ic **Infection & Chemotherapy**

Brief Communication

Check for updates

Self-Assessment Questionnaire for Efficient and Safe Evaluation of Patients with Mild COVID-19

Hyeongseok Jeong (ID)**, Jooyeon Lee** (ID)**, Jungok Kim** (ID)**, Shinhye Choen** (ID)**, Kyung Mok Sohn** (ID)**, Yeon-Sook Kim** (ID)**, and Sungmin Kiem** (ID)

Division of Infectious Disease, Department of Internal Medicine, Chungnam National University School of Medicine, Daejeon, Korea

OPEN ACCESS

Corresponding Author:
Sungmin Kiem, MD, PhD
Division of Infectious Disease, Department of Internal Medicine, Chungnam National University School of Medicine, 282 Munhwa-ro, Jung-gu, Daejeon 35015, Korea.
Tel: +82-42-280-6791
Fax: +82-42-280-6970
E-mail: smkimkor@gmail.com

ORCID iDs
Hyeongseok Jeong (ID)
https://orcid.org/0000-0002-4539-079X
Jooyeon Lee (ID)
https://orcid.org/0000-0002-0898-4433
Jungok Kim (ID)
https://orcid.org/0000-0002-0694-1579
Shinhye Choen (ID)
https://orcid.org/0000-0002-1783-121X
Kyung Mok Sohn (ID)
https://orcid.org/0000-0002-3237-044X
Yeon-Sook Kim (ID)
https://orcid.org/0000-0003-1142-5488
Sungmin Kiem (ID)
https://orcid.org/0000-0003-3518-966X

ABSTRACT

As the outbreak of coronavirus disease 2019 continues and the number of confirmed cases requiring isolation increases, there is a need for a safe and efficient system to assess patients' condition. We developed and evaluated a self-assessment questionnaire consisting of 23 symptoms with linear-scale scores from 0 to 10. Patients were asked to indicate their worst score for each symptom daily, and medical personnel assessed clinical improvement or deterioration based on the changes in scores. Focused communication on severity of specific symptoms was the primary advantage for the clinicians, and a thorough check for their symptoms was helpful for patients.

Keywords: COVID-19; Isolation; Self-assessment; Questionnaire

Coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has become a pandemic disease despite the global efforts of the government, the public, and healthcare workers. To date, more than 750,000 people have been affected in 203 countries, and about 36,405 people have died, with a wide variation in the case fatality rate of up to 10% depending on the country [1].

As the number of infected patients has rapidly increased, isolation of a large number of mild cases has become an important issue. Potential viral shedding during asymptomatic (or subclinical) periods characterizes this respiratory disease [2, 3], and about 80% of confirmed cases display just mild or even no definite subjective symptoms [4, 5]. In Korea, asymptomatic confirmed cases and patients with mild COVID-19 are transferred to isolation wards or Living and Treatment Centers [6]. Living and Treatment Centers are facilities specialized to isolate patients who have little need in-hospital treatment. In March 2020, there were 16 Living and Treatment Centers in Korea, accommodating about 4,000 cases.

As medical resources are insufficient, there is a need for a safe and efficient method for evaluating the mild cases in isolation wards and Living and Treatment Centers. For this purpose, we developed a self-assessment questionnaire to evaluate the condition of patients with mild COVID-19, and we share our experience with healthcare authorities and providers all over the world.

We listed a total of 23 clinical symptoms of COVID-19 reported in previous surveys [4]. In addition to typical symptoms such as fever, headache, sore throat, cough, and myalgia, we also included unusual symptoms such as ageusia and anosmia. Furthermore, non-specific symptoms such as nausea, vomiting, epigastric pain, which might occur as possible medication related-side effects were included. In the list, we applied a linear scale from 0 to 10 to score each symptom (**Fig. 1**). In the initial part of the questionnaire, we included a brief instruction manual and added the Faces Pain Rating Scale [7] to make it easy for patients to understand the meaning of the scores. We selected patients capable of expressing their symptoms accurately and asked them to use the questionnaire form for their symptom evaluation. The patients were asked to indicate the worst score of the day for each symptom. After filling out the questionnaire form every day, the patients kept the forms, and we checked the records the next day.

Since March 13, 2020, a total of 21 patients have used the self-assessment questionnaire. Their median age was 48 with an interquartile range of 40 - 52. All of the participants were able to express their symptoms appropriately. In our experience as clinicians, we found the severity of symptoms determined by the scores a helpful tool for a more objective assessment of clinical improvement and deterioration. We were able to reduce the time spent talking to patients and the time required for routine daily examinations. We could perform a more detailed evaluation

Figure 1. Self-assessment questionnaire: 23 items on the front and back of A4 paper with the brief instruction manual.

of items with high scores and omit items with low scores, leading to more informative communication with patients. This was significant because healthcare workers could not endure long hours of work in personal protective equipment of level D. We received feedback from patients one week after they used the questionnaire (**Fig. 2**). From the patients' point of view, first, the 23 intensive items made it possible to check symptoms that the patients had not previously recognized (*e.g.*, ageusia and anosmia). Patients were also able to explain their symptoms to the medical personnel easily and encourage themselves by seeing their scores improving every day. It took less than three minutes to complete the daily questionnaire.

Given the current global burden of mild COVID-19, there are not enough medical resources to manage the high number of patients. Moreover, considering the current epidemic, we expect this situation to persist for a long time. For the safety of healthcare workers and the efficient evaluation of patients, several evaluation methods have been attempted. The Korean government developed a mobile self-diagnosis application and provided it to passengers entering from risky countries to check their symptoms daily for 14 days. However, there are just a few self-diagnosis items, including fever or febrile sense, cough, sore throat, and dyspnea. In some Living and Treatment Centers, patients are asked to measure their temperatures, blood pressures, and pulse rates by themselves with automated equipment and to report the data to healthcare workers via telephone or a social network system. Our questionnaire has an advantage in that it includes many symptoms and adopts a scaling system to check the changes of symptoms. We did not include self-assessment of vital signs, because nurses assessed these. However, a self-check of vital signs could also be included in our questionnaire.

Regarding limitations of the self-assessment questionnaire, first, the questionnaire sheet filled out by an isolated patient cannot be moved out from the isolation area; therefore, patients were asked to take photos of the sheets and deliver them to our staff via a social network system. Second, as the isolation period extended, the number of sheets increased, which made it difficult to manage scores and store papers. A mobile application connected to the network could be developed to avoid these inconveniences. Then, patients could score the symptoms with their mobile devices without pen or paper, and the data could be transferred and an alyzed automatically. Another possible advantage of the mobile application is that patients could use symptom scores continually, from the time of active inspection or self-quarantine (before diagnosis) to during hospitalization/Living and Treatment Center
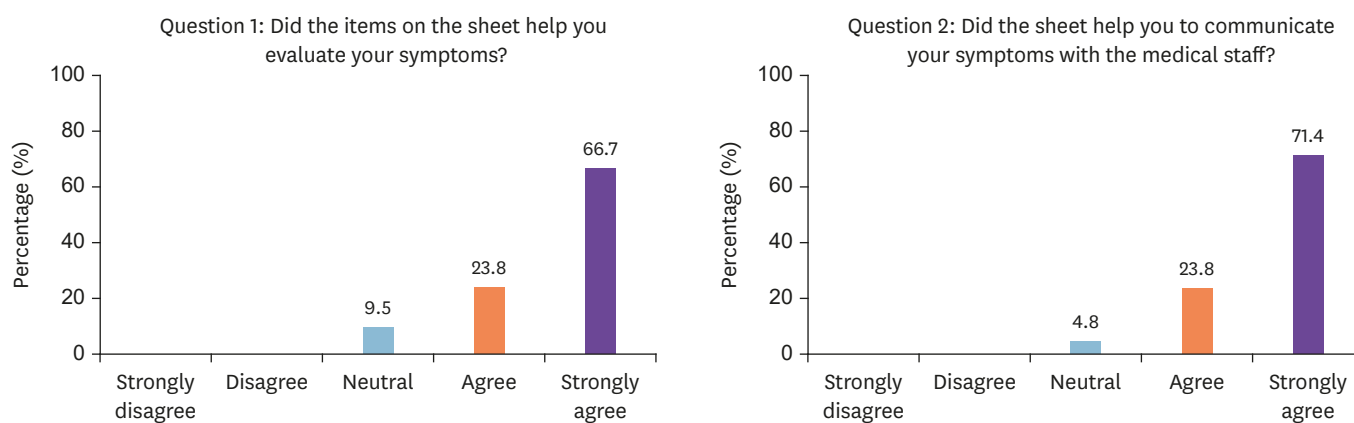

Figure 2. Feedback from patients who completed the self-assessment questionnaire for more than one week.

residence to discharge and the end of isolation. Third, very elderly or patients with mental disorders may not be able to answer the questionnaire; therefore contact examination needs to be performed in these cases.

We believe the self-assessment system we developed is a useful tool for evaluating mild COVID-19 patients in isolation. We hope that it will be developed as a mobile application and spread widely over the world to cope with global diseases.

REFERENCES

1. World Health Organization (WHO). Coronavirus disease 2019 (COVID-19) situation report -71. Available at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports. Accessed 31 March 2020.

2. Bai Y, Yao L, Wei T, Tian F, Jin DY, Chen L, Wang M. Presumed asymptomatic carrier transmission of COVID-19. JAMA 2020;323:1406-7.
   PUBMED | **CROSSREF**

3. Zou L, Ruan F, Huang M, Liang L, Huang H, Hong Z, Yu J, Kang M, Song Y, Xia J, Guo Q, Song T, He J, Yen HL, Peiris M, Wu J. SARS-CoV-2 viral load in upper pespiratory specimens of infected patients. N Engl J Med 2020;382:1177-9.
   PUBMED | **CROSSREF**

4. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, Liu L, Shan H, Lei CL, Hui DS, Du B, Li LJ, Zeng G, Yuen KY, Chen RC, Tang CL, Wang T, Chen PY, Xiang J, Li SY, Wang JL, Liang ZJ, Peng YX, Wei L, Liu Y, Hu YH, Peng P, Wang JM, Liu JY, Chen Z, Li G, Zheng ZJ, Qiu SQ, Luo J, Ye CJ, Zhu SY, Zhong NS; China Medical Treatment Expert Group for Covid-19. Clinical characteristics of coronavirus disease 2019 in China. N Engl J Med 2020;382:1708-20.
   PUBMED | **CROSSREF**

5. Livingston E, Bucher K. Coronavirus disease 2019 (COVID-19) in Italy. JAMA 2020. [Epub ahead of print].
   PUBMED | **CROSSREF**

6. Korea Centers for Disease Control and Prevention (KCDC). Quarantine system, coronavirus disease-19, Republic of Korea. Available at: http://ncov.mohw.go.kr/en/baroView.do?brdId=11&brdGubun=111&dataGubun=&ncvContSeq=&contSeq=&board_id=. Accessed 31 March 2020.

7. Bieri D, Reeve RA, Champion GD, Addicoat L, Ziegler JB. The faces pain scale for the self-assessment of the severity of pain experienced by children: development, initial validation, and preliminary investigation for ratio scale properties. Pain 1990;41:139-50.
   PUBMED | **CROSSREF**