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## Evaluation of a digital programme for final year nursing students during COVID-19

Chipps Jennifer<sup>a,\*</sup>, Martin Penelope<sup>a</sup>, Hoffman Jeffrey<sup>a</sup>, Williams Margaret<sup>a</sup>, Baloyi Olivia<sup>b</sup>, Walters Fiona<sup>b</sup>, Jarvis Mary Ann<sup>b</sup>

<sup>a</sup> School of Nursing, Belville Campus, University of the Western Cape, 14 Blanckenberg Road, Belville, Cape Town, South Africa

<sup>b</sup> School of Nursing and Public Health, Howard College, University of KwaZulu-Natal, 238 Mazizi Kunene Road, Glenwood, Durban, South Africa

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### ABSTRACT

**Aim:** The aim of this study was to evaluate a digital programme aimed to address COVID-19 related anxiety of final year undergraduate nursing students on returning to the clinical practice during the pandemic in South Africa.

**Background:** In South Africa, concern about the physical and psychological safety of nursing students resulted in the planning of a psychological first aid program to facilitate nursing students return to clinical practice.

**Design:** A survey was conducted in September 2020 following the August 2020 return of final year nursing students to clinical facilities.

**Methods:** All final year nursing students were invited to participate in the study ( $N = 196$ ). An online survey was circulated via WhatsApp asking respondents to rate their anxiety and fear of COVID-19 before and after return to practice following an intervention (eCOVID). Related pair analysis was done on the main outcome measures of anxiety, COVID-19 fears and concerns using Related Samples Wilcoxon Signed Rank tests.

**Results:** After the programme, the respondents reported a significant reduction in anxiety ( $W = 2.92, p = .004$ ) and COVID fear ( $W = 0.3.1, p = .001$ ), specifically related to infecting family, being exposed to COVID-19 at work, propagating infection at work and lacking access to COVID-19 information and communication.

**Conclusion:** The implementation of a dedicated digital programme, underpinned by a sound theory base of psychological first aid, may have decreased anxiety and fear in nursing students during clinical practice in the pandemic.

**Contribution:** The study contributes to evidence on psychological first aid support of nursing students during the COVID-19 pandemic.

### 1. Introduction

Due to the infectious nature of COVID-19 and the uncertainty of the impact and duration of the pandemic (Ahorsu et al., 2020; Goyal, Chauhan, Chhikara, Gupta, & Singh, 2020), there has been an increase in psychological distress experienced in the general population and in healthcare workers (Serafini et al., 2020). Healthcare workers had to cope with the higher risks of exposure, extreme workloads, moral dilemmas, and a constant change in their usual working environment (Shanafelt, Ripp, & Trockel, 2020). A recent study conducted in Hubei, China, reported that 70 % of the healthcare workers experienced intense levels of stress followed by mood and anxiety disorders (Udwadia &

Raju, 2020). Healthcare workers experienced depression and anxiety (Chen, Wu, Yang, & Yen, 2005) related to seeing patients die, concerns about their safety, and exhaustion (Cai et al., 2020). Apart from work-related stress, the unavailability of both hospital resources and family support are all contributing factors to healthcare worker burnout (Kim & Choi, 2016), which was exacerbated during COVID-19 with reports of high levels of burnout (Wu et al., 2020), and anxiety associated with the fear of COVID-19 (Lee, 2020).

### 2. Background

The spread of the COVID-19 pandemic was accompanied by

\* Corresponding author.

E-mail addresses: [jchipps@uwc.ac.za](mailto:jchipps@uwc.ac.za) (J. Chipps), [pmartin@uwc.ac.za](mailto:pmartin@uwc.ac.za) (M. Penelope), [jhoffman@uwc.ac.za](mailto:jhoffman@uwc.ac.za) (H. Jeffrey), [marwilliams@uwc.ac.za](mailto:marwilliams@uwc.ac.za) (W. Margaret), [baloyio@ukzn.ac.za](mailto:baloyio@ukzn.ac.za) (B. Olivia), [walters@ukzn.ac.za](mailto:walters@ukzn.ac.za) (W. Fiona), [jarvism@ukzn.ac.za](mailto:jarvism@ukzn.ac.za) (M.A. Jarvis).

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lockdowns, isolating many sectors of the world's population from each other. South Africa was no exception, and on 24th March 2020, a 21-day Level-5 lockdown was declared and then extended to delay the demand for hospital beds (Bedford et al., 2020). As it did globally, the lockdown also affected South African universities, which moved to online learning, and students, including nursing students, returned to their residential areas of origin. The return of medical and nursing students to clinical practice to assist health facilities in managing the effects of the pandemic was debated at South African Higher Education platforms. The National Command Council, which was tasked with overseeing the management of the COVID-19 pandemic, recommended the return of final year medical and nursing students in a staged lockdown approach from July 2020 onwards.

During the COVID-19 pandemic, healthcare workers required support to address their fears around their health, safety, and interpersonal and family needs. From the published literature, it was identified that healthcare workers needed knowledge and information about COVID-19 (Yin & Zeng, 2020); required the continued support and reassurance that their place of work will assist them, listen to their concerns and do everything possible to protect them and prevent infection (Shanafelt et al., 2020); and if the healthcare worker were to become infected, their expectation was that their employers would provide medical and social support (Shanafelt et al., 2020). With the recommendation for the return of final year students to clinical practice, nursing faculty raised concerns about the physical safety of nursing students and the need for personal protective equipment (PPE); issues of COVID-19 testing and indemnity; and social and psychological support.

Psychological First Aid was identified as a theoretical framework which could be applied to assist the nursing students to return to clinical practice and to deal with fears and concerns about COVID-19. Psychological first aid was designed by the World Health Organisation (WHO) to reduce the initial distress caused by traumatic events and to foster short and long term adaptive functioning and coping in disaster settings (World Health Organization, 2011). Psychological first aid has five components: Create a sense of safety; Create a sense of calm; Create efficacy; Create connection; and Create hope (World Health Organization, 2011). Concern about the virus can increase motivation to perform preventative behaviours and a psychological first aid strategy could decrease anxiety, instil hope, and promote safety by providing information and further conscientisation about COVID-19 (Pakpour & Griffiths, 2020). A study conducted by the authors in South Africa has demonstrated the significance of digitally supported psychological interventions for older persons (Jarvis, Padmanabhanunni, Balakrishna, & Chipps, 2020). In this context, nursing faculty in two university nursing schools, both located in hotspots in South Africa, collaborated and developed a digital psychological first aid programme, eCOVID (*Connect, Optimise, Validate, Information, Destress*), to be delivered in July 2020 to final year nursing students prior to return to the facilities to complete their clinical practice. The programme was implemented using both WhatsApp and the universities' learning management systems. The aim of this paper was to evaluate the digital psychological first aid programme (eCOVID) for final year nursing students, at one university, returning to the clinical facilities to complete their clinical training.

### 3. eCOVID: A digital COVID-19 psychological first aid programme

eCOVID is a psychological first aid programme which aimed to reduce COVID-9 related anxiety and concerns using the digital platforms of WhatsApp and the university learning management system. The programme had five objectives: 1) To create a sense of safety with information on the virus and infection control and by providing personal protective equipment; 2) To create a sense of calm through reassurance and strategies to manage COVID-19 related stress; 3) To enhance self-efficacy through the development of competency in the use of PPE and knowledge on COVID-19 epidemiology and nursing care; 4) To

connect the student to a support structure using WhatsApp; and 5) To instil hope, through providing accurate scientific information on the nature of pandemics (World Health Organization, 2011). The online components of eCOVID were hosted on the university's learning management system and consisted of self-directed learning activities on COVID-19 and infection control. All activities were compulsory with a requirement of 80 % to pass. The criteria of 80 % was selected due to the concerns of the high transmission rate of COVID and the importance of competent knowledgeable students. The online sessions were further supported through one 2-hour face to face session under COVID-19 conditions to provide PPE to the students. Stress management and support were provided through ongoing WhatsApp groups with messages delivered three times a week over a four-week period to the students' mobile phones. The WhatsApp messages aimed to create a sense of safety and self-efficacy through information posted about the virus and its management, audio-recordings on stress management strategies as well as inspirational messages. In addition, faculty provided the following additional structural support: PPE, flu vaccines, clinical supervision, and support at the clinical placement facilities. eCOVID was implemented over a week pre-placement at the end of July 2020, followed up by a 4-week period in August 2020, inclusive of support through WhatsApp.

### 4. Methods

A survey to evaluate eCovid was conducted in September 2020, following the August 2020 return of final year nursing students to clinical facilities for completion of their clinical practical requirements. This was Phase 2 of a two phased study where in Phase 1 students were asked to explore their primary perceptions of returning to clinical practice (Jarvis et al., 2021). A single group pre-post evaluation study was planned, however lockdown delays in ethical clearance and the need to prepare nursing students to return to the clinical settings during the height of the pandemic, resulted in delivery of the intervention, eCOVID, followed by a survey once ethical clearance was received.

*Setting:* A South African university that offers a 4-year undergraduate nursing programme leading to the registration of nurse (General, Psychiatric and Community) and midwife ( $N = 1007$  students;  $n = 196$  4th year nursing students). The university attracts students from under-resourced and previously disadvantaged areas, with many staying in university residences. The students returned to their homes during the hard lockdown and the off-campus settings allowed for varying degrees of access to online learning platforms and signal strength for connectivity during the lockdown.

*Population and sample:* All final year nursing students ( $N = 196$ ). These students were the first nursing students to return to the clinical facilities in the area.

*Instrument:* An online questionnaire was developed on Survey-Monkey and circulated on WhatsApp to all 4th year nursing students. The questionnaire asked respondents to rate their feelings about anxiety and fear of COVID-19 and sources of stress for two occasions, before return to practice and 'currently'. In addition, the respondents were asked to evaluate the eCOVID programme components. The questionnaire included the valid and reliable ( $\alpha = 0.903$ ) 7-item Generalized Anxiety Disorder Scale (GAD-7), which measures anxiety based on seven core symptoms and rates the level of anxiety as minimal (score 0–4), mild (score 5–9), moderate (10–14) or severe (score 15–21) (Spitzer, Kroenke, & Williams, 2006). The Fear of Coronavirus-19 Scale (FCV-19S) was used to measure perceived fear of COVID-19 (Ahorsu et al., 2020). The scale was developed in Iran and had shown good internal consistency ( $\alpha = 0.82$  and  $\alpha = 0.883$  in this study) and concurrent validity with the 14-item Hospital Anxiety and Depression Scale (HADS) and the 5-item Perceived Vulnerability to Disease Scale (PVDS) (Ahorsu et al., 2020). The Sources of COVID-19 Anxiety Scale is a self-developed 15-item 3-point Likert scale based on the conceptual model of Sources of COVID Anxiety by Shanafelt et al., (2020). The scale has 12 questions on

sources of anxiety related to COVID-19 and three questions pertaining to anxiety related to remote university studies during the pandemic. In addition, the six questions evaluating the programme were included. The scale had a calculated  $\alpha = 0.775$  scale reliability.

**Data collection and analysis:** The online questionnaire was circulated via WhatsApp using the SurveyMonkey link. Respondents provided informed consent to participate in the study. Data were entered into IBM SPSS v26. Summation of item scores on the GAD-7 (range 0 to 21) and FCV-19S (range 7 to 35) was carried out with the higher score indicating greater anxiety and fear. In addition, an average FCV-19S score was calculated to enable comparison with other data sets. Related pair analysis was done on the main outcome measures of anxiety, COVID-19 fears and sources of anxiety using Related Samples Wilcoxon Signed Rank tests based on normality of data. The study received ethical approval from the university's ethics committee.

**5. Results**

Data were collected over a period of two weeks in September 2020. A total of 135/196 students (68.9 %) completed the questionnaires, of which 127/196 (64.7 %) were included in analysis based on completion of scales. The respondents were mostly female (111, 87.4 %) with an average age of 24.8 years ( $\pm 5.5$ ), with age ranging from 21 to 47 years. Psychiatric Nursing Science (80, 63.0 %) and midwifery placements (68, 53.5 %) were most common among the respondents at the time of the survey. More than three quarters of the respondents (99 (78.0 %) lived in area where the university is located, 90(70.9 %) in the urban area surrounding the university. Nearly all the respondents (115, 90.6 %) were living in private accommodation (not in university residence) before returning to clinical practice. In terms of support, most respondents reported that their family provided them with emotional support during the pandemic (80, 63.0 %), followed by friends (10, 7.9 %).

**5.1. Perceived influence of eCOVID programme on levels of anxiety and fear experienced by nursing students**

To measure the level of anxiety and fear associated with returning to clinical practice during the pandemic, the respondents were asked to rate their levels of anxiety and fear as recalled prior to the eCOVID programme, and in the last 2 weeks (after the programme). The respondents reported a mean anxiety score of 14.07/21 which can be classified as moderate anxiety [95 %CI 12.91–15.24]) and a mean fear level scores (20.46/35 [95 %CI 19–21.87]) before the programme (Table 1).

After the programme (the current state over the last 2 weeks), the respondents reported a significantly reduced mean score for anxiety (12.47 [95 %CI 11.46–13.48]) with a mean difference of  $-1.6$  ( $W = 2.92, p = .004$ ). Similarly, there was a significant reduction in COVID-19 related fear with a 1.7 mean difference reduction in fear ( $W = 0.3.1, p = .002$ ).

**Table 1**  
Perceived influence of eCOVID programme on anxiety and fear.

Fear and Anxiety scales	Before m(sd)	Current m(sd)	d m(sd)	W = Test	p-value
Generalised Anxiety Disorder (GAD) /28 (n = 108)	14.07 (6.1)	12.47 (5.29)	-1.6 (5.6)	2.92	0.004*
COVID Fear Scale (FCV-19S) (n = 113)	20.27 (7)	18.57 (6.6)	-1.7 (5.8)	3.1	0.001*

p-value of significance set at <0.05\*; d = mean difference; W = Related Samples Wilcoxon Signed Rank Test.

**5.2. Perceived influence of eCOVID programme on nursing students' anxieties**

The respondents were asked to rate two occasions, before the eCOVID programme and in the last two weeks (after the programme) for how often they were concerned or anxious about safety, level of support, information on the pandemic, and the completion of their nursing degree. Each concern was rated as Never (1), Somewhat (2) and Often (3).

The biggest source of anxiety was the completion of the nursing academic programme, specifically the academic workload of the university programme (2.67/3 [95 %CI 2.57–2.77]) and the completion of required clinical hours for graduation (2.62/3 [95 %CI 2.52–2.72]). This was followed by anxieties about access to PPE (2.35/3 [95 %CI 2.21–2.48]) and uncertainty whether the organization would support them if they contracted COVID-19 (2.34/3 [95 %CI 2.2–2.47]) (Table 2). Anxiety about access to COVID-19 information (1.84/3 [95 %CI 1.69–1.98]) and communication (1.83/3 [95 %CI 1.69–1.97]) and access to childcare while on clinical placement (1.7 [95 %CI 1.55–1.84]) were rated significantly lower than other sources (Table 2).

After the eCOVID programme (the current state over the last 2

**Table 2**  
Perceived influence of eCOVID programme on sources of nursing students' anxieties.

Categories and sources of anxiety /3	Before m(sd)	Current m(sd)	d m(sd)	W-Test	p-value
<b>Safety</b>					
Access to appropriate personal equipment	2.35 (0.74)	2.48 (0.58)	0.13	1.29	0.197
Infecting my family at home	2.23 (0.82)	1.99 (0.86)	-0.24	2.9	0.003*
Being exposed to COVID-19 at work	2.20 (0.78)	2.02 (0.75)	-0.18	2.1	0.037*
Propagating infection at work	2.13 (0.75)	1.92 (0.71)	-0.21	2.4	0.016
<b>Organisational, educational, and psychological support</b>					
Uncertainty that the organization will support/ take care of my support/take care of my support/take care of my developed infection	2.34 (0.74)	2.41 (0.68)	0.07	1.2	0.219
Uncertainty that the organization will support/ take care of my family needs if I develop an infection	2.3 (0.78)	2.4 (0.73)	0.1	1.3	0.203
Support for other personal and family needs as work hours and demands increase (e.g., for food, hydration, lodging, transportation)	2.14 (0.75)	2.11 (0.75)	-0.03	0.1	0.885
Being able to provide competent medical care if deployed to a new area (e.g., non-ICU nurses having to function as ICU nurses)	2.10 (0.73)	2.09 (0.70)	-0.01	0.3	0.778
Access to childcare during increased work hours and school closures	1.7 (0.79)	1.67 (0.78)	-0.03	0.3	0.748
<b>Access of COVID-19 information</b>					
Lack of access to up-to-date information on COVID-19.	1.84 (0.78)	1.69 (0.73)	-0.15	2.5	0.013*
Lack of access to up-to-date communication on COVID-19	1.83 (0.74)	1.66 (0.69)	-0.17	2.8	0.005*
<b>Completion of nursing programme</b>					
Increased load of university work	2.67 (0.54)	2.58 (0.54)	-0.09	1.3	0.196
Being able to complete required clinical hours	2.62 (0.56)	2.59 (0.58)	-0.03	0.2	0.852
Being able to connect online to sources	2.20 (0.66)	2.21 (0.68)	0.01	0.2	0.851

p-value of significance set at <0.05\*; d = mean difference; W = Related Samples Wilcoxon Signed Rank Test.

weeks), the respondents reported a significant reduction in mean anxiety ratings related to *Infecting my family at home, Being exposed to COVID-19 at work, Propagating infection at work, Lacking access to information on COVID-19, Lacking access to communication on COVID-19* (Table 2).

### 5.3. Evaluation of eCOVID programme

Respondents were asked to rate components of eCOVID programme that they felt assisted them in their return to clinical practice and the impact of the flattening of the pandemic curve. The eCOVID online programme activities and receiving PPE were rated significantly higher than the other components (Fig. 1). The face-to-face component of the eCOVID programme (n = 109) and the WhatsApp groups having a flu vaccine (n = 73) were rated significantly lower than the online programme. This was also confirmed in the specific evaluation of the eCOVID programme, with a very positive rating for the online programme (m = 4.13/5 (sd 1.02) [95 %CI 3.93–4.32]) and the applicability of the programme to living and working during the pandemic (m = 4.08/5 (sd 0.66) [95 %CI 3.96–4.21]). The WhatsApp support groups, and the face-to-face orientation were rated significantly lower (m = 3.21/5 (sd 1.3) [95 %CI 2.97–3.46] and m = 3.2/5 (sd 1.15) [95 %CI 2.98–3.41]) respectively.

## 6. Discussion

Nursing faculty, preparing to return nursing students for their clinical training during the pandemic, anticipated that the nursing students would have similar fears during their return to clinical practice, to those expressed by healthcare workers in other studies (Yin & Zeng, 2020; Shanafelt et al., 2020). This assumption was confirmed in Phase One of this study, where the students expressed that their primary perceptions of returning to clinical practice revolved around uncertainty and stress (Jarvis et al., 2021). The eCOVID online programme was thus developed using a psychological first aid framework to address the anxiety and fears expressed by final year undergraduate nursing students about returning to clinical practice during the pandemic. Similarly, other researchers, concerned about the psychological effects of the pandemic on healthcare workers planned for and implemented interventions utilizing

Psychological First Aid as a framework (Blake et al., 2021; Malik et al., 2021; Sulaiman et al., 2020). In particular a study targeting Malaysian healthcare workers remotely offered Psychological First Aid through WhatsApp and phone calls (Sulaiman et al., 2020).

To decrease the anticipated fears and anxieties, the first objective of eCOVID aimed to create a sense of calm through reassurance, enabling strategies to manage COVID-19 related stress, and connecting the students to clinical supervisors and university and support through the online programme and the WhatsApp support groups. Malik et al., (2021), described the value to hospital-based healthcare workers, of supportive daily rounds as framed within a Psychological First Aid model. This strategy was also supported by Xiao et al., (2020) who reported that support and care that people receive from others during an outbreak was found to have a favourable effect on psychological health and can reduce anxiety and stress (Xiao, Zhang, Kong, Li, & Yang, 2020). In this study, the respondents reported that anxieties and generalised fears related to COVID-19 were significantly reduced from the recalled levels before their return to clinical practice, although their anxieties about support increased slightly, but not significantly. This was also confirmed in evaluating the programme components with the significantly lower ratings of the face-to-face component of the eCOVID programme and the WhatsApp Groups in terms of supporting the return to clinical practice. However, the respondents' most significant anxieties around the impact of COVID-19 were the academic completion of both practical and clinical requirements of their nursing programme due to the loss of clinical hours during the lockdown period. Though these anxieties decreased slightly after the programme, this was not significant.

The second objective of eCOVID was to both create a sense of safety by providing PPE and access to influenza vaccinations; and to facilitate the online validation and application of existing knowledge on infection control related to SARS-COV-2. Sun et al., (2020) reported that, during the pandemic extreme workload, substantial patient numbers and shortage of protective gear caused severe physical fatigue and discomfort (Sun et al., 2020). In addition, healthcare workers experienced feelings of fear, anxiety and helplessness when they lacked knowledge about a widespread infectious disease such as COVID-19 or felt that their health and lives were in danger (Sun et al., 2020). Other studies also

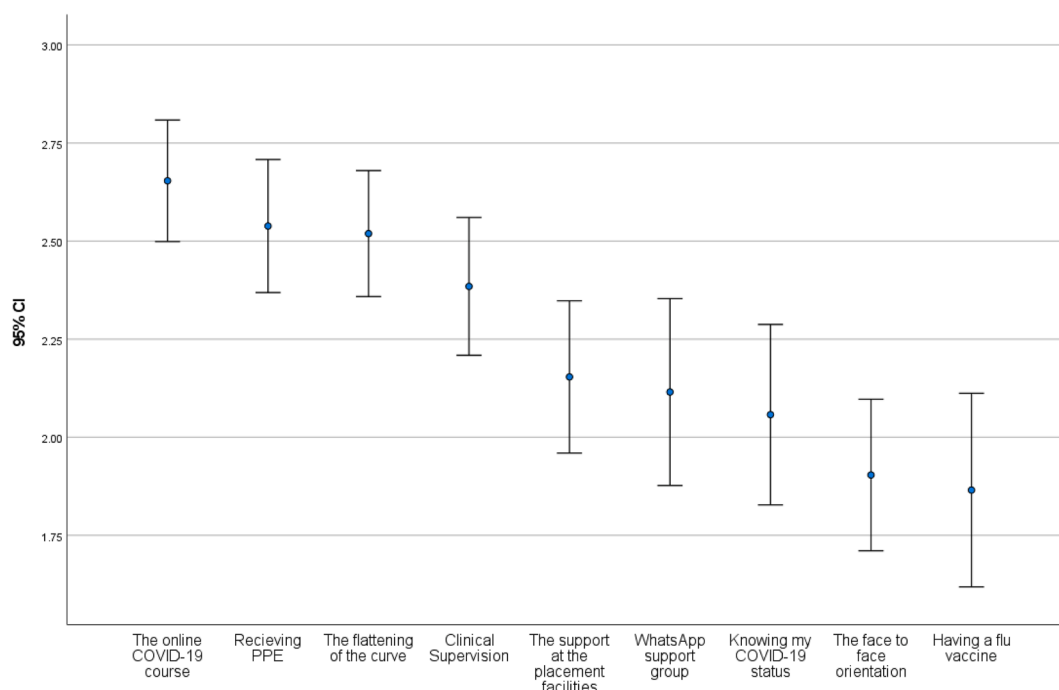


Fig. 1. Perceived factors assisting return to clinical practice.



reported healthcare workers' fears about direct contact with patients infected with SARS-CoV-2, because their duties require them to be in close, frequent contact with potentially infected patients for prolonged periods, and therefore increased their susceptibility to infection (Lai et al., 2020). In the evaluation of the influence of eCOVID components on the students' concerns, the provision of PPE did not create a significant change, but the anxieties about being infected at work, propagating infection at work, and infecting their families reduced significantly post programme. This was also confirmed in the specific evaluation of the eCOVID programme, with a positive rating for the online programme and the applicability to living and working during the pandemic, followed by access to PPE and influenza vaccinations.

Lai et al. (2020) found that, during the early stages of the COVID-19 pandemic in China, healthcare workers were unlikely to be advised about the risk of contracting the virus. Guidance and effective methods to prevent the transmission of the disease helps with reducing stress among nurses (Cai et al., 2020). During the pandemic, factors that encourage healthcare workers to actively work and take part during a pandemic include feeling safe, prompt training, and confidence in professional skills (Sun et al., 2020). Therefore, the third objective was linked together with objectives two and four to build on the respondents' existing knowledge of infection control, by enhancing their self-efficacy through the development of competency in the use of PPE and knowledge on COVID-19 infection control, epidemiology, and nursing care. After the programme, the respondents reported a significant reduction in their anxieties about information about COVID-19 and the communication about COVID-19.

The last objective of eCovid was to instill hope through the provision of accurate scientific information on the nature of pandemics and the COVID-19 pandemic specifically (World Health Organization, 2011). In a study conducted by Yin and Zeng (2020), over 90 % of healthcare workers mentioned that they would like to know more about COVID-19 and the SARS-CoV-2 virus. In the hope of empowering healthcare workers with the correct knowledge about SARS-CoV-2, a large amount of information has been published and educational material made available (Abbag et al., 2018). During a glut of information and not all of it from reputable sources there is a risk of misinterpretation (Khan, Shah, Ahmad, & Fatokun, 2014). In eCOVID, relevant contextual information was provided and as with Objective Three, the respondents reported that after the eCOVID programme, their anxieties for information about COVID-19 and the communication about COVID-19 significantly reduced.

## 7. Conclusions

The process of ensuring nursing students' safety through the provision of PPE, optimising their preparation for clinical nursing during a pandemic by validating their existing self-efficacy in terms of knowledge, skills and confidence in infection control through providing up-to-date information on COVID-19, all significantly contributed to the significant reduction in fear and anxiety. Nursing education and health institutions should offer support for nursing students during an outbreak and protect their mental health, as this also has an impact on health service delivery. The implementation of a dedicated Psychological First Aid programme preparing nursing students for clinical practice in the pandemic showed that a theoretically underpinned programme can reduce concerns about the pandemic's influence and thus reduce the anxiety and fear of working in this environment during a situation such as the COVID-19 pandemic.

## 8. Limitations

The study's main limitation is the reliance on the respondents' recall of their fears and anxieties prior to returning to clinical practice. A delay in the receipt of ethics did not allow for the pre-questionnaire to be administered before the programme as initially planned. As all students

were returning to practice, the intervention was implemented but the evaluation was delayed. It was also not ethical to have a two-group design as all students required preparation to return to practice. There is a possibility that the changes identified in the fear and anxiety levels were not solely attributed to the digital intervention.

## Credit authorship contribution statement

**Chipps Jennifer:** Conceptualization, Formal analysis, Writing – original draft, Writing – review & editing. **Martin Penelope:** Hoffman **Jeffrey:** Project administration, Writing – review & editing. **Williams Margaret:** Baloyi **Olivia:** Writing – review & editing. **Walters Fiona:** Jarvis **Mary Ann:** Conceptualization, Writing – original draft.

## Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Jennifer Chipps reports financial support was provided by University of the Western Cape.

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