Systematic Review of Factors Associated with COVID-19 Knowledge, Attitudes, and Practice among Middle School Students

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Abstract. Purpose: The spread of infectious disease, Coronavirus disease 2019 (COVID-19), has had a significant impact on people worldwide in the past three years. Although people's production and livelihoods are no longer strictly restricted, the fact is that the epidemic is not over. Lack of understanding of the disease is one of the most common drivers of improper use of COVID-19 preventive measures, which increases the spread of the disease and the number of new cases in many countries. Although children and adolescents, are less likely to be infected with COVID-19 or to be or less symptomatic than other populations, adolescents are more likely to fail to follow strict precautions. This systematic review aimed to identify COVID-19 related KAP levels and associated factors among middle school students.

Methods: Related studies published from December 2019 to February 2023 were selected. This systematic review used eight electronic databases, including Web of Science, Cochrane, PubMed, Scopus, EBSCO, ProQuest, China National Knowledge Infrastructure (CNKI), and the Wanfang Database. Quality of evidence was assessed with the using a quality assessment tool developed by the National Heart, Lung, and Blood Institute (NHLBI) of bias tool.

Results: Of 2248 records identified, 48 met eligibility requirements and exhibited low risk of overall bias. On average, middle school students had good knowledge, relatively positive attitudes, and good practices related to COVID-19. Risk factors could be divided into sociodemographic variables, individual factors, psychological variables, medical conditions, COVID-related reaction, cues to action, environmental factors, risky health behaviours, health belief model, the theory of planned behavior, ethical theory, knowledge of COVID-19, attitude of COVID-19, practice of COVID-19, others significantly related to KAP.

Conclusions: The discrepancies of KAP levels between countries and cities in the same country may be due to the different study populations, sample sizes, and/or study periods. Although every country has adopted strategies to control COVID-19, people with different socioeconomic statuses, political preferences, and cultures have shown different attitudes and actions. In addition, each study analyzed in the current review adopted different questionnaires and many reported various indexes, making results difficult to compare. Future research should be conducted across countries and cultures with congruent measures to obtain a better understanding of KAP of COVID-19.

Keywords: Middle school students; COVID-19; Knowledge; Systematic review.

1. Introduction

The spread of infectious disease, Coronavirus disease 2019 (COVID-19), has had a significant impact on people worldwide in the past three years. By March 26th, 2023, a total of 761,321,408 cases and 6,886,489 deaths attributed to COVID-19 were reported globally (World Health Organization [WHO], 2023a). Although people's production and livelihoods are no longer strictly
restricted, the fact is that the epidemic is not over (The Lancet, 2023). Currently COVID-19 remains a dangerous infectious disease, World Health Organization (WHO) declared at a meeting held on January 27, 2023, that COVID-19 remains a public health emergency of international concern (PHEIC) (WHO,2023b).

2. Methods

2.1 Inclusion and exclusion criteria

2.1.1 Inclusion criteria

Inclusion criteria were applicable to the full text to assess eligibility and were as follows: a) published journal; b) journal with an English or Chinese version; c) journal with cross-sectional study; d) journal with study population of middle school students and/or adolescents; e) journal related to knowledge and/or attitude and/or practice related to COVID-19 prevalence; f) factors associated with knowledge and/or attitude and/or practice related to COVID-19 among middle school students; and g) articles with the keywords detailed in S1 Table.

2.1.2 Exclusion criteria

Exclusion criteria were applicable to the full text to assess eligibility and were as follows: a) other literature, such as review articles, conference papers, books, theses, and letters to the editor; b) journal that is not available in full text; c) not available in an English or Chinese version; d) irrelevant title and abstract; e) records with missing outcomes of interest.

2.2 Electronic searches

Keywords in S1 Table were used to navigate through eight electronic databases, including Web of Science, Cochrane, PubMed, Scopus, EBSCO, ProQuest, China National Knowledge Infrastructure (CNKI) and the Wanfang Database. A systematic review was conducted to determine the COVID-19 related KAP in middle school students from studies published from December 2019 to February 2023.

Table 1. Keywords used in literature search

| factor OR predictor OR associated factor OR determinants OR risk factor OR prognostic factor OR covariate OR independent variable OR variable | AND |
| knowledge OR attitude OR practice OR awareness OR behaviour OR behavior OR perception OR action OR prevention practice OR prevention OR KAP | AND |
| COVID-19 OR SARS-CoV-2 OR coronavirus OR novel coronavirus disease OR coronavirus disease OR coronavirus disease 2019 OR novel coronavirus OR severe acute respiratory syndrome coronavirus 2 | AND |
| secondary school students OR middle school students OR high school students OR adolescents OR teenagers OR junior school students OR junior high school |

3. Data Collection Procedure

Retrieved entries were imported into Microsoft Excel. Two independent reviewers (DW and BYL) screened articles based on titles and abstracts according to the inclusion and exclusion criteria. If there was any disagreement in opinion regarding the selection of articles, another independent reviewer (PYL) was brought in to resolve differences. As shown in Fig 1, out of 2,248 potential articles, 689 duplicate articles and 408 other articles were excluded based on the inclusion and exclusion criteria. The remaining 1,151 articles were screened based on titles and abstracts. This screening process resulted in 105 articles that met the eligibility criteria. Records were found for all
relevant data for each study, including authors, year of the study, country, period of data collection, study population, sample size, instrument used, KAP score or KAP level, risk factors, and outcome.

The full text of articles was evaluated, and only articles that appeared to meet criteria were selected. Out of 105 articles, 47 did not clearly identify the study population, seven did not qualify as cross-sectional studies, three recorded missing outcomes of interest. The remaining 48 articles met all of the eligibility criteria. Article selection and extraction processes were performed according to the Preferred Reporting Items for Systematic Reviews (Moher et al., 2015) result of the different instruments and analytical methods used in the selected studies, a meta-analysis could not be conducted for this systematic review.

![Flowchart of the systematic review process](image-url)

**Fig. 1 Flowchart of the systematic review process**
4. Discussion

The global spread of COVID-19 since 2020 has led to millions of fatalities, highlighting the importance of assessing the KAP of COVID-19. Such evaluations are crucial for developing effective strategies pertaining to COVID-19 education, communication, prevention, and control (Siddiqua et al., 2021). The present review, to our knowledge, is the first to investigate COVID-19-related KAP among middle school students. A total of 48 studies from December 2019 to March 2023 conducted in 17 countries were included in the review. The findings suggest that middle school students exhibited varying levels of KAP with regard to COVID-19.

5. Conclusion

It is recommended that health and education departments as well as schools prioritize the promotion of awareness and prevention practices among middle school students through appropriate health education plans, particularly among younger students. This is crucial in reducing the risk of COVID-19 transmission and infection caused by misunderstandings. Moreover, as children in middle school tend to share the same political beliefs as their families, political views could influence the COVID-19 related KAP. Hence, future research should consider the impact of parental political differences on the KAP of students. Additionally, there is a need for more studies using consistent survey tools to allow for better comparability of results.

References


