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Knowledge and Anxiety among Bank Clerks during the COVID-19 Pandemic Before and After Educational Intervention via Mobile Health Technology

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Abstract:

Objective: Bank clerks were among the high risk groups in experiencing physiologic and psychological symptoms during the coronavirus disease 2019 (COVID-19) crisis. This present study aims to investigate the changes in the knowledge and anxiety of bank clerks during the COVID-19 pandemic, before and after the educational intervention via mobile health technology in the south of Fars province, Iran in 2020.

Material and Methods: This present study is a quasi-experimental work with a pretest-posttest design. The participants were recruited according to the lists provided by the bank authorities, and then assigned, through non-random sampling, into a control group from three banks (45 subjects) and 48 subjects from three other banks into intervention group. The intervention group received education via mobile phones, and the control group received the routine information broadcasted by social media. Data were collected using a demographics questionnaire, a researcher-made COVID-19 knowledge questionnaire, and Spielberger's Anxiety Inventory at baseline (before) and follow-up (two weeks after intervention). The collected data were analyzed using descriptive statistics and inferential statistics in Statistical Package for the Social Science version 23.

Results: There were no drop-outs of participants during the study phase. The results showed that the mean knowledge score of the participants were improved in the both control and intervention groups, significantly (p-value<0.001), and there were significant differences between the two groups regarding the knowledge scores in pretest and posttest (p-value<0.001 and p-value=0.001, respectively). The results of the t-test also showed that the mean scores of state and trait anxiety levels were increased in the control group (p-value<0.001 and p-value=0.932, respectively), while decreased significantly

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in the intervention group (p-value<0.001). However, there were significant differences between the two groups regarding the state and trait anxiety levels in pretest and posttest (p-value<0.001).

Conclusion: The results show that e-education via mobile phones can help to increase the knowledge, and decrease the anxiety of bank clerks during the COVID-19 pandemic. Accordingly, it is suggested that this method of education be employed to raise the COVID-19 awareness of the employees in other organizations. Indeed, limitations; such as, low sample size and long-term outcomes should be considered in future studies.

Keywords: anxiety, COVID-19, e-education, knowledge

Introduction

Originating in China in 2019, the emerging disease of coronavirus 2019 (COVID-19) rapidly spread to all countries, and was eventually declared to be a pandemic by the World Health Organization (WHO).[1] In January 2020, WHO described the coronavirus pandemic as a Public Health Emergency of International Concern.[2]

According to a report of the National Institute for Occupational Safety and Health (NIOSH), bank clerks face various sources of stress, i.e., exposure to dangerous infectious diseases; including COVID-19, which can cause serious physiological and psychological harms.[3] The study of Moorthi et al. (2020) in India showed that bank clerks, who are among the high-risk groups of professionals during the coronavirus pandemic, experience considerable tension at work. Thus, there is an urgent need for measures to protect their physical and psychological well-being, and to enhance their occupational safety; especially, in the face of infectious and deadly diseases.[4] Findings of other studies also showed that most bank employees felt nervous, anxious or frightened when they received the news about someone who died from COVID-19, or tested positive for COVID-19. For these reasons, they couldnot concentrate on their regular activities and were stressed about losing their current jobs due to COVID-19.[5,6] Moreover, a comparison of the stress levels among bank employees before and after the COVID-19 pandemic shows that 80.0% of them experienced severe stress after the outbreak[7], and having knowledge of COVID-19 was followed by high stress values.[6]

Other, prior literature has investigated work stress and its impact on various work practices[8] under normal conditions as well as during uncertain conditions; such as, the outbreak of the COVID-19 pandemic.[9] The results of a study on bank employees revealed that COVID-19 work stress has a significant, negative impact on task and contextual performance of banking sector employees.[9] These results are consistent with the prior studies on work stress and employee performance during the COVID-19 pandemic.[10,11]

The high levels of anxiety found in previous studies warrants the implementation of effective preventive and emotional regulation control strategies.[12] Since bank clerks normally deal with a large number of customers they are at a very high risk of contracting COVID-19; thus, there is a need for them to acquire education concerning COVID-19 transmission and protective measures.[13]

Educational interventions are well-known as a key strategy to enhance the awareness and knowledge of the general public regarding COVID-19 issues.[14] Knowledge of COVID-19 and related safety and preventive measures are imperative to prevent disease spread, and psychological

distress.[15] Several studies also affirmed that giving necessary information to people concerning COVID-19 increases their awareness and knowledge about the disease. This ultimately enhances their sense of control, leading to decreased anxiety and increased emotional well-being.[16-18] In fact, a lack of knowledge in concerns to infectious diseases, their transmission routes, and the risk of exposure creates a sense of uncertainty, vulnerability, and a general state of fear.[19,20] Kaim et al., (2020) also introduced educational intervention as a cost-effective approach that gives required information, diminishes the negative emotional effects and provides anxiety control to the public during pandemics and crises.[21] Currently there are some traditional and modern methods for educational purposes, and modern technologies will be inherently capable of joining telehealth programs in the not-too-distant future. Such technologies; including apps, have many advantages; and as such, they can be used as a patient empowering factor[22] for reducing job stress and anxiety.[23]

Nonetheless, the huge amount of information about the novel coronavirus circulated on social media perhaps sparks anxiety[12]; therefore, sharing such information without checking its authenticity might cause reverse effects. As many people acquire their knowledge from non-authentic resources; such as, social media, the results of studies regarding the association between knowledge and anxiety have been controversial. For example, in a study in Jordanian students, showed that they were more anxious and fearful of infections; as they either have insufficient information or misinterpret information about COVID-19.[24] However, in other studies, there was no significant association between knowledge and psychological distress, and knowledge was not a significant predictor for psychological distress.[15]

In the banking sector of a developing country, due to limited use of online banking services, the banking staff had to physically work in the bank during the outbreak of COVID-19. As service providers, the employees working in the banks have more vulnerability toward the prevailing hazards of COVID-19, due to frequent human-to-human interactions. Similarly, in Iran, from the beginning of the corona virus epidemic, bank personnel were among the first groups involved, and after medical personnel they were the second most vulnerable group. Additionally, due to the lack of online banking in most parts of the country, during the COVID-19 epidemic most businesses were closed during the third to fifth waves; however, the banks were not.[25] Furthermore, Maarefvand et al. found that knowledge regarding the prevention of COVID-19 was significantly associated with stress among the public in Iran.[26] Hence, lack of knowledge and misconceptions concerning COVID-19 may lead to psychological distress.

All these gaps highlight the necessity of conducting further studies into educational interventions among bank employees. Offering education through distance learning via technologies; such as mobile technology, may help overcome barriers to utilization of these evidence-based treatments.[27] Accordingly, this present study aims to investigate the changes in the knowledge and anxiety of bank clerks during the COVID-19 pandemic, before and after educational intervention via mobile health technology, in the south of Fars province, Iran.

Material and Methods

This study was a quasi-experimental work of research, with a pretest-posttest design. The study was performed and reported in accordance with the CONSORT 2010 guidelines.[28]

The study population consisted of clerks employed in public banks, located in the south of the Fars province. Participant-recruitment for this present study was conducted from May until September, 2020. Study participants were employees from six public banks. At the time of this research

project, 4 months had passed since the announcement of the pandemic, and there was still no cure nor vaccine for it. Bank employees were present at work part-time; one day at home and one day at the bank. This way, their numbers were halved and their density was reduced. The protective methods at the banks were: using masks for employees and customers, using disinfectant solution or hand washing before contacting the face and eyes and eating/drinking, using plastic barriers at the bank counters to minimize physical contact; keeping doors and windows open to improve ventilation, and restricting customers from entering at the same time to avoid overcrowding. In addition, employees who showed any signs of illness were immediately referred to health centers, and if their illness was confirmed they had to take COVID sick leave, and were not allowed to return to work until their symptoms improved. Moreover, all organizations, including the banks, provided employees with essential information about the disease; how it is transmitted and protective methods through their website.

Inclusion criteria were having a smart mobile phone, having at least one year's experience of work in the bank, and not having an acute or chronic psychological disorder; according to self-reporting. The participants who were unwilling to continue cooperation, and those who had not answered over 20.0% of the items on the knowledge and anxiety questionnaires were excluded.

After the participants had been selected, they were all asked to complete the demographics, knowledge, and anxiety questionnaires. Then the participants in the intervention group were instructed on how to install and use the educational software. Two weeks after intervention, both groups completed the questionnaires again.

Based on the findings of a former study, regarding the mean score of anxiety levels in bank employees post COVID-lockdown (M1=23.4, M2=21.4, S1=4.6, S2=4.1)[29]; using the MedCalc software, α=0.05, β=0.8, and 20% attrition, approximately 44 participants in each group were required to detect a significant difference between the intervention and control group. Eventually, 93 subjects (45 in the control group and 48 in the intervention group) participated in the study.

The participants were selected via non-random sampling from the public banks. To prevent any contact and exchange of information among the subjects, the researchers selected the control group from the clerks of Melli, Keshavarzi, and Sepah banks, while the intervention group was selected from the clerks of Mellat, Tejarat, and Saderat banks. Study staff (not involved in the group assignment) contacted (by telephone) the participants, and asked them whether they were willing to participate in the study. The eligible participants were screened until the target number of 93 participants was reached. All participants were informed regarding the voluntary nature of their participation, and informed consent was obtained from them.

There was one interventional education methods and one control group, for which the contents for the intervention group was designed by the research team.

All eligible participants allocated to this group received education during the 2 weeks. The educational software was designed by the school of virtual education, at Shiraz University of Medical Sciences; based on data collected from scientific sources, and verified by several university faculty members. The modules of this education consisted of hand washing (the first module), use of gloves (the second module), use and characteristics of different types of masks (the third module), and cleaning surfaces and personal belongings (the fourth module). Each module contained texts, pictures, audio files and movies in Persian; however, there were no tasks for the participants. Therefore, the application was not interactive; except for the knowledge and anxiety questionnaires which were answered before

and 2 weeks after using the application. Upon completion of each module, participants were allowed access to the next module. They were contacted twice weekly by a research team member through text messages and/or phone calls, so as to assess their understanding of the modules, and to answer their questions in concerns to the content of the modules. Since the participants attended work during the morning shift, they could read and use the contents after work, or in the evening.

The software, which was available on the Android operating system, required a login with a username and password. With the permission of the managers of the banks under study, the bank clerks' national I.D. numbers were set as their passwords. Subsequently, the participants were sent a link to gain access to the educational content of the software, which consisted of textual data, 17 audio files, and 20 videos. To make it possible for the bank clerks to interact with the research team, the researchers created a group on WhatsApp to answer the participants' queries. An on-device database stored all end user responses, and the data export feature was provided only to interventionists allowing data to be offloaded as csv files.

Participants in the control group received routine education. When the present research was undertaken, all agencies had started training their staff regarding the safety measures in cincerns to COVID-19. In this way, the participants of the control group also received some information through the official websites of the banks. Other formal and informal educations were provided to both groups through television, radio, the Ministry of Health, medical universities as well as mass media; such as WhatsApp. Following completion of their follow-up assessment, the educational content was made available to the control group, and their questions were answered.

The instruments used to collect data consisted of a demographics questionnaire (age, gender, work experience, education, and marital status), a knowledge questionnaire, and Spielberger's Anxiety Inventory. The knowledge questionnaire was a researcher-made instrument; consisting of 13 multiple-choice questions. A correct answer was assigned 1 point and an incorrect answer was assigned 0 points. Thus, the score range was from 0 to 13. The content validity of the questionnaire was verified by 15 nursing professors, at a university of medical sciences, located in the South of Iran. Its reliability was tested via the test-retest approach: the researchers had 50 bank clerks complete the questionnaire twice with a two-week interval. The results confirmed the reliability of the instrument, with a Cronbach's alpha of 0.89.

Spielberger's Anxiety Inventory is a valid and reliable instrument that has been validated by researchers in various studies within different populations. Also known as: the State-Trait Anxiety Inventory, this instrument measures respondents' trait anxiety (20 items) and state anxiety (20 items). The inventory measures respondents' state anxiety at the time of responding on a 4-point Likert scale, ranging from very little to very much. Respondents' trait anxiety, which concerns their general feelings, is measured on a Likert scale ranging from almost never to almost always. The items which indicate lack of anxiety are scored reversely. The total score range of this scale is between 20 and 80. According to Mahram's study (1994), a score of between 20 and 31 indicates mild anxiety, between 32 and 42 indicates moderate to mild anxiety, between 43 and 53 indicates moderate to high anxiety, between 54 and 64 indicates relatively high anxiety, between 65 and 75 indicates high anxiety, and above 76 indicates extreme anxiety. Using internal correlation, various studies have verified the reliability of the scale with the following values for Cronbach's alpha: 0.91, 0.87, 0.89, and 0.9.

After acquiring the approval of the ethics committee (IR.FUMS.REC.1398.189), and making the necessary

arrangements with the mangers of the public banks selected for study, the researchers met the participants and informed them of the objectives of the study and obtained their informed consent. In compliance with research ethics, the subjects were assured that participation was on a voluntary basis, and that they were free to withdraw from the study at any time. To maintain confidentiality, the subjects were told not to write their names on the questionnaires. At the end of the study, for ethical considerations, the educational content was made available to the subjects in the control group and their questions were answered.

In this present study, demographic variables were presented using descriptive statistics. The normal distribution of the findings were measured using the inferential statistic test of Kolmogorov-Smirnov. The hypotheses were tested using independent and paired t-tests. Analysis of covariance (ANCOVA) was employed to measure the impact of the covariate variables. Furthermore, multivariate linear regression analysis was performed to determine the association between dependent factors and the outcome variables within each group. The collected data were analyzed in Statistical Package for the Social Science version 23 (SPSS-23). P-values of less than 0.050 were considered to be statistically significant.

Results

In this present study, 100 employees with eligible criteria were contacted, for which 4 of them did not consent to participate in the study. The remaining 96 participants were divided into either the control or intervention group. Nonetheless, three cases in the control group were excluded, due to them having contracting COVID-19 before the implementation of the study. Ultimately, there were 45 participants in the control group and 48 participants in the intervention group. The means of the ages of the participants in the control group and intervention group were 37.7 (9.0) and 36.4 (7.8) years, respectively. With regard to age, marital status, education, employment status, and sources of information concerning COVID-19, there were no statistically significant differences between the two groups, and they were homogeneous (p-value>0.050). However, there were statistically significant differences between the two groups with regards to gender and work experience (p-value<0.050). Table 1 shows the groups' demographic characteristics.

The results showed that the mean knowledge score of the participants were improved in both the control and intervention group, significantly (p-value<0.001), and there were significant differences between the two groups regarding the knowledge scores of the pretest and posttest (p-value<0.001 and p-value=0.001, respectively). The results of the t-test also showed that the mean scores of state and trait anxiety levels were increased in the control group (p-value<0.001 and p-value=0.932, respectively), while decreased significantly in the intervention group (p-value<0.001). However, there were significant differences between the two groups regarding the state and trait anxiety levels of the pretest and posttest (p-value<0.001) (Table 2).

As the researchers found a significant difference between the two groups' pretest knowledge and state anxiety mean scores, they conducted the ANCOVA test to control the impact of the pretest scores on the relationship between the intervention and the subjects' posttest scores. The results of the ANCOVA test showed that by controlling the effect of pretest, the difference between the two groups' state anxiety levels would still be significant, and that the pretest variable did not have a significant impact on that finding (p-value=0.924). However, with regard to the variable of knowledge, the participants' pretest scores were found to have a significant impact on the relationship between the intervention and the posttest scores (p-value<0.001).

Table 1 The demographic characteristics of the bank clerks in the control and intervention groups

Variable	Control (n=45)	Intervention (n=48)	p-value
Age (Mean±S.D.)	37.74 (9.1)	36.4 (7.86)	0.449
Work experience (Mean±S.D.)	6.74 (5.1)	9.92 (5.74)	0.007
Gender, N (%)			0.014
Male	23 (51.1)	38 (79.2)	
Female	20 (44.4)	10 (20.8)	
NA	2 (4.4)		
Marital status, N (%)			0.258
Single	9 (20.0)	4 (8.3)	
Married	30 (66.7)	39 (81.3)	
Widowed	3 (6.7)	2 (4.2)	
Divorced	1 (2.2)	3 (6.3)	
NA	2 (4.4)		
Education, N (%)			0.440
Less than high-school	4 (8.9)	1 (2.1)	
High-school	10 (22.2)	13 (27.1)	
Associate degree	22 (48.9)	21 (43.8)	
Bachelor's degree	6 (13.3)	11 (22.9)	
Master's degree	1 (2.2)	2 (4.2)	
NA	2 (4.4)		
Employment status, N (%)			0.156
Retired	1 (2.2)	0 (0.0)	
Fixed-term	3 (6.7)	7 (14.6)	
Agency staff	7 (15.6)	2 (4.2)	
Contractual	9 (20.0)	15 (31.3)	
Permanent	23 (51.1)	24 (50.0)	
NA	2 (4.4)		
Source of information, N (%)			0.265
Social media	25 (55.6)	19 (39.6)	
The Internet	6 (13.3)	10 (20.8)	
The media	11 (24.4)	15 (31.3)	
Family	1 (2.2)	4 (8.3)	
NA	2 (4.4)		

S.D.=standard deviation, N=number, NA=not answered by participants

To measure the association of gender and work experience, which were not homogenous in the study groups, and the pretest scores of the outcome measures; which were significantly different between the two groups, multivariate regression analysis was performed. The results showed that none of these three factors were associated with the knowledge scores of the control group; however, gender was significantly associated with knowledge in the intervention group (p-value=0.028). Moreover, work experience and pretest scores were significantly associated with the posttest state anxiety level in both the control and intervention groups (p-value=0.009, p-value<0.001, p-value=0.017 and p-value<0.001, respectively). Additionally, the pretest scores of trait anxiety were associated with the posttest state anxiety level in both groups (p-value<0.001); hence, gender was only associated with the state anxiety in the intervention group (p-value=0.037) (Table 3).

Discussion

This present study aimed to investigate the changes in the knowledge and anxiety of bank clerks during the COVID-19 pandemic, before and after the educational intervention via mobile health technology, in the south of the Fars province, Iran. The results showed that the education improved the knowledge, state and trait anxiety in the intervention group. Empirical studies have also shown that health education can improve knowledge and can also change unfavorable attitudes and behaviors.[30] The positive impact of health applications for the purpose of educating adults has been verified in other studies.[7,23] However, a problem with these applications in a crisis; such as the coronavirus pandemic, is the spread of false information or rumors, which will lead to an increase in stress, wrong practices, or wrong notions about what medication to take.[31] Notably, the state anxiety of the control group increased, which might be related to the continuing of the pandemic, the consequent spread of the disease and speculations. Similarly, other studies reported that people's anxiety levels have risen as a result of the coronavirus pandemic.[32] Literature also mentions that infectious disease outbreaks are frequently characterized by social disruption and an overall climate of fear. As of such, during the COVID-19 outbreak, daily reporting of the exponential increase in confirmed cases and death rates over the news media could be the leading cause of high anxiety levels.[12]

The fact that anxiety levels were found to be higher in the present study compared to similar studies can be attributed to the following factors. First, it has been found that men tend to perceive anxiety derived from financial issues from national and international aspects, while women are mostly concerned about the impact of these issues on their families and emotional relationships.[33] Considering the economic crisis in Iran as well as the international sanctions currently imposed on this country, the difference between men and women in experiencing anxiety can explain the male participants' higher levels of anxiety in the present study. Second, the data of the study were collected at the beginning of the coronavirus pandemic, when the rate of anxiety and other psychological disorders were high within society. Another possible reason for the differences between the findings of the present study, and those of similar studies conducted in China, United States of America (U.S.), and Israel is cultural differences and variations in sampling methods. In the Chinese study, the subjects were interviewed face to face[34], while in the studies conducted in the U.S. and Israel, data were collected via an online questionnaire.[35] Moreover, geographical, political, economic, and social differences between those countries and Iran as well as differences between the characteristics of their healthcare systems, can account for the inconsistencies between the research results. Accordingly, it is suggested

Table 2 A comparison between the groups' pretest and posttest knowledge, state anxiety, and trait anxiety mean scores

Variable	Control group		Intervention group		p-value between groups
	Before intervention Mean (S.D.)	After intervention Mean (S.D.)	Before intervention Mean (S.D.)	After intervention Mean (S.D.)	
Knowledge	0.73 (0.63)	3.23 (1.08)	0.94 (0.69)	4.22 (1.07)	<0.001
p-value within group	<0.001		<0.001		0.001
State anxiety	35.41 (34.41)	56.61 (14.41)	69.10 (2.47)	67.63 (2.99)	<0.001
p-value within group	<0.001		<0.001		<0.001
Trait anxiety	57.84 (17.77)	57.93 (15.01)	70.48 (2.26)	69.60 (2.42)	<0.001
p-value within group	0.932		<0.001		<0.001

S.D.=standard deviation

Table 3 The results of multivariate regression analysis of independent factors associated with the knowledge, state and trait anxiety

Factor	Group associated factors	R	R^2	B	p-value	CI (95%)	
Knowledge	Control	0.555	0.308				
	Gender			-1.295	0.095	-2.837	0.246
	Work experience			0.665	0.058	-0.025	1.355
	Pretest			0.333	0.372	-0.431	1.097
	Intervention	0.387	0.150				
	Gender			-0.853	0.028	-1.607	-0.098
	Work experience			-0.053	0.729	-0.358	0.253
	Pretest			0.266	0.250	-0.194	0.726
State anxiety	Control	0.848	0.719				
	Gender			-8.627	0.213	-22.413	5,016
	Work experience			-7.911	0.009	-13.741	-2.081
	Pretest			3.361	<0.001	2.460	4.260
	Intervention	0.847	0.717				
	Gender			-0.431	0.391	-1.432	0.571
	Work experience			0.547	0.017	0.101	0.994
	Pretest			0.578	<0.001	0.422	0.734
Trait anxiety	Control	0.862	0.742				
	Gender			-0.678	0.776	-5.455	4.100
	Work experience			0.668	0.514	-1.383	2.720
	Pretest			1.327	<0.001	1.049	1.605
	Intervention	0.853	0.727				
	Gender			0.965	0.037	0.062	1.869
	Work experience			0.309	0.098	-0.059	0.677
	Pretest			0.739	<0.001	0.578	0.899

R=regression coefficient, B=unstandardized coefficient, CI=confidence inerval

that, when the peak of the pandemic is over, longitudinal studies be conducted to address the stress over the medical and economic consequences of the pandemic.

The improvement of knowledge in both the control and intervention groups of this present study might be associated with the study design. The non-random selection of the participants may have lead to sampling bias, which was a limitation of the study. In fact, the experimental requirements for the participants in the control group were different from those for participants in the intervention group; thus, this difference may have influenced the experimental results. The effectiveness of the innovative features in this application cannot be commented on before an randomized controlled trial (RCT) is performed. It is suggested, therefore, that these results are taken as preliminary results, and that a study that is completely randomized is performed to verify them.

Moreover, this might indicate that the participants in the control group were largely influenced by media information. It also can be attributed to the formal education available to the bank clerks via the websites of the banks. At the time of this present study, the websites of Iranian banks provided formal education on coronavirus safety instructions to their employees, and assessed the employees' knowledge through periodic tests.

On the contrary of the findings of the present research, studies of anxiety due to COVID-19 in many countries showed that women experience higher levels of anxiety than men do.[36,37] The inconsistency between the findings of this present study and other studies may also be due to differences between the instruments used by the researchers. Since the anxiety scale used in the present study was not a coronavirus-specific instrument, it is possible that the participants' anxiety scores were not exclusively a reflection of their perception of COVID-19, and were simply the result of gender differences. The differences can also be due to social and educational factors.

Given that mobile health applications have a relatively good social acceptance, another reason for improving the intervention group scores may be related to this issue. mHealth has gained more importance with the rapid uptake and utilization of smart-phones, which are powerful and monitor the real-time data of the user.[38]

The subjectivity of the anxiety should be also considered in interpreting the results of this present study. As the participants may have reported higher or lower levels of anxiety, using other tools; such as physiological variables, to assess anxiety to obtain more valid results would be warranted. Additionally, Self-report scales may have been insufficient for measuring effectiveness in this present study.

It should be noted that the participants were from public banks, so the findings cannot be generalized to private bank and other organizations' employees. Hence, further randomized studies; involving participants from different organizations and from different geographical areas, should be conducted to generalize the findings of this present study. In addition, this present study involved only healthy participants. To extend the findings of this present study to the patient population, randomized studies should be conducted in patients with different levels of anxiety and depression. This would thereby, support the generalizability of the app to a novel and untrained context.

In view of the above-mentioned study results, we see in the foreseeable future the combining of Telehealth programs in knowledge improvement and anxiety reduction, regarding COVID-19. The role of the caregivers and family members should not be dismissed, but this intervention is only complementary to existing educational programs that are available today.

The pilot study was an initial development study, consisting of a small sample, so as to assess the feasibility, utility, and acceptability of this mobile application. Although, we observed positive results from

participants, the conclusion is preliminary and the study has several limitations. The participants were not asked any questions about the extent of their adherence to hygiene protocols. Thereby, it remains unclear whether use of the app would be effective in other contexts; such as in the daily life of the individual, in which adherence cannot be as easily supervised. Therefore, the results require further support from future studies.

Also, other factors which could have affected the anxiety of the participants, like their own prior infection or the infection of one their family members with the coronavirus, were not addressed. These factors may have had a mediating or confounding impact on the relationship between the intervention and the anxiety-related variables under study. Thus, it is suggested that future studies measure the above-mentioned factors. In this present study, there was an opportunity for the subject chance for transfer of the educational content. For minimizing the effect of this limitation, on the results of the study, the researchers did not inform the subjects about their group assignment. However, the researchers were not able to fully eliminate this possibility.

The mobile application for the education offers visualization of information collected in real-time. One of the strengths of this present study is that it is free of bias, with regards to selection of subjects based on their demographic characteristics: highly-educated individuals with specialized health knowledge were not included. However, there is a need for more research into other demographic variables, and their possible impact on psychological variables. Use of an intervention is an advantage of this present study over cross-sectional studies, as it enabled the researchers to determine some of the variables which had an impact on anxiety. In addition, use of the ANCOVA test helped determine the role of demographic variables as mediating variables. According to the positive effects of mobile education on knowledge and reducing anxiety of bank Clerks in the face of COVID-19, it is suggested that this educational method be used in other vulnerable occupational groups during the COVID-19 Crisis.

Conclusion

In conclusion, from the perspective of educational practice, this paper provides new experimental data on the topic of mHealth via a mobile app for COVID-19. It also gives evidence in that the use of mobile phones can contribute to the improvement of educational outcomes. The results of the present study show that education via mobile phones can prove beneficial in increasing the knowledge and decreasing the anxiety of bank clerks during the COVID-19 pandemic. Accordingly, it is suggested that this method of education be employed for the employees in other organizations during the pandemic. These research results might be included in the materials for bank administrators' continuing professional development programs, and might be taken into account for other professions and employees. Specialized psychological interventions are recommended for individuals affected by COVID-19 anxiety disorders.

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Conflict interest

TThe authors declare no potential conflicts of interest; with respect to the research, authorship, and/or publication of this article.

References

1. Zhu N, Zhang D, Wang W, Li X, Yang B, Song J, et al. A novel coronavirus from patients with pneumonia in China, 2019. New Eng J Med 2020;382:727-33.
2. Habibzadeh P, Stoneman EK. The novel coronavirus: a bird's eye view. Int J Occup Environ Med 2020;11:65.
3. Mannocci A, Marchini L, Scognamiglio A, Sinopoli A, De Sio S, Sernia S, et al. Are bank employees stressed? Job perception and positivity in the banking sector: an Italian observational study. Int J Environ Res Public Health 2018;15:707.
4. Moorthi S, Muraledharan K, Radhika P, Remsy R. Prevalence of stress and anxiety among the bank employees in india during lockdown due to covid 19. Int J Res Anal Rev 2020;7:719-30.
5. Rahman MM, Uddin MB, Chowdhury MS, Rahaman MS. Psychological status of private commercial bank employees in Bangladesh during COVID-19. J Bus Stategy Finance Manag 2021;3:66-73.
6. Yasmin S, Alam MK, Ali FB, Banik R, Salma N. Psychological impact of COVID-19 among people from the banking sector in Bangladesh: a cross-sectional study. Int J Mental Health Addic 2021. doi: 10.1007/s11469-020-00456-0.
7. Maurya A, Meshram V, Mungle K, Nade V, Nanotkar P. To assess awareness and stress level regarding COVID-19 pandemic among banker. J Pharm Res Int 2021;33:593-9.
8. Yunita PI, Saputra IGNWH. Millennial generation in accepting mutations: Impact on work stress and employee performance. Int J Soc Sci Human 2019;3:102-14.
9. Saleem F, Malik MI, Qureshi SS. Work stress hampering employee performance during COVID-19: is safety culture needed?. Front Psychol 2021;12:e655839.
10. Giorgi G, Lecca LI, Alessio F, Finstad GL, Bondanini G, Lulli LG, et al. COVID-19-related mental health effects in the workplace: a narrative review. Int J Environ Res Public Health 2020;17:7857.
11. Kumar P, Kumar N, Aggarwal P, Yeap JA. Working in lockdown: the relationship between COVID-19 induced work stressors, job performance, distress, and life satisfaction. Current Psychol 2021:1-16.
12. Lin Y, Hu Z, Alias H, Wong LP. Knowledge, attitudes, impact, and anxiety regarding COVID-19 infection among the public in China. Front Public Health 2020;8:236.
13. Santhi M, Reddy PN. Occupational stress of bank employees: a study of Chittoor district, Andhra Pradesh. MANTHAN: J Commerce Manag 2020;7:15-30.
14. Alanezi F, Aljahdali A, Alyousef S, Alrashed H, Alshaikh W, Mushcab H, et al. Implications of public understanding of COVID-19 in Saudi Arabia for fostering effective communication through awareness framework. Frontiers Public Health 2020;8.
15. Saravanan C, Mahmoud I, Elshami W, Taha MH. Knowledge, anxiety, fear, and psychological distress about COVID-19 among university students in the United Arab Emirates. Frontiers Psychia 2020;11:e582189.
16. Rajkumar RP. COVID-19 and mental health: a review of the existing literature. Asian J Psychia 2020;52:102066.
17. Alrubaiee GG, Al-Qalah TAH, Al-Aawar MSA. Knowledge, attitudes, anxiety, and preventive behaviours towards COVID-19 among health care providers in Yemen: an online cross-sectional survey. BMC Public Health 2020;20:1-11.
18. Dubey N, Podder P, Pandey D. Knowledge of COVID-19 and its influence on mindfulness, cognitive emotion regulation and psychological flexibility in the Indian community. Front Psychol 2020;11:3031.
19. Singh AK, Agrawal B, Sharma A, Sharma P. COVID-19: Assessment of knowledge and awareness in Indian society. J Public Affairs 2020;20:e2354.
20. Tripathi R, Alqahtani SS, Albarraq AA, Meraya AM, Tripathi P, Banji D, et al. Awareness and preparedness of COVID-19 outbreak among healthcare workers and other residents of South-West Saudi Arabia: a cross-sectional survey. Frontiers Public Health 2020;8:482.
21. Kaim A, Jaffe E, Siman-Tov M, Khairish E, Adini B. Impact of a brief educational intervention on knowledge, perceived knowledge, perceived safety, and resilience of the public during COVID-19 crisis. Int J Environ Res Public Health 2020;17:5971.
22. Vo V, Auroy L, Sarradon-Eck A. Patients' perceptions of mHealth Apps: meta-ethnographic review of qualitative studies. JMIR mHealth uHealth 2019;7:e13817.
23. Lobo DA. Investigating the effects of an ACT-based mobile

application on stress, anxiety, and burnout in the workplace. Hamilton: The University of Waikato; 2018.

24. Khasawneh AI, Humeidan AA, Alsulaiman JW, Bloukh S, Ramadan M, Al-Shatanawi TN, et al. Medical students and COVID-19: knowledge, attitudes, and precautionary measures. A descriptive study from Jordan. Front Public Health 2020;8:253.
25. Zandifar A, Badrfam R. Iranian mental health during the COVID-19 epidemic. Asian J Psychia 2020;51:101990.
26. Maarefvand M, Hosseinzadeh S, Farmani O, Safarabadi Farahani A, Khubchandani J. Coronavirus outbreak and stress in Iranians. Int J Environ Res Public Health 2020;17:4441.
27. Briz-Ponce L, Juanes-Méndez JA, García-Peñalvo FJ, Pereira A. Effects of mobile learning in medical education: a counterfactual evaluation. J Med Systems 2016;40:136.
28. Schulz KF, Altman DG, Moher D. Research methods & reporting. British Med J 2010;340:698-702.
29. Shah M, Kadam S, Kadam S, Karambelkar A, Karani M, Kataria H. Effect of recreational activities versus aerobic exercises on stress, anxiety, sleep, quality of life and neck range of motion in bank employees post covid-19 lockdown: a comparative study. Indian J Appl Res 2021;11:65-9.
30. Verelst F, Willem L, Beutels P. Behavioural change models for infectious disease transmission: a systematic review (2010–2015). J Royal Soc Inter 2016;13:20160820.
31. Drouin M, McDaniel BT, Pater J, Toscos T. How Parents and Their Children Used Social Media and Technology at the Beginning of the COVID-19 Pandemic and Associations with Anxiety. Cyberpsychology, Behavior, and Social Networking. 2020.
32. Ozamiz-Etxebarria N, Dosil-Santamaria M, Picaza-Gorrochategui M, Idoiaga-Mondragon N. Niveles de estrés, ansiedad y depresión en la primera fase del brote del COVID-19 en una muestra recogida en el norte de España (Stress, anxiety, and depression levels in the initial stage of the COVID-19 outbreak in a population sample in the northern Spain). Cadernos de Saúde Pública 2020;36:e00054020.
33. Van der Vegt I, Kleinberg B. Women worry about family, men about the economy: gender differences in emotional responses to COVID-19. Soc Info 2020;12467:397-409.
34. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. JAMA Netw Open 2020;3:e203976.
35. Barzilay R, Moore TM, Greenberg DM, DiDomenico GE, Brown LA, White LK, et al. Resilience, COVID-19-related stress, anxiety and depression during the pandemic in a large population enriched for healthcare providers. Transl Psychia 2020;10:1-8.
36. Ausín B, González-Sanguino C, Castellanos MÁ, Muñoz M. Gender-related differences in the psychological impact of confinement as a consequence of COVID-19 in Spain. J Gender Studies 2020;30:29-38.
37. Rodríguez-Rey R, Garrido-Hernansaiz H, Collado S. Psychological impact of COVID-19 in Spain: early data report. Psychol Trauma: Theory Res Pract Policy 2020;12:550.
38. Mechael P, Nemser B, Cosmaciuc R, Cole-Lewis H, Ohemeng-Dapaah S, Dusabe S, et al. Capitalizing on the characteristics of mHealth to evaluate its impact. J Health Commun 2012; 17(Suppl1):62-6.