Feasibility of Master of Science (MS) Nursing Students to Self-Report COVID-19 Symptoms

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Abstract

A feasibility project was carried out by 4 Doctor of Nursing Practice students enrolled at Boston College. It was a project aimed at determining if symptom monitoring twice daily, as recommended for healthcare providers by the Center for Disease Control, was feasible for nursing students who would need to do so to reenter their field training in medical facilities. The team set out to determine the factors that contributed to adherence and those that were barriers to adherence. COVID-19 lead to nursing students having virtually no in-person learning experiences so we wanted to be proactive in planning for the reopening of healthcare learning environments. It was anticipated that students would be expected to maintain daily symptom monitoring. We had 16 participants and we included a pre-survey and post-survey in addition to the symptom checklist. The participants received an email reminder twice daily which was noted as the most helpful to adherence in our project. The barriers to adherence were technology issues and personal schedule conflicts. The limitations identified were technology issues mainly related to a computer glitch that lead to a shorter period for data collection and a small sample size. The recommendations for future projects include incorporating information technology support and continuing the email reminders.

Keywords: COVID-19; Anticipate; Qualitative Data

Abbreviations: BCCSON: Boston College Connell School Nursing; SCT: Social Cognitive Theory; IRB: Institutional Review Board; CDC: Center for Disease Control; MS: Master of Science; CSON: Connell School of Nursing; PCP: primary care provider; DNP: Doctor of Nursing Practice.

Introduction

Problem & Background Significance

COVID-19 has profoundly affected higher education across the United States and the impact on nursing education has been particularly significant. During the early phase of the pandemic, clinical placements were closed to students due to concern for patients' and students' wellbeing, as well as a scarcity of personal protective equipment. In anticipation of the start of the 2020 fall semester, as health care institutions would begin allowing nursing students to return to clinical settings, it was presumed that only those students who would be able to demonstrate a record of continuous self-monitoring of symptoms of COVID-19 would be allowed to return. Among administration and faculty at Boston College Connell School Nursing (BCCSON), a primary consideration in the implementation of a daily COVID-19 symptom checklist was the concern about adherence. Would nursing students adhere to completing an online twice daily symptom monitoring checklist?

Statement of Purpose

Mindful of Boston College's values of social justice and equality, the project team identified COVID-19 symptom

St Pierre S, et al. Feasibility of Master of Science (MS) Nursing Students to Self-Report COVID-19 Symptoms. Adv Nursing Patient Care Int J 2020, 3(3): 180049.

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monitoring as an essential tool to allow nursing students a safe re-entry to clinical practice. The purpose of this project was to assess nursing students' ability to adhere to a twice daily COVID-19 symptom checklist for a 14-day period. We were aware that nurses working in healthcare facilities were being mandated to maintain symptom monitoring in a variety of different ways in order to prevent the spread of this highly contagious illness to others.

Theoretical Framework

Bandura's Social Cognitive Theory (SCT) provided the theoretical framework for the project. SCT is grounded in the belief that learning is dynamic, and occurs within a social context that has strong reciprocal interactions between the person, behavior and environment [1]. The project members selected SCT as a framework for the project because it provided a lens through which the complex interplay of heightened anxiety related to COVID-19, and the eagerness of the students to return to their clinical rotations could be understood. Among the principle constructs of STC, "expectations" and "self-efficacy" closely align with this project. The construct of expectations advances the belief that "people anticipate the consequences of their actions before engaging in the behavior, and these anticipated consequences can influence successful completion of the behavior". Self-efficacy refers to the "level of a person's confidence in his or her ability to successfully perform a behavior" [2]. Project members hypothesized that nursing students, motivated by a desire to re-enter the clinical setting, would exercise their "expectations" and "self-efficacy" and participate in the 14-day symptom monitoring project.

Methods

Project Design

This was a small-scale feasibility project designed to measure nursing students' adherence to completing an online COVID-19 symptom checklist twice daily for 14 days. The project was approved by the Boston College Institutional Review Board (IRB), on May 11, 2020. There were no ethical issues identified throughout the duration of the project. The symptom checklist consisted of a list of physical symptoms most frequently associated with COVID-19 based on data from the Center for Disease Control (CDC) (Coronavirus Disease 2019 [3]. In addition to completion of the symptom self-monitoring checklist, pre-survey and post-survey data were collected to garner perspectives of the participants' experience with the self-monitoring process.

Description of the Sample and Setting

The project was conducted in early June of 2020, with a target population of student participants who had previously earned a baccalaureate degree in a non-nursing field and were currently enrolled in their first year of obtaining a Master of Science (MS) from the Connell School of Nursing (CSON). Project members anticipated that nursing students would be interested in participating in the project because the focus was closely linked to their ability to re-enter the clinical setting. 56 MS students enrolled in their pre-licensure year were invited to participate in the project. Inclusion criteria for this project were:
1. MS student currently enrolled in their pre-licensure year
2. MS student of any age or gender

The Instrument	
Pre-survey	• Age • Contact with anyone outside of your household within 6 feet in the past 14 days • Live in a COVID-19 hotspot • Own a working thermometer
Symptom Monitoring Survey	• Feeling feverish • Chills, repeated shaking with chills • Sore throat • Headache • New nasal congestion (not related to seasonal allergies) • New cough (not related to chronic condition) • Shortness of breath • Muscle aches/pain • New loss of smell • New loss of taste • Experiencing any of the above symptoms

Post -survey	• Contact with anyone outside of your household within 6 feet in the past 14 days? • Have you been diagnosed with COVID-19? • Do you think a twice daily self-assessment will be feasible during the school year? • What factors helped you to adhere to the daily self-assessment? • Barriers to daily assessment schedule? • Did you experience any other symptoms of COVID-19 not listed?

Table 1: The instruments.

Prior to the start of the project, two Zoom information sessions were held with the student cohort to describe the purpose of the project and to answer questions. On June 2, 2020, an email was sent to the student cohort restating details about the project, and consent to participate in a 14-day anonymous survey of COVID- 19 symptoms.

Data Collection Process

Data was collected through Redcap, a secure web based data collect platform, which was made available to the project team by Boston College Research and Information Technology Services. The data collection took place in three parts:
• Pre-survey data (prior to the start of 14 days of symptom monitoring)
• Twice daily symptom self-monitoring (day 1-14)
• Post-survey data (day 14 and 15)

Twice daily email notifications were sent to participants reminding them to access the symptom checklist and complete it, which took less than a minute on a hand-held device or laptop. Each day participants had 12 hours to open the link and complete the checklist (the link expired after 12 hours).

Participants were encouraged to contact their primary care provider (PCP) or the Boston College University Health Services if they were experiencing any of the identified symptoms.

Results

Data Analysis Procedures

Intellects Statistics, a software program for non-statisticians being utilized in the Doctor of Nursing Practice (DNP) Program at Boston College, provided the statistical analysis of the data. Descriptive statistics (percent, average and mean) was used to categorize pre-survey information, and inferential statistics (Chi-square) was used to report the data analysis and findings. Qualitative data was reviewed by project members and grouped according to themes. Due to a malfunction that occurred with the Redcap system, data from days 11-14 were considered potentially inaccurate and therefore not used in the analysis. The computer error was

corrected to allow for post-survey data collection.

Pre-survey Data

Of the 56 students in the cohort, 16 students (28%) consented to participate in the project. The mean age of participants was 27 years with a range of 22 to 44 years; gender was not obtained in the demographic data. All participants reported being in contact with someone outside of their household within 6 feet in the past 14 days. More than half of the participants (56%) lived in a COVID-19 hot spot and 12 participants (75%) owned a thermometer. The results of Chi-square test were not significant based on an alpha value of 0.05, $\chi^2(10) = 6.73$, p = .751, suggesting that recording of COVID-19 symptoms and the date could be independent of one another. The results of Chi-square test were not significant based on an alpha value of 0.05, $\chi^2(1) = 1.78$, p = .182, suggesting that pre-survey question of "Do you think you live in a COVID-19 hot spot" and recording of COVID-19 symptoms could be independent of one another. The results of the Chi-square test were not significant based on an alpha value of 0.05, $\chi^2(1) = 0.76$, p = .383, suggesting that recording of COVID-19 symptoms and the answer to the pre-survey questions: "Do you own a thermometer?" could be independent of one another.

Post Survey Qualitative Data Analysis

The post-survey was completed by 14 (87%) participants. As was the case with the pre-survey, all participants reported positive contact with someone outside of their household within 6 feet in the past 14 days; no cases of COVID-19 were reported. Qualitative items responses were reviewed and grouped according to themes.

Discussion

Major Findings

The results of this project provide a mixed view of nursing student's ability to adhere to a twice daily COVID-19 symptom monitoring. Quantitative data reveals that 8 (50%) participants were able to complete the full 10 days. While adherence was highest during the early days of data collection, no single factor was indicated as a cause for the decline in adherence. The Chi-square tests in Tables 2, 3, 4 and 5 show no correlation in adherence to symptom monitoring

according to date, living in a COVID-19 hot spot and owning a thermometer. These results suggest that further research is warranted to understand factors that contribute to or are associated with symptom monitoring adherence.

Recording of COVID-19 symptoms in survey					
Date	Incomplete	Complete	χ^2	df	p
6/2/2020	5[3.45]	27[28.55]	6.73	10	0.751
6/3/2020	3[3.45]	29[28.55]			
6/4/2020	1[3.45]	31[28.55]			
6/5/2020	4[3.45]	28[28.55]			
6/6/2020	5[3.45]	27[28.55]			
6/7/2020	3[3.45]	29[28.55]			
6/8/2020	3[3.45]	29[28.55]			
6/9/2020	3[3.45]	29[28.55]			
6/10/2020	3[3.45]	29[28.55]			
6/11/2020	2[3.45]	30[28.55]			
6/12/2020	6[3.45]	26[28.55]			

Table 2: Symptom Checklist Data Analysis.

Recording of Covid-19 Symptoms					
Pre-survey: live in COVID-19 hot spot?	No	Yes	χ^2	df	p
No	0[0.88]	7[6.12]	1.78	1	0.182
Yes	2[1.12]	7[7.88]			

Table 3: "Do you think you live in a COVID-19 hot spot".

Pre-Survey: Owns Thermometer					
Recording of COVID-19 symptoms	No	Yes	χ^2	df	p
No	0[0.50]	2[1.50]	0.76	1	0.383
Yes	4[3.50]	10[10.50]			

Table 4: "Do you own a thermometer".

Facilitators to adherence	Participants Responses
Electronic mail reminders	• "I think because I'm in school, I check my email frequently." • "The time of day of the surveys coincided with times when I c6DFFDCVheck my email" • "I think the emails are a very helpful reminder."
Barriers to adherence	**Participants Responses**
Computer/technology issues	• "I only missed some because I was blocked from entering the site due to "unsecure connection", otherwise no barriers." • "Broken link on several survey days; still assessed my symptoms but could not submit a response." • "For the past few days, I was not able to complete the survey because the link was not "secure" • "None but I think if I had to do it for a longer period of time it would have been hard/I would have been less diligent"

Difficulty recording at the same time of day	• "I was able to complete each survey twice daily, but never at the same time or the time that the alert was sent." • "I think this would work perfectly for someone who is on a 7-7 schedule. Because my schedule was so unpredictable it was hard for me to adhere to these exact times." • "Checking my email at different times, waking up at different times"

Table 5: "Qualitative data themes from post survey".

Post-survey participation was surprisingly high with 14 (87%) participants completing the final component of the data collection. This was an interesting finding considering that only 8 (50%) completed the full 10 days of data collection. Qualitative data in the post-survey reveal several themes with regard to facilitators and barriers to adherence. Facilitators were grouped around the theme of email reminders which were viewed positively. In general, comments endorsed email reminders as an effective tool in increasing response rates. Barriers to adherence can be divided into two categories; technical malfunction and personal schedules. The technical malfunction of Redcap, the web based data collection program, occurred over a weekend and despite participants reaching out to alert project members about the issue, no technical support was available until the following Monday. This resulted in a truncated version of the project from 14 to 10 days of data collection. The other identified barrier was schedule conflicts that made it difficult for participants to complete the symptoms checker within the allotted 12-hour window.

Finally, there are factors that may have influenced both participation in the project, and adherence to the symptom monitoring, that are not easily captured but essential to discuss. This project took place during a time of unprecedented national crises; the COVID pandemic and the financial crisis that ensued and equally devastating, the national crisis related to structural racism. The death of George Floyd, while in the custody of the Minneapolis police set off an outpouring of demonstrations in Boston, across the United States and around the globe [4]. According to local media, during late May and early June, Boston and its surrounding communities experienced over 20 large and small scale demonstrations [5]. Many of those who took part in these demonstrations parallel the age of the project's participants, as people in their 20's were especially active in the protests [6]. Even those that did not attend demonstrations in person would have been impacted by these events as they were wildly covered on social media. There is of course no way of knowing the impact of these events on the project but it is important to note their occurrence [7,8].

Limitations

Several factors can be viewed as limitations of the project. The small sample size limits the applicability of the findings, and the Redcap malfunction resulted in a shortening of the data collection, again reducing the applicability of the findings. Another limitation is related to time constraints on the project which resulted in only one invitation to participate being sent. The project might have had higher rates of participation if a second invitation had been sent to potential participants.

Conclusion & Recommendations for Future Projects

COVID-19 is a highly contagious infection and until a vaccine is available and widely adopted, symptom monitoring will remain an essential tool to stopping the spread of the virus. The project team believes future projects focused on increasing adherence to tracking and reporting symptoms of college students is warranted. Recommendations for future projects that include electronic symptom reporting should incorporate 24/7 IT support for the survey participants as well as cloud based backup storage system to capture data in the event of a local computer malfunction. Daily reminders should be included in future projects as this was identified as beneficial to remembering to complete the survey. This project could be repeated among junior and senior nursing students to assess levels of adherence among different groups of students who face a similar prerequisite to attend clinical. Finally, the project could be repeated with symptom monitoring reduced from twice to once daily and assessed for adherence when less frequent monitoring was required.

Processes should be designed and implemented to monitor symptoms and linked to clearance for the students to participate in college activities and courses. Early detection strategies coupled with testing, contract tracing and self-quarantine, remain critical in managing the spread of this highly contagious infection until a vaccine becomes available.

References

1. Bandura A (1986) Social foundations of thoughts and actions: A social cognitive theory. Prentice-Hall, Inc., APA PsycNet.

2. Morte WL (2019) The Social Cognitive Theory. Behavioral Change Models.

3. CDC (2020) Coronavirus Disease 2019 (COVID-19)-Symptoms. Centers for Disease Control and Prevention.

4. (2020) Protesters Clash with Officers Outside Boston Police Station. CBS Boston.

5. Roche C, Hass T (2020) Photos: Peaceful protesters around Massachusetts on Saturday demand change.

6. McDonald D, Dasia M, Hillard J (2020) Protesters gather in demonstration across Boston Saturday.

7. (2020) Intellectus Statistics.

8. McHugh ML (2013) The chi-square test of independence. Biochemia Medica 23(2): 143-149.

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