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# Trajectories of Anxiety Symptoms for COVID-19 Patients Using Multimodal Data Collected from Telemedicine

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**Abstract.** We designed and developed Remote Patient Monitoring (RPM) system specific for coronavirus (COVID-19) patients, and collected multimodal data. Using the collected data, we explored the trajectories of anxiety symptoms for 199 COVID-19 patients quarantined at home. Two classes were identified using latent class linear mixed model. Thirty-six patients showed an exacerbation of anxiety. Presence of initial psychological symptoms, pain on the start day of quarantine, and abdominal discomfort at one month after finishing the quarantine were associated with exacerbation of anxiety.

**Keywords.** COVID-19, Telemedicine

## 1. Introduction

Seoul National University Hospital designed a contactless clinical trial [1] and developed remote patient monitoring (RPM) system to expand telemedicine use, and collected multimodal data using online survey, wearable devices, and video call to effectively monitor COVID-19 patients while minimizing contact with the medical staffs. This study aimed to explore the trajectories of anxiety symptoms experienced by COVID-19 patients using the collected data.

## 2. Methods

A total of 199 adult patients with COVID-19 infection quarantined at home participated in this study from March 2022 to June 2022. The anxiety symptoms were examined using

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Generalized Anxiety Disorder 7-item scale (GAD-7) [2] at 3 time points: on the start day of quarantine (Time 1), on the final day of quarantine (Time 2), and one month after finishing the quarantine (Time 3). The data was collected from remote patient monitoring system using telehealth. The latent class linear mixed model was used to identify the subgroups of trajectories of anxiety symptoms, and logistic regression was applied with trajectory groups as dependent variables, and sociodemographic features, past medical history, initial psychiatric symptoms, and average number of days with acute COVID-19 symptoms at each of the three time points as independent variables.

## 3. Results

Two classes of anxiety symptoms' trajectories were identified by sequential GAD-7 score plot of individual patients (Figure 1). Class 1 showed a slow linear declined of anxiety symptoms. Class 2 showed a linear aggravation of anxiety symptoms.

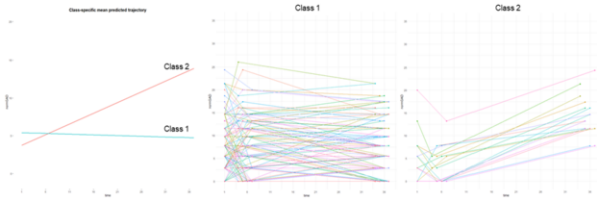


**Figure 1.** Identified anxiety symptoms' trajectories

Thirty-six patients showed class 2, an exacerbation of anxiety. Presence of initial psychological symptoms (OR, 1.14; 95% CI, 1.00-1.29), pain at Time 1 (OR, 1.12; 95% CI, 1.03-1.22), and abdominal discomfort at Time 3 (OR, 1.23; 95% CI, 1.05-1.45) were associated with exacerbation of anxiety.

## 4. Conclusion

The results of this study demonstrated the effectiveness of RPM system for COVID-19 patients by expanding the use of telemedicine and possible use to forecast the likelihood of anxiety exacerbation.

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