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## Abstract

The COVID-19 pandemic has influenced the community's lifestyle, including adolescents' behavior. One aspect majorly affected was physical growth, which encompasses several areas, including nutritional status and personal hygiene. Maintaining the quality of physical growth is very important, even beyond the pandemic. Therefore, this study aimed to determine the influence of the COVID-19 pandemic on adolescents' nutritional status and personal hygiene. A literature review method was used through a bibliometric and content analysis of publications obtained from databases such as Google Scholar. The articles obtained were classified by publication year, study location, keywords, and journal titles. Based on the literature search, 11 articles were found on the influence of the COVID-19 pandemic on the nutritional status of adolescents, and 10 articles discussed the effect on personal hygiene. After reviewing the articles, it was concluded that the pandemic influenced adolescents' nutritional status and personal hygiene.

**Keywords:** adolescents, COVID-19, nutritional status, personal hygiene

## Introduction

Coronavirus disease 2019 (COVID-19) is caused by an infection of the virus named SARS-CoV-2. The etiology or main cause is the transmission from one individual to another. This disease occurs through respiratory droplets produced when a carrier coughs, sneezes, or talks.<sup>1</sup> This virus belongs to the family of coronavirus, which induces Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS).<sup>2,3</sup>

The first case of COVID-19 was found in Wuhan, China, towards the end of 2019. Based on data from the World Health Organization until 30 September 2020, the cases worldwide reached 44 million, with 1,174,624 deaths.<sup>4</sup> The Indonesian Ministry of Health data reported that 1 in 8 cases was found among children.<sup>5</sup> Furthermore, the pandemic significantly affected adolescents' physical growth,<sup>5</sup> encompassing several aspects, including nutrition and personal hygiene.<sup>6</sup> Many adolescents suffered a decrease in immunity caused by food insecurity.<sup>7</sup> The nutrition aspect relates to their daily food intake, while personal hygiene is concerned with maintaining cleanliness. When both aspects are well maintained, the physical growth of adolescents can proceed optimally.<sup>6,7</sup>

The continuity of physical growth among adolescents

needs to be ensured,<sup>8-10</sup> given that the pandemic has impacted their behavior.<sup>11-13</sup> Therefore, studies are needed to examine the influence of COVID-19 on adolescents' physical growth. The results will help stakeholders identify the necessary steps to overcome the problem. These studies can be a reference or academic resource for future health emergencies, including pandemics.

The physical and personal hygiene of adolescents plays a critical role in their growth and development. Both characteristics are also associated with the welfare and health of the next generations.<sup>8</sup> Studies are needed to provide references for public health and government readers to produce health policies in the post-pandemic. Therefore, this study aimed to examine the influence of the COVID-19 pandemic on adolescents' nutritional status and personal hygiene.

## Method

This study used a literature review method with several scientific literature published between 2020 and 2022 collected from sources such as Google Scholar, PubMed, and Elsevier. A bibliometric and content analysis of publications obtained was conducted and classified based on the publication year, study location, keywords,

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and titles. The keywords used were "the effect of the COVID-19 pandemic on adolescents' nutritional status" and the "effect of the pandemic on adolescents' personal hygiene." The inclusion criteria were articles published in English, in international journals, and focused on the impact of the COVID-19 pandemic.

### Results

A bibliometric and content analysis of publications obtained was conducted, and the articles were classified based on the year, location, keywords, and titles. Based on the literature search, 11 and 10 articles that discussed the influence of the pandemic on the nutritional status and personal hygiene of adolescents were found. The summary of these articles is shown in Tables 1 and 2.

### Discussion

#### *The Influence of the COVID-19 Pandemic on the Nutritional Status of Adolescents*

The COVID-19 pandemic has culminated in significant malnutrition among adolescents. Based on the literature review, 3 papers focused on undernutrition or malnutrition, 7 on overweight, 9 on food insecurity, and 10 on unhealthy food (high-sugar diets, etc). The results showed that the burden of COVID-19 had led to an increase in the number of adolescents suffering from undernutrition and overweight. The government and policymakers have addressed this problem, including providing supplementary food to improve nutrition.<sup>14</sup> Adoles-

cents often consume high-fat and sugar foods, which are unhealthy for their bodies.<sup>14</sup> This condition is influenced by their increased screen time, resulting in less attention to adequate food (preferring fast food) as well as the lack of parental knowledge about healthy food.<sup>16</sup>

During the pandemic, the food supply for the community was significantly disrupted, and the stakeholders' priority was largely focused on treating COVID-19 rather than providing nutrition education.<sup>21</sup> Various policies implemented by the government include school closures to prevent the spread of this virus infection.<sup>18</sup>

Adolescents often consume fast and nutritionally poor foods, culminating in an increase in obese patients. The lack of specific nutritional guidelines also contributed to this issue.<sup>22</sup> Due the government-imposed isolation, adolescents engaged in unhealthy behavior,<sup>19</sup> such as consuming high-sugar foods frequently.<sup>20</sup>

The stamina and nutritional status of adolescents need to be maintained optimally. Good nutrition will strengthen the body's defense system against various diseases, including COVID-19.<sup>35</sup> To prevent nutritional problems during the pandemic, there is a need to reduce adolescents' addiction to fast food and maintain their physical activity according to health standards.<sup>23</sup>

#### *The Influence of the COVID-19 Pandemic on the Personal Hygiene of Adolescents*

According to the literature review, 7 papers discussed the impact of the COVID-19 pandemic on personal hy-

**Table 1. Articles About the Influence of the COVID-19 Pandemic on Adolescents' Nutritional Status**

Author	Year	Type of Study	Population of the Study	Country	Results Summary
Fahim, <i>et al.</i> <sup>14</sup>	2021	Qualitative	Childhood (including adolescents)	Bangladesh	Malnutrition in adolescents occurred during this period.
Allabadi, <i>et al.</i> <sup>15</sup>	2020	Quantitative	Adolescents	West Bank (Palestine)	Adolescents' dietary habits changed during the pandemic.
Ruiz-Roso, <i>et al.</i> <sup>16</sup>	2020	Quantitative	Adolescents	Spain, Italy, Brazil, Colombia, and Chile	The COVID-19 pandemic influenced adolescents' dietary habits.
Kavle, <i>et al.</i> <sup>17</sup>	2022	Qualitative	Adolescents	Nairobi and Uasin Gishu Counties (Kenya)	During the pandemic, adolescents seldom consumed junk foods.
Mayurasakorn, <i>et al.</i> <sup>18</sup>	2020	Qualitative	Adolescents	Thailand	Food insecurity is expected to be higher during the COVID-19 pandemic.
Pujia, <i>et al.</i> <sup>19</sup>	2021	Quantitative	Adolescents	Italy	The COVID-19 lockdown caused significant changes in adolescent behavior.
Bennet, <i>et al.</i> <sup>20</sup>	2021	Qualitative	Adolescents	US, India, China, Palestine, Italy, France, Spain, Poland, UK, Australia, and Zimbabwe	The COVID-19 lockdown caused changes in the dietary practices of adolescents.
Akseer, <i>et al.</i> <sup>21</sup>	2020	Qualitative	Parents and children (including adolescents)	Kyrgyz Republic	The improvement in undernutrition post-pandemic requires serious efforts from the governments.
Stavridou, <i>et al.</i> <sup>22</sup>	2021	Qualitative	Parents and children (including adolescents)	Italy, Spain, Poland, France, Colombia, Chile, Brazil, US, and Palestine	The adolescents' dietary behaviors changed during the pandemic.
Gülü, <i>et al.</i> <sup>23</sup>	2022	Quantitative	Children (including adolescents)	Turkey	Obese adolescents increased during the pandemic.
Chi, <i>et al.</i> <sup>24</sup>	2021	Quantitative	Adolescents	Hechi City (China)	Malnutrition in adolescents increased during the pandemic.

**Table 2. Articles About the Influence of the COVID-19 Pandemic on the Personal Hygiene of Adolescents**

Author	Year	Type of Study	Population of the Study	Country	Results Summary
Zenic, <i>et al.</i> <sup>25</sup>	2020	Quantitative	Adolescents	Croatia	The behavioral pattern of adolescents, specifically personal hygiene, changed due to the pandemic.
Kim, <i>et al.</i> <sup>26</sup>	2022	Quantitative	Adolescents	Korea	Adolescents' personal hygiene behavior changed during the pandemic.
Adelekan, <i>et al.</i> <sup>27</sup>	2021	Quantitative	Adolescents	Nigeria	During the pandemic, adolescents need much knowledge about personal hygiene.
Oakley, <i>et al.</i> <sup>28</sup>	2022	Qualitative	Adolescents	Ethiopia, Jordan, and Palestine	During the pandemic, adolescents need support from the government to increase their personal hygiene.
Singh, <i>et al.</i> <sup>29</sup>	2020	Qualitative	Children (including adolescents)	India	Adolescents' personal hygiene behavior changed during the pandemic.
Meherali, <i>et al.</i> <sup>30</sup>	2021	Qualitative	Adolescents	Ethiopia, Lebanon, Kenya, Jordan, South Africa, Ecuador, and Brazil	During the pandemic, adolescents' personal hygiene behavior has caused limited access to reproductive health services.
Ott, <i>et al.</i> <sup>31</sup>	2020	Qualitative	Adolescents	US	Adolescents' reproductive health changed during the pandemic.
Riiser, <i>et al.</i> <sup>32</sup>	2020	Quantitative	Adolescents	Norwegia	The pandemic has caused limitations in adolescents' knowledge about reproductive health.
Ares, <i>et al.</i> <sup>33</sup>	2021	Quantitative	Children (including adolescents)	Uruguay	Adolescents need information about personal hygiene during the pandemic.
Gilic, <i>et al.</i> <sup>34</sup>	2020	Quantitative	Adolescents	Bosnia and Herzegovina	Parental and family factors during the pandemic have influenced numerous aspects of adolescents' living, including their personal hygiene.

giene, while 4 focused on external reproductive organs. The pandemic has changed the behavior patterns of adolescents, including their hygiene habits. There were hesitations in going out due to government policies prohibiting gatherings, among other reasons.<sup>25</sup> The grooming duration has changed to approximately 2 hours each day compared to the period before the pandemic.<sup>28</sup>

The pandemic has caused fluctuations in the behavior of adolescents, specifically in maintaining hand hygiene, which has reduced compared to their initial diligence.<sup>26</sup> Optimal growth and development have also been impacted,<sup>30</sup> with the health status becoming less stable. This can be attributed to various reasons, including the lack of literacy regarding personal hygiene, the closure of schools that provide health education, and the lack of interest in paying attention to or watching health education advertisements on television.<sup>32</sup>

The COVID-19 pandemic has led adolescents to consistently use personal protective equipment, such as masks when going outside.<sup>27,34</sup> Clean living behaviors greatly affect the health degree status, reducing susceptibility to viral infections.<sup>36</sup> These behaviors can hinder and prevent the spread of disease-causing viruses, including COVID-19.<sup>35</sup>

The government consistently strives to implement various policies to ensure the optimal physical health of adolescents.<sup>29</sup> During the pandemic, there were challenges in improving and increasing the health degree status,<sup>31</sup> due to the induced changes in behavior. Adolescents are more likely to embrace new knowledge that

aligns with their preferences.<sup>33</sup>

Adequate health education needs to be provided, particularly during the COVID-19 period. For instance, adolescents should be able to explain the material they have learned, draw conclusions, and provide examples.<sup>37</sup> There were also additional burdens on healthcare services,<sup>38</sup> which significantly influenced adolescents' immunization.<sup>39,40</sup>

This literature review suggests that adolescents' nutritional status and personal hygiene behavior have been hampered due to the COVID-19 pandemic. The results provide a reference for stakeholders regarding the strategies to countermeasure the growth and development problem among adolescents in the post-pandemic. However, this study has certain limitations, particularly the absence of a review of adolescents' nutritional status and personal hygiene behavior in traditional communities in the post-pandemic

## Conclusion

The COVID-19 pandemic has significantly impacted the physical growth of adolescents, as evidenced by their nutritional status and personal hygiene. Therefore, stakeholders, including the government, were recommended to employ this study as a reference or academic resource in future health emergencies. The results can be used in the rehabilitation policy for physical growth in the post-COVID-19 pandemic.

### Abbreviations

COVID-19: coronavirus disease 2019; SARS: Severe Acute Respiratory Syndrome; MERS: Middle East Respiratory Syndrome.

### Ethics Approval and Consent to Participate

The ethics approval and consent of this study were issued by the Ethical Research Committee of Politeknik Baubau, Number: 108/PL.B/D.A7/PE/VI/2023.

### Competing Interest

The authors declare that there are no significant competing financial, professional, or personal interests that might have affected the performance or presentation of the work described in this manuscript.

### Availability of Data and Materials

Data were collected from Google Scholar, PubMed, and Elsevier, published between 2020 and 2022.

### Authors' Contribution

RH conceptualized the review, interpreted the data, and became a corresponding author. AA, WONJS, and SP helped to collect literature and arrange the framework. WOSJ and SMS helped in designing and preparing the manuscript draft.

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