ORIGINAL

Characteristics of psychiatric nurses' observation techniques for psychopathological symptoms

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Abstract : The purpose of this study was to clarify characteristics of psychiatric nurses' observation techniques for psychopathological symptoms. The subjects were 21 psychiatric nurses and 20 nursing students who had finished their practicum in psychiatric nursing. Using a non-contact eye-tracking analysis system, we compared quantitatively their radial motion while they were observing psychopathological symptoms of a schizophrenia simulation patient. The radial motion of them was recorded while they were observing a video of a simulated patient presenting psychopathological symptoms, and the recording was analyzed by the eye-tracking system. The investigator set the important observation areas and determined the sum of the fixation time and the number of fixations in the areas. Differences between psychiatric nurses and nursing students were tested using the Mann-Whitney U-test. The results revealed a significant difference in observation of the upper limbs area with a median of 7147.90 msec for nurses group and a median of 2447.54 msec for students group (U = 98.00, p = 0.01). The finding suggests that nurses tend to pay more attention to patient's upper limbs to be cautious about possible violence and to find agitation caused by psychopathological symptoms, extrapyramidal adverse effects, and scars caused by self-mutilation. J. Med. Invest. 68 : 271-275, August, 2021

INTRODUCTION

Sustained and mastered observation in nursing is considered to be a core element of nurse's outstanding practice (1), and it is reported that 87% of the information collected using the five senses is visual information (2). It is the same in psychiatric nursing, and mastered technique for observing psychopathological symptoms is a core element of psychiatric nursing practical ability. The object of psychiatric nursing is patient's mind, but since the mind cannot be visually observed, nurses do not directly observe the mind. Nurses observe patient's eye movements, facial expressions, speed of movement, involuntary movement, speed of speech, situation of self-care, and so on. Through these observations, they indirectly evaluate patient's mind. This observation technique is learned empirically through practice, and it is clinical knowledge that nurses accumulate individually through experience. In psychiatric nursing, it is especially difficult to visualize observation techniques because subject to be observed is patient's mind, and much of the clinical knowledge is implicit knowledge (3). In the field of basic and adult nursing, using the eye-tracking technique, observation of the hospital bed environment (4, 5), observation of fall risk (6, 7), observation during infusion pump operation (8), development of educational programs (9) and so on have been studied.

The purpose of this study was to clarify characteristics of psychiatric nurses' observation techniques for psychopathological symptoms. In the analysis of nursing technology of psychiatric nursing, studies using quantitative (10, 11) and qualitative methods have been conducted (12-15). However, quantitative research using the eye-tracking technique has not been performed.

In the present study, using the non-contact eye-tracking analysis system (eye-tracking system), we quantitatively evaluated the radial motion of psychiatric nurses and nursing students when they were observing psychopathological symptoms. We believe that the findings will help visualize the observation techniques of psychiatric nurses and contribute to the improvement of psychiatric nurses' practical skills and education for newcomers.

METHODS

Subjects

The subjects were 21 psychiatric nurses who were working in a psychiatric hospital in A Prefecture and had more than five years of psychiatric nursing experience, and 20 nursing students who were studying in a nursing course of university in B Prefecture and had completed their practicum in psychiatric nursing. All subjects gave written informed consent to participate in the study. Data were collected between August 2019 and October 2020.

Investigation method

To perform accurate gaze measurement, each subject's jaw was placed on a platform and each subject was instructed not to move it. Next, we performed a calibration using the eye-tracking system (QG-PLUS, manufactured by DITECT) to capture the distance between the eyes and the curvature of the cornea, which are the physical characteristics of each subject. Then, a 3-minute video of a simulated patient presenting psychopathological symptoms of schizophrenia such as auditory hallucination, delusion, restlessness, and lack of self-care was projected on a monitor ("Basics of Psychiatric Care Learned through DVD, First Volume, Edited," Nakajima Video Teaching Material Publishing), and the radial motion during the observation by the subject was recorded by an eye-tracking camera and analyzed by an eye-tracking system. The sampling frequency of the system was 60Hz.

The fixation is the state of gaze in which the eyeball does not move, the gaze is fixed, and the person acquires visual information. Conventionally, the fixation point is defined as a point where the eye movement speed is less than 5 deg/sec for more than 165 msec (16). There are two types of fixations : a specific search that looks at a specific part of an object of interest in detail, and a diffuse search that looks at the parts one wants to see when looking at an object (17). The observation of subjects in this study was regarded as a specific search because they looked at some parts with interest from which they thought they could observe psychopathological symptoms of the simulated patient. The feature of the fixation time of the gaze line in a specific search tends to be more than 300 msec (18), so in the present study, the fixation point was defined as a point where the eye movement speed was less than 5 deg/sec for more than 300 msec.

Important areas that the researchers judged to be necessary for observation and a region frame for gaze analysis were set up in advance. In the video of a simulated patient showing psychopathological symptoms, the patient's facial area, body area, upper limbs area, and the doctor's facial area were selected as important areas because through these areas, subjects were thought to be able to observe psychopathological symptoms, side effects of drugs, and reactions to external stimuli.

Analysis method

The sum of the fixation times and the number of fixations in each important observation area was calculated, and the differences between psychiatric nurses and nursing students groups were tested using the Mann-Whitney U-test.

Ethical considerations

This study was conducted with approval from the Tokushima University Hospital Medical Ethics Committee (approval number : 3233).

Table 1. Characteristics of subjects

	Psychiatric Nurses	Nursing students
Number of subjects (Men/Women)	21 (10/11)	18 (0/18)
Age (years)	51.43 ± 7.44	21.00 ± 0.46
Clinical experience		
Number of nurses who had work experience only in psychiatric department	10	—
Years of experience in psychiatric department (years)	22.93 ± 8.00	—
Number of nurses who had work experience in other departments	11	—
Years of experience in other departments (years)	2.86 ± 3.97	—
Number of mid-level nurses	2	—
Years of experience (years)	7.25 ± 0.75	—
Number of skilled nurses	19	—
Years of experience (years)	25.00 ± 6.48	—
Educational background		
Third year in nursing course of university	—	14
Fourth year in nursing course of university	—	4
Graduated from nursing school	17	—
Graduated from nursing course of university	2	—
Graduated from master's course of university	2	—

Mid-level nurses ; nurses having more than 5 years clinical experience, skilled nurses ; nurses having more than 10 years clinical experience.

RESULTS

Characteristics of the subjects

Of the 20 nursing students, 2 whose fixation point based on gaze analysis was clearly out of the important observation area were excluded from the analysis. Therefore, the data of 21 psychiatric nurses (51.43 ± 7.44 years of age) and 18 nursing students (21.00 ± 0.46 years of age) were used for the analysis (Table 1). Regarding psychiatric nurses, there were 2 mid-level nurses who had clinical experience in psychiatric nursing for more than 5 years and 19 skilled nurses who had clinical experience in psychiatric nursing for more than 10 years. 10 had been working only in psychiatric department. 11 had work experience in other departments, and the number of years of their work experience in other departments was 2.86 ± 3.97 years. As for educational background, 17 graduated from nursing school, 2 from nursing course of university, and 2 from master's course of university. Regarding nursing students, 14 were in the 3rd year and 4 in the 4th year of nursing course of university, and all of them had completed their psychiatric nursing practicum.

Comparison of the sum of fixation times between psychiatric nurses and nursing students

Median of the sum of the fixation times in the observation of the patient's facial area was 97725.85 msec for psychiatric nurses group and 99830.88 msec for nursing students group, and there was no significant difference between the two groups (U = 183.00, p = 0.87) (Table 2). The upper limbs area was observed with a median of 7147.90 msec for nurses group and a median of 2447.54 msec for students group, showing a significant

difference (U = 98.00, p = 0.01). In the observation of the body area, median was 11716.07 msec for nurses group and 11862.03 msec for students group, showing no significant difference (U = 175.00, p = 0.69). In the observation of the area of the doctor's face, median was 4505.53 msec for nurses group and 9263.10 msec for students group and there was no significant difference between the two groups (U = 147.00, p = 0.24). As for the relation between years of nurses' working experience in psychiatric department and nurses' fixation time of the upper limbs area, there was no significant correlation between them (r = 0.27, p = 0.26).

Comparison of the sum of the number of fixations between psychiatric nurses and nursing students

Median of the sum of the number of fixations in the observation of the patient's facial area was 185.00 times for nurses group and 175.00 times for students group, showing no significant difference (U = 181.00, p = 0.87) (Table 3). In the observation of the upper limbs area, median was 14.00 times for nurses group and 11.00 times for students group, showing no significant difference (U = 140.50, p = 0.17). In the observation of the body area, median was 120.00 times for nurses group and 93.50 times for students group, and there was no significant difference (U = 176.00, p = 0.71). In the observation of the doctor's facial area, median was 25.00 times for nurses group and 25.50 times for students group, showing no significant difference (U = 167.00, p = 0.54).

Table 2.   Comparison of fixation times between psychiatric nurses and nursing students

Important observation areas	Psychiatric nurses (n = 21)		Nursing students (n = 18)		U-value	P-value	
Patient's face	97725.85	(79402.95 - 114528.00)	99830.88	(84709.03 - 109043.92)	183.00	0.87	
Patient's upper limbs	7147.90	(3254.44 - 10947.37)	2447.54	(390.72 - 6583.24)	98.00	0.01	**
Patient's body	11716.07	(6532.78 - 16983.70)	11862.03	(7454.88 - 18902.05)	175.00	0.69	
Doctor's face	4505.53	(797.86 - 13424.38)	9263.1	(2584.40 - 12222.13)	147.00	0.24	

Statistical analyses were performed by Mann-Whitney U-test, **p < 0.01.
The values indicate medians of fixation times (msec) and interquartile ranges.

Table 3.   Comparison of number of fixations between psychiatric nurses and nursing students

Important observation areas	Psychiatric nurses (n = 21)		Nursing students (n = 18)		U-value	P-value
Patient's face	185.00	(144.00 - 251.50)	175.00	(140.75 - 223.25)	181.00	0.82
Patient's upper limbs	14.00	(9.50 - 31.50)	11.00	(2.50 - 27.75)	140.50	0.17
Patient's body	120.00	(58.50 - 154.50)	93.50	(52.75 - 159.50)	176.00	0.71
Doctor's face	25.00	(2.50 - 46.50)	25.50	(14.50 - 36.75)	167.00	0.54

Statistical analyses were performed by Mann-Whitney U-test, **p < 0.01.
The values indicate medians of number of fixations and interquartile ranges.

DISCUSSION

The significant difference we found between psychiatric nurses and nursing students groups was the sum of the fixation times in the upper limbs area, which was significantly longer for nurses group. However, there was no significant difference in the fixation times in other areas and in the numbers of fixations. From this finding, we found that psychiatric nurses observed the patient's upper limbs area multiple times over a longer period of time compared to nursing students. It has been reported that there were some characteristics in the differences in times and number of fixations depending on number of years of clinical experience of nurses, and the characteristics were related to risk prediction (19, 20). Generally speaking, schizophrenia patients in the acute phase are thought to be at a high risk of violence. As the simulated patient in the video used in this study was moving their hands and upper arms throughout the duration of the video, nurses seemed to have observed the upper limbs area more in anticipation of possible violence. Patients' violence towards psychiatric nurses has been increasing recently (21-23). Therefore, the Comprehensive Violence Prevention and Protection Program (CVPPP), which teaches appropriate response of nurses towards such violence, is attracting attention and many nurses are receiving the training. In the CVPPP, nursing techniques used for violence include detecting the presence or increase of violence risk, lowering the current and immediate violence risk, determining strategies for violence risk, preventing the occurrence of violence, and encouraging the improvement of the patient's ability to deal with violence risk (24). This suggests that in the present study nurses might have observed the upper limbs area from the viewpoint of sensing a heightened risk of violence. As one of the nursing techniques in psychiatric acute care wards in the UK and Australia, risk assessment and management of patients' aggressiveness have been reported (13, 14). So, it can be said that the risk prediction of violence is an important nursing technique throughout the world. In addition, it is reported that nurses working in other departments took shorter time to observe for danger prediction than nursing students, and appropriate observation was carried out and evaluated in

a shorter time (7). However, psychiatric nurses in this study observed upper limbs area longer than nursing students, psychiatric nurses' fixation time of the upper limbs was not significantly correlated with years of their working experience in psychiatric department. The movement of upper limbs may reflect not only danger of violence but also agitation caused by psychopathological symptoms (25), involuntary movements which are side effects of psychotropic drugs (26), scars caused by self-mutilation (27, 28) and so on. Therefore, it is suggested that psychiatric nurses observed the movement of the upper limbs for a longer time while examining various possibilities including the possibility of violence. It is already said that one of the characteristics of observation in psychiatric nursing is to observe patients while being involved (29, 30), and the finding we obtained seems to be consistent with the characteristic.

In the present study, nursing students showed the same fixation times in other observation areas and the same number of fixations as psychiatric nurses. Since the nursing students had already taken all the lectures and completed their practicum in psychiatric nursing, the findings may reflect their improved practical skills in psychiatric nursing (31). It is reported that nursing students tend to be patient-centered observers, and many observe psychopathological symptoms, side effects, and sleep state (32). On the other hand, although the danger of self-mutilation and violence is taught in lectures and during the practicum, there is little opportunity for nursing students to experience the danger in practice, which may lead to less observation of upper limbs area from the viewpoint of danger prediction. As a characteristic of inexperienced nurses, it has been reported that their ability to predict distress and danger is poor even if the fixation times and number of fixations are the same as those of experienced nurses (5). So, although in this study there was no significant difference in the fixation times in the areas except for upper limbs area and in numbers of fixations in all areas between psychiatric nurses and nursing students, there may be some differences in analysis ability after observation between the two groups. Further study about analysis ability after observation will be required in the future.

LIMITATIONS

This study has some limitations. First, we used simulated patient in this study. Second, the sample size was small. Therefore, further study with actual patients and a larger sample size would be required to confirm the results.

CONCLUSION

The findings show that psychiatric nurses pay more attention to patent's upper limbs than nursing students, and it is suggested that psychiatric nurses may do this because they try to predict possible violence and to detect adverse effects of medication, agitation caused by psychopathological symptoms, scars left by self-mutilation and so on.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest directly relevant to the content of this article.

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