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Experience-Based Hand Bathing Among Expert Nurses for Stroke Patients

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Abstract

Objective: This study aimed to systematically analyze the experience-based knowledge and skills among expert nurses with regard to hand bathing given to stroke patients.

Methods: In total, 20 nurses from rehabilitation and acute stroke wards were interviewed on the purpose, methods, and effects of hand bathing, as well as their observations of the medical conditions of patients receiving hand bathing.

Results: The results indicated that hand bathing not only provided hygiene care for stroke patients but also served to improve edema, improve and prevent contractures, promote awareness of the affected side, "stimulate consciousness, and promote communication. The purposes of hand bathing for stroke patients varied depending on whether the patient was in the acute or convalescent stage. Most nurses mentioned that it allowed them to monitor edema and hand skin and nail condition, whereas many also mentioned that it allowed them to monitor words and actions, numbness and pain, and facial expression. Nurses also checked patients' sensory perceptions on their healthy sides before soaking their hands in warm water.

Conclusions: Hand bathing has integrative effects, providing both thermal stimulation and acting as a medium to deliver other care, such as massage and exercise. Our study results should be verified to confirm the broader applications of hand bathing to patients with cerebrovascular disease.

Keywords: Hand bathing; Stroke patients; Experience-based knowledge; Expert nurse

repetitive stimulation of the arm has been demonstrated to create clinically important, long-lasting beneficial effects [2,3]. A specific approach along these lines is the process of hand bathing, which provides thermal stimulation, massage therapy, and communication during the provision of hygiene care. When used before each meal, this hand-bathing regimen can increase the range of joint movement on the affected side, allow for a smoother eating action, and alleviate pain during rehabilitation. Some patients may even start to bathe their own hands once the benefits are realized, indicating benefits not only for improved hand function but also for their psychological state.

Hand bathing entails both massage and thermal stimulation, making it more than a simple hand-washing procedure. Hand massage has been performed on various types of patients, including the aged [4] and those with dementia [5,6], with reported efficacies in facilitating communication [7] and improving mobility [8]. In addition, thermal stimulation affects several biological functions, including neuromuscular function and tissue viscoelasticity, thereby improving circulation and local metabolism and alleviating pain [9]. Further, the application of superficial heat can increase collagen extensibility [10], and when combined with stretching exercises, this extensibility can improve joint motion [11]. However, most studies to date have focused on hand massage or thermal stimulation rather than on hand bathing, which combines both therapeutic approaches.

Hand bathing, or *shuyoku* in Japanese, describes a uniquely Japanese type of hygiene care in which a nurse washes the patient's hands while they are being soaked in warm water. In Japan, several descriptive case studies have reported benefits from this practice, including enhanced communication [12-14] and improvement in the severity of contractures [15]. In research among patients after strokes, Koyama et al. [16] reported on the significance of hand bathing when providing nursing care to patients with higher brain dysfunction resulting from cerebrovascular disease. Among other things, they argued that hand bathing was of benefit to the "daily life care provided to enhance cognitive function in motor paralysis, sensory impairment, and left-sided hemispatial neglect cases" (pp. 159-160).

If hand bathing is to be established as a nursing intervention for patients after stroke, however, research data must be gathered to ensure evidence-based practice. In their report, Burns et al. [17] stated, "Clinicians are an important source of information about the intervention because they have

Introduction

Stroke is the third leading cause of death in Japan after cancer and heart disease and can be a major cause of depression, with a systematic review estimating that the frequency of depression up to 5 years after stroke is 30% [1]. Therefore, novel nursing interventions are needed to improve the quality of care for stroke patients; for example, early and

firsthand experience in implementing interventions for the patient's problem and are more familiar than most with the nuances and variations of the situations." Based on this considered view, the early stages of this research would be best informed by interviews with expert nurses at stroke and cerebrovascular hospitals. This, in turn, will facilitate ongoing study and will clarify the benefits of hand bathing for patients with strokes. The hypothesis was that, given Japan's rapidly aging society, hand bathing could be utilized as an effective nursing intervention to improve both the physical and emotional states of patients after stroke.

Aim

The aim in this study was to analyze, systematically, the experience-based knowledge and skills acquired by expert nurses concerning hand bathing for stroke patients.

Methods

This was a descriptive study with data collected through semi-structured interviews.

Participants and setting

Nurses were recruited from two wards: one in a pioneering center for stroke rehabilitation (the REHAB group), and one in the acute phase ward of a specialist neurosurgical hospital (the ACUTE group). These two hospitals were selected because they were situated in different areas of the Northern island of Hokkaido, Japan, and were actively engaged in studies of nursing patients after strokes. Both hospitals had introduced warm hand bathing, including during conventional bathing, as a central component of their nursing regimen. Managers at each hospital were asked to recommend nurses with at least 5 years of nursing experience who would be willing to elaborate about their experience of hand bathing at interview. We then included a purposive sample of nurses from each hospital.

Data collection and analysis

Each participant was interviewed once in a private room, with the interviews guided by semi-structured questions. The questions themselves were based on the following categories: (1) the purpose of hand bathing, (2) the method of hand bathing (water temperature, bathing time, supplies, procedures, and important points to remember), and (3) what is observed and monitored during hand bathing. To refine the interview technique, mock interviews were initially conducted. All interviews were recorded in their entirety, with the interviewee's consent, and verbatim transcripts were created from those recordings. In the next step, the transcripts were read several times to provide a sense of the whole data, before the text was grouped by the similarity of content and provided with a code. Various codes were considered based on similarities and differences. To assess reliability, the developed codes were checked by a nursing researcher and two nurses with extensive experience of care for stroke patients.

Ethical considerations

Nurses recommended by hospital managers were individually briefed, both verbally and in writing, about the ethical aspects of the study. Specifically, they were informed that the results would be solely used for the purpose of this study; that participation was voluntary; that whether they participated would not be disclosed to their manager; that the confidentiality and anonymity of their data would be ensured; and that they would need to provide their consent for audio recording of the interviews. When the nominated nurses agreed to these, they were asked to sign duplicate consent forms, keeping one for themselves. Randomized codes were used to ensure anonymity of the participants and data. The Research Ethics Committee of St. Luke's College of Nursing approved this study.

Results

We included a purposive sample of 20 nurses, of whom 13 were in the REHAB group and seven were in the ACUTE group. The length of clinical experience in neurosurgery ranged from 6 to 25 years, averaging 17.4 ± 5.0 years for those in the REHAB group and 12.7 ± 5.6 years for those in the ACUTE group. Interviews ranged from 16 to 61 min in duration, with the mean being 36 min.

Nurse opinions on the purpose of hand bathing

Table 1 shows the identified reasons for hand bathing. All participants cited "maintenance of hygiene" as one of the major reasons. However, most also stated other purposes, with at least half stating that "improvement of edema," "improvement and prevention of contractures," and "alleviation of pain" were important. In terms of priority, most selected "hygiene" as the primary purpose, elaborating that this was because stroke patients suffer from paralysis on one side of the body, which makes it difficult to keep their hands clean without assistance. In the REHAB group, the most common purposes after hygiene were "improvement of edema," "promoting awareness of the affected side," and "improvement of circulation." In the ACUTE group, "stimulation of consciousness," "improvement and prevention of contractures," and "improvement of edema" were listed as the next most important aims.

It is interesting to note that none in the ACUTE group said they used hand bathing to promote awareness of the affected side or to improve circulation, both of which were priorities for the REHAB group. Conversely, none from the REHAB group prioritized the stimulation of consciousness, which was considered more important by the ACUTE group. Promoting awareness of the affected side was only stated by those in the REHAB group, and was probably intended to help improve the patient's impaired cognitive function in the case of left unilateral spatial neglect. For those in the ACUTE group who gave hand bathing to stimulate consciousness, they reported taking care to apply multiple stimulation of some or all of their

senses; for example, asking the patient to take a sitting position during hand bathing.

Table 1 Purpose of hand bathing by hospital type, n (%).

	Hospital Convalescent A: (n = 13)	Hospital Acute B: (n = 7)	Total (n = 20)
Maintenance of hygiene	13 (100.0)	7 (100.0)	20 (100.0)
Improvement of edema	10 (76.9)	5 (71.4)	15 (75.0)
Improvement and prevention of contracture	5 (38.5)	5 (71.4)	10 (50.0)
Alleviation of pain	6 (46.2)	4 (57.1)	10 (50.0)
Promoting awareness of the affected side	9 (69.2)	0	9 (45.0)
Improvement of circulation	8 (61.5)	0	8 (40.0)
Stimulation of consciousness	0	5 (71.4)	5 (25.0)
Alleviation of numbness	2 (7.7)	1 (14.3)	3 (15.0)
Improvement of movement on paralyzed side	0	2 (28.6)	2 (10.0)
Promoting communication	2 (7.7)	0	2 (10.0)

In the ACUTE group, several nurses reported performing hand bathing to improve movement on the affected side and to improve and prevent contractures. Another nurse talked about using a hand-grip exercise, either active or passive, in addition to the massage during hand bathing. The two nurses in the REHAB group who identified that hand bathing could promote communication reported that they used it as a means to unveil the feelings of patients about their physical impairments.

Bathing method: The temperature, duration, and technique used

Table 2 details the water temperature and duration of hand bathing used by the participants. The temperature ranged from 38°C to 43°C and the bathing time varied between 5 and 30 min. Nurses would adjust the water temperature and bathing time depending on the purpose of hand bathing: 41–42°C for 5 min was used to stimulate consciousness, and 38°C for 5–20 min was used for general hygiene. It was common for nurses in the REHAB group to use water at a temperature of 38–40°C, but only a few from the ACUTE group did. It was rare for nurses in either group to use a higher temperature of 42–43°C to stimulate consciousness.

Observations made by nurses during hand bathing

The participants were asked to outline what they would monitor or observe in the patient during hand bathing, and their responses are summarized in Table 3. Most nurses cited “edema” and the “condition of the skin and nails of the hands,” and many also mentioned that they noted the “patient’s words and actions,” the “presence of numbness and pain,” and the “patient’s facial expression.” Nurses also

checked the patients’ sensory perceptions using their healthy sides before immersing their hands.

Table 2 Hand-bathing method: temperatures and times by hospital type, n (%).

	Hospital Convalescent phase A: (n = 13)	Hospital Acute phase B: (n = 7)	Total (n = 20)
Temperature (°C)			
38–40	9 (69.2)	3 (42.9)	12 (60.0)
40–41	1 (7.7)	1 (14.3)	2 (10.0)
42–43	1 (7.7)	2 (28.6)	3 (15.0)
Other	2 (15.4)	1 (14.3)	3 (15.0)
Time (min)			
5–10	8 (61.5)	3 (42.9)	11 (55.0)
10–20	4 (30.8)	1 (14.3)	5 (25.0)
30		1 (14.3)	1 (5.0)
Others	1 (7.7)	2 (28.6)	3 (15.0)

Discussion

The purpose of hand bathing

All participating nurses selected hygiene as the main purpose of hand bathing, indicating that expert nurses primarily considered hand bathing to be a form of hygiene care for stroke patients who had difficulties in cleaning the healthy side of their body with their affected hand.

Improvement of edema was another common concern among the participants. Edema of the paralyzed hand is a frequent complication of severe paralysis. Takauchi et al. [18] suggested that edema is caused by a cycle of three key factors: 1) an impaired pumping mechanism resulting from reduced upper limb muscle contraction, 2) inflammatory hypertrophy of synovial and subsynovial tissue caused by vasomotor edema and orthostatic edema, and 3) limitations in tendon and tendon sheath movement caused by contractures. Considering that patients in both the REHAB and ACUTE groups were prone to edema, this purpose demonstrated active intervention through thermal stimulation and massage.

Table 3 Reported observations during hand bathing by hospital type, n (%).

	Hospital A	Hospital B	Total
	(n = 13)	(n = 7)	(n = 20)
Edema	10 (76.9)	4 (57.1)	14 (70.0)
Condition of hand skin and nails (color, redness, presence of epidermolysis)	8 (61.5)	3 (42.9)	11 (55.0)
Patient's words and actions	7 (53.9)	2 (28.6)	9 (45.0)
Presence of numbness and pain	6 (46.2)	3 (42.9)	9 (45.0)
Patient's facial expression	4 (30.8)	4 (57.1)	8 (40.0)
Range of joint movement, joint stiffness	2 (15.4)	4 (57.1)	6 (30.0)
Degree of cleanliness (odor, dirt)	2 (15.4)	3 (42.9)	5 (25.0)
Hand movement	0	4 (57.1)	4 (20.0)
Eye movement: eye opening, following movement	0	3 (42.9)	3 (15.0)
Altered awareness on the affected side	3 (23.1)	0	3 (15.0)
Extent of relaxation	0	3 (42.9)	3 (15.0)
Change in vital signs such as blood pressure	1 (7.7)	1 (14.3)	2 (10.0)
Extent of patient self-care	2 (15.4)	0	2 (10.0)

Consistent with the concern about edema, the need to improve and prevent contractures was another common concern. The acknowledgement that water was used at a temperature of 38°C or higher for 5–20 min to achieve this purpose suggests that the nurses were aware of the physiological effects of a warm hand bath. This is consistent with the theory proposed by Cameron [9] that thermal stimulation can improve various biological functions, including neuromuscular function, tissue viscoelasticity, circulation, local metabolism, and pain sensation.

We also extracted two aims that had not previously been mentioned (including in Japanese nursing manuals). These were 1) promoting awareness of the affected side and 2) stimulating consciousness. While nurses from the REHAB group did not mention stimulation of consciousness to be a priority, most in the ACUTE group felt that it was a priority. According to Penfield's map, the innervation of nerves to the hand occupies a disproportionately large area of the cerebral cortex motor area [19]. It might then follow that performing hand bathing for the purpose of stimulating consciousness is appropriate to the ACUTE group because patients tend to have greater disturbances of consciousness in the acute phase after a stroke. To help stimulate consciousness, nurses used water that was warmer than that used for usual thermal stimulation, and they also tended to apply multiple stimulations together, often combining hand bathing with the patients sat unaided to activate brain activity [20].

While nurses in the REHAB group did not focus on stimulating consciousness, they did talk more specifically about the need to promote awareness on the affected side. They gave hand bathing in the hope that patients with left unilateral spatial neglect would become interested in and pay more attention to their hands. Washing the patient's hands as part of routine care, nurses were able to share a moment that was intentionally created to pay specific attention to the hands. In the case of patients with severe unilateral spatial neglect, talking from the patient's left side would be counterproductive because it would activate excessive attention to the right space. According to Suzuki [21], the nurse should instead make eye contact in the right space and bring that eye contact to the median line. During hand bathing, the patient's attention naturally falls on his or her hands in the median line, which makes hand bathing an effective means of promoting awareness of the paralyzed side.

The fact that the nurses on the rehabilitation ward regarded hand bathing as an opportunity to communicate with patients suggested that hand bathing offered more than just hygiene care or thermal stimulation of physiological responses. According to four previous articles concerning the communication-promoting effects of hand bathing [11], the process appears to encourage patients to talk about their past and present. The relationship between the patient and nurse may deepen as a result, and the patient's willingness to participate in other activities, such as day-care activities, may increase.

The method of hand bathing

Technical manuals only usually recommend minimal bathing temperatures, with figures variously reported as "38–41°C," "lukewarm," or "around 40°C" [22,23]. One nurse in this study reported using a slightly higher temperature of 43°C for stimulating patient consciousness. When the water temperature is within the range 16–40°C, warmth is felt strongly when placing the hand in water, but the hand rapidly becomes used to the temperature and the water starts to feel tepid; by contrast, temperatures of 45°C or higher give a burning sensation to the hand [24]. Thus, the bathing

temperature of 43°C, when used to stimulate consciousness, is within the safe range of temperature that avoids burns or pain. All participants reported that they checked the water temperature on the patient's healthy side before proceeding with bathing. This is crucial, not only to ensure patient safety but also to ensure satisfaction with the bathing temperature.

It was interesting to note the use of hand-grip exercises during hand bathing, which was presumably motivated by a desire to improve and prevent contractures and to alleviate pain. This conclusion was reached because the physiological effects of thermal stimulation include reduced tension in soft tissues, improved tissue contraction, and enhanced tissue distensibility [25]; when the hand is warmed before stretching, it is known that the range of joint motion on the affected side can be extended with minimal pain. Moreover, massage can then promote relaxation, reduce edema, improve mobility, encourage communication, and facilitate the release of emotion or feelings. Therefore, not only does bathing provide thermal stimulation but it also acts as a medium for other care activities, such as massage and exercise. It is suggested that these factors explain the integrative effects of hand bathing, and that they should be investigated in future research.

Limitations

It is possible that including participants from two hospitals in the same geographical area could have introduced bias given that nursing care can vary from region to region. However, this qualitative study focused on revealing the perceptions of the expert nurses in these hospitals to gain a better understanding of their knowledge and skills. Although the conclusions drawn in this report are reasonable assumptions based on their reports, the findings have not been validated by the nurses themselves. Therefore, further study is needed that focuses on this verification.

Conclusion

In this qualitative study, it was shown that, rather than simply being a routine nursing activity, hand bathing was a tool used by expert nurses and had specific aims for stroke patients. Not only was it used as a form of hygiene care but it was also used for clear therapeutic reasons, such as the improvement of edema and contractures. Overall, the purpose of hand bathing depended on whether patients were in the acute or convalescent phase of treatment, and varied from promoting awareness of the affected side and stimulation of consciousness to promoting communication. This study adds to a growing evidence base describing traditional Japanese nursing practice, and sheds new light on the rationale and implementation of hand bathing.

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Conflict of Interest

The authors confirm that they have no significant financial or personal interest in the products, technology, or methodology mentioned in the submitted manuscript.

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References

1. Ayerbe L (2011) Natural history, predictors, and associations of depression 5 years after stroke. *Stroke* 42: 1907-1911.
2. Duncan PW (1997) Synthesis of intervention trials to improve motor recovery following stroke. *Top Stroke Rehabil* 3: 1-20.
3. Feys H, De Weerd W, Verbeke G, Steck GC, Capiou C, et al. (2004) Early and repetitive stimulation of the arm can substantially improve the long-term outcome after stroke: a 5-year follow-up study of randomized trial. *Stroke* 35: 924-929.
4. Cho K, Snyder M (1996) Use of hand massage with presence to increase relaxation in Korean-American elderly *J Acad Nurs* 26: 623-626.
5. Snyder M, Egan EC, Burns KR (1995a) Efficacy of hand massage in decreasing agitation behaviors associated with care activities in persons with dementia. *Geriatr Nurs* 16: 60-63.
6. Snyder M, Egan EC, Burns KR (1995b) Interventions for decreasing agitation behaviors in persons with dementia. *J Gerontol Nurs* 21: 34-40.
7. Kolcaba K, Schirm V, Steiner R (2006) Effects of hand massage on comfort of nursing home residents. *Geriatr Nurs* 27: 182-186.
8. Smith MC, Stallings MA, Mariner S, Burrall M (1999) Benefits of massage therapy for hospitalized patients: A descriptive and qualitative evaluation. *Altern Ther Health Med* 5: 64-71.
9. Cameron HM (2008) *Physical Agents in Rehabilitation From Research to Practice* (2nd edn) (Watanabe I Trans). Ishiyaku & Company, Japan.
10. Lehmann JF (1982) *Therapeutic heat and cold*. (3rd edn), Williams & Wilkins, Baltimore.
11. Nakao M (1999) Touching heart: interaction with patients through hand bathing. *J Jpn Psychiatr Nurs Soc* 42: 302-304.
12. Yano R, Ishimoto M, Shinachi T, Iino T (2009) Case studies of hand bath for stroke patients. *Jpn J Nurs Art Sci* 8: 101-108.
13. Kawazu Y, Miyazaki K, Yahiro H, Hatabe S, Hirashima S (2003a) Report of day-care nursing practice using hand bath therapy communication with hands of the elderly. *Proceedings of the Japan Nursing Association: Gerontological Nursing* 33: 144-146.
14. Kawazu Y, Hirashima S, Miyazaki K (2003b) What we learned from individualized day-care practice: case study of individual care and group care. *Proceedings of the Japan Nursing Association: Community Nursing* 33: 93-95.
15. Tokuyama M, Kanazashi K, Kurihara M, Yagi K, Hirata S (2006) Improved contracture of fingers by the concurrent use of hand-roller massage device and hand massage. *Proceedings of the Japan Nursing Association: General Nursing* 37: 147-148.

16. Koyama T, Tokoro K (2005) Nursing guide for higher brain dysfunction due to cerebrovascular disease. (2nd edn), Nissouken, Tokyo, Japan.
17. Burns N, Grove SK (2007) The practice of nursing research: conduct, critique and utilization (Kuroda Y, Nakaki T, Oda M et al. Trans.). Elsevier, Japan.
18. Takauchi H, Sashika H (2007) Management of disabled hand due to unilateral paralysis and the effect. *Total Rehabilitation* 35: 1419-1425.
19. Nanbu A (2005) Cerebral cortex & basal ganglia. In Hongou T, Hiroshige T & Toyoda J (Eds), *Standard Textbook Physiology*, Igakushoin, Tokyo, Japan. 359-386.
20. Okubo N, Hishinuma N (2005) Effect of aided and unaided support of the neck while sitting (with back support) on autonomic nervous system activities. *Jpn J Nurs Sci* 2: 33-39.
21. Suzuki K (2010) Unilateral spatial neglect. *Rehabil Nurs* 3: 220-226.
22. Fujisaki K, Shigeno K, Arita K, Morimoto T, Yoshimura M, et al. (2009) Hygiene Clothing Care Skills. In Fujisaki K & Nin K (Eds), *Fundamental Nursing Skills*, Igakushoin, Tokyo, Japan. 142-195.
23. Honjou K (2006) Hand Bathing. In Kawashima M (Ed), *Nursing Skills Standard Manual*, Medical-Friend & Company, Tokyo, Japan. 323-327.
24. Aso Y, Ujiie S, Inoue T (2005) *Fundamental Nursing Skills II*. Igakushoin Ltd, Tokyo, Japan.
25. Nakata M, Oyama M (2006) *Introduction to hand therapy for occupational therapists*. (2nd edn), Miwa Publishing, Tokyo, Japan.