The 3-Month Efficacy of Visual Art Training on Observational and Diagnostic Skills Among Nursing Students - A Randomized Controlled Trial

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Research Article

Abstract

Background: Visual art training is a student-led approach using Western art pieces as the main teaching resources. It has been developed and applied in nursing and medical education in the United States. This study aimed to adapt visual art training to Chinese cultural context, then to compare the efficacy of the culturally-tailored visual art training versus traditional education on observational and diagnostic skills at 3-month follow-up among Chinese nursing students in master program.

Methods: This study included Phase 1 (cultural adaptation) and Phase 2 (3-month efficacy evaluation). It was conducted from June to September, 2019. In Phase 1, cultural barriers were identified and cultural adaptation strategy were made based on two focus group interviews. Phase 2 was a randomized controlled trial in a local museum. A total of 106 first-year nursing students in master program were randomized to the intervention group (visual art training composed of a field-guided museum visit with observation and debriefing of Chinese oil paintings and clinical images, plus traditional education) or the control group (traditional education). Data were collected for both groups at baseline and 3-month follow-up on the observational and diagnostic skills measured by clinical image tests. Satisfaction with the visual art training was investigated among staff and students respectively.

Results: Observational skills of the intervention group increased significantly compared with the control group three months after the training ($p < .001$). A trend towards the improvement of diagnostic skills was indicated with increment of 2.92 points of the intervention group vs. 0.39 of the control group ($p > .05$). In general, all participants and staff were satisfied with the visual art training, especially the selected Chinese oil paintings and the student-led teaching process, but 34% (n = 18) were not satisfied with the long distance from the museum.

Conclusions: A culturally-tailored visual art training with great acceptability and feasibility was implemented in China. It had a sustained positive effect on improving the observational skills of Chinese nursing students. This study can be used for a reference to introduce visual art training to nursing students or nurses from other cultures.

Trial registration: Retrospectively registered in Chinese Clinical Trial Registry (ChiCTR2000037956) on 4th September, 2020.

Background

Nursing diagnosis making begins with observations, then gather information derived from observations, analyze information, and end with conclusions (Bramstedt et al., 2016). There is general agreement that accurate observations are key components of nursing diagnosis-making by providing careful, unbiased visual information (Kirklin et al., 2007). For example, Chang et al. found that medical students who are able to observe key information in clinical cases are more likely to arrive at accurate diagnoses (Chang et al., 1998).

An observation is the process of noting and identifying something or someone to gain information, which involves more than just a cursory glance at an object or a patient (Oxford English Dictionary, 2016). Observational skills teach us about objects, events, attitudes, and experiences by our visual sense (Monahan et al., 2019). The development of observational skills is essential for nursing students, as it directs them to move away from simply making assumptions to critically diagnosing patients and examining situations (Nanavaty et al., 2018).

Many studies show inadequacy in observational skills among most nurses and nursing students in China and elsewhere, which may be owing to lack of explicit teaching of observation (Lamanna et al., 2019; Qin et al., 2018). Unlike memorization of rules, practices, and experiential and theoretical knowledge, observation is a unique skill that cannot be learned formally through books or lectures (Pellico et al., 2009). However, courses in nursing schools tend to emphasize the identification of memorized clinical signs rather than formally teaching students how to observe (Arslanian et al., 2011). It is clear that better teaching methods for observational skills need to be introduced in nursing schools.

There are many specialized teaching methods for observational skills with the common goal to deliver experiences that modify the way learners process visual information to foster the development of observational skills. These include: 1) visual art training, which engages students in visual observation to find meaning in works of art under the guidance of educators by three questions: "What do you see?", "What makes you say that?", and "What else do you see?" (Jasani & Saks, 2013); 2) experiential learning activities in which students assume the role of the patient in simulated clinical scenarios (Nikendei et al., 2007); 3) narrative interventions, which use literary and theatrical media to immerse students within the contexts of illness and care (Lancaster et al., 2002); and 4) observation skills workshops, which use lectures or video recordings to highlight the correct way to observe (Bardes et al., 2001). Among these methods, visual art training as a cost-effective approach is developed to combine clinical scenarios, and is highly recommended for nursing educators by the Carnegie Foundation (Braverman, 2011; Carnegie Foundation Report, 2010).

Visual art training is a student-led pedagogical method with Western art pieces used as the main teaching resources. The goal of this pedagogical method is to impart experience concerning how to observe patients and situations in clinical scenarios by viewing and critiquing art pieces exhibited in a museum (Reilly et al., 2005). Pellico and her colleagues found that nursing students observed more symptoms and identified more objective clinical findings right after a half-day visual art training (Pellico et al., 2009). Previous studies with medical students showed that three-week visual art training can improve observational skills in the short term, appreciation of multiple perspectives, and their relationship to clinical practice (Klugman et al., 2011). According to a narrative review, these trainings achieved excellent effectiveness, but almost all of results were reported right after the training (Mukunda, et al. 2019). Whether or not the skill retention can be achieved by visual art training needs additional assessment.

The visual art training for nursing or medical students is rarely reported in other countries out of the United States. In 2018, our research team introduced the visual art training which has been conducted at

Yale University since 2009 to mainland China (source deleted for blinded review). A total of 29 Chinese nursing students in master program interpreted six Western art pieces in a simulated art museum, and debriefed four clinical images using the same procedure for art pieces in this training. However, we found student involvement was low, especially when each student was encouraged to interpret one Western art painting based on their personal experience. To address low student involvement, we explored reasons from a cultural difference perspective and designed a new randomized controlled trial that modifies the original visual art training to make it culturally more relevant to nursing students in China.

This study aimed to a) adapt visual art training to Chinese cultural context; b) compare the 3-month efficacy of this culturally-tailored visual art training versus traditional education on the observational (primary outcome) and diagnostic skills (secondary outcome) among Chinese nursing students in master program; and c) investigate the satisfaction with this culturally-tailored visual art training among participants and staff, respectively.

Methods

Study Design

This study included two consecutive phases: 1) cultural adaptation of visual art training; 2) the 3-month efficacy evaluation with a randomized clinical trial. Approval for adapting the visual art training to Chinese culture was authorized by the developer of the original training, Dr. Pellico Linda (Pellico et al., 2009). The study was approved by the ethical review board of our university (No.2017037) and registered on the Chinese Clinical Trial Registry (ChiCTR) (No. ChiCTR XXXXXXXXXX) (deleted for blinded review).

Phase 1: Cultural Adaptation Process of the Visual Art Training

Based on Barrera's heuristic framework concerning cultural adaptation of interventions, this phase included two consecutive steps: information gathering and adaptation design (Barrera et al., 2006).

Step 1: Information Gathering (Identification of Cultural Barriers)

In this step, two focus group interviews were simultaneously conducted among seven student participants and eight staff members a week after completion of the pilot study (source deleted for blinded review). The goal of the two interviews was to identify the potential cultural barriers in the pilot study to introduce the visual art training to Chinese cultural context. The staff members were interviewed separately from the student participants to guarantee that barriers could be fully proposed from both of learning and teaching perspective.

All the student participants were female with the average age of 25.4 (SD 2.8) years old. Most of them (n = 5) had not received some formal art education before recruited. In addition, the staff members who

conducted the teaching process (refer to museum guides) or who supervised the process (refer to experts) at the simulated museum were also invited to the interview. These staff members included four museum guides who were at least bachelors of arts and familiar with art pieces used in pilot study well, and four experts (one clinical professor, two nursing professor, and one art professors) who obtained doctoral degree of nursing or arts and were systematically trained the teaching approach of visual art training by Pellico and her colleagues in Yale University. All of the staff members were over 35 years old with at least 5 years working experience or teaching experience.

These student participants and staff members were asked to share their learning experience (or teaching experience), what they liked and disliked, and any comments or questions that came to mind as they reviewed the training. The emphasis of the interview was on a constructive critique, rather than approval. Focus group interviews were audio recorded and transcribed verbatim. NVIVO (Version 10, QSR International) was used to organize, code, and analyze the data (Pope et al., 2007).

The student participants and staff members enthusiastically supported for the application of the visual art training in Chinese nursing education and their feedback regarding areas for improvement was elicited. The student participants thought Western art pieces used in the training were the main barrier to get them involved. A student said, "*I think it is interesting and I want to take an active part, but it was hard for me to initiatively interpret these Western art pieces without cues from the teacher, because most Western art pieces had intricate historical backgrounds and mysterious religious color for me*". In addition, staff members suggested student involvement was the core component of the training and needed to be improved. One staff member said, *"There was an unconscious shift from student- to teacher-led training during the implementation process, which was not what we expected. This might be due to shy nature of Chinese students and obscure Western art pieces. We should work on this"*. Based on the systematically assessment and unanimous agreement of students and staff, Western art pieces and low student involvement were identified as major cultural barriers and needed to be addressed.

Step 2: Adaptation Design (Cultural Adaptation Strategy Making)

After the cultural barriers were determined, an expert workshop was followed immediately among staff members. A series of consensus-based cultural adaptation strategies were put forward to designed a culturally-tailored visual art training for Chinese students.

(1) The Selection of Chinese Oil Paintings

With the development of society and culture, there have been a few art museums in provincial capitals (including our research site) in China. A local art museum was chosen for field visit in the training with free access to a collection of Chinese oil paintings and covering an area of 15.3 hectares. Compared with in a simulated museum, there are more paintings and better learning atmosphere to inspire students get more involved in the training in a real art museum.

All Western art pieces used in the previous pilot study were replaced with Chinese oil paintings exhibited in this museum. The staff members reformulated the inclusion criteria of art pieces: having obvious Chinese characteristics, rich visual detail, and potential for ambiguity of interpretation without predetermined correct answers. The art pieces with obscure historical backgrounds, mysterious religious color and art background knowledge were excluded.

The preliminary selection of Chinese oil paintings was done by working with a local museum manager according to the inclusion and exclusion criteria of art pieces. A total of 17 Chinese oil paintings in the museum were selected by the museum manager. After that, these 17 paintings were rated (highly recommend = 4, moderately recommend = 3, slightly recommend = 2, not recommend at all = 1) separately by previously mentioned eight staff members during a field visit. The top six paintings with highest scores were selected finally (range 30 ~ 32 points). Appendix A shows all of the Chinese oil paintings used in the study.

(2) Other Attempts to Improve Student Involvement

The detailed teaching plans and observation procedures of six Chinese oil paintings were developed to help improve student involvement. Compared with the original observation procedure used in the pilot study (Qin et al., 2018), we prolonged interpretation and communication process from 5 minutes to 10 minutes for each art pieces. Students were encouraged to explore various plausible interpretations about the art piece without judgement from professionals, unless their interpretations were illogical or showed idiosyncratic personal bias. "*Can anybody add some observations or interpretations?*" or "*What else do you find?*" were repeated asked to prompt students to share ideas and generate multiple interpretations via group discussions.

The museum guides were invited to lead students in this culturally-tailored visual art training. They were trained about the standard implementation procedures to guide the observations of Chinese oil paintings by reviewing the training manual developed by the research team and practicing delivery scenarios together, etc. They were also armed with intervention skills (e.g. how to encourage students to overcome their shy nature). At the end of the delivery training for museum guides, they were asked to simulate the standard procedures of visual art training one by one and the research team gave comments suggested some improvements according to their individual practices. Only receiving all delivery training, the museum guides could be qualified to deliver the visual art training.

Phase 2: 3-Month Efficacy Adaptation Test

A randomized controlled trial was designed to test 3-month efficacy of culturally-tailored visual art training from June to September, 2019. It was conducted in a local art museum.

Participants

Inclusion criteria were: 1) first-year nursing students in master program who were enrolled in 2018; 2) registered nurses; and 3) able to speak and write in Mandarin Chinese. Students were excluded if they 1) had received visual art training before (other forms of art experience were accepted); 2) had schedule

conflicts that limited their ability to participate; and 3) had severe psychiatric disorders or physical disability.

Sample size was determined by G*Power according to the primary outcome-observational skills (Faul et al., 2007). Based on the effect size d = 0.61 observed by Nease et al. in their randomized controlled study of visual art training, the required total sample size with alpha = .05 and for power = .80 is 90 (Nease and Haney, 2018). Based on an estimated maximum potential attrition rate of 20% at the 3-month follow-up, a sample size of 106 was needed.

With the assistance of the administrative staff of the nursing master's programs, eligible students were invited to enroll in our study after the purpose, benefits, and risks of the study were fully explained in the form of a PowerPoint presentation (20 minutes) by a member of our research team during the break time of a compulsory course. If students were interested in our study, a trained research assistant contacted them within a week, and the study was further described in detail before information registration into the study. The written informed consent was obtained from each participant.

Participants were randomly assigned 1:1 to either the intervention group (n = 53, receiving culturally-tailored visual art training plus traditional education) or the control group (n = 53, receiving traditional education) using an SPSS-generated random allocation sequence with setting 1 as the control group and 0 as the intervention group in advance by a statistician. All intervention participants signed a confidentiality agreement, which stated that the contents of the intervention should not be disclosed to the control participants.

Interventions

Traditional Education refers to an Advanced Health Assessment Course (48 classroom hours), which is a core course for first-year nursing students in master program. It focuses on g how to take comprehensive health histories, physical examination, electrocardiogram, and nursing record writing. Both groups in this study received traditional education.

Culturally-tailored Visual Art Training included a field-guided museum visit and exposure to clinical images with debriefing. In the first session (field-guided museum visit), participants were assigned to nine groups (five to six participants per group) according to the registration order to observe six Chinese oil paintings in rotation in the museum, which ensured each participant in a group had opportunities to be chosen as a speaker to describe at least one painting. Each of the museum guides led one group. They used various strategies to prompt participants to view paintings interactively. The detailed implementation process of the field-guided museum visit was described elsewhere (Swami & Barron, 2019). In brief, it includes four steps: observation (5 minutes), interpretation (10 minutes), reflection (5 minutes) and communication (10 minutes). Participants were encouraged to identify objective visual findings without judgment and draw conclusions about the meaning of the art pieces.

In the second session (exposure to clinical images with debriefing), participants were asked to replicate the approach they learned in the first session to observe four clinical images with specific disease

processes or visible clinical symptoms (diabetic foot, ascites, dyspnea and debilitation) and to discuss plausible nursing diagnoses (Appendix B show all the clinical images used in the study). These images were taken by research assistants in different wards according to the following requirements: 1) one to three people (including patients, nurses, and physicians, etc.) in the image to ensure richness of the visual information without getting too jumbled, 2) avoiding posing to promote authenticity, and 3) with permissions to be used in teaching. The images used for intervention got the consensus of all three clinical or nursing professors. This session was guided by a nursing professor and lasted approximately one hour (each clinical image for 15 minutes). For the fidelity of this intervention, the museum guides strictly adhered to the teaching manual with a trained research assistant in each group to remind them of any missed points or excessive information.

Data Collection

(1) Instruments

Demographics and Art-related Experience were collected via a self-administered questionnaire. Demographics included age, gender, types of masters, and work experience. Art-related experience included duration of exposure to formal and general art education.

Observational and Diagnostic Skills were measured with a self-administered "clinical image test" which included an Observation Subtest and a Diagnosis Subtest. The two subtests involved four clinical images (none of the images used in the test were discussed before). The clinical images were different at baseline and 3-month follow-up, but comparable images (subject, genre, and complexity) were selected from a large group of images by experienced nursing professors.

The "clinical image tests" are reliable and valid tool. Each of images used in the "clinical image test" earned the consensus of five experienced nursing professors who were asked to comment on the validity of images one by one using Context Validity Index ("1" = "not relevant"; "2" = "somewhat relevant"; "3" = "quite relevant"; "4" = "highly relevant"). All images in the "clinical image test" were determined to be highly relevant (4/4 points) to evaluation of observational or diagnostic skills. The test-retest reliability of the "clinical image tests" in our pilot study is $r = 0.873$ and $r = 0.816$. The inter-rater reliabilities of the "clinical image tests" range from 0.84 to 0.92, as measured by the correlation of the scores of two graders in this study.

Participants were given 40 minutes to complete the "clinical image test" and reported their free-text observations and diagnoses as fully and accurately as they could. Two trained graders (nursing masters, who masked to the group) scored independently scored the test by using a predetermined grading list developed through the discussion of five nursing professors, who independently recorded their observations and plausible diagnoses for each image and then gathered together to reach a consensus regarding the grading list. A "point" was assigned for each objective observation or plausible diagnosis if they matched the predetermined grading list. The average score of the two graders was taken as the final

score. The proportion of the obtained points to the total possible points were calculated. Higher proportions indicate better observational or diagnostic skills.

The Satisfaction with the Culturally-tailored Training Rated by Students was measured with a self-administrated satisfaction questionnaire (30 items) on a 5-point Likert-type scale from rating 1 = very dissatisfied to 5 = very satisfied. It involved Chinese oil paintings, museum, staff, and training content. The total satisfaction score was defined as the mean of all item scores. The Cronbach's alpha was .96 in this study.

The Satisfaction with the Culturally-tailored Training Rated by Staff Members was measured using two self-designed questions on "whether you will recommend this training to your students?" and "what is your favorite part in this training?".

(2) Procedures

Data were collected at baseline and 3-month follow-up by two trained research assistants who did not know the group assignment. Outcome variables included observational skills, diagnostic skills, and satisfaction with the culturally-tailored visual art training rated by students and staff, respectively. All the variables were measured by self-administered questionnaires. Participants were invited to complete these questionnaires in a quiet classroom. Research assistants were available to answer questions and check each questionnaire to avoid unintentional missing items or pages.

Data Analysis

All data were double entered in a database and checked for accuracy. All analyses were done using SPSS (version 23.0; SPSS Inc., Chicago, IL). A p-value < 0.05 was considered statistically significant. Demographics between the intervention and control groups were compared with two independent samples t-test and Chi square tests. Changes in scores of observational and diagnostic skills were analyzed using independent sample t-tests according to the difference in differences method. Descriptive statistics were computed to describe the satisfaction with the culturally-tailored visual art training.

Results

Of the 118 students who were invited to participate in the study, 12 students (10.2%) declined participation due to lack of interest or schedule conflicts, etc. Attrition at 3-month follow-up was 6.7% (7/106), with the rest of 99 (49 in the intervention group and 50 in the control group) analyzed. There was no significant difference in the demographics and art-related experience between the seven participants who dropped out and the 99 participants who completed this study (p > .05). Figure 1 shows the CONSORT participant flow chart.

Comparison of demographics and art-related experience at baseline between intervention and control group

The mean age of participants was 26.2 (SD = 4.1) years, with 26.0 (SD = 4.7) years for the intervention group and 26.3 (SD = 3.3) years for the control group. A total of 94% of the participants were female, and 41% were full-time nursing students. The work experience of participants was 3.4 (SD = 3.3) years on average. A total of 57% of the participants reported that they had received general art education for six years or fewer, and 67% never received professional art education. There were no significant differences between the two groups at baseline for demographic and art-related experience (p > .05), as reported in Table 1.

Table 1
Comparison of Demographics and Art-related Experience at Baseline between Intervention and Control Groups

Characteristics	Intervention (n = 53)	Control (n = 51)	χ^2/t	p-value
Age (years), mean (SD)	26.0 (4.7)	26.3 (3.3)	0.34	.733
Female, n (%)	49 (93)	49 (96)	0.14	.678
Full-time nursing students, n (%)	25 (47)	18 (35)	1.51	.219
Have been a nurse for (years), mean (SD)	3.0 (3.6)	3.9 (3.4)	1.18	.239
Received general art education (years), n (%)			0.59	.444
≤ 6	32 (60)	27 (53)		
> 6	21 (40)	24 (47)		
Received formal art education (years), n (%)			0.95	.331
Yes	15 (28)	19 (37)		
No	38 (72)	32 (63)		

Note. SD = Standard Deviation

The 3-month efficacy of culturally-tailored visual art training on observational and diagnostic skills

As shown in Table 2, the proportion (raw obtained scores/total possible scores, range 0–100%) of objective observations made by intervention students (mean change + 9.84%, SD 11.29%) significantly increased compared with that of control students (mean change – 0.72%, SD 7.44%, p < .001). A trend towards the improvement of diagnostic skills was indicated with increment of 2.92 points (SD 13.71) of the intervention group vs. 0.39 (SD 10.89) of the control group during 3-month study period, though there was no statistical difference between the two groups (p > 0.05).

Table 2
The 3-month Efficacy of Culturally-tailored Visual Art Training on Observational and Diagnostic Skills

		Intervention group (n = 49)	Control group (n = 50)	t	*p*-value
		Mean (SD)	Mean (SD)		
Observational skills	Baseline	17.39 (7.82)	16.17 (8.92)		
	3-month follow-up	27.15 (10.90)	15.45 (6.91)		
	Change in means	9.84 (11.29)	-0.72 (7.44)	5.615	< .001
Diagnostic skills	Baseline	23.13 (8.18)	21.96 (7.42)		
	3-month follow-up	26.06 (12.66)	22.35 (10.21)		
	Change in means	2.92 (13.71)	0.39 (10.89)	1.041	0.301
Note. SD = Standard Deviation					

Satisfaction with culturally-tailored visual art training

The mean score of satisfaction rated by the intervention group was 4.5 out of 5 points (range from 3.3 to 5.0) on a 5-point Likert scale. The top two items with the highest score in the satisfaction questionnaire were the selected Chinese oil paintings with all participants (*n* = 53) satisfied or very satisfied, and degree of involvement in the training with over 90% of participants (*n* = 48) satisfied with their active involvement in the training. What students were most dissatisfied with was the distance to the museum, with 35% (*n* = 18) participants choosing "dissatisfied" or "very dissatisfied". Over 20% of participants (*n* ≥ 11) were dissatisfied or very dissatisfied with the length of visual art training and its practical utility. All of the staff members indicated that they would recommend this culturally-tailored visual art training to their students and half of the staff (n = 4) said interpretation process of Chinese oil paintings was their favorite part.

Discussion

To the best of our knowledge, we are the first institution to introduce visual art training to Mainland China and adapt the training for the Chinese culture among nursing students. We confirmed culturally-tailored visual art training can improve observational skills of Chinese nursing students in master program. The Chinese oil paintings with rich Chinese characteristics used in the training are appropriate to be selected as the main teaching resources, which was responsive to the Chinese cultural context and suitable for Chinese nursing students.

A systematic cultural adaptation was conducted based on a multi-phase mixed method study design guided by a heuristic framework (Barrera & Castro, 2006), rather than delivering a fixed intervention.

Kumpfer et al indicated that cultural adaptations are imperative when engagement is below standards that were established in applications of foundation researches, as it might affect the core components of the training that account for its efficacy (Kumpfer, Alvarado, & Bellamy, 2002). We used a qualitative approach to integrate the concerns of relevant stakeholders, who assess characteristics and preferences of Chinese nursing students (e.g. tend to be shier) and identify ideas that have the best chances to enhance the student involvement to better translate the visual art training in Mainland China.

The culturally-tailored visual art training could significantly improve observational skills three months after the training, which is consistent with the findings of prior research suggesting that observational skills could be enhanced with focused viewing, describing, and interpreting of art pieces and debriefing clinical images (Gurwin et al., 2018). Based on the 3-month follow-up efficacy, we confirmed that visual art training is effective for a longer follow-up period in improving observational skills.

In our study, there was an exciting trend towards the improvement of diagnostic skills during 3-month study period. According to a guideline of visual art, diagnostic skills are hard to improve in the short term without a well-developed systematic knowledge of nursing, although the improvement of observational skills creates the conditions for the improvement of diagnostic skills. (Haidet et al., 2016). Nursing postgraduate education in China is still in its infancy (Zou et al., 2012). Many components of its curriculum (for instance, objectives, requirements, and evaluation) are not appropriate for Chinese nursing students (Gao et al., 2012). We believe diagnostic skills can be improved in the future as the nursing knowledge of students improves.

Given the satisfaction survey of culturally-tailored visual art training we carried out among students and the staff, it is clear that the cultural adaptation of visual art training was successfully completed in China as the pre-identified cultural barriers were overcome. It also shows that there is a need to increase the amount or duration of visual art training. A positive dose-response relationship was also demonstrated between the number of visual art sessions attended and the improvement of observational skills accordingly (Naghshineh et al., 2008). Some participants also indicated that the museum is too far, which is the challenge that most developing countries have faced—scarce museum resources. Although we got access to the museum, seeking an alternative to museum visits is a future research direction.

Limitations

This study has several limitations. First, clinical outcomes were not measured. This means there is no direct evidence that these skills can be transformed into improved patient care. We used clinical images as reasonable surrogates for testing observational and diagnostic skills, but in future studies, it would be worthwhile to evaluate the students using actual (or standardized) patients. Second, the comparability of the images at baseline versus 3-month follow-up might be questioned, although we created a measurement standard. Third, the generalizability of the educational benefits of visual art training to other groups of health professionals is not clear and requires additional investigation. Last but not least,

the study was located at only one nursing school, thus the ability to generalize these findings to other schools in China is unknown.

Implications

There are several important implications for both of teaching practice and research. First, the systematic cultural adaption process of an innovative teaching approach modified for Chinese culture could provide an example to disseminate the evidence-based program to other countries with different cultures. Second, there is considerable evidence that excellent observational skills can provide information critical to the accuracy of diagnoses, which is the ultimate goal of the visual art training applied in nursing education. More studies focused on diagnostic skills are needed, and how to translate observational skills into diagnostic skills remains an open question. In addition, the local museums are absent in most rural areas of China, which is often the case in developing countries. With the development of social economy and culture, it will be possible to build more local public museums in underdeveloped areas.

Conclusions

The systematic cultural adaption process of the visual art training modified for Chinese culture provides a reference for other places with different cultures to localize this training and make it available to local nursing students. Culturally-tailored visual art training via Chinese oil paintings is feasible and acceptable for Chinese nursing students during a longer follow-up period. Further studies for longer period are needed on diagnostic skills and on how skills gained in visual art training translate to clinical practice.

Declarations

Ethics Approval and Consent to Participate

The study was approved by the ethical review board of Central South University before data collection (No.2017037). All methods were carried out in accordance with local guidelines and regulations. The written informed consent was obtained from each participant.

Consent for Publication

The Chinese oil paintings used in the study obtained consent for publication from the Li Zijian Art Museum. The clinical images used in the study obtained informed consent for publication from patients.

Availability of Data and Materials

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Competing Interests

The authors declare that they have no competing interests.

References

1. Arslanian-Engoren, C., Sullivan, B. J., & Struble, L. (2011). Revisioning a Clinical Nurse Specialist Curriculum in 3 Specialty Tracks. *Clinical Nurse Specialist, 25*(5), 253-259. doi:10.1097/NUR.0b013e31822c47d7

2. Bardes, C. L., Gillers, D., & Herman, A. E. (2001). Learning to look: developing clinical observational skills at an art museum. *Medical Education, 35*(12), 1157-1161. doi:10.1046/j.1365-2923.2001.01088.x

3. Barrera, M. J., & Castro, F. G. (2006). A heuristic framework for the cultural adaptation of interventions. *Clinical Psychology: Science and Practice, 13*(4), 311–316. doi.org/10.1111/j.1468-2850.2006.00043.x

4. Bramstedt, K. A. (2016). The Use of Visual Arts as a Window to Diagnosing Medical Pathologies. *AMA journal of ethics, 18*(8), 843-854. doi:10.1001/journalofe thics.2016. 18.8.imhl1-1608

5. Braverman, I. M. (2011). To see or not to see: How visual training can improve observational skills. *Clinics in Dermatology, 29*(3), 343-346. doi:10.1016/j.clindermatol.2010.08. 001

6. Carnegie Foundation Report. (2010). Relevance of the Flexner Report to Contemporary Medical Education in South Asia. *Academic Medicine, 85*(2), 333-339. doi:10.1097/ACM.0b013e3181c874cb

7. Chang, R. W., Bordage, G., & Connell, K. J. (1998). The importance of early problem representation during case presentations. *Academic medicine : journal of the Association of American Medical Colleges, 73*(10 Suppl), S109-111. doi:10.1097/00001888-199810000-00062

8. Dolev, J. C., Friedlaender, L. K., & Braverman, I. M. (2001). Use of fine art to enhance visual diagnostic skills. *Jama-Journal of the American Medical Association, 286*(9), 1020-1021. doi:10.1001/jama.286.9.1020

9. Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*(2), 175-191. doi:10.3758/bf03193146

10. Gao, L.-L., Chan, S. W.-C., & Cheng, B.-S. (2012). The past, present and future of nursing education in the People's Republic of China: a discussion paper. *Journal of advanced nursing, 68*(6), 1429-1438. doi:10.1111/j.1365-2648.2011.05828.x

11. Grossman, S., Deupi, J., & Leitao, K. (2014). Seeing the forest and the trees: increasing nurse practitioner students' observational and mindfulness skills. *Creative Nursing, 20*(1), 67-72.doi:10.1891/1078-4535.20.1.67

12. Gurwin, J., Revere, K. E., Niepold, S., Bassett, B., Mitchell, R., Davidson, S., . . . Binenbaum, G. (2018). A Randomized Controlled Study of Art Observation Training to Improve Medical Student Ophthalmology Skills. *Ophthalmology, 125*(1), 8-14. doi:10.1016/j.ophtha.2017.06.031

13. Haidet, P., Jarecke, J., Adams, N. E., Stuckey, H. L., Green, M. J., Shapiro, D., . . . Wolpaw, D. R. (2016). A guiding framework to maximise the power of the arts in medical education: a systematic review and metasynthesis. *Medical Education, 50*(3), 320-331. doi:10.1111/medu.12925

14. Katz, G. B., Peifer, K. L., & Armstrong, G. (2010). Assessment of Patient Simulation Use in Selected Baccalaureate Nursing Programs in the United States. *Simulation in Healthcare-Journal of the Society for Simulation in Healthcare, 5*(1), 46-51. doi:10. 1097/SIH.0b013e3181ba1f46

15. Kirklin, D., Duncan, J., McBride, S., Hunt, S., & Griffin, M. (2007). A cluster design controlled trial of arts-based observational skills training in primary care. *Medical Education, 41*(4), 395-401. doi:10.1111/j.1365-2929.2007.02711.x

16. Klugman, C. M., Peel, J., & Beckmann-Mendez, D. (2011). Art Rounds: Teaching Interprofessional Students Visual Thinking Strategies at One School. *Academic Medicine, 86*(10), 1266-1271. doi:10.1097/ACM.0b013e31822c1427

17. LaManna, J. B., Guido-Sanz, F., Anderson, M., Chase, S. K., Weiss, J. A., & Blackwell, C. W. (2019). Teaching Diagnostic Reasoning to Advanced Practice Nurses: Positives and Negatives. *Clinical Simulation in Nursing, 26*, 24-31.doi:10.1016/j.ecns.2018.10.006

18. Lancaster, T., Hart, R., & Gardner, S. (2002). Literature and medicine: evaluating a special study module using the nominal group technique. *Medical Education, 36*(11), 1071-1076. doi:10.1046/j.1365-2923.2002.01325.x

19. Mangione, S., & Nieman, L. Z. (1997). Cardiac auscultatory skills of internal medicine and family practice trainees. A comparison of diagnostic proficiency. *Jama, 278*(9), 717-722. doi:10.1001/jama.278.9.717

20. Miller, A., Grohe, M., Khoshbin, S., & Katz, J. T. (2013). From the galleries to the clinic: applying art museum lessons to patient care. *The Journal of medical humanities, 34*(4), 433-438. doi:10.1007/s10912-013-9250-8

21. Monahan, L., Monahan, M., & Chang, L. D. (2019). Applying art observation skills to standardized patients. *Applied Nursing Research, 48*, 8-12.doi:10.1016/j.apnr.2019.05.004

22. Moorman, M., Hensel, D., Decker, K. A., & Busby, K. (2017). Learning outcomes with visual thinking strategies in nursing education. *Nurse Education Today, 51*, 127-129. doi:10.1016/j.nedt.2016.08.020

23. Mukunda, N., et al. (2019). Visual art instruction in medical education: a narrative review. *Medical Education Online,*24(1), 114-121. doi:10.1080/10872981.2018.1558657

24. Naghshineh, S., Hafler, J. P., Miller, A. R., Blanco, M. A., Lipsitz, S. R., Dubroff, R. P., . . . Katz, J. T. (2008). Formal art observation training improves medical students' visual diagnostic skills. *Journal of General Internal Medicine, 23*(7), 991-997. doi:10.1007/s11606-008-0667-0

25. Nanavaty, J. (2018). Using visual thinking strategies with nursing students to enhance nursing assessment skills: A qualitative design. *Nurse Education Today, 62*, 39-42. doi:10.16/j.nedt.2017.12.014

26. Nease, B. M., & Haney, T. S. (2018). Evaluating an Art-Based Intervention to Improve Practicing Nurses' Observation, Description, and Problem Identification Skills. *Journal for Nurses in Professional Development, 34*(1), 2-7. doi:10.1097/nnd. 0000000000000411

27. Nikendei, C., Kraus, B., Lauber, H., Schrauth, M., Weyrich, P., Zipfel, S., . . . Briem, S. (2007). An innovative model for teaching complex clinical procedures: Integration of standardised patients into ward round training for final year students. *Medical Teacher, 29*(2-3), 246-252. doi:10.1080/01421590701299264

28. Oxford English Dictionary. (2016). Definition of observation in English. *Oxford University Press.* Retrieved from https://en.oxforddictionaries.com/definition/observation

29. Pellico, L. H., Friedlaender, L., & Fennie, K. P. (2009). Looking is not seeing: using art to improve observational skills. *J Nurs Educ, 48*(11), 648-653. doi:10.3928/01484834-20090828-02

30. Perry, M., Maffulli, N., Willson, S., & Morrissey, D. (2011). The effectiveness of arts-based interventions in medical education: a literature review. *Medical Education, 45*(2), 141-148. doi:10.1111/j.1365-2923.2010.03848.x

31. Pope, C., & Mays, N. (2007). Qualitative methods in health research. Qualitative research in health care (pp. 1–11) (3rd ed.). doi:org/10.1002/9780470750841.ch1.

32. Qin, X. F., Chen, J., Guo, J., & Chen, Y. Y. (2018). Effects of visual art training on clinical observation ability of nursing graduate students. *Journal of Nursing Science, 33*(07), 69-71. doi:10.3870/j.issn.1001-4152.2018.07.069 (in Chinese)

33. Reilly, J. M., Ring, J., & Duke, L. (2005). Visual thinking strategies: A new role for art in medical education. *Family Medicine, 37*(4), 250-252. doi:10.1370/afm.323

34. Shao, C., & Pan, H. (2015) Improving the clinical ability of medical students through art education. *China Advanced Medical Education, 2017*(08), 13-14. doi: 10.3969/j.issn.1002-1701.2017.08.007 (in Chinese)

35. Shapiro, J., Rucker, L., & Beck, J. (2006). Training the clinical eye and mind: using the arts to develop medical students' observational and pattern recognition skills. *Medical Education, 40*(3), 263-268. doi:10.1111/j.1365-2929.2006.02389.x

36. Sun, J. X., Deng, R. Y., & Gu, D. F. (2015). How to cultivate the diagnostic skills of nursing undergraduate interns. *Chinese General Nursing,13*(24), 2439-2440. doi:10.3969/j.issn.1674-4748.2015.24.050 (in Chinese)

37. Zou, H., Li, Z., & Arthur, D. (2012). Graduate nursing education in China. *Nursing Outlook, 60*(3), 116-120. doi:10.1016/j.outlook.2011.04.001
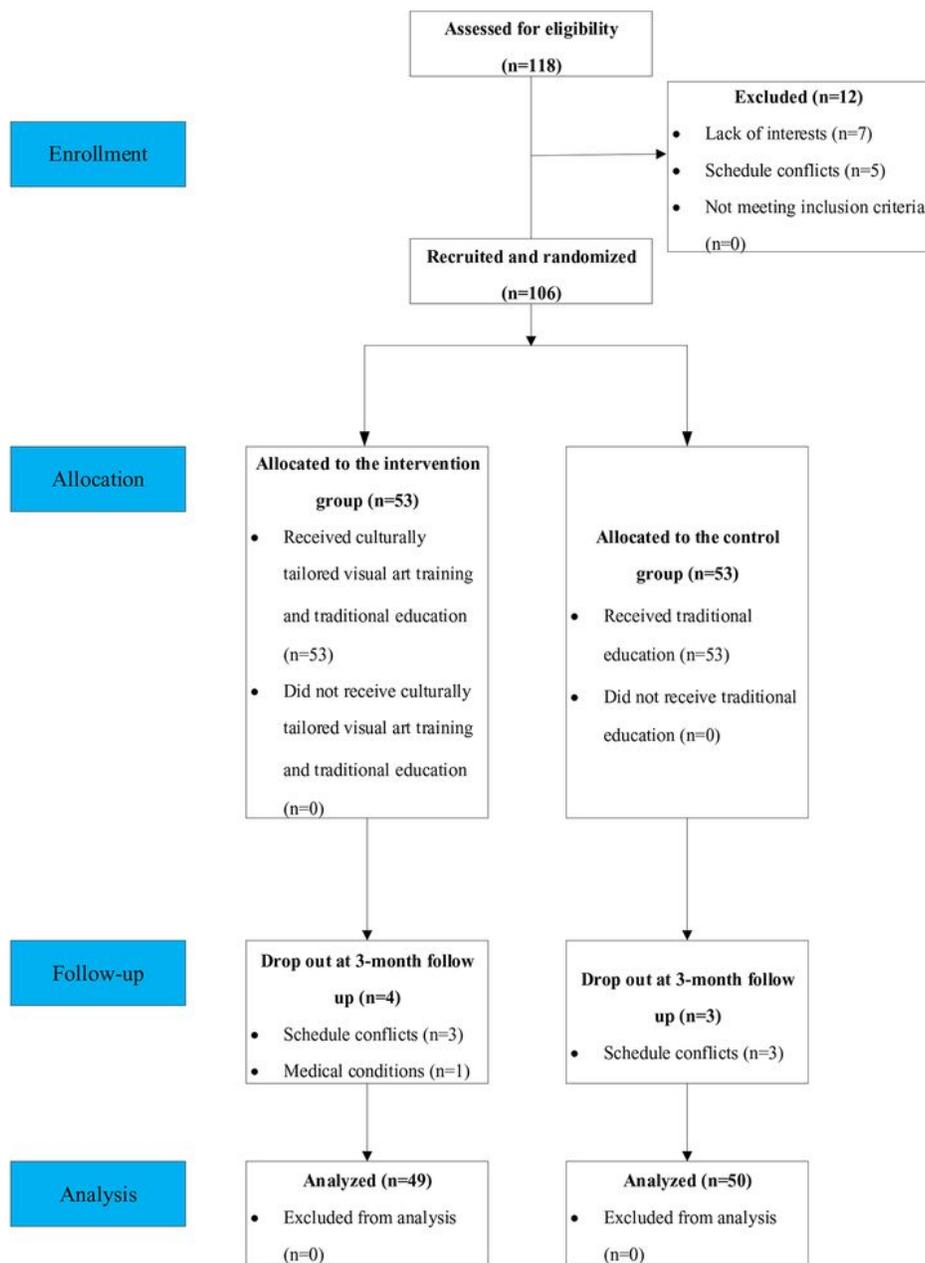
Figures

Figure 1

The CONSORT participant flowchart.

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