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AIR QUALITY IN SECONDARY SCHOOLS AND ITS IMPACT ON PUPILS' HEALTH AND WELL-BEING

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Abstract
This article examines the air quality in comprehensive schools and its impact on students' health and learning. The study looked at the impact of air quality indicators such as carbon dioxide levels, dust particles, humidity, and chemicals. The results show that poor air quality negatively impacts students' health and their ability to concentrate. Recommendations include improving ventilation, using air purifiers, and limiting the use of chemicals.

Keywords: Air quality, secondary schools, health, learning process, concentration, ventilation, dust particles, carbon dioxide.

Introduction

Air pollution and environmental degradation pose a serious threat to global health. At least 5.5 million people die each year due to pollution, and this number is expected to reach 6 million by 2050. Air pollution is the cause of many deaths, especially in India and China, which account for almost half of all deaths worldwide. For example, in 2013, 1,600,000 people in China and 1.5 million people in India died from air pollution. The problem is exacerbated by factors such as poor air quality, pollutants emitted by transport and industry, and toxic chemicals in agriculture. According to Michael Braner, a professor at the University of Vancouver in Canada, air pollution is the fourth leading cause of death worldwide, but according to some studies, these deaths are second only to smoking. These cases reinforce the need to study air quality in secondary schools and its impact on students' health and well-being, as air pollution can cause students to develop various problems such as respiratory illnesses, allergies and asthma, which reduces their participation, concentration and overall activity in school [6, 13-17].

As of 2024, air pollution remains a major global health problem. Outdoor air pollution causes an estimated 4.5 million premature deaths, up from 4.2 million in 2019. Most of these deaths, approximately 89%, occurred in low- and middle-income countries, with a heavy burden in the WHO South-East Asia and Western Pacific regions [5].

Among the main causes of pollution, pollution from transport, industry, electricity generation and urban waste play an important role. Policies to increase access to clean energy and control pollution are crucial to reduce mortality [1, 13-14].

Poor air quality can have the following negative effects:

- Allergic reactions (reactions caused by pollen, dust mites and other allergens, mold).
- Respiratory diseases (asthma, bronchitis).
- Difficulty concentrating, excessive fatigue and decreased cognitive abilities [2].
- Problems associated with declining academic performance.

As a result of polluted air, which worsens the well-being of students, their motivation to study may decrease, as well as their memory and decision-making speed [9].

According to WHO experts, bringing the dust concentration in the air to such a level allows us to reduce mortality from lung and heart diseases associated with air quality. WHO recommendations on air quality appeared in 2005. It should be understood that the recommendations presented by the organization are only an ideal to which we should strive [7].

According to the latest estimates from WHO and other global health sources, the health burden of outdoor air pollution will remain as high in 2024 as it has ever been. The main causes of premature mortality due to outdoor air pollution are cardiovascular and respiratory diseases. According to the latest data [3] :

- ❖ 65–70% of air pollution-related deaths are due to coronary heart disease and stroke. [4]
- ❖ 15–17% of deaths are related to chronic obstructive pulmonary disease (COPD) .
- ❖ 10–15% are caused by acute lower respiratory tract infections.
- ❖ and 4–5% are associated with lung cancer [5].

The aim of the study was to analyze indoor air quality in schools and its impact on students' health and academic performance in Uzbekistan.

Results and Analysis:

In order to analyze the indoor air quality of comprehensive schools and its impact on students' health and academic performance, a regional comparison was conducted between School No. 126 in Tashkent and School No. 72 in Kamashni District, Kashkadarya Region. According to him, School No. 72 still uses systems based on natural ventilation. The absence of mechanical ventilation systems can lead to increased CO_2 levels, especially in winter when windows are less open. It was noted that School No. 126 is equipped with a well-developed ventilation system. But it should also be noted that the atmospheric air in Kamashni District is relatively clean, since it is a mountainous region. Schools in Tashkent, the Fergana Valley and other industrialized regions can experience high levels of PM 2.5. This is especially dangerous for children prone to asthma and respiratory diseases. When studying the number of absences related to the health of students in these schools, it was found that 12-14% of the total number of absences among students in School No. 72 were due to allergic reactions and respiratory diseases. In School 126, this figure was at the level of 18-20%. However, in winter, due to a poorly developed ventilation system in School 72, the amount of CO_2 in the premises increases, and in some cases this can cause hypoxia. Due to the lack of oxygen, metabolism and energy production slow down. The increase in the

amount of CO_2 stimulates receptors sensitive to it in the medulla oblongata. In this case, it causes weakness and drowsiness. This leads to a decrease in students' attention to the lesson and the level of learning.

Conclusion

Using new ventilation systems, eco-friendly building materials, and regularly airing out classrooms will not only help clean the air but also improve the health of students. At the same time, improving air quality in schools requires upgrading ventilation systems, using new cleaning technologies, avoiding the use of chemical cleaners, and conducting regular monitoring. Such research is important for schools because it helps create a healthy and effective learning environment. This helps improve student health and learning outcomes, as well as improve well-being in schools.

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