RESEARCH ARTICLE

# Evaluation of the effect of respiratory disease protection education given to adolescents in Kemalpasa, Turkiye

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## Abstract

**Objective:** To evaluate the effectiveness of education given to adolescents about protection against respiratory-transmitted diseases.

**Method:** The quasi-experimental, multi-phase study was conducted from October 1, 2020, to June 11, 2021, at a vocational and technical high school in Anatolia, Turkiye, after approval from the ethics review committee of Ege University, Turkiye, and comprised students of either gender in grades 9, 10, 11, and 12 in the 2020-2021 academic year. Data wascollected during face-to-face interviews through the Student Information Formand the Scale for Assessing Perceptions and Attitudes Towards the Coronavirus Disease-2019 Outbreak. Educational material and video films of the Ministry of Health were edited and used during the education phase. To evaluate the effectiveness of the education, the students' level of knowledge about protection from respiratory-transmitted diseases was tested again 3 months after the education intervention. Baseline and post-intervention leveks were compared to assess the impact of the intervention. Data was analysed using SPSS 26.

**Results:** Of the 665 students, 302(45.4%) participated in the pre-test, while 374(56.2%) attended the education phase, and 365(54.9%) participated in the post-test. The open-ended question in the post-test was answered by 310(84.9%) subjects. The majority of the students were male 284(94.0%), and aged 13-16 years 283 (93.8%). The statement "Respiratory diseases are caused by bacteria" was correctly affirmed by 236(78.1%) of the students before and 278(76.2%) after the education. There was a significant difference between the awareness of the students post-intervention compared to baseline about the transmission route of the infectious agent, the disease process, and the importance of wearing a mask. The difference was also significant in terms of students' perception of danger, contagiousness, causes, conspiracy, environment, macro, avoidance behaviours, cognitive avoidance, avoidance of common areas, and avoidance of personal contact ($p<0.05$).

**Conclusion:** Continuous education of adolescents, families and teachers within the scope of school health contributed to the prevention of respiratory diseases and health promotion.

**Keywords:** Adolescent, Respiratory tract diseases, Educational assessment, Public health, Nursing. (JPMA 76: 834; 2026)

**DOI: https://doi.org/10.47391/JPMA.22144**

## Introduction

Respiratory-transmitted infections (RTIs) spread all over the world from time to time, causing disaster.[1] With the increase in relations among countries, the course of epidemics has changed. Not only goods, thoughts, and technology, but also disease germs are carried across societies.[2] Respiratory system diseases (RSDs) are diseases that occur as a result of abnormalities occurring in the upper respiratory tract, consisting of the nose, nasal cavity, sinuses, mouth, pharynx and larynx, and lower respiratory tract organs, such as the lungs and trachea.[3] When the RTIs are considered in chronological order, it is seen that the Spanish flu, the Asian flu, and severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) coronavirus disease-2019 (COVID-19) outbreaks followed each other.[4] RTIs, which can be transmitted to healthy people, are common. They are sometimes difficult to diagnose, can cause serious complications when left untreated, and can lead to increased mobility and mortality. They continue to be an important health problem in terms of human health all over the world.[5-7]

RTIs in adolescents are common in crowded school environments and cause absenteeism.[8,9] It has been determined that among adolescents, COVID-19 infection can progress without symptoms, its prognosis is better than adults, the infection attack rate is lower, there is evidence that it is less infected than adults, but the risk of infection increases in the presence of additional diseases, Besides, the disease is asymptomatic, and hospitalisation is required from time to time.[10-12] During the COVID-19 pandemic,the process of education was massively affected, and had to be largely carried out online and through self-learning.[13-15]

The rapid spread of COVID-19 globally developed the idea that there was no safe place anywhere in the world

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**Submission complete:** 18-10-2024 **1st Revision received:** 17-01-2025

**Acceptance:** 28-01-2026 **Last Revision received:** 27-01-2026

anymore, and fear, hopelessness, stress, anxiety, helplessness and depression caused crises in terms of mental health of students.[16,17] In a 2021 study, it was found that 30.7% of adolescents had depression and 46.9% had anxiety, while girls had higher anxiety levels than boys.[18]

Adolescents were found to have information about the COVID-19 outbreak. They had positive attitudes towards protective measures, obtained information about the outbreak mostly from television and social media, had poor knowledge about the outbreak, and did not fully comply with some protective measures.[19,20]

The purpose of school health services is to ensure and maintain optimum physical, mental, and social health of students.[21] It has been stated that the impact of diseases, like SARS and influenza, can be reducedby providing training to students on RSDs and personal hygiene. The foundations of the responsibilities required for the development of positive values regarding a healthy adulthood are laid during the childhood period, which includes the primary and secondary school years.[22] The most important issue regarding school health is that there is a high probability that RSDs will spread rapidly due to the fact that students move around together in groups.[23] The main purpose of school health studies is to eliminate health problems that may affect the learning process. In this respect, school health programmes target improving health, protecting against diseases, identifying existing health problems, and educating students and their families about a healthier life.[24]

Transferring the right information regarding life, and making it a habit, can be ensured by the education that the person will receive from the family, close environment, and especially from school.[7]

The current study was planned to evaluate the effectiveness of education given to adolescents about protection against RTIs and RSDs.

## Subjects and Methods

The quasi-experimental, multi-phase study was conducted from October 1, 2020, to June 11, 2021, at a vocational and technical high school in Anatolia, Turkiye, after approval from the ethics review committee of Ege University, Turkiye, and comprised students of either gender in grades 9, 10, 11, and 12 in the 2020-2021 academic year. All the students who agreed to participate were included. Since it was optional for students to come for face-to-face education during the COVID-19 pandemic when the study began, the number of participants kept changing through the various phases of the study.

In the first stage, after taking written informed consent from the students and their families, the participants filled out surveys under the observation of researchers in their classes. Those who were absent on the day or not willing to participate were excluded. Individual identifiers, like names, were not collected in order to reduce response bias. Data was collected using the Student Information Form (SIF), and the Respiratory Diseases Protection Knowledge Level Questions (RDPKLQ) and the Scales for Assessing Perceptions and Attitudes Towards the COVID-19 Outbreak (SAPATCO).

SIF was designed in thelight of literature[7,8,15,25] and consisted of 15 questions, exploring socio-demographic characteristics and information level about RTIs.

RDPKLQ was created in accordance with literature.[7-9,15,25-28] The form was sent to five experts for their opinion, and was pilot-tested on 12 students, and some of the questions were rephrased. These students were not included in the main study. There were 15 knowledge-related questions. Each statement carried response options "*true*", "*false*", and "*no idea*".Correctly answered statements were scored 1, while the rest of the responses were scored 0. The total score ranged 0-15, with high score indicatinga high level of knowledge about protection from respiratory diseases.

SAPATCO was designed after permission from the authors of a study[15] that evaluated perceptions and attitudes towards COVID-19. Artan et al. in 2020 modified the fifth form related to avoidance behaviours with the permission of the original author, and a total of 4 subscales were, thus, used. Each of the scales was evaluated independently, and separate scores were obtained. The statements in the scale were used as they were in the original scale, except for the necessary revisions related to COVID-19. High scores on all scales indicated that the belief in that area was high. The general perception, causes, and perception of control scales were scored on a 5-point Likert scale ranging from "*strongly disagree*" to "*strongly agree*". The general perception subscale coveredthe elements of "*contagiousness*" and "*danger*." The causes subscale assessedthe factors that cause the disease, and included the dimensions of conspiracy, environment, and belief. The conspiracy dimension assessed the perception that the coronavirus had been created with some kind of conspiracy motivation. The environment dimension assessedthe perception that the disease occurred due to environmental reasons, and the dimension of belief measured the level of attributing the disease to religious reasons. The control subscale evaluatedthe perception of control over the disease. High scores indicated higher perception of control. Among the macro-control, personal control, and inevitability dimensions, the statements under '*inevitability*' required reverse-coding, and high scores indicated that the

belief that the person could avoid the disease was high. The avoidance behaviors subscale was scored on a 5-point Likert scale, ranging from "*never*" to "*very often*". The subscale included cognitive avoidance, avoidance of common areas, and avoidance of personal contact.[15] In the stage 2 of the study, the education material and video films of the Ministry of Health (MoH) were edited and used in the education.[26,27] The intervention comprised 20 sessions, with 10-15 students in each session. The intervention was carried out in the classrooms with the support of counsellors. Before the education, the classroom was organised with U-shaped seating arrangement, appropriate lighting, ambient temperature, sound and with posters and banners in the education room. Each session had two parts, and lasted 90 minutes in total. In the first part, the topics covered were RTIs, their symptoms and transmission routes, preventive steps, including protection in crowded environments, washing hands and wearing masks in the context of COVID-19. In the second part, the questions of the participants were answered, and their feedback was received. The prepared posters and brochures were hung on the school board and classroom boards, where all students could see them. They were shared by counsellors on students' social networking sites and groups. The messages were revised regularly and shared every week.

Stage 3 of the study comprised the evaluation three months post-intervention. The effectiveness of the education was evaluated on the basis of knowledge, perceptions/attitudes towards the disease, and anxiety/avoidance levels. In addition to the relevant questionnaires used in stage 1, the process evaluation had an additional open-ended question: "What are your thoughts about the education you received on protection from respiratory diseases?".

Data was analysed using SPSS 26. Data were presented as mean±standard deviation, or frequencies and percentages, as appropriate. Data distributionwas tested using the Kolmogorov-Smirnov test. The impact of the intervention, which was the independent variable, on dependent variables, like students' knowledge level, perceptions or attitudes, and anxiety or avoidance level was assessed using the Wilcoxon Signed testand McNemar test. $P<0.05$ was considered significant.

## Results

Of the 665 students, 302(45.4%) participated in the pre-test, while 374(56.2%) attended the education phase and 365(54.9%) participated in the post-test. The open-ended question in the post-test was answered by 310(84.9%) subjects (Figure 1). The majority of the students were male

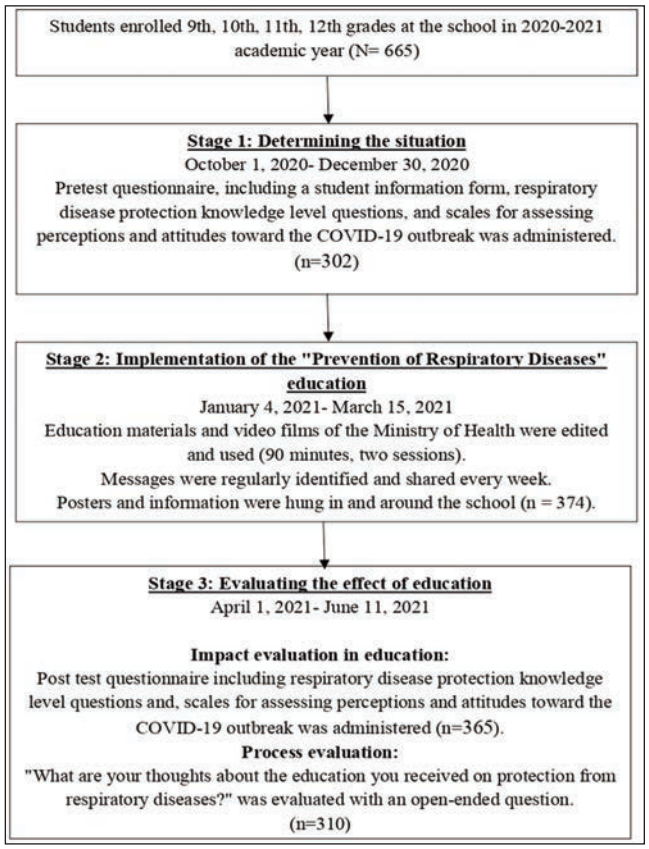


**Figure-1:** The study flowchart.

**Table-1:** Demographic characteristics of the participants.

| Variables | Pre-test (n=302) n (%) | Post-test (n=365) n (%) |
|---|---|---|
| **Gender** | | |
| Female | 18 (6.0) | 39 (10.7) |
| Male | 284 (94.0) | 326 (89.3) |
| **Age Group** (years) | | |
| 13-14 | 111 (36.8) | 57 (15.6) |
| 15-16 y | 172 (57.0) | 190 (52.0) |
| 17-18 | 19 (6.3) | 113 (7.6) |
| ≥19 | 0 | 5 (1.3) |
| **Presence of a chronic disease** | | |
| Yes | 65 (21.5) | 54 (14.8) |
| No | 237 (78.5) | 311 (85.2) |
| **RTIs status** | | |
| Yes | 96 (31.8) | 111 (30.4) |
| No | 206 (68.2) | 254 (69.6) |
| **Relative's RTIs status** | | |
| Yes | 96 (31.8) | 279 (76.4) |
| No | 206 (68.2) | 86 (23.6) |
| **Friend's RTIs disease status** | | |
| Yes | 96 (31.8) | 293 (80.3) |
| No | 206 (68.2) | 72 (19.7) |
| **Death of an acquaintance due to COVID-19 disease** | | |
| Yes | 96 (31.8) | 135 (37.0) |
| No | 206 (68.2) | 230 (63.0) |

RTI: Respiratory-transmitted infections, COVID-19: Coronavirus disease-2019.

**Table-2:** Students' responses at baseline and post-intervention.

| Information questions | | Pre-test (n=302) n (%) | Post-test (n=365) n (%) | *p*-value |
|---|---|---|---|---|
| 1. Respiratory diseases are caused by bacteria | True | 236 (78.1) | 278 (76.2) | 0.876 |
| 2. RTIs are mainly transmitted by droplet | True | 163(54.0) | 225 (61.6) | 0.080 |
| 3. Common symptoms of RTIs are fever, cough and shortness of breath | True | 287(95.0) | 348 (95.3) | 1.000 |
| 4. Loss of taste and smell is very rare in RTIs | True | 141(46.7) | 193 (52.9) | 0.054 |
| 5. RTIs may not give any symptoms | True | 200(66.2) | 248 (67.9) | 1.000 |
| 6. Patients who have a "negative" Coronavirus PCR test result in health institutions are definitely not patients. | True | 79(26.2) | 159 (43.6) | 0.000* |
| 7. Every patient who is proven to have Coronavirus is hospitalised | True | 26(8.6) | 97 (26.6) | 0.000* |
| 8. RTIs are more severe in young people | True | 98(32.5) | 94 (25.8) | 0.0191* |
| 9. Coronovirus is a type of pneumonia | True | 246(81.5) | 129 (35.3) | 0.000* |
| 10. People recovering from RTIs do not need to wear a mask | True | 255(84.4) | 58 (15.9) | 0.000* |
| 11. In case of quarantine in RTIs, patients can spend time in open areas such as parks and gardens away from everyone else | True | 33(10.9) | 115 (31.5) | 0.000* |
| 12.COVID-19 vaccine studies are not carried out in our country | True | 62(20.5) | 123 (33.7) | 0.000* |
| 13. In case of quarantine in the RTIs, do not leave the house during the quarantine period unless absolutely necessary | True | 224(74.2) | 276 (75.6) | 0.926 |
| 14. Wearing a mask at RTIs cannot fully prevent disease transmission | True | 231(76.5) | 311 (85.2) | 0.030* |
| 15. In RTIs, it is absolutely necessary to wear a mask if it is necessary to coexist with non-family members in closed environments | True | 91(30.1) | 268 (73.4) | 0.000* |

*$p<0.05$; Test: McNemar Test; RTI: Respiratory-transmitted infections, COVID-19: Coronavirus disease-2019.

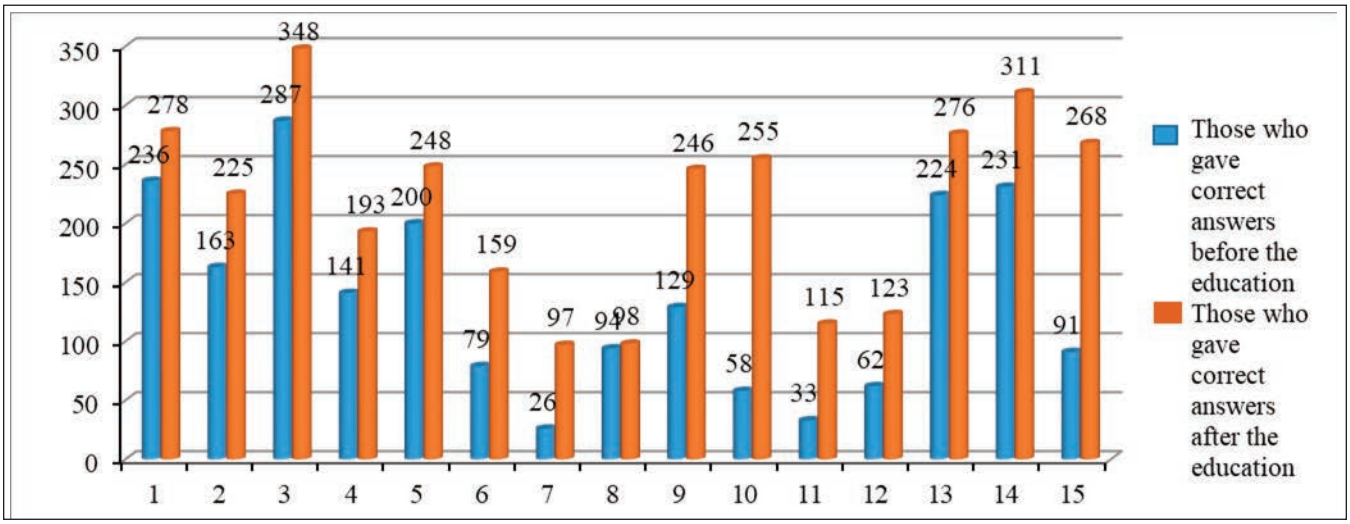


**Figure-2:** Change in knowledge-relatedquestions post-intervention compared to baseline.

and aged 13-16 years (Table 1).

Of the 15 items explored, there was a significant difference post-intervention compared to baseline related to 9 (60%) (Table 2, Figure 2).

The students' perception and attitude scores also showed the positive impact of the intervention (Table 3).

## Discussion

In the current study, the majority of the students were males aged13-16. A 2019 study with university students found that they were aged 18 and over, 28 while a 2022 study with university students found more female students than male. The high number of male students in the current study was probably because it was conducted at a vocational high school.[29]

In a 2022 study, the mean value of Fear of COVID-19 Scale (FCV-19S) was 22.1and the median score was 22 and the fear level of female university students washigher than thatof male students.[29] Ahorsu et al. reported that fear scores from the COVID-19 pandemic were high, and higher in women than in men, while psychological symptoms were similar in both genders and age groups.[30] In a study with students in Malaysia and Pakistan, 63.1% of students in Malaysia and 51.2% in Pakistan were afraid of COVID-19 disease, and one-third of students in both countries were afraid of losing a relative during the pandemic.[25] In a study in Malaysia, it was found that the fear of COVID-19 disease caused anxiety, depression, and stress-related symptoms, and the scores were higher in the younger age group.[31]

In order to reduce the rate of pandemic's spread, it was

**Table-3:** Evaluation of students' perceptions and attitudes.

| | | Mean±SD | Test value | *p*-value |
|---|---|---|---|---|
| General Perception | Pre-test | 27.37±4.,46 | 0.770 | 0,440 |
| | Post-test | 27.17±4.92 | | |
| Danger | Pre-test | 14.71±3.63 | -2.621 | 0.009* |
| | Post-test | 15.40±3.65 | | |
| Contagiousness | Pre-test | 12.66±2.58 | 4.927 | 0.000* |
| | Post-test | 11.77±2.95 | | |
| Causes Perception | Pre-test | 49.13±13.42 | 5.732 | 0.000* |
| | Post-test | 53.14±12.74 | | |
| Conspiracy | Pre-test | 15.92±6.7 | -4.450 | 0.000* |
| | Post-test | 18.04±5.88 | | |
| Environment | Pre-test | 21.38±6.51 | 5.796 | 0.000* |
| | Post-test | 23.38±6.68 | | |
| Faith | Pre-Test | 11.84±3.67 | 2.932 | 0.002* |
| | Post-test | 11.72±3.67 | | |
| Control | Pre-test | 39.22±7.61 | 2.001 | 0.045 |
| | Post-test | 40.27±8.5 | | |
| Macro | Pre-test | 10.76±4.04 | 3.453 | 0.001* |
| | Post-test | 11.41±3.88 | | |
| Personal | Pre-test | 15.34±4.11 | -0.923 | 0.587 |
| | Post-test | 15.68±4.08 | | |
| Inevitability | Pre-test | 13.12±3.52 | -0.069 | 0.945 |
| | Post-test | 13.18±3.33 | | |
| Avoidance Behaviours | Pre-test | 45.05±10.44 | 3.529 | 0.000* |
| | Post-test | 40.99±10.2 | | |
| Avoidance of Cognitive | Pre-Test | 20.10±5.60 | 4.625 | 0.000* |
| | Post-test | 17.32±5.35 | | |
| Avoidance Common Areas | Pre-test | 16.44±4.91 | 4.711 | 0.000* |
| | Post-test | 14.24±4.54 | | |
| Avoidance of Personal Contact | Pre-test | 8.52±3.13 | -3.587 | 0.000* |
| | Post-test | 9.43±2.93 | | |

Test: Wilcoxon Signed Test, SD: Standard deviation.

important that people have the right behaviours to protect themselves, because individual behavioural changes can cause changes that will affect the whole society.[32] School health programmes are meant to improvehealth, prevent diseases, identify existing health problems, and educate the students and their families about a healthier life.[33] The aim of health education is to provide students with the right health behaviours to live healthy lives and to replace bad habits with useful ones.[33]

The current study has limitations as it did not collect individual identifiers to protect minors' privacy and to avoid stigma around sensitive topics, such as COVID-19, but this methodological choice led to the presentation of aggregate data reflecting the overall effect of the intervention.

In the light of the current findings, continuous education of students, families and teachers is recommended because it will contribute the health of society.

## Conclusion

The students were found to to lack in sufficient knowledge about the epidemic that coud cause RTIs, and they did not know how the disease was transmitted or the methods of protection.

**Disclaimer:** None.

**Conflict of Interest:** None.

**Source of Funding:** None.

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**Author Contribution:**
**NB & GM:** Concept, design, data acquisition, analysis, interpretation, drafting, revision, final approval and agreement to be accountable for all aspects of the work.