

# Knowledge, attitudes, and preventive behaviours towards COVID 19 of high school students in Perth

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**Abstract:** The outbreak of COVID-19 had affected Australia. One of the ways to control the spread of COVID-19 is to have a good understanding of the disease and correct preventive behaviours.

**Purpose:** Accessing the knowledge, attitudes, and preventive behaviour towards COVID-19 of high school students in Perth

**Methodology:** The study was conducted using a questionnaire. A total of 171 students participated. COVID-19-related knowledge, attitudes toward COVID-19, and preventive behaviours were assessed. Differences between outcomes and sociodemographic were analysed through independent t-test and the ANOVA. Preventive behaviours were analysed by a generalized linear model.

**Findings:** Students revealed moderate knowledge about COVID-19, correctly answering 10.48 (SD = 2.36) questions in a total of 15, moderate attitudes toward preventive behaviours 39.39 (SD = 6.17) and good preventive behaviour 42.57 (SD = 7.43), questions in a total of 35. There are statistically significant positive correlations shown: between attitudes toward preventive behaviours and preventive behaviours ( $r=.646^{**}$ ,  $p<0.01$ ) and between knowledge about COVID-19 and preventive behaviours ( $r=.239^{**}$ ,  $p<0.01$ ). Attitude toward preventive behaviours ( $B=.764$ ,  $p<0.05$ ), Knowledge about COVID-19 ( $B=.374$ ,  $p<0.05$ ) and Gender ( $B=2.037$ ,  $p<0.05$ ) had significant effects on preventive behaviours.

**Conclusion:** Students had a good level of preventive behaviour, while their knowledge about COVID-19 and attitude toward preventive behaviour were moderate. Attitude toward preventive behaviour had a positive correlation with preventive behaviour. Attitude toward preventive behaviour, knowledge and gender had significant effects on preventive behaviour. From the results, increasing attitude toward preventive behaviour is recommended to raise the level of preventive behaviour.

**Keywords:** COVID-19, preventive behaviour, high school students.

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## 1. INTRODUCTION

People around the world had suffered from COVID-19. On 11 March 2020, The World Health Organization declared the COVID-19 pandemic [1]. It was first detected in Wuhan, China in December 2019 before it spread around the world [2]. There were more than 200 million infection cases and over 4 million lives were taken away [3]. It can spread to humans and animals by droplets from infected patients. It causes respiratory infections. Vaccines were needed to be used along with providing knowledge and understanding of the disease to raise individual immunity, create herd immunity and promote protective behaviour.

The virus has been named "SARS-CoV-2". The disease it causes has been named "Coronavirus disease 2019" or COVID 19 [4]. Transmission of COVID-19 is primarily via droplets including droplets and aerosols that leave the reservoir from the portal of exit, and airborne transmission. Respiratory secretion from an infected person stays on the surface from 2 hours to several days depending on several factors, such as temperature, type of surface, relative humidity, etc. Close

contact with an infected person increases the chance of infection (including 48 hours before they develop the symptoms). COVID-19 can affect both the upper respiratory tract and lower respiratory tract, mostly the lungs. The alveoli become filled with fluid leaking from blood vessels around them, which causes shortness of breath and difficulty breathing. After infection, symptoms may begin one to 14 days. Most common symptoms: fever, fatigue, and dry cough, aches, sore throats, headache, loss of smell or taste, rash, diarrhoea. It can cause multiple symptoms, especially serious respiratory problems such as difficulty breathing and lung complications. Most people who have a mild illness can recover by isolating themselves at home. People need to seek immediate medical attention if they develop serious symptoms.

Vaccines can reduce the risks of getting the disease by helping individuals' immune systems recognise the virus. The World Health Organization (WHO) recommended that vaccination should be prioritized for people who expose a high risk of infection such as healthcare workers, elders, or people under medical conditions [5]. When a large number of individuals were immunised in the population, there would be less chance of the disease being transmitted. As a result, Herd immunity is reached [6].

The outbreak of COVID-19 had affected Australia. Lockdowns, restrictions, and vaccination had been used to minimise the infection. The Australian Government had developed and funded a comprehensive response to the COVID-19 pandemic [7]. The Government reduced the risks of COVID-19 spreading from international travel by applying travel restrictions, ensuring they quarantine on arrival and continuing with border surveillance. The Government also provided information about COVID-19, restrictions, vaccination, and their plan for the outbreak's response in English and other languages for people to have a good understanding and manage their risks to COVID-19. This study aims to assess the knowledge, attitudes, and preventive behaviour of high school students in Perth towards COVID-19.

## 2. METHODS

### Participants and procedure

This was a cross-sectional observational study. An online questionnaire was purposely developed and made available through Google from between 13-July-2021 and 15-August-21. All Year 11 and 12 students from a local high school in Perth were eligible and were invited to participate in the study. The invitation was sent by direct message on the school website. All Year 11 and 12 students have access to the school website, so they all receive an invitation. In this invitation, information about the objectives of the study as well as the ethical guarantee of confidentiality and anonymity in the data collected as stated in the informed consent was explained. Participation was completely free and voluntary, and no personal data were collected from any participant. Of the 308 Year 11 and 12 students, a total of 171 students participated in the study (response rate: 55.52%).

### Instrument

The questionnaire was developed based on a literature review including (1) Knowledge about COVID-19, Vaccine and immunity, and the Australian Government's response to COVID-19 from the World Health Organization, Centres for Disease Control and Preventive, and WA Health, Government of Western Australia. (2) studies performed on the same topics where several common items were used to assess each of the dimensions analysed in this study. The proposed items were then grouped and redundant items were removed.

A preliminary version of the instrument was reviewed by three experts to validate its content. A pre-test was then performed with a small sample of [who] to test for comprehension and difficulty. All the questions remained without modifications. The psychometric characteristics of the questionnaire were tested, as described in the statistical analysis subsection.

The final version of the questionnaire contained 39 questions; 4 about sociodemographic (gender, ethnicity, level of education, subject) and 35 items divided into 3 sections.

Knowledge about COVID-19: this scale consisted of 10 questions related to the name of the virus, the way COVID-19 spread, COVID-19 infection, risks and symptoms of COVID-19, hand sanitiser against COVID-19, and COVID-19 prevention. The participants were asked to choose the correct answer from multiple choices of 4. One point was assigned to each correct answer while providing an incorrect answer received zero points. The sum of all items was made hence higher scores corresponded to a higher level of knowledge.

Attitude toward preventive behaviour: this scale was composed of 10 items, and response categories consisted of a five-point Likert scale (from 1-strongly disagree, to 10- strongly agree) with the highest score corresponding to more positive attitudes toward preventive behaviours. Some items on the scale were inverted for the analysis. A sum of all the items was made to obtain a score. The “Attitude toward preventive behaviour” factor consisted of 10 items and varied from 10 to 50 and the higher values corresponded to a more positive attitude toward preventive behaviour.

COVID-19 preventive behaviour: this scale referred to the number of preventive behaviours adopted and included 10 items (Hygiene, physical contact, social distancing, mask, risk of infection and awareness of COVID-19). The data analysis reports to 10 items. Each item was answered using a five-point scale (From 1-Never to 10-Always), with one point assigned to each behaviour that was always practised. The number of behaviours practised was added up. A high score on this scale indicated good preventive behaviours, ranging from 10 to 50.

### Statistical analysis

The analysis was performed using SPSS for Windows, version 26. To analyse psychometric characteristics of the scales, an exploratory factor analysis, using principal component analysis with varimax rotation, was carried out. Reliability was analysed through the calculation of item-total correlation coefficients and Cronbach's alpha ( $\alpha$ ) for the scales of the questionnaire. The descriptive analysis was presented in absolute (n) and relative (%) frequencies, mean (M) and standard deviations (SD). To assess the differences between the outcome variables (Knowledge toward COVID-19, attitudes toward preventive behaviour and preventive behaviours) and the sociodemographic characteristics, considering the sample size, an independent t-test and the ANOVA were used as appropriate. The correlations between the outcomes of the study were calculated by Pearson's correlation. Lastly, a generalized linear model was calculated to determine the predictive variables of the preventive behaviours. Exp ( $\beta$ ) and the respective 95% confidence intervals (95% IC) were presented. Statistical significance was defined as  $p < 0.05$ .

### Ethical Considerations

This research uses an anonymous data collection method to collect data from grade 11-12 Students of Kent Street Senior High School, Perth, Western Australia, by using Google form. The invitation was sent by 13 July 2021 to 15 August 2021. In these invitations, information about the study's objectives and the ethical guarantee of confidentiality and anonymity in the data collected as stated in the informed consent was explained. Participation was completely free and voluntary, and no personal data were collected from any participant.

## 3. RESULT

This study comprised a total of 171 students. The sociodemographic characteristics of the sample are presented in Table 1. Most students were female (n=98, 57.3%). Most student ethnicities were Australian (n=75, 43.9%) followed by Asian (n=68, 39.8%) and African (n=14, 8.2%) respectively. 93 (54.4%) of the students were in year 12 while the rest were in year 11 (n=78, 45.6%). Most students did science related subjects (n=112, 65.5%).

Regarding knowledge about COVID-19, students revealed moderate knowledge about COVID-19, correctly answering a mean of 10.48 (SD=2.36) questions in a total of 15. Male students showed higher COVID-19 related knowledge scores (M=10.73, SD=1.92) than female students (M=10.30, SD=2.64). The ethnicity of others showed the highest COVID-19 knowledge related score of 11.21 (SD=1.97) followed by Australians who showed a COVID-19 knowledge score of 10.72 (SD=2.02). Students who were in year 12 showed higher COVID-19 related knowledge scores of 10.48 (SD=2.37). For the subjects group, students who did science-related subjects had a higher COVID-19 related knowledge score of 10.63 (SD=2.19).

Students showed a moderate level of attitudes toward preventive behaviours (M=39.39, SD=6.17). Male students showed a higher attitude toward preventive behaviours (M=39.55, SD=6.32) than female students (M=39.28, SD=6.08). The ethnicity of others showed the best attitude toward preventive behaviours (M=41.64, SD=4.63) followed by Asian (M=39.96, SD=5.38). Students who were in year 11 showed a better attitude toward preventive behaviours (M=39.65, SD=5.47) than students who were in year 12 (M=39.17, SD=6.72). Students who did science-related subjects had a better attitude toward preventive behaviours (M=40.09, SD=5.39)

Concerning preventive behaviour, students revealed a good level of preventive behaviour with an average of 42.57 out of 50 (SD=7.43). Female students (M=43.21, SD=6.95) more frequently engaged in preventive behaviour than male students (M=41.71, SD=7.99). An analysis by ethnicity showed that others had the highest score 43.86 out of 50 (SD=6.81) followed by Asian (M=43.19, SD=6.54). Students who were in year 12 and did science-related subjects had a higher preventive behaviour score of 42.59 (SD=5.37) and 43.17 (SD=6.05) respectively. (Table 1)

**Table 1: Differences in outcomes according to the sociodemographic characteristics of participants (N = 171)**

Sociodemographic characteristics	N (%)	Knowledge about COVID-19 (Range 0-15) M (SD)	Attitude toward preventive behaviours (Range 10-50) M (SD)	Preventive behaviour (Range 10-50) M (SD)
<b>Gender</b>				
Male	73 (42.7)	10.73 (1.92)	39.55 (6.32)	41.71 (7.99)
Female	98 (57.3)	10.30 (2.64)	39.28 (6.08)	43.21 (6.95)
<b>Ethnicity</b>				
Australian	75 (43.9)	10.72 (2.02)	38.51 (6.14)	42.00 (7.65)
Asian	68 (39.8)	10.26 (2.54)	39.96 (5.38)	43.19 (6.54)
African	14 (8.2)	9.50 (3.20)	39.14 (10.04)	41.36 (10.70)
Others	14 (8.2)	11.21 (1.97)	41.64 (4.63)	43.86 (6.81)
<b>Level of Education</b>				
Year 11	78 (45.6)	10.47 (2.37)	39.65 (5.47)	42.55 (6.17)
Year 12	93 (54.4)	10.48 (2.37)	39.17 (6.72)	42.59 (8.37)
<b>Subject</b>				
Science-related	112 (65.5)	10.63 (2.19)	40.09 (5.39)	43.17 (6.05)
Non science related	59 (34.5)	10.20 (2.65)	38.07 (7.30)	41.44 (9.47)
<b>Total</b>	171 (100)	10.48 (2.36)	39.39 (6.17)	42.57 (7.43)

The analysis of the correlations between the outcomes of the study - knowledge about COVID-19, attitudes towards preventive behaviours and preventive behaviour revealed the existence of positive and statistically significant correlations between the attitude towards preventive behaviours ( $r=.646^{**}$ ,  $p<0.01$ ). The preventive behaviour and knowledge about COVID-19 ( $r=.239^{**}$ ,  $p<0.01$ ). (Table2.)

**Table 2: Pearson's correlation coefficient between the study outcomes**

Variables	Knowledge about COVID-19	Attitude toward preventive behaviours	Preventive behaviour
Knowledge about COVID-19	1		
Attitude toward preventive behaviours	.209**	1	
Preventive behaviour	.239**	.646**	1
**Correlation is Significant at the 0.01			
*Correlation is Significant at the 0.05			

Results from the generalized linear model indicated that the attitude towards preventive behaviours (Beta=.634,  $p<0.01$ ), gender of students (Beta=.136,  $p<0.01$ ), knowledge about COVID-19 (Beta=.119,  $p<0.01$ ) had a statistically significant effect on the preventive behaviours adopted. (Table 3).

**Table 3: Generalized linear model predicting preventive behaviours of COVID-19**

	B	SE	EXP ( $\beta$ )	Sig (p)	95% IC	
					Lower	Upper
Gender	2.037	0.895	0.136	0.024	0.271	3.804
Ethnicity	-0.344	0.497	-0.042	0.49	-1.325	0.637
Level of Education	0.513	0.88	0.034	0.561	-1.225	2.251
Subject	0.293	0.954	0.019	0.759	-1.592	2.177
Knowledge about COVID-19	0.374	0.188	0.119	0.048	0.003	0.745
Attitude toward preventive behaviours	0.764	0.073	0.634	0	0.619	0.908

#### 4. DISCUSSION

The results regarding knowledge about COVID-19 in Year 11 and 12 students in local high school in Perth, Western Australia revealed a moderate understanding of transmission, risks, symptoms of COVID-19 and prevention for COVID-19 infection (average score of 10.48 out of 15,  $SD=2.36$ ) and a moderate level of attitude toward preventive behaviours (average of 39.39 out of 50,  $SD=6.17$ ). However, preventive behaviour was at a good level (average of 42.57 out of 50,  $SD=7.43$ ). This shows that students in the local high school in Perth, even though their knowledge about COVID-19 and attitude toward preventive behaviours were not high. According to the Australian Government Department of Health, the number of local cases was minimized. Students were rarely exposed to the pandemic, therefore, their knowledge about COVID-19 was moderate, enough to be aware and understand the disease. However, when it came to practising preventive behaviour, they were often familiar with it. The government seriously controlled the pandemic. When they were exposed to COVID-19, everyone had the responsibility to follow the restrictions. Consequently, their preventive behaviour level was high. The results of this study show a significant positive correlation between attitudes toward preventive behaviours and preventive behaviour ( $r=.646^{**}$ ,  $p<0.01$ ). This suggests that if students have a better attitude toward preventive behaviours or are satisfied to practice preventive behaviours, their preventive behaviours will be practised more.

Male students had better knowledge and attitudes toward preventive behaviours than female students. The study results consistent with the study of Jessie Pinchoff, KG Santhya et al., (2020), Gender-specific differences in COVID-19 knowledge, behaviour and health effects among adolescents and young adults in Uttar Pradesh and Bihar, and India, found the higher results in male participants may be influenced by their behaviour which involved being more sociable, and therefore greater exposure to risks [8]. In contrast, female students had better preventive behaviours. The previous study by Nicolas Bronfman et al., (2021), Gender Differences on Psychosocial Factors Affecting COVID-19 Preventive Behaviours, found that women more frequently adopt various hygiene and social distancing behaviours. It is suggested that women frequently deal with a problem, while men are less active when they face a problem [9].

Students who did science-related subjects had a higher score and level than students who did not do science-related subjects of 10.63 ( $SD=2.19$ ) and 10.20 ( $SD=2.65$ ) in knowledge about COVID-19, 40.09 ( $SD=5.39$ ) and 38.07 ( $SD=7.30$ ) in attitude toward preventive behaviours, 43.17 ( $SD=6.05$ ) and 41.44 ( $SD=9.47$ ) in preventive behaviour. This may be due to the fact that students who did science-related subjects had learnt about health and disease or believed scientific proof which increased their awareness of COVID-19. Consequently, their knowledge, attitude toward preventive behaviours and preventive behaviour had increased.

According to the previous study, Knowledge, attitudes and preventive behaviours toward COVID-19: a study among higher education students in Portugal by Regina Ferreira Alves, Catarina Samorinha, and Jose Precioso, shows that the students of the health-related field had higher results in COVID-19 related knowledge, Attitudes toward preventive behaviour, and preventive behaviours, of 13.89 out of 14 ( $SD=0.33$ ), 33.44 out of 35 ( $SD=2.19$ ), and 6.59 out of 12 ( $SD=2.19$ ), which were higher than students of the non-health-related field [10]. This may be due to the contents that they have done in the course, understanding of disease and awareness of health problems.

Students in Year 11 and Year 12 did not have much difference in the level of knowledge about COVID-19 and preventive behaviours. However, Year 11 students had the result of attitudes toward preventive behaviours of 39.65 out of 50

(SD=5.47), which was higher than Year 12 students, 39.17 out of 50 (SD=6.72). The study results are consistent with the study of Tawan Petpaiboon, (2021), Knowledge, attitudes, and preventive behaviours toward coronavirus disease-19: A study among high school students in Bangkok, found that Grade 12 students have lower results in attitudes toward COVID-19 preventing guidelines of 8.6 out of 12 (SD=2.48), compared to Grade 11 students which scored 9.16 out of 12 (SD=1.91) [11]. This may be due to the fact that Year 12 students were more socialized, which they might have found out that it was annoying for them to follow the restrictions. Consequently, their attitudes toward preventive behaviours were lower.

For recommendations, knowledge about COVID-19 had a positive correlation with both attitudes and COVID-19 preventive behaviour. Schools should provide COVID-19 related programs or put information about COVID-19 on school courses to increase students' attitudes toward preventive behaviours, which eventually will dramatically raise the level of COVID-19 preventive behaviours of students.

### Limitation

In 2021, Western Australia successfully minimised the spread of COVID-19. People had less exposure to the risks, which consequently affected their attitude and preventive behaviours. Since this study used an online questionnaire, participants could use the internet to search up the answers.

## 5. CONCLUSIONS

There were 171 Year 11 and 12 students, who participated in this study. Students revealed moderate knowledge about COVID-19 and moderate level of attitudes toward preventive behaviours. Students revealed a good level of preventive behaviours. The results of this study showed significant positive correlation between attitudes toward preventive behaviours, knowledge about COVID-19 and COVID-19 preventive behaviours. Results from the generalized linear model indicated that the attitude towards preventive behaviours, gender of students, knowledge about COVID-19 had a statistically significant effect on the preventive behaviours adopted.

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