

A Study on the Health Changes of Students in Long-Term Online Classes due to COVID-19

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Abstract

The COVID-19 pandemic has had a significant impact on the educational landscape for students across the globe, leading to a shift towards long-term online learning. This study aims to examine the changes in the health status of college and university students before and after the transition to online classes. We conducted a survey questionnaire among 200 students enrolled at K University in Gangwon-do, including participants from both the Department of Visual Optics and the Department of Physical Therapy. The survey employed a 5-point Likert scale to evaluate a range of health-related factors, including physical and mental well-being, alterations in lifestyle, and academic performance. Both male and female students experienced a decline in physical strength and exercise during the online class period, while mental health and overall happiness showed improvement, particularly among female students. Notable shifts in lifestyle emerged, including an increased usage of electronic devices and enhanced familial connections. The study also shed light on intriguing trends related to academic accomplishments and adherence to official quarantine guidelines. In sum, the findings of this study offer valuable foundational information for the maintenance of students' well-being during online learning, as well as the development of effective strategies for online education in future academic settings.

Keywords: COVID-19 Pandemic, Online Classes, Health Status, Mental Health, Academic Accomplishments

1. Introduction

Since the beginning of 2020, the global educational landscape has undergone significant changes due to the widespread impact of COVID-19 [1-3]. The pandemic has required substantial adjustments in the delivery of education worldwide. Especially during the first semester of 2020, universities transitioned to comprehensive remote learning, with only a few practical classes conducted in person. This was done to

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carefully manage limited contact time and space [4-6]. This unexpected and prolonged change in educational conditions has led college and university students to adopt distinct lifestyles from what they were used to. These changes may have had unnoticed effects on their mental and physical well-being.

Given this context, the present study aims to assess changes in students' health before and after the implementation of online classes [7, 8]. Data on students' health status were collected through a comprehensive questionnaire survey and subsequently analyzed. The questionnaire used a 5-level Likert scale to explore various health-related aspects, including weight, vision, physical strength, sleep, appetite, emotional well-being, depression, happiness, hope, future outlook, and the occurrence of any new diseases. Gender and grade were also taken into consideration.

The findings of this study are expected to provide essential foundational data for maintaining students' health in the context of long-term online classes. Additionally, these findings will lay the groundwork for a robust system of online educational methods suitable for future learning environments [9, 10].

2. Research Method

This study conducted a questionnaire survey to investigate the impact of the increased use of long-term non-face-to-face classes during the COVID-19 period on the health status of students attending K University in Gangwon-do. The survey included responses from 200 students, specifically from the Department of Visual Optics and the Department of Physical Therapy. The questionnaire covered various aspects of physical and mental health, such as weight, exercise, physical strength, sleep, appetite, emotions, depression, happiness, and hope. It also addressed changes in lifestyle, academic achievement, and students' awareness of COVID-19.

Participants were asked to provide their responses using a 5-point Likert scale (ranging from ① Very Decreased/Very Bad to ⑤ Very Increased/Very Good) based on their self-assessment. The collected survey data were used to calculate average response values for three groups: all students, male students, and female students. The results for each group's average values were then analyzed in comparison to the baseline value of 3.00, which represents no change attributed to COVID-19.

3. Results and Discussion

3.1 Changes in Physical Health perceived by Self-assessment

The average body weight of students during the extended online classes does not exhibit any change compared to the pre-online class period. As indicated in Table 1, the overall average value is 2.96 (2.99 for male students and 3.03 for female students). This outcome suggests that long-term online classes have minimal impact on the body weight of students, irrespective of gender differences.

The physical strength of both male and female students decreased due to prolonged online classes. The overall average value is 2.56, with female students averaging 2.36 compared to 2.79 for male students. This finding indicates that the physical strength of female students is more affected by insufficient daily activity or lack of physical exercise during the online class period than that of male students.

The amount of exercise during the online class period slightly decreased for both male and female students, as presented in Table 1. The overall average value for all students is 2.81, with male students averaging 2.86

and female students averaging 2.76. The reduction in exercise is believed to be attributed to longer periods of staying at home, especially after the outbreak of the coronavirus.

There is a slight disparity in the perceived physical health condition among male and female students. The average values for male and female students are 3.42 and 2.91, respectively. This difference is thought to stem from changes in the lifestyles of male and female students due to the extended period of staying at home. The decrease in alcohol consumption among male students may contribute to their better perceived physical health condition compared to female students.

Table 1. Changes in physical health perceived by self-assessment in long-term online classes

	All students	Male students	Female students
Body weight	2.99	3.03	2.96
Physical strength	2.56	2.79	2.36
Amount of exercise	2.81	2.86	2.76
Physical health condition	3.15	3.42	2.91

3.2 Change in Mental Health perceived through Self-assessment

The impact of long-term online classes on memory and forgetfulness health has shown a slight decline. The overall average score, as indicated in Table 2, is 2.84. Among the students, females scored 2.76, which is lower than the male students' score of 2.92. It is believed that the prolonged period of home stay affects the memory and forgetfulness health of female students more significantly than that of male students.

The stress experienced by students slightly decreased due to the extended period of online classes. The combined average score for all students is 3.17. In terms of gender, the average scores are 3.03 for males and 3.29 for females, indicating that the reduction in stress was more pronounced in female students compared to their male counterparts.

Long-term online classes have contributed to an improvement in students' mental health. The collective average score is 3.23. Specifically, the average scores for mental health are 3.02 for male students and 3.40 for female students. Notably, the enhancement in mental health among female students surpassed that of male students.

Table 2. Change in mental health perceived through self-assessment during extended online classes

	All students	Male students	Female students
Memory and forgetfulness health	2.84	2.92	2.76

Stress	3.17	3.03	3.29
Mental health	3.23	3.02	3.40
Feelings of happiness	3.46	3.20	3.68
Sense of hope	3.15	3.09	3.20
Depression	3.01	2.94	3.08

There has been a substantial increase in feelings of happiness as a result of long-term online classes. The average happiness rating is 3.46 for all students. Particularly noteworthy is the average score of 3.68 for female students, which is higher than the male students' average of 3.20. This outcome suggests that female students derive more satisfaction from online classes than their male counterparts.

The sense of hope has experienced a minor uptick through long-term online classes, with an average score of 3.15. Female students exhibited an average score of 3.20, surpassing the 3.09 average score of male students.

However, the level of depression among students remained unchanged during the period of long-term online classes. The overall average score remains at 3.01, with male students averaging at 2.94 and female students at 3.08. This indicates that online classes had no significant impact on students' levels of depression.

3.3 Self-perceived Changes in Lifestyle

As shown in Table 3, the food intake during long-term online classes remains unchanged. The average value for all students is 3.04. Moreover, there is only a slight difference between male and female students, with average values of 3.09 and 2.97, respectively. This result indicates that food intake is not influenced by long-term online classes, regardless of gender.

The time spent using electronic devices such as smartphones, TVs, and computers after online classes has increased significantly. The average value for all students is 3.92, which is much higher than the unchanged average value of 3.0. Particularly, female students exhibited a higher value of 4.00 compared to the value of 3.83 for male students. This implies that long-term online classes affect female students' lifestyles more than male students'.

Sleep duration has increased considerably due to long-term online classes. The average value for all students is 3.42. Specifically, female students displayed a higher average value of 3.55 compared to 3.27 for male students. This indicates that long-term online classes have a greater impact on changing female students' lifestyles compared to male students'.

The quality of sleep has slightly improved due to long-term online classes for all students. The average value is 3.28. Female students showed an average value of 3.38, which is higher than the 3.17 of male students. This result can be attributed to the fact that all students may have more time to sleep at home instead of commuting to school. Additionally, female students appear to have become accustomed to such circumstances.

The level of intimacy with peers remains unchanged during long-term online classes. The average value for all students is 3.02. Both male and female students displayed values of 2.95 and 3.08, respectively. This indicates that online classes do not significantly impact intimacy with peers for all students.

Conversely, the level of intimacy with family has significantly improved during long-term online classes. The average value for all students is 3.38. The average value for female students is 3.51, higher than the 3.23 for male students. This is likely due to the extended time spent at home, leading to a more positive relationship between family members, particularly for female students.

For all students, the regularity of daily routines has slightly worsened during long-term online classes compared to before. The average value for all students is 2.80. Specifically, male students have an average value of 2.74, lower than the 2.86 for female students. The lifestyle of students appears to become more irregular due to extended periods of staying at home.

The consumption of alcoholic beverages among students has significantly decreased during the prolonged COVID period. The average value for all students is 2.62, indicating a decrease in drinking compared to the unchanged value of 3.00. Both male and female students have nearly identical values of 2.61 and 2.63, respectively, irrespective of gender.

On the other hand, smoking among male students has slightly increased during the prolonged COVID period, with an average value of 3.17. However, the average value for female students is 3.04, indicating no change due to COVID online classes. The overall average value for all students is 3.10.

Table 3. Self-perceived changes in lifestyle due to long-term online classes

	All students	Male students	Female students
Food intake	3.04	3.09	2.97
The time spent using electronic devices	3.92	3.83	4.00
Sleep duration	3.42	3.27	3.55
Quality of sleep	3.28	3.17	3.38
The intimacy with peers	3.02	2.95	3.08
The intimacy with family	3.38	3.23	3.51
The regularity of daily routines	2.80	2.74	2.86
The drinking	2.62	2.61	2.63
The smoking	3.10	3.17	3.04

3.4 Change of Academic Achievement

The reading and the study hours during long-term online classes were nearly the same as before. The overall average scores for those are 3.02 and 3.06 respectively as shown in Table 4. However, female students displayed an average score of 3.18 in the study hours, slightly higher than the male students' average of 2.92. This suggests that female students are more dedicated to online studies than their male counterparts.

There is a noticeable difference in academic achievement perceived by students between online and offline

classes [11]. The overall average score is 3.32, slightly higher than the no-difference score of 3.0. However, a significant disparity exists between male and female students, with scores of 3.58 and 3.09, respectively. As mentioned earlier, this is because female students adapt more easily to online classes compared to male students.

3.5 Students' Cognition for COVID-19

For the necessity of COVID-19 vaccination, all students exhibited an average score of 3.46 as indicated in Table 4. Male students, on the other hand, recorded a significantly higher average score of 3.67, in contrast to the 3.28 average score of female students. These findings indicate that while all students acknowledge the positive impact of COVID-19 vaccination, male students tend to have greater confidence in its effectiveness compared to their female counterparts.

There exists a certain degree of apprehension among all students regarding the potential side effects of vaccination, as evident from the average score of 3.19. Notably, female students (with an average score of 3.36) exhibited noticeably more concern than male students (with an average score of 3.02). These results suggest that, akin to the matter of trust in vaccination, side effects constitute a significant concern for female students.

The official quarantine guidelines were adhered to satisfactorily by all students, yielding an overall average score of 4.39. The average scores for male and female students were 4.45 and 4.34, respectively, indicating a minimal gender disparity.

A great consensus was observed among all students regarding the necessity of online classes as a preventive measure against COVID-19, as evidenced by an overall average score of 4.01. However, female students exhibited a slightly higher average score of 4.21, as opposed to the male students' average score of 4.00. This discrepancy could potentially be attributed to the greater adaptability of female students to online learning compared to their male counterparts.

Table 4. Modification of various factors as perceived through self-assessment during extended periods of online classes

	All student s	Male students	Female students
Reading	3.02	3.12	2.93
Study hours	3.06	2.92	3.18
Differences in academic achievement	3.32	3.58	3.09
The necessity of COVID19 vaccination	3.46	3.67	3.28
Apprehension regarding the side effects of vaccination	3.19	3.02	3.36
The following of official quarantine guidelines	4.39	4.45	4.34
The necessity of on-line classes	4.01	4.00	4.21

4. Conclusion

The COVID-19 pandemic necessitated an unprecedented shift to long-term online classes, dramatically altering the educational landscape for college and university students. In this study we investigated the health changes experienced by students during online classes and explored their academic achievements and adherence to pandemic guidelines. The findings revealed the following several significant features.

Physical health changes showed that body weight of all students remained largely unaffected, while physical strength and exercise of female students decreased. These changes can be attributed to reduced daily activity and limited opportunities for physical exercise during prolonged periods of staying at home.

Mental health changes were observed, with improvements in mental health and happiness reported, particularly among female students. Conversely, memory and forgetfulness health remained relatively stable, and stress levels decreased for all students during online classes.

Lifestyle changes were evident in increased electronic device usage and improved intimacy with family. However, irregularity in life routines became apparent, likely due to the prolonged home-stay situation.

Academic achievements indicated that study hours remained consistent, while some students perceived significant differences between online and offline classes. Female students seemed to adapt better to online learning compared to their male counterparts.

Students displayed a positive attitude toward vaccination in preventing COVID-19, but female students expressed more concern about potential side effects. However, all students well followed official quarantine guidelines.

Overall, this study sheds light on the multifaceted effects of online classes on students' physical and mental well-being, lifestyle, academic achievements, and perceptions related to the pandemic. The findings can serve as a crucial foundation for formulating strategies to maintain students' health and well-being during extended online learning periods and designing effective online education approaches for future challenges.

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