Form 1	39	2234	10.0	6.26	15.61
Form 2	31	-	-	-	-
Form 3	25	1204	5.7	3.30	9.70
Form 4	24	-	-	-	-
Form 5	20	1061	5.6	3.34	9.16
Ethnicity					
Malay	76	4043	8.6	5.97	12.19
Chinese	38	1929	4.2	3.15	5.61
Indian	21	-	-	-	-
Bumiputera Sabah	1	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	3	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.12.6: Most common ways of being bullied at least once in the past 30 days among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
Hit, kicked, pushed, shoved around or locked indoor	11	-	-	-	-
Made fun of race, nationality or color	11	580	0.6	0.34	1.01
Made fun because of religion	4	-	-	-	-
Made fun with sexual jokes, comments of gestures	22	1184	1.2	0.81	1.76
Left out activities on purpose of completely ignored	21	1084	1.1	0.73	1.64
Made fun of how body or face looks	24	1252	1.3	0.78	2.05

- Prevalence with high RSE, not reported

Table 3.12.7: Prevalence of involvement in cyberbullying activities (perpetrator) a few times within a year or more among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
PULAU PINANG	311	16124	15.3	12.96	18.08
Sex					
Male	204	10900	20.7	17.29	24.57
Female	107	5224	10.0	8.33	11.90
Form					
Form 1	52	2963	13.0	8.80	18.89
Form 2	60	3401	15.3	11.07	20.69
Form 3	82	4001	18.9	14.14	24.76
Form 4	64	2906	14.9	10.49	20.71
Form 5	53	2853	14.8	10.57	20.21
Ethnicity					
Malay	159	8330	17.4	14.74	20.53
Chinese	121	5972	12.9	8.55	18.89
Indian	25	1501	15.0	8.84	24.27
Bumiputera Sabah	2	-	-	-	-
Bumiputera Sarawak	0	-	-	-	-
Others	4	-	-	-	-

- Prevalence with high RSE, not reported

Table 3.12.8: Most common ways of involvement in cyberbullying activities (perpetrator) a few times within a year or more among adolescents in Pulau Pinang, 2022

Socio-demographic characteristics	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
Ever made rude comments to anyone online	204	10530	10.2	8.26	12.57
Ever sent or posted others' embarrassing photos online	80	4084	4.0	2.70	5.79
Ever spread rumours about someone online	102	5333	5.2	3.90	6.84
Ever made threatening comments to hurt someone online	46	2496	2.4	1.55	3.77
Ever asked someone to talk about sex online	36	1968	1.9	1.11	3.27
Ever asked someone to do something sexual online	19	1078	1.0	0.60	1.81

3.13 Adolescents' Perspectives on the Impact of COVID-19 on their families

Contributors: S Maria Awaluddin, Lim Kuang Kuay, Noor Syaqilah Shawaluddin, Tuan Mohd Amin Tuan Lah, Maznieda Mahjom, Noor Ani Ahmad, Saidatul Norbaya Buang, Nik Rubiah Nik Abdul Rashid.

3.13.1 Introduction

The COVID-19 pandemic has impacted adolescents in many aspects, such as their developmental milestones and well-being, even though they are less affected by the COVID-19 disease[1]. Adolescents may have many positive and negative perspectives towards the government restrictions on gathering and outdoor activities, which will affect their mental health status[2].

3.13.2 Objectives

To determine the prevalence of adolescents, reported that:

i. Parents lost their jobs due to the COVID-19 pandemic.
ii. Their family has to cut their expenses due to the COVID-19 pandemic.
iii. Their family needs to move to a less expensive rental house due to the COVID-19 pandemic
iv. Their family had to sell properties due to the COVID-19 pandemic
v. Family relationships became strained due to the COVID-19 pandemic
vi. Family had no changes due to the COVID-19 pandemic
vii. Their family ever been infected with COVID-19

3.13.3 Variable definitions

- **Parents lost job**: the adolescent answered option "Yes" to the statement My parent/s lost his/her/their job.
- **Family has to cut their expenses**: the adolescent answered option "Yes" to the statement "Our family has to cut our expenses".
- **Family has moved to a less expensive rental house**: the adolescent answered option "Yes" to the statement My parent(s) lost his/her/their job.
- **Family had to sell properties**: the adolescent answered option "Yes" to the statement "Our family has to sell properties".
- **Family relationships became strain**: the adolescent answered option "Yes" to the statement family relationships became strained/not close.
- **Family had no changes**: adolescent who answered "No" for each subquestion of 6(a), 6(b), 6(c), 6(d), 6(e) and 6(f).
- **Family ever been infected with COVID-19**: the adolescent answered option "Yes" to the question "Has your family ever been infected with COVID-19?".

3.13.4 Findings

The prevalence of adolescents in Pulau Pinang reported that parents lost their job due to the COVID-19 pandemic was 6.9% (95% CI: 5.30, 9.01). Adolescents also reported that their family had to cut their expenses, needed to move to a less expensive rental house and had to sell properties, 36.5% (95% CI: 33.54, 39.60), 3.4% (95% CI: 2.57, 4.53) and 2.7% (95% CI: 2.02, 3.68), respectively. The prevalence of adolescents reported that family relationships became strained was 7.4% (95% CI: 6.23, 8.78). About 57.2% (95% CI: 54.16, 60.17) of adolescents reported that their family had no negative impact during the pandemic COVID-19. In terms of adolescents reporting family members ever been infected with COVID-19, the prevalence was 55.7% (95% CI: 51.41, 59.89). **(Table 3.13.1)**.

3.13.5 Discussion / Conclusion

About half of the adolescents reported that their family had experienced negative consequences following the pandemic COVID-19 including family members ever been infected with COVID-19. Identification of the family who experienced a negative impact due to the COVID-19 pandemic can prevent further mental health problems among the affected population.

3.13.6 Recommendations

Pandemic COVID-19 caused a serious impact on the marginal of the family unit in terms of economic sustainability and parent-adolescent relationships. Therefore, the recommendations are:

i. To work up on the emergency financial support system in reaching the affected family
ii. To strengthen community support such as fundraising, food donation and emergency shelter
iii. To spread awareness on Covid-19 prevention at home to prevent further disease spread
iv. To encourage adolescents to reach out for help in any difficult situation.

3.13.7 References

1. Rao N, Fisher PA. The impact of the COVID-19 pandemic on child and adolescent development around the world. Child Dev. 2021;92(5): e738–48
2. Panchal U, Salazar de Pablo G, Franco M, Moreno C, Parellada M, Arango C, et al. The impact of COVID-19 lockdown on child and adolescent mental health: systematic review. Eur Child Adolesc Psychiatry [Internet]. 2021;(0123456789). Available from: https://doi.org/10.1007/s00787-021-01856-w

Table 3.13.1: Adolescents' perspectives on the impact of COVID-19 pandemic to their family: Self-reported findings from the adolescents in Pulau Pinang, 2022

Categories of COVID-19 impact	Unweighted count	Estimated population	Prevalence (%)	95 % CI	
				Lower	Upper
Parents lost job	139	7279	6.9	5.30	9.01
Family had to cut their expenses	745	38343	36.5	33.54	39.60
Family needed to move to less expensive rental house	66	3589	3.4	2.57	4.53
Family had to sell properties	53	2871	2.7	2.02	3.68
Family relationships became strain	148	7783	7.4	6.23	8.78
Family had no changes	1176	60084	57.2	54.16	60.17

APPENDICIES

Appendix 1: Members of Steering Committee NHMS 2019-2022

1. Director General of Health
2. Deputy Director General of Health (Research & Technical Support)
3. Deputy Director General of Health (Public Health)
4. Deputy Director General of Health (Medical)
5. Principal Director, Oral Health Programme
6. Principal Director, Pharmaceutical Services
7. Principal Director, Food Safety and Quality Division
8. Director, Medical Development Division
9. Director, Planning Division
10. Director, Health Education Division
11. Director, Disease Control Division
12. Director, Family Health Development Division
13. Director, Nutrition Division
14. Representative of State Directors
15. Director, Institute for Public Health
16. Dean Faculty of Medicine, University of Malaya
17. Dean Faculty of Medicine, National University of Malaysia
18. Principal Investigator, NHMS

Appendix 2: Terms of reference for NHMS 2022 Steering Committee

1. To approve the objectives and scopes of NHMS 2019 - 2022
2. To facilitate inter and intra sectorial collaboration
3. To monitor the implementation of NHMS 2019 - 2022
4. To facilitate the utilization of the NHMS 2019 - 2022 findings

Appendix 3: List of members of Central Coordinating Committee, NHMS 2022

1. Dr. Noor Ani Ahmad, Director of Institute for Public Health
2. Mr. Lim Kuang Kuay, Principal Investigator of Adolescent Health Survey
3. Dr. Muhammad Fadhli Mohd Yusoff, Method And Statistic
4. Ms. Hamizatul Akmal Abd Hamid, Data Manager
5. Dr. Shubash Shander Ganapathy, Central Field Supervisor of Negeri Sembilan, Melaka & Johor
6. Dr. Ahmad Ali Hj Zainuddin, Central Field Supervisor of Kedah, Perlis, Pulau Pinang & Perak
7. Dr. S Maria Awaluddin, Central Field Supervisor of Kelantan, Terengganu & Pahang
8. Dr. Maznieda Mahjom, Central Field Supervisor of Selangor, Kuala Lumpur & Wilayah Putrajaya
9. Dr. Mohd Shaiful Azlan Kassim, Central Field Supervisor of Sabah, Labuan & Sarawak
10. Dr. Tan Lee Ann, Data Processing & Quality
11. Ms Noor Syaqilah Shawaluddin, Logistic Support
12. Ms. Nashrah Adilah Ismail, Project Manager

Appendix 4: Terms of Reference for NHMS 2022 Central Coordinating Team (CCT)

No	Team	Duties	Officers
1	Project Management and Finance	• Work closely with recruitment group for employment of temporary Research Assistant • Prepare Questionaires mannual, Data collection manual • Meeting with research team members, and stakeholders • Planning for data collection training • Prepare security cards/name tags for research team Arrangement for advanced payment for survey research teams • Process claims of Field Supervisors • Monitor the expenditure/budget	Mr. Lim Kuang Kuay Dr. S. Maria Awaluddin Ms. Nashrah Adilah Ismail Ms. Nurul Amalina Yusof Mr. Muhammad Safuan Suhaimi Mr. Mohamad Shafiq Abd Basid
2	Method and Data Analysis	**Before Data Collection** • Calculate the sample size • Determine the sample distribution by state • Selection of schools samples for each state • Selection of class samples from the selected school • Prepare unique ID for the selected schools and classes • Check module cover and dummy table prepared by key module **During Data Collection** • Monitoring the quality of data received from data processing team • Conducting daily data cleaning • Merge the clean dataset • Updating the monitoring board for data processing and data quality during CCT meeting • Analyst the estimate prevalence for each module during data collection **After Data Collection** • Check syntax analysis to ensure the analysis meet the module objectives • Prepare sampling weight for complex sample analysis • Check the table analysis for technical report • Prepare final database • Prepare data dictionary for reference	Ms. Hamizatul Akmal Abd Hamid Dr. Muhammad Fadhli Mohd Yusoff Ms. Nur Syahirah Ibrahim
3	Data Processing and Quality	• Setting up data processing facility Development of directory of variables database • Development of quality control (QC) manual for data processing Specify data structure for data processing and data output requirement • Responsible for data entry and data cleaning • Monitoring and evaluation of QC performance for data processing Maintenance of the scanning machine • Daily back up for databases	Dr. Tan Lee Ann Ms. Nurul Haniyah Rosslan Ms. Nur Faraeein Zainal Abidin Ms. Azlin Awatif Mohd Amir Hamzah

No	Team	Duties	Officers

4	Central Field Supervisors	**Before Data Collection**
		• Central Field Supervisors are expected to prepare for the initiation of data collection.The preparation tasks include:
		• Conduct meeting with State Education Office, School Principals, Teacher in-charged for the selected schools.
		• To ensure adequate logistic support for the data collection and liaise with the District Education Office, District Health Office and other relevant departments to ensure that:
		  • Human resources are available: Field Supervisors, Team leaders, Research Assistants and drivers.
		  • Manage transport: Vehicles
		  • Manage survey intruments and relavant form
		  • Manage lodging for data collectors
		During Data Collection
		• Gather feedback from the field on the data collection status and problems related to logistics.
		• Visit the field to help data collectors solve the problem if necessary.
		• To ensure all data collection monitoring forms have been received on time.
		• To ensure bundle from field received by the Operation Centre by hand and by post.
		• Updating the monitoring board for state acheivement and atteding CCT meeting.
			Dr. Ahmad Ali Zainuddin
			Dr. Maznieda Mahjom
			Dr. Mohd Shaiful Azlan Kassim
			Dr. S Maria Awaluddin
			Dr. Shubash Shander Ganapathy

5	Operation Centre	• Arrange date and place of meeting • Prepare and circulate briefing materials • Prepare and circulate minutes of CCT meeting • Prepare letters of appointment for Central Field Supervisors, Field Supervisors and data collectors • Prepare advertisement material for recruitment of data collectors Prepare letters of notifications for data collections • Prepare manuals for field Supervisors and data collectors • Develop a system/format and monitor the distribution of materials/ equipment for field work	Mr. Lim Kuang Kuay Ms. Nashrah Adilah Ismail

Appendix 5: List of Research Team Members, NHMS 2022

Alcohol Use

1. Dr. Rusdi Abd Rashid
2. Dr. Norli Abdul Jabbar
3. Mr. Faizul Akmal Abdul Rahim
4. Ms. Hamizatul Akmal Abd Hamid
5. Ms. Halizah Mat Rifin
6. Ms. Hasimah Ismail
7. Mr. Mohd Hatta Abdul Mutalip
8. Dr. Muhammad Fadhli Mohd Yusoff
9. Dr. Thamil Arasu Saminathan
10. Dr. Tania Gayle Robert
11. Dr. Chong Zhuo Lin

Dietary Behaviours

1. Dr. Ahmad Ali Zainuddin
2. Ms. Ainan Nasrina Ismail
3. Ms. Teh Wai Siew
4. Dr. Lai Wai Kent
5. Dr. Suhaila Abdul Ghaffar
6. Mr. Azli Bin Baharudin@ Shaharudin
7. Mr. Chong Chean Tat
8. Ms. Lalitha Palaniveloo
9. Mr. Muhammad Faiz Mohd Hisham
10. Ms. Munawara Pardi
11. Dr. Norsyamlina Che Abdul Rahim
12. Ms. Nurul Huda Ibrahim
13. Ms. Siti Adibah Ab. Halim
14. Ms. Syafinaz Mohd Sallehuddin

Nutritional Status

1. Ms. Ainan Nasrina Ismail
2. Dr. Ahmad Ali Zainuddin
3. Ms. Lalitha Palaniveloo
4. Mr. Khairul Hasnan Amali
5. Ms. Siti Adibah Ab. Halim

Drug Use

1. Dr. Mohamad Salleh Abdul Ghani
2. Dr. Norli Abdul Jabbar
3. Dr. Rushidi Abd Rashid
4. Dr. Thamil Arasu Saminathan
5. Dr. Maznieda Mahjom
6. Ms. Hasimah Ismail
7. Ms. Hamizatul Akmal Abd Hamid
8. Dr. Muhammad Fadhli Mohd Yusoff
9. Mr. Mohd Haniff Bistari
10. Dr. Halizah Mat Rifin
11. Dr. Tania Gayle Rober

Hygiene (Including Oral Health)

1. Dr. Fazila Haryati
2. Ms. Rafidah Ali
3. Dr. Chan Yee Mang
4. Mr. Mohd Hatta Abdul Mutalip
5. Dr. Nik Adilah Shahein
6. Ms. Norzawati Yoep
7. Dr. Annapurny Venkiteswaran
8. Dr. Nurulasmak Mohamed
9. Dr. Nik Daliana Nik Farid
10. Dr. Saidatul Norbaya Buang

Mental Health Problems

1. Dr. Nurashikin Ibrahim
2. Dr. Nor Rahidah Abdul Rahim
3. Dr. Noor Raihan Khamal
4. Dr. Noor Ani Ahmad,
5. Dr. Sherina Mohd Sidek
6. Ms. Norhafizah Sahril
7. Dr. Chan Yee Mang
8. Dr. Kishwen Kanna Yoga Ratnam
9. Mr. Mohd Ruhaizie Riyadzi
10. Mr. Mohd Haniff Bistari
11. Dr. Muhammad Azri Adam Adnan
12. Dr. Muhamad Khairul Nazrin Khalil
13. Dr. Mohd Shaiful Azlan Kassim
14. Mr. Mohamad Aznuddin Abd Razak
15. Ms. Nur Hidayatun Fadhilah Mohd Nor
16. Mr. Sheikh Shafizal Sheikh Ilman

Physical Activity

1. Dr. Hazizi Abu Saad
2. Dr. Mohd Azahadi Omar
3. Ms. Nur Hidayatun Fadhilah Mohd Nor
4. Dr. Muhammad Solihin Rezali
5. Dr. Affendi Isa
6. Ms. Siti Balkhis Shafie
7. Mr. Lim Kuang Kuay
8. Mr. Mohamad Aznuddin Abd Razak
9. Dr. Mohd Shaiful Azlan Kassim
10. Mr. Azli Baharudin@ Shaharudin
11. Mr. Mohd Hairmansah Mohd Shah
12. Ms. Nor'Ain Ab Wahab
13. Ms. Norliza Shamsuddin
14. Ms. Nazirah Alias
15. Ms. Nurul Haniyah Rosslan

Protective Factors

1. Dr. Nik Rubiah Nik Abdul Rashid
2. Dr. Nik Daliana Nik Farid
3. Dr. Zamzaireen Zainal Abidin
4. Ms. Nazirah Alias
5. Ms. Eida Nurhadzira Muhammad
6. Ms. Filza Noor Asari
7. Mr. Faizul Akmal Abdul Rahim
8. Dr. Tan Lee Ann
9. Dr. S Maria Awaluddin
10. Dr. Khaw Wan-Fei
11. Mr. Mohd Amierul Fikri Mahmud
12. Mr. Mohd Farihan Md Yatim
13. Dr. Nur Hamizah Nasaruddin

Sexual Behaviour that contribute to HIV infection, other STI and unintended pregnancy

1. Dr. Anita Suleiman
2. Dr. Nik Rubiah Nik Abdul Rashid
3. Dr. Chong Zhuo Lin
4. Dr. Fatin Athira Tahir
5. Dr. Mazliza Ramly
6. Dr. Maznieda Mahjom
7. Dr. Nik Adilah Shahein
8. Dr. S Maria Awaluddin
9. Dr. Noor Aliza Lodz
10. Dr. Amal Shamsudin

Tobacco Use

1. Dr. Noraryana Hassan
2. Dr. Norliana Ismail
3. Dr. Muhammad Hairul Nizam Abd Hamid
4. Ms. Ummi Nadiah Yusoff
5. Dr. Nizam Baharom
6. Mr. Lim Kuang Hock
7. Mr. Mohd Ruhaizie Riyadzi
8. Dr. Muhammad Fadhli Mohd Yusoff
9. Dr. Thamil Arasu Saminathan
10. Dr. Tania Galye Robert Lourdes
11. Dr. Halizah Mat Rifin
12. Ms. Hamizatul Akmal Abd Hamid
13. Ms. Hasimah Ismail
14. Dr. Wan Kim Sui
15. Dr. Kishwen Kanna Yoga Ratnam

Violence and Unintentional Injury

1. Ms. Hamizatul Akmal Abd Hamid
2. Dr. Tan Lee Ann
3. Dr. Nor Rahidah Abd Rahim
4. Dr. Noor Raihan Khamal
5. Mr. Mohd Hazrin Hasim@Hashim
6. Ms. Nur Faraeein Zainal Abidin
7. Dr. Noor Suraya Muhamad
8. Dr. Shubash Shander Ganapathy
9. Mr. Muhammad Hanafi Bakri

Adolescents' Perspective on the Impact of COVID-19 to their family

1. Dr. S Maria Awaluddin
2. Mr. Lim Kuang Kuay
3. Ms. Noor Syaqilah Shawaluddin
4. Mr. Tuan Mohd Amin Tuan Lah
5. Dr. Maznieda Mahjom
6. Dr. Noor Ani Ahmad
7. Dr. Saidatul Norbaya Buang
8. Dr. Nik Rubiah Nik Abdul Rashid

Appendix 6: List of Data Collection Teams, NHMS 2022

JOHOR

Field Supervisor
Dr. Lai Wai Kent

Drivers
1. Mr. Muhammad Azraei Alias
2. Mr. Mohammad Nazrin Nazmuding

Research Assistants
1. Ms. Salsabeela Mohd Ariff
2. Ms. Nurfatin Syazwana Ayob
3. Ms. Raja Nur Fatin Ainsyah Raja Omar
4. Ms. Nor Diana Zulkefli
5. Mr. Mohammad Luqman Abdul Aziz
6. Ms. Siti Noorul Nadhirah Zamrus

KEDAH

Field Supervisor
Mrs. Lalitha Palaniveloo

Drivers
1. Mr. Muhammad Shahrul Arieff Shahruddin
2. Mr. Mohamad Najmi Shahrin

Research Assistants
1. Ms. Nur Liyana Rosle
2. Mr. Muhammad Iqbal Mat Rosdi
3. Ms. Siti Nur Adibah Zainudin
4. Ms. Nur Hawanis Hashim
5. Mr. Muhammad Zaquan Mohamad Zamri
6. Ms. Noor Fazira Mhd Sofbri

KELANTAN

Field Supervisor
Dr. Norsyamlina Che Abdul Rahim

Drivers
1. Mr. Muhamad Sahasrizan Samat
2. Mr. Muhamad Izzat Amir Mohd Nasir

Research Assistants
1. Mr. Muhammad 'Izzuddin Che Ismail
2. Mr. Mohamad Azli Che Daud
3. Ms. Wan Anisa Rodzlan Hasani
4. Mr. Muhammad 'Izzuddin Che Ismail
5. Ms. Nurul Farhani Faizol
6. Ms. Siti Hajar Ishak

MELAKA

Field Supervisor
Ms. Eida Nurhadzira Muhammad

Drivers
1. Ms. Siti Zulaikha Yahya
2. Ms. Puteri Nurdhiyana Othman

Research Assistants
1. Ms. Erma Safwan Erison
2. Ms. Nur Aishah Solihin Mohmad Nezan
3. Ms. Siti Normah Abdul Manan
4. Ms. Najihah Md Din
5. Ms. Nur Anis Syafiqa Zulkefli
6. Ms. Fairuz Mohd Hashim

NEGERI SEMBILAN

Field Supervisor
Mr. Jayvikramjit Singh Manjit Singh

Drivers
1. Mr. Zakaria Mohammad
2. Mr. Gabriel Jatum

Research Assistants
1. Ms. Norsahira Kamarudin
2. Mr. Mohamad Pauzan Razali
3. Ms. Norhayati Kamarudin
4. Ms. Nurul Syuhada Samsuddin
5. Ms. Siti Aisyah Ibrahim
6. Ms. Izzati Wan Azelee

PAHANG

Field Supervisor
Mr. Sheikh Shafizal Sheikh Ilman

Drivers
1. Mr. Muhammad Ruzaini Ahmad Amri
2. Mr. Ihsan Hashim

Research Assistants
1. Ms. Norhakimah Md Din
2. Mr. Harizamharizal Syafrizal
3. Ms. Norhidayah Abdul Majid
4. Ms. Nur Aina Amira Zailani
5. Ms. Geerthana A/P R. Ravichandiran
6. Mr. Muhamad Firdaus Paizol

PULAU PINANG

Field Supervisor
Ms. Rafidah Ali

Drivers
1. Mr. Muhammad Arif Misra
2. Mr. Muhammad Syauqi Adrus

Research Assistants
1. Mrs. Eng Gaik Sim
2. Mr. Neoh Choo Loa
3. Mr. Mohammad Hasrizal Hassan
4. Mr. Tan Jun Xian
5. Mr. Muhammad Amin Sabri
6. Ms. Nurnabilah Afrina Azami

PERAK

Field Supervisor
Dr. Halizah Mat Riffin

Drivers
1. Mr. Muhammad Raidillah Che Ab. Rahim
2. Mr. Muhamad Syawal Azim Mohd Hisham

Research Assistants
1. Ms. Azieda Abu Bakar
2. Ms. Zawahir Ngah Said
3. Ms. Erma Natasa Norhan
4. Ms. Amni Zulaika Ahmad Azmi
5. Ms. Haszieyatul Affidah Hasnan
6. Mr. Amirul Amin Mohamed Tarmizi

PERLIS

Field Supervisor
Dr. Suhaila Abdul Ghaffar

Drivers
1. Mr. Mohammad Amiruddin Kamarunzaman
2. Mr. Mohd Aizam Zahid

Research Assistants
1. Ms. Ainul Mardhiah Pakhrurrazi
2. Ms. Nur Syuhada Zahid
3. Ms. Fairuz Tasnim Shaffie
4. Ms. Nor Najihah Muslim
5. Ms. Jaizah Jamil
6. Ms. Noor Faralina Izzati Kamarunzaman

SELANGOR

Field Supervisor
Ms. Nazirah Alias

Drivers
1. Mr. Hezri Izuan Ahmad Termizi
2. Mr. Muhammad Izzat Mat Yusoff

Research Assistants
1. Ms. Nurul Atiqah Mat Yusoff
2. Ms. Rabi'ahtul Assuhadah Mohd Rafa'ai
3. Ms. Fatini Abd Rahman
4. Mr. Muhammad Azrol Mohd Rozi
5. Ms. Noor Aiman Afaf Afiffudden
6. Ms. Nurul Ashikin Nosarodin

TERENGGANU

Field Supervisor
Dr. Fazila Haryati Ahmad
Mr. Mohd Ruhaizie Riyadzi

Drivers
1. Mr. Muhammad Afif Bani Yami
2. Mr. Muhammad Najmi Alif Muda

Research Assistants
1. Mr. Alif Amirul Ikhwan Hussin
2. Ms. Nur Alis Nadia Azman
3. Ms. Nurul Shafiqah Kusno
4. Ms. Siti Nur Sharmiela Ayob
5. Ms. Madhihah Che Man
6. Ms. Nur Atiqah Hazwani Mohammed

SABAH

Field Supervisor
Ms. Nur Faraeein Zainal Abidin

Drivers
1. Mr. Steve Glantdenventur E Benjamin
2. Mr. Javiksen James
3. Mr. Mohd Jazlan Harith Abdul Razak

Research Assistants
1. Mr. Joel Sonny Saimin
2. Ms. Haslinda Hasan
3. Mr. Wan Misly Kindon
4. Ms. Nur Maisarah Maksud
5. Mr. Mohd Hafizan Sani
6. Mr. Mohd Aldy Abdul Razak
7. Ms. Marini Juanah Mantigang
8. Ms. Fyrah James
9. Ms. Lovera Karera Kalaka

SARAWAK

Field Supervisor
Dr. Khaw Wan Hei
Mr. Mohd Hairmanshah Mohd Shah

Drivers
1. Mr. Mohammed Hefalani Mohd Azman
2. Mr. Wilkinson Anak Welling
3. Mr. Afiq Fakrul Ismail

Research Assistants
1. Mr. Daniel Sia Pong Chai
2. Ms. Nurul Afifah Nasir
3. Mr. Mugang Anak Japar
4. Mr. Fabian Anak Mathew
5. Ms. Aelsa Anak Anthony
6. Ms. Christina Sie Fang Yun
7. Ms. Happilyn Anak Li
8. Mr. Mohammad Hasnol Abd Halim
9. Mr. Nazran Bazlan Nawi

KUALA LUMPUR

Field Supervisor
Dr. Nur Hamizah Nasaruddin

Drivers
1. Mr. Muhammad Muazzam Abdul Rahman
2. Mr. Adib Iman Osman

Research Assistants
1. Mr. Amirah Ali
2. Mr. Muhammad Yusri Abdullah
3. Ms. Nur Amirah Alias
4. Mr. Nurulnatasha Jumali
5. Ms. Noor Hasnieza Ahmad
6. Mr. Muhammad Naim Ismail

WP LABUAN

Field Supervisor
Dr. Muhammad Azri Adam Adnan

Driver
1. Mr. Niveno Eldo Sonny Mat

Reearch Assistants
1. Ms. Mawarsari Said
2. Mr. Jeldy Galoh
3. Ms. Nor Syafina Gorganius
4. Mr. Ignasius Cartilo Taimin
5. Ms. Norfazirah Amlan
6. Ms. Noor Azni Adzmain

WP PUTRAJAYA

Field Supervisor
Ms. Syafinaz Mohd Sallehuddin

Drivers
1. Mr. Mohd Sanusi Aziz
2. Mr. Muhammad Asyraf Jasri

Research Assistants
1. Ms. Aini Farina Mohd Zamri
2. Ms. Nurul Atikah Mohd Rozi
3. Mr. Nurlis Yunarlis
4. Ms. Azizah Nurfauziah Jafri
5. Ms. Rohana Saharudin

KEMENTERIAN KESIHATAN MALAYSIA

KEMENTERIAN PENDIDIKAN MALAYSIA

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