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**Original Research**

# Perception of Jordanian pharmacy students towards community pharmacy-virtual training experience during COVID-19 outbreak

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**Abstract**

**Background:** This study aims to assess the perception of pharmacy students towards this new modality of training during CoViD-19 period. **Methods:** Senior pharmacy students were included in this study. Accredited and certified community pharmacy preceptors were asked to simulate the community pharmacy training and record that as videos, which were evaluated and assessed by expert academics before being delivered to students. A validated online questionnaire was then distributed for self-administration electronically to evaluate their perception. **Results:** A convenience sample (n=109) of senior pharmacy students were recruited. The majority of the participants were females (70.6%) and the median age of students was 22.0 years (IQR= 1). Around half of the participants showed positive perceptions towards the virtual training module and the pharmacy training preceptors. A 46.8% of the students benefited from the virtual training in time management, and 43.1% in developing lifelong learning skills. The absence of eye contact during the learning was the most important barrier revealed by the students (52.3%). Half of the students agreed/strongly agreed that combining the virtual and conventional techniques for future training would improve training outcomes. **Conclusion:** While students had an overall positive experience, there were many hurdles that need to be addressed, such as lack of communication and technical support. This spot the light on the crucial need to continually improve and redesign our experiential education; to achieve optimum learning outcomes for students.

**Keywords:** CoViD-19; Jordan; pharmacy training; pharmacy students; virtual training

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## INTRODUCTION

A dramatic change in the development of online courses has been noticed in the last few years.[1,2] Moving from face-to-face, teacher-student interaction to online learning has grown intensely with emphasizing and understanding how to have the best student engagement, with the ultimate goal of achieving optimum learning outcomes.[3] However, the environment of the online courses is critical to their success.[4] For example, in online teaching, students appear to need more direct feedback from their professors than in a conventional teaching method.[4] A study by Bangert found that students seek prompt comments and feedback related explicitly to problems they have when using online course platform management tools and submitting quizzes and assignments.[5] Several factors have resulted in this shift to online courses, including program marketability, student adaptability and suitability, the rapid growth of technology and internet access.[6]

By the end of 2019, the world has faced a coronavirus disease (CoViD-19) outbreak, significantly impacting education and teaching strategies worldwide.[3,7,8] Due to this outbreak, all classes were switched to online learning,[7-10], which was the most effective tool to maintain students' access to education and keep their retention according to the current situation. A recent study by Ponti et al. assessed the medical students' perception of online training, including simulated clinical scenarios during the CoViD-19 pandemic.[10] Most of the study participants gave a positive evaluation of the virtual reality training and appreciated the structure of the online training format. Despite the difficulties in online access (mainly related

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to technical issues), students considered the future use of such training helpful in parallel to the actual training practice.[10]

Subsequently, university/faculty higher education must evaluate students' satisfaction with online courses, especially those who have clinical training, such as healthcare students.[2,11,12] As the nation is switching entirely to virtual teaching, studying this dramatic change is critical in the educational world. That will provide an insight into the change impacts on the learning outcomes, which are supposed to be achieved during their training. In addition, there is not enough data in the literature that measure the satisfaction with virtual/online learning and the impact this new training method will have on different factors such as the delivery of the course materials, grades and the level of students' engagement.[1,9,10] As an example, Rothman et al.[2] reported that students were overall satisfied with online courses, with somewhat lower satisfaction regarding instructor feedback and technology aspects. In Jordanian Universities, all pharmacy students must complete 1440 hours of mandatory community pharmacy field training to be equipped with the necessary pharmacy-related skills needed for their future careers. Similar to other academic courses, this field training was utterly switched to a virtual training modality in order to reduce the risk of infection.[13] Another measurement that can be taken into consideration as a result of the new pandemic is the mental health of the students, which has a high impact on their learning process.[14] A recent study evaluated the stress levels among Indian students, any psychological imbalances, and their major hurdles during the CoViD-19 lockdown.[14] The observations of this study showed that students were generally stressed during the lockdown and the pandemic. Also, it showed that fear of vulnerability, self-management, and failure to accept virtual learning had impacted their learning process.[14] Similarly, and from a Jordanian perspective, a study by Al-Tammemi et al. showed that about 70% of university students had severe distress levels during the first wave of the pandemic.[15] Online distance learning was the most serious issue of concern in the majority of them.[15,16]

Thus, the interruption of traditional in-pharmacies training represents a particularly critical issue for pharmacy students and healthcare students attending the last year of their training course, who must complete their training as a prerequisite before graduation. Therefore, in replacing traditional pharmacy training and overcoming this educational gap, virtual training was the major method adopted by different medical and Pharmacy schools. Hence, to address this change in the training module in a concise period of time during the CoViD-19 pandemic, this study aimed to evaluate the perception of final-year pharmacy students with virtual community-based education (the community pharmacy field training) as a result of the CoViD-19 outbreak.

## METHOD

### Study design and participants

This study is a descriptive cross-sectional conducted in Jordan between September 15th to December 30th, 2020using an online survey administered to a convenience sample of pharmacy students. Clinical researchers developed the online survey to solicit anonymous responses, which were treated confidentially. The inclusion criteria were senior (fifth-year) pharmacy students registered in the "Training II" course at the pharmacy/Applied Science Private University faculty located in Amman-Jordan and could comprehend English.

Initially, "Training II" course was built on the actual (conventional) training of the students in the community pharmacies for the whole semester. They used to meet the academic instructor weekly to discuss the pre-assigned tasks and patient cases. The course structure was as follows in the virtual training: five selected community pharmacists were accredited and certified by the Faculty of Pharmacy at Applied Science Private University as community pharmacy training preceptors (who were also involved in the conventional training before). They recorded different videos related to various topics determined by the course instructor, including the cardiovascular system, respiratory system endocrine system, infectious diseases, and gastrointestinal system. The preceptors covered essential information about the drugs, for instance, different trade names, drug indications, mechanism of actions, side effects, and the most relevant patient's counseling points. The videos were recorded in the community pharmacy setting to simulate the actual practice and pharmacy layout. Expert academics in the field of pharmacy practice have evaluated the videos before submission to the students. The students were asked to watch the videos which the course instructor uploaded via the educational platform (Microsoft Teams®). Discussion with students, which the course instructor-led was completed to achieve the course learning outcomes.

Participants were recruited through the educational platform (Microsoft Teams®). Participants were advised that their participation in the study was voluntary and did not pose any risks. Written participant consent was given to the participants at the beginning of the survey. If the participants were willing to proceed with the survey, they approved their consent. If not, they selected "disagree to participate" and did not continue with the survey questions.

### Survey development, validation, and reliability

The literature was reviewed[2,11,17,18] and a published questionnaire by Abufarha et al[13] which evaluated the perceptions of undergraduate pharmacy students regarding their current conventional pharmacy training practices was adopted to develop the online survey that suits the aim of this study. The final version of the survey was designed using the general principles of good survey design.[19] The online survey was finally prepared in English using Google Forms®. The survey contained multiple-choice and open-ended questions and was designed to be completed within 10-15 minutes.

The face validity of the survey was evaluated using the following steps: three independent academic staff members who had previous experience in survey development and pharmacy training-related work and research studies were requested to evaluate the first draft. A statistician was also

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involved at this stage of the evaluation. Their feedback, as well as their comments, were considered and incorporated where appropriate to prepare the final version of the survey. The questions were free from medical jargon or complicated terminology. Also, a pretest for the survey was conducted through a pilot sample of 30 students, with their responses being excluded from the final analysis; then, necessary refinements were made accordingly. The evaluation of the survey was conducted from different aspects, such as the wording, the clarity of the questions and whether each question is relevant for inclusion with respect to the study objectives. As a final step in the survey development, the research team re-examined each question and made sure that the survey was suitable for online administration (relevance, clarity, context, response categories, format, timing, and layout) and confirmed the study's applicability to the students. The reliability of the questionnaire was assessed using Cronbach's α measure, with value of 0.85. The cutoff point for the Cronbach's α values is ≥ 0.7 to indicate acceptable internal consistency.[20]

The final version of the survey contained four parts. Part one comprised seven questions, which included sociodemographic and general information such as gender, age, nationality, and the number of completed field training hours before the virtual training course it is one of the pre-request parameters to register for the training II course is to complete at least 600 hours of field training. The latter will reflect the students' conventional training experience before the virtual course. The second part assessed pharmacy students' perception towards training preceptors, where potential participating students were asked to rate their level of agreement with the following statements "*Pharmacy preceptors acknowledge the objectives of training"; "Pharmacy preceptors acknowledge your role as a training student"; "Pharmacy preceptors help students integrate their knowledge of drug therapy into patient care"*, etc.

The third part reflected pharmacy students' perceptions toward the virtual training module. Here, the students were asked about the benefits as well as the barriers of the virtual training module from their perception. The last part compared virtual training vs. conventional community pharmacy training. Students were asked if they had the chance to modify the quality of the virtual training, to what level they agreed on the given suggestions such as *"converting the video records to interactive meetings with the training preceptors"; "changing the used online platform (i.e. Microsoft teams) to a different one", "keep the training sessions with one preceptor rather than multiple preceptors", "combine the virtual with the conventional for future training" and "no modifications are required".* A 5-level Likert scale was used to assess participants' responses to sections two-four i.e., "5: Strongly agree", "4: Agree", "3: Neutral", "2: Disagree", or "1: Strongly disagree". For section three, a benefit perception score was calculated out of 55 for the 11 statements used to assess students perception about the benefit of the virtual training module.

**Sample size**

The sample size was calculated based on the current number (109) of registered students in the Training II course provided by the admission and registration department at the University. The sample size was calculated using the online sample size calculator Raosoft® (http://www.raosoft.com/samplesize.html), using 5% margin of error, a 95% confidence level and a response distribution of 50%. The minimum sample size calculated was 86.

**Statistical analyses**

The completed surveys were extracted from Google Forms® as an Excel sheet and were then exported to Statistical Package for Social Sciences version 22.0 (SPSS® Inc., Chicago, IL, USA) for the statistical analysis. The descriptive statistics included frequency and percentages for categorical variables (both nominal and ordinal) and median/interquartile range (IQR) means for continuous variables. As stated in the methods above, Cronbach's α was used to evaluate the reliability of the questionnaire i.e., that the constructed scales are fit for their purpose.[20] Linear regression analysis was performed to assess factors associated with students perception score about the benefit of virtual training module**.** Statistical significance was considered at $P \leq 0.05$.

## RESULTS

**Sociodemographic characteristics of the study participants**

During the study period, 109 pharmacy students completed the questionnaire out of 110 students registered in the training II course (response rate= 99.1%). More than two-thirds of the students were females (n=77, 70.6%). The median age of students was 22.0 years (IQR= 1), and they completed a median of 888.0 field training hours (IQR= 539.5) before registering for this course. The majority of students reside in Amman (the capital of Jordan), and only 35.8% of them (n= 39) were Jordanians. More than half of the students (n= 63, 57.8%) reported taking a previous virtual training course before this one. Demographic characteristics are presented in Table 1.

Table 1. Demographic characteristics of the study participants (n= 109)

| Parameter | Median (IQR) | n (%) |
|---|---|---|
| Age (years) | 22.0 (1.0) | |
| Gender<br>Female<br>Male | | 77 (70.6)<br>32 (29.4) |
| Residential area<br>Amman (the capital of Jordan)<br>Others | | <br>85 (78.0)<br>24 (22.0) |
| Nationality<br>Jordanian<br>Other | | <br>39 (35.8)<br>70 (64.2) |
| Completed field training hours | 888.0 (539.5) * | |
| Previous pharmacy virtual training course<br>No<br>Yes | | <br>46 (42.2)<br>63 (57.8) |

IQR: interquartile range, *out of 1440 hr= the required field training hours.

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**Students' perception towards preceptors participated in their virtual training course**

Students reported positive perceptions towards preceptors participated in their virtual training course (Figure 1), where 65.1% of them (n= 71) believed that preceptors have acknowledged their role as training students, and 57.8% of them (n= 63) agreed/strongly agreed that preceptors have helped them integrating their knowledge of drug therapy into patient care. Also, 55.0% of the students believed that preceptors assisted them in achieving the objectives set for their training. Students had fewer positive attitudes of preceptors regarding their application of interesting learning activities (n= 51, 46.8%).

**Pharmacy Students' Perception towards the virtual training module**

Students also showed inadequate perception towards the benefit of their virtual training module concerning helping them to manage their time efficiently (n= 51, 46.8%), reducing the stress of real exposure to patients (n= 49, 44.9%), developing lifelong learning skills (n= 47, 43.1%), giving them the chance to think critically (n= 46, 42.2%), and helping them to develop social skills (n= 43, 39.5%). More details are summarized in Table 2.

The barriers of the virtual training module were assessed using eight statements (Table 3). Absence of eye contact during the

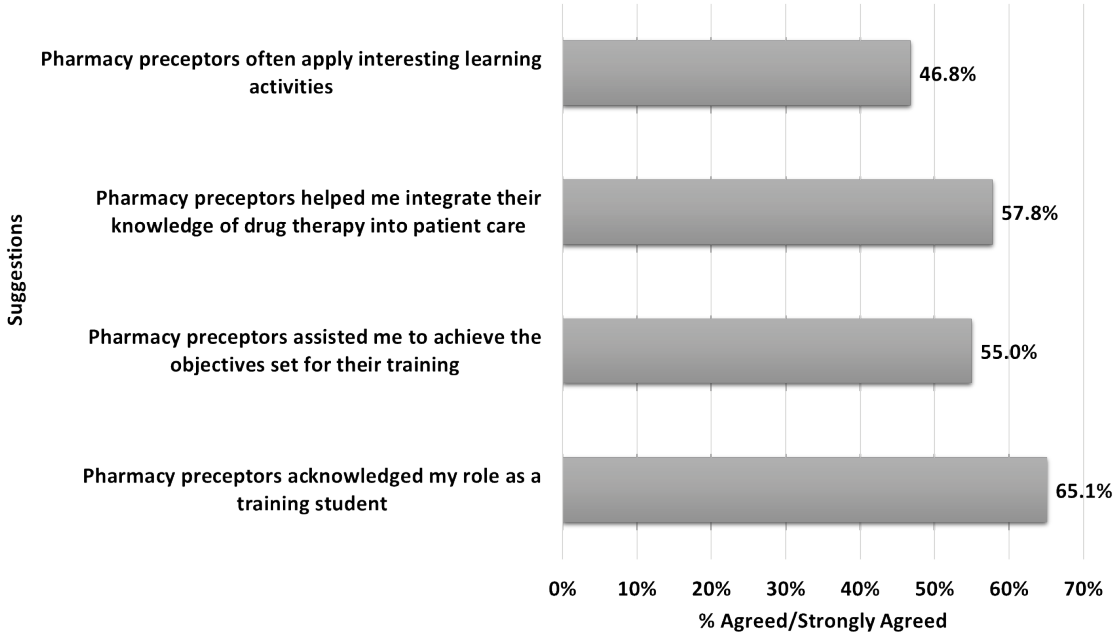


**Figure 1.** Pharmacy students' perception towards training preceptors (n= 109)

Table 2. Pharmacy Students' benefits of the virtual training module (n= 109)

| Statements | Strongly agree / Agree | Neutral | Strongly disagree/ Disagree |
|---|---|---|---|
| The virtual training experience increased my involvement with the pharmacy profession | 59 (54.1) | 32 (29.4) | 18 (16.5) |
| The virtual training module helped me to understand many training related topics proficiently | 59 (50.1) | 29 (26.6) | 21 (19.3) |
| The virtual training module gives an opportunity to see/know the medications before real exposure to the patients | 61 (56.0) | 33 (30.3) | 15 (13.8) |
| The virtual training module helped me to manage my time efficiently | 51 (46.8) | 37 (33.9) | 21 (19.3) |
| The virtual training module reduces the stress of real exposure to patients | 49 (44.9) | 39 (35.8) | 21 (19.3) |
| The virtual training experience helped me to develop social skills | 43 (39.5) | 39 (35.8) | 27 (24.8) |
| The virtual training module gives the chance to think critically | 46 (42.2) | 44 (40.4) | 19 (17.4) |
| The virtual training experience is a development of lifelong learning skills/completion of the experiential learning cycle | 47 (43.1) | 43 (39.4) | 19 (17.4) |
| The virtual training module improved my self-directed learning skills. | 57 (52.3) | 32 (29.4) | 20 (18.3) |
| The virtual training module pushed me to improve my IT skills. | 61 (56.0) | 30 (27.5) | 18 (16.5) |
| The virtual training module assignments pushed me to learn how to search for information efficiently | 70 (64.2) | 22 (20.2) | 17 (15.6) |

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Table 3. Pharmacy Students' perceived barriers of the virtual training module (n= 109)

| Statements | Strongly agree /Agree | Neutral | Strongly disagree/ Disagree |
|---|---|---|---|
| The used virtual training tools (i.e. online platforms and videos) created a barrier for my learning | 40 (36.7) | 38 (34.9) | 31 (28.4) |
| Poor internet connection | 41 (37.6) | 43 (39.4) | 25 (22.9) |
| Non-availability of well-functioned device | 42 (38.5) | 38 (34.9) | 29 (26.6) |
| Absence of eye contact during the learning | 57 (52.3) | 36 (33.0) | 16 (14.7) |
| Lack of suitable/quiet place during the virtual training | 45 (41.3) | 42 (38.5) | 22 (20.2) |
| Lack of access to certain technical support | 44 (40.4) | 39 (35.8) | 26 (23.8) |
| Lack of enough time | 44 (40.4) | 35 (32.1) | 30 (27.5) |
| Insufficient training using the virtual training tools (i.e. online platforms and videos) | 36 (33.0) | 45 (41.3) | 28 (25.7) |

learning was essential barriers revealed by the students (n= 57, 52.3%), followed by the lack of suitable/quiet place during the virtual training (n= 45. 41.3%), lack of access to particular technical support (n= 44, 40.4%), and lack of time (n= 44, 40.4%).

Moreover, students were asked about their perception towards suggestions that may modify the quality of the virtual training (Figure 2). Almost half of the students agreed/strongly agreed to combine the virtual and conventional techniques for future training and to convert video records to interactive meetings with the preceptors (n= 56, 51.4% for both). Also, 45.9% of the students (n= 50) agreed/strongly agreed to keep the training sessions with one preceptor rather than multiple preceptors. Only 26.6% of the students (n= 29) reported that no modifications are required.

Finally, regression analysis was performed to assess factors associated with student's perception score about the benefit of virtual training module (Table 4), and none of the factors a significant association with student's perception scores (P>0.05 for all).

## DISCUSSION

While professional community pharmacy practice training has been long incorporated into the curriculum at many pharmacy schools and health institutions,[21,22] the concept of virtual professional pharmacy training is still a relatively new concept for some Jordanian pharmacy schools. Online distance learning tools were utilized to deliver a virtual learning environment for pharmacy students to fulfill particular training competencies.[21,22] Moreover, due to the ongoing global CoViD-19pandemic, all virtual pharmacy training has been regarded as an inevitable alternative for sustaining pharmacy curriculum and program learning outcomes. Additionally, there are variations across pharmacy schools, nationally and internationally, which adopted such type of professional virtual training in terms of content and delivery to have it tailored to the competency standards or context where such program is located.[23-25]

This descriptive cross-sectional study aimed to explore senior pharmacy students' perceptions of the value and relevance of the virtual-based pharmacy training targeting community

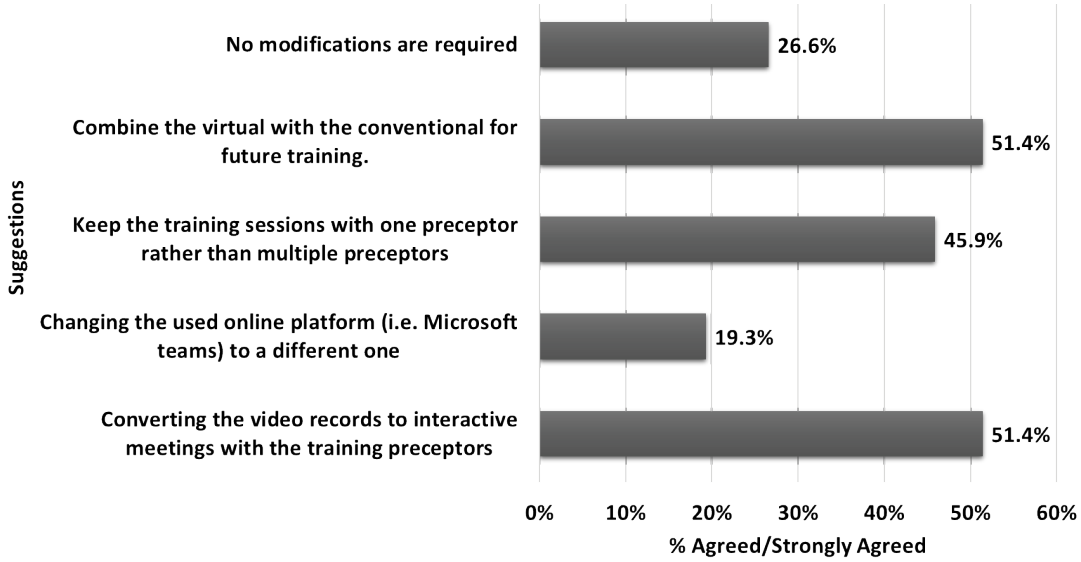


**Figure 2.** Suggestions to enhance the quality of virtual training from pharmacy students' perspectives (n= 109)

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Table 4. Assessment of factors associated with pharmacy students' perception towards the benefits of virtual training

| Parameters | Benefit perception score | |
|---|---|---|
| | Beta | P-value# |
| Age (years) | 0.064 | 0.509 |
| Gender<br>Female<br>Male | Reference<br>-0.065 | 0.501 |
| Residential area<br>Amman (the capital of Jordan)<br>Others | Reference<br>-0.039 | 0.687 |
| Nationality<br>Jordanian<br>Other | Reference<br>-0.002 | 0.986 |
| Completed field training hours | 0.018 | 0.854^ |
| Previous pharmacy virtual training course<br>No<br>Yes | Reference<br>-0.033 | 0.734 |

# Using simple linear regression

pharmacy competencies during the CoViD-19 pandemic and the influence of different variables on their perception. Additionally, this study identified the extent to which they agree with suggestions to enhance the quality of virtual-based pharmacy training from their own perspectives.

A previous study by De Ponti, Roberto, et al. regarded online training as a means of avoiding interruption in the training of medical students during the CoViD-19 pandemic, with positive perceived quality of such training by participating students.[26] Findings from our study show that during a virtual-based pharmacy training module, preceptors positively influence their students through acknowledgment of their role as training students, integration of pharmacotherapy knowledge into patient care, and assistance to achieve objectives of such training. Relatively similar, pharmacy students denied the interference of preceptors with their learning in a previous study by Darr et al. involving a virtual training course.[27] Nevertheless, the application of exciting learning activities by preceptors of virtually-based pharmacy training was regarded deficient by the students.

A study by Lucas et al. described better student learning and confidence levels before advancing to their pharmacy placements as a result of participating in a virtual pharmacy program,[28] while Ambroziak et al. described better students' self-identification of practice required to gain pharmacy dispensing skills after engaging in a virtual pharmacy course activity,[29] such benefits are particularly appreciated by pharmacy students participating in our study who expressed positive perception toward some suggested benefits of a virtual-based pharmacy training module in terms of increasing their involvement with the pharmacy profession, the achievement of proficiency in training topics, knowledge of medications prior real patient exposure, improvement of self-directed learning skills, improvement of Information Technology (IT) skills, and efficient information searching skills. Basheti et al. emphasized the importance of real patient simulation training toward mastering several skills among pharmacy students,[30] which explains the insufficient perception of suggested benefits by our participants in this study, particularly ones related to the development of social skills, critical thinking, and lifelong learning skills of the experiential learning cycle.

The sense of agency is defined as "the sense that I am the one who is causing or generating an action".[31] The sense of agency is of utmost value when it comes to controlling an external device. It will influence its technological effect, thus influencing people's commitment and performance toward that task.[32] Stress could aggravate such a sense of agency; Chhetri, Bijoy, et al. highlighted that stress was attributed to prolonged CoViD-19 restrictions and students' inability to accept the paradigm shift in academic activities.[14] Participants in this study identified a prominent barrier of virtual-based pharmacy training: the absence of eye contact, particularly related to the sense of agency.[33] Simultaneously, the other five suggested barriers were less appreciated in terms of majority. However, they might still be valid for future discussion, including descending perception, lack of quiet place, technical support, and time.

A previous study by Abu Farha et al. described the use of recorded video tutorials as being effective supportive tools for pharmacy education,[34] though using them solely might not be as effective, thus, making a blended learning style, which combines both interactive and face-to-face training, more comprehensive.[35] Pharmacy students in our study expressed expected higher levels of agreement with mainly two suggested solutions for a better quality of virtual-based pharmacy training module, which included combining virtual-based training with conventional ones and inclusion of interactive live sessions with their preceptors rather than recorded ones. Recent additional literature highlighted other interesting options for a fruitful virtual pharmacy training experience, like integrating simulation-based software,[36] virtual bedside teaching,[37] virtual motivational awards,[37] and interactive fiction.[38]

Strenght points of this study were summarized in the originality of the study methods and being the first study of its type. In addition, the training model had shown an acceptable and successful approach to conducting field training in Pharmacy. Limitations of this study include the involvement of an online Google® survey subject to security breaches yet protected by a password that is regarded as safe and only accessible by the research team. Moreover, using an online survey instead of a face-to-face meeting poses reliability and authenticity risks to the study data. Nevertheless, the link to this online survey was only shared among a carefully picked student group through our educational platforms (Microsoft teams®). Considering the ongoing CoViD-19 pandemic, using an online survey was the best approach to align with the physical and social distancing measures. Other alternative and better authentic methods could have been carried out (like institutional emails). Still, reduced engagement with students was a major concern, as they might not often log in to their emails. Data representation of this study population might pose a limitation since only one cohort of pharmacy students (using convenience sampling

without randomization) was used from one institution who were involved in a unique program to that institution, as students' perceptions from other universities or schools may differ. One of the most important limitations was the lack of a control group for the study who did not receive the virtual training.

## CONCLUSION

This is the first study to assess pharmacy students' perceived benefits and barriers towards virtual training modality. Addressing these issues is expected to help in the continuous quality improvement of pharmacy experiential education while preparing students for their future careers in pharmacy practice. This is especially important as this modality might be the only available option to ensure learning continuity during this unprecedented CoViD-19 outbreak. Generally, pharmacy students had a positive attitude towards virtual training. More than half of the students believed that the virtual training experience increased their involvement with the pharmacy profession, helped them to absorb topics more proficiently, gave them a chance to be familiar with many types of medications before real exposure to the patients, improved their self-learning skills, as well as IT/computer skills. However, the change was not without hurdles. Lack of effective communication, technical support and time were major concerns.

## RECOMMENDATIONS

A continuous evaluation is required to optimize this experience and find room for improvement. The majority of students agreed that training could be enhanced by combining both the virtual and conventional techniques in the course. Such a result could spotlight the value of implementing this hybrid method in various courses (virtual with actual) in the pharmacy curricula. Effective experiential training in pharmacy education as well as in health professions education, has become inevitable. Therefore, there will be a crucial need for well-designed study modules to be incorporated into the pharmacy education curriculum while complying with the intended learning outcomes of pharmacy programs.

## LIST OF ABBREVIATIONS

| | |
|---|---|
| CoViD-19 | Coronavirus disease |
| IQR | Interquartile range |
| IT | Information Technology |

## DECLARATIONS

**Ethics approval**: Potential participants who completed the survey were considered to have given informed consent to participate in the study. The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Institutional Review Board of Faculty of Pharmacy, Applied Science Private University (Approval number: 2020-PHA-31).

**Availability of data and materials**: The datasets generated and/or analysed during the current study are not publicly available due to their containing information that could compromise the privacy of research participants, but are available from the corresponding author on reasonable request.

**Competing interests**: All authors declare that they have no conflict of interest.

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**Authors' contributions:** All authors were involved in all parts of the study and manuscript preparation, including literature search, study design, data analysis, manuscript preparation, and review of the manuscript.

**Conflicts of Interest:** All authors declare that they have no conflicts of interest.

**Consent to publish**: Authors consent for publication of their identifiable details in relation to "Perception of Jordanian Pharmacy Students towards Community Pharmacy-Virtual Training Experience during CoViD-19 Outbreak".

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