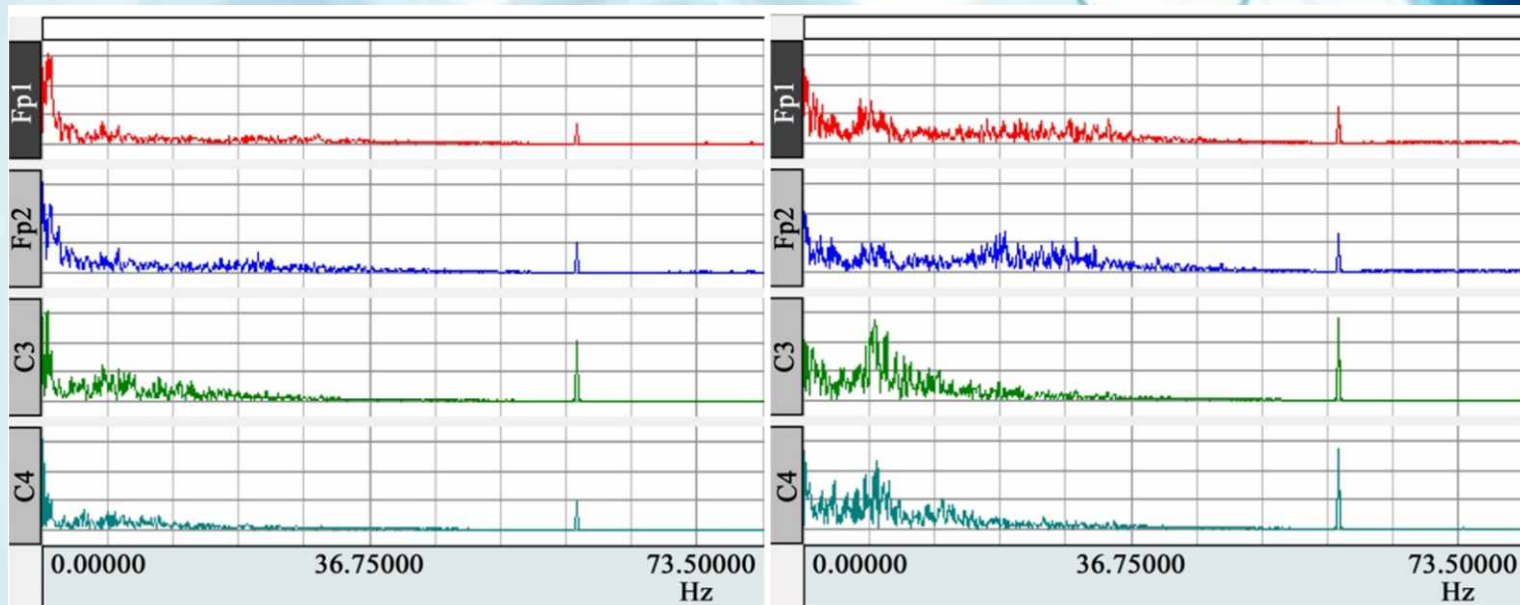


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Reducing the Prevalence of Catheter-Related Infections by Quality Improvement: Six-Year Follow-Up Study

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Abstract

Background: Peripheral venous catheter (PVC) insertion is a crucial nursing action during life support. Several factors that increase the risk of thrombophlebitis associated with PVCs have been reported. **Objective:** We wish to evaluate the impact of a quality improvement regarding PVC treatment for patients with coronary heart diseases. **Method:** A longitudinal, quantitative observational study was carried out in 2008 and 2013 in a hospital in southern Sweden with 360 consecutive patients suffering from acute chest pain. New routines for PVC treatment were included in the hospital with daily inspection according to a checklist. A structured observation protocol was used to survey the prevalence of thrombophlebitis between 2008 and 2013. Also, we examined the relationship between the location and luminal diameters of PVCs. **Results:** The student's *t*-test showed significant differences between 2008 and 2013 with respect to luminal diameter of PVCs ($p = 0.002$), prevalence of thrombophlebitis ($p = 0.003$) and number of days with PVC left *in situ* ($p < 0.001$). **Conclusion:** These findings emphasize the value of using systematic daily inspections and checklists to achieve quality and safety in patients with acute chest pain having PVC-based treatment.

Keywords

Bloodstream Infection, Peripheral Venous Catheter, Quality Improvement, Thrombophlebitis

*Corresponding author.

1. Introduction

Insertion of a peripheral venous catheter (PVC) is a crucial nursing action during life support in emergency (prehospital or hospital) settings for patients with symptoms of acute myocardial infarction. In hospitalized patients, administration of pharmaceutical substances *via* the intravenous route is the most common invasive procedure [1] [2].

Risks associated with intravenous therapy include thrombophlebitis (prevalence of 2.3% - 35%) and intravenous catheter-related bacterial infection ($\approx 0.8\%$) [3]. Major differences in studies reporting the prevalence of thrombophlebitis may be due (at least in part) to differences in: survey selection; follow-up times; definitions of thrombophlebitis. An acceptable prevalence of thrombophlebitis is $\leq 5\%$ but higher levels are acceptable if a PVC is inserted by paramedics [4] [5]. Anderson *et al.* show that, for patients receiving medication that excite peripheral vessels, elective changing of intravenous PVCs results in marked reduction in the prevalence of peripheral venous thrombophlebitis [6]. Recent studies have shown that re-siting PVCs (if indicated clinically) does not lead to more complications or reduced healthcare costs compared with changing such PVCs routinely every 72 h [7]-[9]. However, guidelines recommend that PVCs should be re-sited every 48 - 96 h in adults. This strategy has been shown to restrict the risk of infection, and most hospitals follow this recommendation [10] [11]. In a review conducted by the Cochrane Collaboration in 2015, there was no evidence to support re-siting of PVCs every 72 - 96 h to minimize the risk of bacterial infections and phlebitis [12] [13]. In addition, guidelines state that ongoing, close monitoring of the cannula site, along with timely treatment, will help to identify complications. However, those guidelines cite only one study [14] to support this recommendation. Hence, consensus regarding current use of PVC is lacking.

1.1. Problems at a County Hospital in Southern Sweden

Evidence-based PVC treatment results in reduced risks for patients and excessive healthcare costs [9] [12] [15]. However, guidelines are based on incongruous literature and emphasize the duration of PVC-based treatment. Daily observation as well as documentation of puncture sites and luminal diameter may provide more relevant information [10].

In the Swedish healthcare system, nurses are responsible for informing patients why PVCs need to be inserted, as well as their maintenance, removal and documentation. Each year in Sweden, nurses insert ≈ 5 million PVCs [16]. Such everyday tasks necessitate considerable demands on knowledge and skills. All nursing students in Sweden undergo education and training on PVC insertion.

The present study took place in County Hospital in southern Sweden. Ward review revealed that $\approx 6\%$ - 10% of patients at County Hospital had suffered from infections that could lead to thrombophlebitis upon PVC-based treatment. Therefore, it was decided at the departmental level to work with quality improvements (QIs) for nurses regarding PVC management.

1.2. Intended Improvement

The intended improvement was to reduce the prevalence of bacterial infections and phlebitis. To achieve improvements in PVC-based treatment, efforts from healthcare professionals are needed [17]. Systems analyses of adverse events [18] have emphasized that the intended outcome can be achieved if healthcare professionals and patients collaborate to obtain quality and safety in healthcare (Table 1). Patients should also follow guidelines for identification of the symptoms of thrombophlebitis (redness or swelling) and report them to nurses. An additional intended outcome was to investigate the prevalence of thrombophlebitis in patients with chest pain who received paramedic care. In addition, to improve outcome, systematic data-guided activities were carried out [19].

1.3. Quality Improvement

Quality Improvement (QI) is being adopted increasingly in healthcare in Sweden and overseas. In the present study, a QI method, root cause analysis (RCA) [20] [21], was used to identify and understand in a systematic way the underlying reasons why a problem or error occurs. RCA is important for the prevention of injuries and errors in healthcare [22]. Evidence regarding the improvement and successful outcomes desired from healthcare professionals is lacking [23] [24]. Consequently, evaluation of improvement interventions regarding the safety

of PVC-based treatment will be useful for healthcare professionals [18] [23] [25]. Therefore the aim of this study was to evaluate the impact of QI regarding PVC-based treatment for patients with coronary heart diseases.

2. Materials and Methodology

2.1. Study Design and Selection Criteria

This was a longitudinal, quantitative, observational study carried out in 2008 and 2013 at a surgical and medical clinic in County Hospital in South of Sweden. A total of 360 (2008: $n = 145$; 2013: $n = 215$) consecutive patients with symptoms of chest pain admitted to the Emergency Ward and then transported immediately to the Department of Cardiac Diseases where enrolled in the study.

2.2. Improvement Intervention

QI was initiated by a development leader after review of the prevalence of thrombophlebitis on the ward. Using local data and discussion of the prevalence with those involved can lead to deeper understanding of local problems [20]. To analyze the cause of thrombophlebitis, the development leader interviewed nurses and asked three main questions: “What happened?”, “How did it happen?” and “Why did it happen?” Information obtained during the interview regarding contributory factors (as perceived by the nurses) was used to improve the routines of safe PVC-based treatment. New routines included daily inspection according to a checklist (Table 2) and re-siting the PVC every third day (or more often if necessary) (Table 1). If drugs that irritated blood vessels were administered, then the PVC was re-sited each day. In conjunction with PVC insertion, nurses rinsed the PVC with 10 mL of physiologic (0.9%) sodium chloride (NaCl). After each injection, the PVC was flushed with 10 mL of NaCl. The PVC was flushed every day with 10 mL of NaCl. Step-by-step improvement interventions (Table 3) involved all nurses on the ward.

2.3. Data Collection

A structured observational protocol was used for data collection (Table 2). All PVCs were inserted by prehospital paramedics from ambulances (the first PVC or (“PVC1”) and by healthcare professionals from the Department of Cardiac Diseases (second, third and fourth PVC (“PVC2”, “PVC3” and “PVC4”, respectively). All patients were followed up from the insertion to removal of PVCs. Sex and age of patients were taken from individual patient records. Also, how long the catheter was *in situ*, as well as its diameter and location, were recorded. In accordance with Swedish guidelines for regular changing of PVCs to prevent thrombophlebitis [26], we observed PVC sites for 12 - 72 h [2] [26]. Only specialist nurses made the observations (Table 1), and made assessments according to criteria for thrombophlebitis classification. Each PVC location was observed every day after 12, 24, 48 and 72 h (Table 2). If redness (grade > 1) or further signs of thrombophlebitis were observed, the PVC was removed. In patients without signs of thrombophlebitis, the PVC were removed or replaced after 72 h.

If a complication was noted, observation of symptoms continued after PVC removal until the patient was asymptomatic. If complications remained after discharge from hospital, or symptoms recurred, patients were requested to visit their general practitioner.

2.4. Ethical Considerations

The study followed the principles outlined in the Declaration of Helsinki, and was approved by the Ethics Committee [27]. Eligible patients were given information about the study, and informed consent was obtained from all patients.

2.5. Statistical Analyses

Background variables are presented as the mean, 95% confidence interval (95% CI), frequency, and percentage. Comparisons between categorical variables in 2008 and 2013 were made with the chi-squared test. But when more than 20 percent of the cells had an expected value less than five have instead Fisher’s exact test been used. Bootstrapping was used to calculate 95% CIs. Analysis of crosstabs with more than four cells have also Correspondence analysis have been used [28]. For variables on scale levels (e.g., PVC 1-4, age) the independent sam-

Table 1. Guideline for symptoms of thrombophlebitis and interventions for PVCs.

Degree		Symptom of thrombophlebitis	Intervention for PVC
0	No complication	No discomfort or slight discomfort; tenderness upon insertion.	No action.
1	Slight thrombophlebitis	Redness and tenderness < 15 × 15 mm.	Stop treatment and remove the PVC. Hirudoid® ointment applied one to several times daily.
2	Medium thrombophlebitis	Redness, tenderness pain, swelling > 15 × 25 mm; increased temperature in the area.	Stop treatment and remove the PVC. Hirudoid® ointment applied one to several times daily. Inform the attending physician.
3	Severe thrombophlebitis	Redness, tenderness pain, swelling > 25 × 50 mm; increased temperature in the area and palpable cord in the vein.	Stop treatment and remove the PVC. Inform the attending physician.
4	Very severe thrombophlebitis	Redness, pain, swelling more than 50 × 50 mm; increased temperature in the area and palpable cord in the vein; pain spreading up to the arm; possible fever	Stop treatment and remove the PVC. Inform the attending physician.

Modified checklist from Lundgren *et al.*, 1993 [30].

Table 2. Checklist for PVC insertion.

PVC in	PVC	Flush	Flush	PVC out	Thrombophlebitis	Complications	Intervention
Date Clock: /Sign	Size Place /Sign	Date /Sign	Date /Sign	Date Clock: /Sign	Degree 0-4 /Sign		

Table 3. Improvement intervention.

Intervention	Process
To improve the way to PVC-based treatment is carried out	<ul style="list-style-type: none"> *A comprehensive review of international and national literature on PVC treatment was done *A checklist was composed based on the review *Secure assessment of thrombophlebitis by defining the extent of thrombophlebitis *Information for all staff on the ward for people with heart disease using the new guideline
To test and evaluate compliance to the checklist	<ul style="list-style-type: none"> *Follow-up of 60 patients was conducted *Nurses' documentation and comments regarding the new working process was reviewed
To improve the checklist further and working practices	<ul style="list-style-type: none"> *Meetings with nurses where follow-up was discussed *Create conditions to facilitate compliance with the new guideline. The checklist included equipment for appropriate PVC-based treatment.
To establish the new guideline as a routine	*Follow-up of working practices as a regular discussion at monthly meetings
To secure the quality of the new routine	*Continuous follow-up of the checklist

ple *t*-test was used. However, none of these variables had a normal distribution according to Kolmogorov-Smirnov and Shapiro-Wilk tests ($p < 0.05$). Therefore, a non-parametric test and Mann-Whitney U-test were also used. Both tests reported significant and non-significant variables, so only *p* values for the independent sample *t*-test are reported. Significance was set at $\alpha = 0.05$. Statistical analyses were made using SPSS v22 (IBM, Armonk, NY, USA).

3. Results

QI on the ward resulted in significant reductions in the prevalence of complications associated with PVC-based treatment by healthcare professionals (PVC 2-4) in 2013 compared with those in 2008 ($p = 0.04$). Upon treatment by paramedics (PVC1), the prevalence of complications increased significantly ($p = 0.03$) (Table 4). In both groups, the number of days that the PVC was *in situ* (Table 5) increased significantly ($p = 0.001$) from a mean of 2.1 days in 2008 to 2.5 days in 2013. There is a significant difference ($p = 0.002$) between 2008 and 2013 with regard to luminal diameter, complications, and days the PVC was left *in situ* (Table 4, Table 5). Correspondence analyses showed that at PVC1, a blue PVC (lumen diameter, 0.9 mm) gave the strongest con-

Table 4. Distribution of PVCs with location, luminal diameter and complications for 2008 and 2013.

		2008			2013			p
		n	%	95% CI	n	%	95% CI	
Location of PVC1 (paramedics)	Upper hand	57	41.9	33.8 - 50.0	86	41.5	35.3 - 48.3	0.96
	Forearm	57	41.9	33.8 - 50.0	85	41.1	34.8 - 47.8	
	Antecubital	22	16.2	10.3 - 22.8	36	17.4	12.6 - 22.7	
	Neck	-	-	-	-	-	-	
	Legs	-	-	-	-	-	-	
Location of PVC2-4 (healthcare professionals)	Upper hand	16	20.3	11.4 - 29.1	28	20.3	13.8 - 26.8	0.08
	Forearm	30	38.0	27.8 - 42.4	69	50.0	42.0 - 58.0	
	Antecubital	30	38.0	26.6 - 48.1	41	29.7	22.5 - 37.7	
	Neck	1	1.3	0 - 3.8	-	-	-	
	Legs	2	2.5	0 - 6.3	-	-	-	
Luminal diameter (mm) PVC1 (paramedics)	Yellow (0.7)	1	0.7	0 - 2.1	-	-	-	0.002
	Blue (0.9)	44	31.2	23.4 - 39.0	35	16.9	11.6 - 22.0	
	Pink (1.1)	89	63.1	54.6 - 70.9	147	71.0	64.7 - 77.3	
	Green (1.3)	7	5.0	2.1 - 9.2	25	12.1	7.7 - 16.4	
Luminal diameter (mm) PVC 2-4 (healthcare professionals)	Yellow (0.7)	1	1.3	0 - 5.1	-	-	-	0.07
	Blue (0.9)	18	22.8	13.9 - 32.9	16	11.7	6.6 - 16.8	
	Pink (1.1)	54	68.4	58.2 - 78.5	96	70.1	62.8 - 77.4	
	Green (1.3)	6	7.6	2.5 - 12.7	25	18.2	12.4 - 24.8	
Complications PVC1 (paramedics)	No thrombophlebitis	143	97.9	95.2 - 100	176	92.6	88.9 - 96.3	0.03
	Thrombophlebitis	3	2.1	0 - 4.8	12	7.4	3.7 - 11.1	
Complications PVC 2-4 (healthcare)	No thrombophlebitis	50	87.7	78.9 - 94.7	83	96.5	91.9 - 100	0.04
	Thrombophlebitis	7	12.3	5.3 - 21.1	3	3.5	0 - 8.1	

First PVC (PVC1), second PVC (PVC2), third PVC (PVC3), fourth PVC (PVC4) and age in years for 2008 and 2013 in terms of number (n), percentage (%), 95% confidence interval (95% CI) and probability (p).

Table 5. Sex, age, and number of days PVC left *in situ* for 2008 and 2013.

		2008			2013			
		n	%	95% CI	n	%	95% CI	p
	Female	65	44.5	36.3 - 52.7	80	38.1	31.9 - 45.2	0.23
	Male	81	55.5	43.7 - 67.3	130	61.9	54.8 - 68.1	
Age in years		146	69.9	68.0 - 71.1	210	70.6	68.5 - 72.7	0.62
Days PVC1		127	2.1	1.9 - 2.2	184	2.5	2.3 - 2.7	<0.001
Days PVC2								
Days PVC3								
Days PVC4								

m: mean

tribution, followed by a green PVC (1.3 mm) and then a yellow PVC (0.7 mm), and the difference was significant. PVCs with a smaller luminal diameter (e.g., blue, 0.9 mm) were used less often and those with a larger luminal diameter (e.g., green, 1.3 mm) were used more often in 2013 compared with 2008. Yellow PVCs (0.7 mm) were not used at all in 2013 compared with 2008. PVCs with larger luminal diameters were used more often in 2013 compared with 2008.

4. Discussion

Six-year follow-up of an improvement intervention in patients who received treatment for acute chest pain in a coronary care unit highlighted the benefits of avoiding unnecessary changes of PVCs. PVCs were replaced for clinical indications or every 72 h. This result supports the work of Rickard *et al.*, who use clinical indicators to

decide if PVCs should be replaced or removed, as opposed to the usual prescribed length of time (≤ 72 h), the PVC has been *in situ* [15]. The present study as well as that of Webster *et al.* show the benefits of avoiding unnecessary changes of PVCs, such as a reduction in: patient discomfort; equipment costs; staff workload [9] [15]. This knowledge should be taken into account given that PVC insertion often results in swelling and redness as early as 6 h after insertion [29]. However, inter-patient differences in reactions to PVCs mean that they should be inserted or changed only if it is indicated clinically and not according to a fixed schedule (72 h).

From a QI perspective, patients' knowledge of the symptoms and signs of thrombophlebitis is important. Lundgren *et al.* showed that residual symptoms of thrombophlebitis after PVC removal could be apparent ≤ 5 months after hospital discharge [30]. Therefore, patients should be aware of the signs and symptoms associated with discharge from care: redness, swelling, increased temperature at site, palpable induration, fluid discharges, pain, and pain upon palpation. If two of these symptoms emerge based on the site where the PVC is removed, patients should contact the hospital for extra checks and treatment [3] [30].

During the period of the survey (2008-2013), a significant reduction in the prevalence of thrombophlebitis was noted in patients who had their PVC replaced as a result of clinical indications or every 72 h. This treatment was a part of the improvement work implemented by all nurses on the ward (Table 3). This result is supported by prospective longitudinal studies showing that infections and the risk of superficial thrombophlebitis are highest in the first day after PVC insertion [4] [31]. Swedish guidelines have shown that PVCs should be inserted within the shortest possible time and be replaced every 24 - 72 h [26]. Data on the prevalence of thrombophlebitis if PVCs are re-sited 72 - 96 h after insertion or on clinical indications are lacking and there is no evidence of benefit to support current practice of changing PVC routinely every three to four days [12].

An improvement intervention must be evaluated through systematic collection of data to measure the effects of that intervention [32]. The number of days a PVC was left *in situ* to show a significant increase from 2008 to 2013 (Table 5) within prehospital care (PVC1) and on the ward (PVC 2-4). However, the prevalence of thrombophlebitis increased significantly within prehospital care but decreased significantly on the ward. These results may be related to a lack of planning of the improvement intervention from healthcare professionals [33]. A patient-centered perspective to improve clinical performance facilitates improvement interventions [34]. There is evidence on the consequences of involving only a single care process in improvement interventions [33]. Patient-centered thinking emphasizes a holistic view in the efforts of healthcare professionals for QI, and includes all the people involved in patient care [35]. Care of patients with acute chest pain involves at least two processes: prehospital and inpatient. Nurses on the ward are involved in the improvement intervention but the paramedics in the prehospital setting are not. These results may emphasize the need of involving healthcare professionals in each step of patient care. Therefore the method used in this QI captures the nurses perception of lack of experience as one of the root cause to thrombophlebitis [20].

Zingg *et al.* also found that if untrained or inexperienced healthcare workers insert PVCs, the risk of thrombophlebitis increases [36]. This phenomenon can probably not explain the increase in the prevalence of thrombophlebitis in our study because all paramedics were registered nurses in 2013 (though their level of experience was not known). The improvement intervention regarding evidence-based PVC treatment involved all nurses on the ward, and the improvement intervention was undertaken in several steps.

From 2008 to 2013, when paramedics inserted PVCs, a significant increase in the prevalence of thrombophlebitis ($p = 0.04$) was noted (Table 4), a result that is in accordance with other studies [5] [37]. Swedish guidelines for paramedics state that all patients with acute chest pain should have the PVC inserted in the forearm to enable injection of vital agents. However, the expectation of "load and go" treatment of patients with chest pain in hospital could affect PVC handling. Preparing the patient for rapid transport could result in poor hygiene with respect to PVC insertion.

National and local guidelines recommend that paramedics should insert PVCs with luminal diameters of ≥ 1.1 mm in patients with acute chest pain. Our results showed a significant reduction in use of PVCs of luminal diameter 0.7 mm and 0.9 mm to favor of 1.1 mm. In 2008, PVCs with a luminal diameter of 1.1 mm were inserted in 63% of patients, whereas in 2013 it was 71%, which should have reduced the risk of thrombophlebitis. Studies have shown that a smaller luminal diameter increases the risk of thrombophlebitis because small catheters allow more blood flow into adjacent tissues [3] [38]. Also, the material and lumen of catheters can increase the risk of thrombophlebitis [39]-[41].

Paramedics who instigated PVC-based treatment did so in significantly more upper-arm locations in 2008 and 2013 (Table 4). These results are not in accordance with recommendations that a PVC should be inserted in a

Table 6. Medicines (i.v.) given by paramedics to treat chest pain.

2008	2013
1 Ketogan Novum [®] , 5 mg/mL *Ketobemidone	1 Morphine [®] diluted to 1 mg/mL and not diluted to 10 mg/mL *Morphine
2 Ringer-Acetat [®] *Isotonic crystalloid solution	2 Ringer-Acetate [®] *Isotonic crystalloid solution
3 Stesolid novum [®] 5 mg/mL *Diazepam	3 Perfalgan [®] 10 mg/mL *Paracetamol
4 Adrenalin [®] 0.1 mg/mL *Adrenalin	4 Stesolid novum [®] 5 mg/mL *Diazepam
5 Furix [®] 10 mg/mL *Furosemide	5 Zofran [®] 2 mg/mL *Ondansetron

*Genericname

larger vein (e.g. in the forearm) in patients suffering from chest pain [42]. This treatment could be one of the reasons why patients had a significantly higher prevalence of thrombophlebitis. In addition, the current most common treatment for acute chest pain increases the risk of thrombophlebitis. This treatment (**Table 6**) changed from 2008 to 2013 to increased use of morphine (i.v.) as first-line treatment for acute chest pain instead of ketobemidone; morphine may increase the risk of thrombophlebitis [29] [43].

Significant increases in the prevalence of thrombophlebitis could be explained by inappropriate disinfection of skin in conjunction with PVC-based treatment [42]. One reason could be the difficulties of working in an aseptic manner in the environment where the patient with acute chest pain is collected. This hypothesis is supported by the significantly lower prevalence of thrombophlebitis on the ward, where aseptic conditions can be controlled and improved. Studies have shown that appropriate aseptic conditions prevent thrombophlebitis [31] [40] [44].

4.1. Methodological Considerations

One of the strengths of our follow-up study was that we could record changes over time that may have been affected by new work practices [45]. However, these comparisons were made over time at the group level, so the same patients and staff were not compared. Also, we did not have information on the time of day patients received PVC-based treatment, or distribution of night-time and daytime patients in 2008 and 2013. Furthermore, frequencies in the tables for some options were low, which reduced the statistical power of our study [28].

4.2. Clinical Implications

QI on the ward showed a significant reduction in the prevalence of thrombophlebitis. These findings emphasize the value of using systematic daily inspections and checklists to achieve quality and safety in healthcare. In improvement interventions regarding PVC-based treatment, the impact that healthcare professionals in other units has on patient care must be considered. In addition, patients must be encouraged to take part in the follow-up of improvement interventions.

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Disclosure

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Development and Practice of Integrated Nursing Model NNN Link for Breastfeeding Clinical Nursing Model as a Whole

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Abstract

Objective: To establish breastfeeding clinical holistic nursing model used in clinical nursing and teaching, it is possible to improve nurses and nursing students to master knowledge of breastfeeding, analysis, judgment, decision-making and the ability to care-related issues, promoting pure improve breastfeeding rates. **Method:** 1) The North American Nursing Diagnosis Nursing Association (NANDA), Nursing Outcomes Classification (NOC) and Nursing Classification (NIC) link (NNN link) clinical clues reasoning to determine the contents of the questionnaire were used. Then, the Delphi method to care was used. 2) The survey questionnaire was designed. The content included the clinical holistic nursing care model in breastfeeding and the model's use situation. 3) Questionnaire survey: in the national midwifery care industries, volunteers were collected who were willing to use the breastfeeding clinical holistic nursing care model in the nursing work. We issued 98 questionnaires and took back 76 valid questionnaires. **Results:** The construction of the breastfeeding clinical holistic nursing model includes 9 nursing diagnoses which contain the breastfeeding effective, the lack of knowledge, the decision conflicts, the risk of breast tenderness, the risk of cracked nipple, the invalid hazard occurring in breastfeeding, the risk of caregiver role strain, the risk of breast feeding jaundice and the ineffective community coping, 18 nursing outcomes and 64 nursing measures. In the composition of breastfeeding after clinical holistic nursing model in clinical practice, 100% of obstetric nurses think that the breastfeeding nursing model can promote the nursing staff to care patients according to the nursing process, can help nurses to analyze, evaluate, make decision, and care about breastfeeding related problems, as well as can promote the mother's milk feeding rate. **Conclusion:** The establishment of the breastfeeding nursing model provides a learning material for obstetric breast-feeding. Moreover, nursing diagnosis, nursing outcomes and nursing measures correspond according to the form of chart, which are easy to use and find. The breastfeeding clinical holistic nursing model is practicing in clinical nursing, which can help nursing staff to improve the ability of nursing personnel according to evidence-based nursing patients, to improve the ability of nursing personnel analysis, evaluation, decision-making and nursing in breastfeeding problems and to promote the rate of breastfeeding.

Keywords

Breastfeeding, Clinical Global Care Model, Nursing Diagnosis, Care Outcomes, Nursing

1. Introduction

In recent years, the study found that to implement the breastfeeding, to children, from the physiological level, could reduce the occurrence of gastroenteritis, otitis media, severe lower respiratory tract infections, atopic eczema and sudden infant death syndrome, etc., in infancy. In childhood, implementation of the breastfeeding that could reduce the incidence of the type 1 diabete and type 2 diabete, overweight and obesity. When they are adults, they are less plagued by chronic diseases. From the psychological level, the breastfed babies are quieter, less crying at night, and smarter. At the same time, to their mothers, implementation of the breastfeeding not only can promote the recovery of uterus and decrease the incidence of postpartum hemorrhage, but also can prevent breast cancer, ovarian cancer and osteoporosis, which make the postpartum body to recover faster [1]. Therefore, breastfeeding is good for both maternal and child's health. However, in recent years, our country breastfeeding rates show a falling trend on the whole. In 2014, Chinese exclusive breastfeeding rate of the World Bank's research results was 27.8%. The city was 15.8%, 30.3% in the countryside. In recent years, there are a lot of reports to analyze the causes of breastfeeding decline in literature. In addition to the women, family and social factors, the survey results also showed that nursing staff lacked the ability on the impact of breast feeding factors analysis and coping. Nursing personnel is insufficient, can't make pertinent individual care plan. Breast-feeding advice and care takes a long work time; it lacks job evaluation index system; nursing workload calculation pay is out of step with income, etc. The presence of these elements will affect the implementation of the quality of obstetric care and breastfeeding. And in gynecology and obstetrics nursing teaching material list, only one "breastfeeding is invalid" breastfeeding related nursing diagnosis [1] cannot satisfy the nurses and nursing students at the present stage in China according to the nursing process to breastfeed needs of clinical evidence-based nursing.

2 Research Methods

2.1. Use of NNN Links to Breastfeed Clinical Development of Holistic Nursing Model

1) To assess breast-feeding for background information: according to the literature survey, clinical observation and textbook evaluation content determine maternal background information. Background information including lifestyle, parity, parity, physical health, breastfeeding confidence, consciously lactation, educational level, economic status, occupation, mother role adaptation, health education, care model, family and social support as well as nurses, mothers and caregivers of knowledge, attitudes, behavior and will affect the health of babies breastfed implementation. 2) To determine the nursing diagnosis: to determine the conflict of breastfeeding, lack of knowledge, effective decision-making, the risk of breast pain and the risk of cracked nipple, the risk of breastfeeding is invalid, caregiver role strain of risk, the risk of breast fed raises a gender jaundice and community in the face of the invalid, etc. 9. 3) The determined nursing outcome has 18. 4) The determined nursing measures are 64 items. 5) Set by the nursing diagnosis and nursing outcomes and nursing measures of the combination of expert consultation questionnaire breastfeeding clinical holistic nursing model.

2.2. For Expert Advice

In this study, we choose the obstetric nursing experts who have worked more than 10 years. The first round, 25 questionnaires are returned. There are 23 valid questionnaires. In the second round of expert consultation, we choose 23 experts to consult who participate in the first round on a high enthusiasm. The 23 experts include 4 head nurses, 5 midwives and nursing teaching, 5 midwives and 9 obstetric nurses. Their titles include 2 high, 9 deputy and 12 intermediate. Their degrees contain 3 masters and 20 undergraduates. According to the expert advice to revise breastfeeding clinical path in the fourth round of survey, all experts no longer change their opinion. As a result, experts to collect process stop after the fourth round.

2.3. In Clinical Nursing Practice

Many volunteers in obstetric nursing staff in the country in the clinical nursing used in breastfeeding the whole nursing model require to fill in the questionnaire after feedback clinical effect. Volunteers aged between 25 and 50 years of fixed working were 3 - 25 years; Title: orthometric height, 5; the subtropical, high 19 people; intermediate, 32 people; primary, 20 people; education: 4 masters, 45 undergraduates, 27 specialty people. Out 98 questionnaires, 76 effective questionnaires were taken back.

2.4. Data Collection and Analysis

Spss13.0 statistical software for data analysis was used.

3. The Results

3.1. Experts Situation Analysis

This research adopts the expert consultation method for consulting clinical path of breastfeeding. Through statistical analysis: experts coefficient is 0.812; the variation coefficient is 0.748; four rounds of expert consultation questionnaire recovery efficiency were 92%, 100%, 100%, 100%, accord with the requirement of Delphi expert consultation has the reliability of the research.

3.2. Breastfeeding Clinical Index System of the Whole Nursing Model

NNN links were used to make breastfeeding clinical nursing model as a whole. Determine the nursing diagnosis of nine, ending 18, 64 nursing measures, will form the nursing diagnosis, nursing outcome, nursing measures according to the chart in the form of one to one correspondence, in order to using simply and conveniently.

3.3. Clinical Practice Analysis of the Clinical Nursing Model of Breastfeeding

Table 1 shows: 100% of obstetric nursing staff think that the establishment of breastfeeding nursing model can improve the ability of nursing personnel according to the holistic nursing process nursing patients, to improve the ability of nursing personnel analysis, evaluation, decision-making and nursing in breastfeeding problems and to promote the rate of breastfeeding.

Table 2 shows: 86.8% of the obstetric nursing staff apply breast feeding clinical holistic nursing model to the nursing interns in the specialty of knowledge learning. 76.3% of the obstetric nursing staff apply it to the new nursing staff in professional training. 68.4% of the obstetric nursing staff recommend it as learning materials to nursing staff. 6.5% of the obstetric nursing staff use it to develop the maternal breastfeeding care plan.

Table 1. Breastfeeding clinical holistic nursing model's clinical practice effect.

Content	N	%	%
Problem analysis, evaluation, decision-making, and care ability in breastfeeding	76	100%	0
The ability that can care patients according to the nursing procedure	76	100%	0
To improve the breastfeeding rates	76	100%	0

Table 2. Breastfeeding clinical holistic nursing model's clinical practice approach.

Approach	N	%
The specialized knowledge training nurses	66	86.8%
The specialized knowledge training new nurses	58	76.3%
Nursing staff professional work learning materials	52	68.4%
Developing a plan of the individual patient care	5	6.5%

4. Discussion

4.1. The Significance of Developing Clinical Holistic Nursing Model

About the significance of this topic, research mainly reflects in the following three points: 1) In gynecology and obstetrics nursing textbooks at present, only listed one “breastfeeding is invalid” breastfeeding related nursing diagnosis cannot meet the needs of the nursing problems of evidence-based nursing process breastfeeding according to the present stage in our country. Clinical study of this subject is to establish breastfeeding the whole nursing model and supplement the shortage of the textbook, as resources for nursing students in learning, the teacher in the teaching, the nurse in clinical nursing work, to make plans for the individual. 2) The 201 items nursing diagnoses listed in the basic nursing teaching material only have names and have no description to the definition of nursing diagnosis, so that nursing students, teachers, clinical nursing staff in use process can’t grasp the practical significance of the nursing diagnosis well and feel very abstract and difficult to apply. At the same time, the corresponding nursing diagnosis suggested that nursing outcome did not introduce [2]. Therefore, it cannot be used as reference materials in working out nursing plan, which makes our country facing the bottleneck problem in nursing diagnosis, outcomes and measures. With the continuous deepening of the study of the clinical pathway of multi-diseases, to form a perfect clinical nursing model database can be regarded as a breakthrough in the bottleneck problem in using of nursing diagnosis in our country at present, and can form a unique knowledge system in the field of nursing specialty suitable for China’s national conditions [3]. 3) The nursing staff can make use of a computer system, establish breastfeeding clinical holistic nursing model database in evaluating patients on the basis of background story, determine the individual care plan and improve the efficiency of nursing work [4].

4.2. Use NNN Links to Breastfeed Clinical Feasibility of the Whole Nursing Model Developed

NNN link refers to North America, NANDA nursing association, nursing diagnosis, nursing outcomes classification (NOC) and nursing intervention classification (NIC) links. Developed for clinical use of NNN link, the whole nursing model advantages are: 1) Helping nursing staff to build the optimal nursing diagnosis, the optimal nursing intervention, and the optimal nursing outcome of combining the knowledge of the system. 2) Promoting nursing students using the north American association of nursing diagnosis nursing diagnosis classification, the classification of the nursing measures and nursing outcomes classification of nursing language in the teaching practice [1]. In Dr. Wu’s book, the book also mentions that using NNN links can help nursing students to master the skills necessary for clinical decision making. Nursing students can link the database when they develop nursing plans for patients. With the development of nursing knowledge, we need to evaluate the effectiveness of different nursing measures and to choose the appropriate nursing measures to solve the diagnosis or to achieve the specific outcome of the decision-making process. Through the empirical study, it is helpful to establish the theory of nursing in the middle level, and establish the special knowledge system in the field of nursing specialty [5]. In this study, we use NNN links, experts consultation and clinical practice to make an empirical study. This research is to study the relationship between breastfeeding related nursing diagnosis, outcome and measures as well as the environment, health care organization structure, nursing process and patient outcomes, so as to establish the clinical nursing model database of breast feeding. Research is feasible.

4.3. This Study Make Breastfeeding Clinical Holistic Nursing Model and the Differences of Clinical Nursing Path Analysis of Clinical

Clinical nursing pathway is a time schedule for specific patient groups, with time as the horizontal axis, with admission guidance, inspection, medication, treatment, nursing, diet guidance, events, health education, discharge planning, ideal nursing measures for the vertical axis, which describes the patients care goals in detailed including when the patients need to do what kinds of care measures, when leave hospital and so on. In the course of clinical nursing, the plan is hung on the side of the patient’s bed and the nursing staff execute measures in schedule corresponding to column tick. Both nurses and patients promote the completion of the nursing plan [6]. Clinical holistic nursing model developed in this study is in accordance with the nursing procedure model, and a clinical holistic nursing model for specific patient groups. The model, which is on the basis of the background of patients and on the core of nursing diagnosis, is to make sure the best nursing care and the best

outcome. The results of this research can be used as a nursing model in clinical nursing work and teaching and it is helpful for nursing staff and nursing students when combining with the clinical cases to carry out evidences and make a individual nursing plan.

4.4. The Index Analysis

The clinical pathway in breastfeeding includes three indicators: nursing diagnosis, nursing outcomes and nursing measures, with reference to the editor in chief being Dr. Wu Yuan Jianyun. 1) There are 9 establishment of the nursing diagnosis. Breastfeeding, lack of knowledge, effective decision-making conflicts, in danger of caregiver role strain, community in the face of the invalid and five nursing diagnosis with the corresponding evaluation content are directly used in the editor Dr. Wu's book. To "invalid hazard occurring in breastfeeding" of nursing diagnosis, which are used "ineffective breast feeding" in Dr. Wu's book and obstetrics and gynecology nursing textbooks. But in this study, through clinical evidence-based, we thought that "ineffective breast feeding" as a potential nursing problem did not occur in all women in the process of implementing the breastfeeding. The purpose of nursing is to realize the breastfeeding. According to the theory of behavioral psychologist Skinner, "Behavior is shaped by the positive or negative reinforcement." What is more, the positive reinforcement is more effective in shaping behavior [7]. Therefore, in this study, we change the name of invalid nursing diagnosis name of breast feeding to "invalid hazard occurring in breastfeeding" that is more to strengthen the awareness of nursing staff and nursing students on the implementation of breastfeeding. It is easy to occur breast tenderness, cracked nipples and breast milk jaundice feed raises a gender, which affects maternal breastfeeding confidence and affects the secretion of milk, decreases the rate of breastfeeding, therefore, increases "the risk of breast tenderness", "the risk of cracked nipple" and "the risk of breast fed raises a gender jaundice", which improve the awareness of clinical nursing staff and nursing students to prevent risks and to improve the rate of pure breast feeding. 2) The establishment of the nursing outcome has 18 items, among them, some nursing outcomes in reference to the definition on the basis of Dr. Wu's book have made some changes, such as the definition of breastfeeding to establish, defined as in the book "three weeks before the breastfeeding, baby get nutrition". Baby gets nutrition through biting and sucking the breast. Experts agree that the concept is not easy to understand. Therefore, it will be defined to "postpartum breastfeeding is 3 weeks window period, the baby can get nutrition". The baby can get nutrition through biting and sucking the breast, which has been approbated by experts. 3) The establishment of the nursing measures has 64 items, in the first round of the experts consultation table, for nursing measures only lists the directory, expert advice should specifically list the implementation methods of nursing measures, for reference, therefore, in the second round consultation table lists the corresponding nursing measures of the implementation of the method get the approbation of the experts, and further perfect.

4.5. The Situation Analysis of Clinical Practice

Through the analysis of the research result that obstetric nurses use the breastfeeding clinical holistic nursing model in nursing clinical, 100% obstetric clinical nursing staff think that the establishment of breastfeeding clinical holistic nursing model provides a database for obstetric breast-feeding care. What is more, nursing diagnosis, nursing outcome and nursing measures can correspond according to the form chart, which facilitates to use and search. 100% of obstetric nurses think that the breastfeeding nursing model can promote the nursing staff to care patients according to the nursing process, can help nurses to analyze, evaluate, make decision, and care about breastfeeding related problems, as well as can promote the mother's milk feeding rate. The model's application of the way in the clinical nursing work and study is that 86.8% of the obstetric nurses put the breastfeeding clinical holistic nursing model applied to specialized knowledge learning in nursing interns, that 76.3% of the obstetric nurses put it applied to specialized knowledge training in the new nursing staff, that 68.4% of the obstetric nursing staff suggest that it can become learning materials for nursing staff, and that 6.5% of nursing staff use it to make maternal breastfeeding care plans. The model applied to the clinical nursing work and study obtains satisfactory nursing effect and achieves the exclusive breastfeeding.

5. Conclusion

Establishment of the breastfeeding nursing model provides a learning material for obstetric breast-feeding. Moreover, nursing diagnosis, nursing outcomes and nursing measures correspond according to the form of chart,

which are easy to use and find. The breastfeeding clinical holistic nursing model is practicing in clinical nursing, which can help nursing staff to establish overall concept of holistic nursing, to improve the ability of nursing personnel according to evidence-based nursing patients, to improve the ability of nursing personnel analysis, evaluation, decision-making and nursing in breastfeeding problems, to promote the rate of breastfeeding and to promote the quality of obstetric care.

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Comparison Effectiveness Breast Milk and Dry Sterile Gauze to Treatment Umbilical Cord

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Abstract

Infection of the umbilical cord has been the cause of illness and death constantly in different countries. Each year 500,000 infants die from neonatal tetanus and 460,000 infants die from bacterial infections. One way that is currently being developed is the use breast milk. Various kinds of content of nutrients and substances that exist in breast milk may reduce the risk of incidence of the infection so that the baby can avoid the incidence of umbilical cord infection. This type of research is quasy experiments with static group comparison. The research data are obtained by researchers using observation sheet, then the data are tabulated. Results of the observation of the time required in the treatment of breast milk and umbilical cord using dry Sterile gauze then compare and conclusions draw an average release time of each media. From the results, the average time of the release of the umbilical cord using breast milk is for 127.41 hours and the average time of the release of the umbilical cord using dry Sterile gauze is for 157.38 hours. From the results of correlation Mann Whitney test with significance level $\alpha = 0.05$ is obtained significance value (p) of 0.00. It takes a more active research and in a greater scope to conduct more studies in the use of breast milk to use for umbilicard cord of the baby. That requires the active participation of various stakeholders to provide support in implementing it.

Keywords

Umbilical Cord, Breast Milk, Dry Sterile Gauze

1. Introduction

Child health problem is one of the main problems in the health sector that is currently happening in the State of

Indonesia. Degree child health reflects the health of the nation, because children as the future generation have the ability that can be developed in the continuing development of the nation. One indicator of health status in Indonesia is the infant mortality rate. High infant mortality rate in Indonesia is caused by various factors, including the factor of disease, infection and malnutrition. One of the threats to the baby is the occurrence of tetanus. One of the efforts to reduce infant mortality infant care needs to be done properly, especially cord care in order to avoid the risk of infection [1]. Umbilical cord care in general aims to prevent infection and speed up the breakdown of cord [2]. Umbilical cord infection classified as mild strains of the infection but if not treated immediately will be able to develop into a dangerous infection and may even be one of the causes of infant mortality. One medium that is often used by health professionals in the care of the umbilical cord is to use dry Sterile gauze. The media are often used as treatments using umbilical cord dry Sterile gauze proven effective for use in the treatment of the umbilical cord. Average time release of the umbilical cord using a dry Sterile gauze is 154 hours 10 minutes [3]. Recent research conducted one of the ways that can be used for cord care is to use breast milk. Research conducted by Triasih, Widowakti, Haksari and Surjono with the study design Randomize Controlled Trial (RCT) concludes that breastfeeding is safe and effective for the treatment of cord [4]. Most of the people in Indonesia tend to use alcohol as a medium for umbilical cord care. But in reality, umbilical cord care using alcohol tends to take longer than the non-alcoholic cord care. Results of research conducted by Sumaryani [5] show the average time the release of the cord treated with ASI takes 5:32 today, open dry Sterile gauze of 6.65 days and 6.87 days 70% alcohol.

Infection of the umbilical cord has been the cause of illness and death constantly in different countries. Each year 500,000 infants die from neonatal tetanus and 460,000 infants die from bacterial infections [4]. In the Southeast Asian region, there are an estimated 220,000 infant deaths caused by cord care less clean. According Kasiati [1] long release cord in babies with dry treatment closed more quickly (70,105) 35-hour time difference compared to treatment with alcohol. Results of research conducted by the Sri Sumaryani showed the average time of the release of the umbilical cord that was treated with 70% alcohol 6.87 days/165 hours, open dry takes 6.65 days/159 hours, and by using the ASI takes 5:32 days/127 hours [5]. From the results of the observations made in several BPS in Mojokerto, umbilical cord care were performed using Sterile gauze and alcohol.

Time release umbilical cord is affected by how clean umbilical cord care, humidity cord, environmental sanitation around the newborn, and the incidence of infection of the umbilical cord because of action or treatment that does not meet the requirements of cleanliness Impact umbilical cord care that may result in a release of the umbilical cord is getting slow and umbilical cord infection. Infection of the cord may cause sepsis, meningitis, and others. Fatal risks that may happen are the death in infants [6]. In the tropics, effectiveness of volatile alcohol decreased. Some research which has been done and can't prove the use of alcohol in the care of the umbilical cord is the most effective way [4]. One way that is currently being developed is the use of ASI cord care. In addition to efficient, the use of breast milk as a medium cord care avoids maternal postpartum breast milk of the dams. Besides being able to prevent the mother from the dam breast milk, cord care by using breast milk is much more efficient in economics/finance family because the breast milk in the care of the umbilical cord does not need at all costs or is relatively more economical. The impact of the use of breast milk as a medium cord care is minimal. This is because the content of the milk itself. Various kinds of content of nutrients and substances that exist in breast milk may reduce the risk of incidence of the infection so that the baby can avoid the incidence of umbilical cord infection. Some research which has been done on the effectiveness of treatments using umbilical cord ASI shows that cord care using the ASI has a mean release cord faster than with other media such as dry Sterile gauze, alcohol 70% and povidone iodine.

The purpose of this study was to compare the effectiveness of treatments umbilical cord using breast milk and dry kassa.

2. Methods

This type of research is quasy experiments with static group comparison study design which in practice is used two groups: treatment using breast milk and dry Sterile gauze. The research data obtained by researchers using observation sheet then the data is tabulated. Results of the observation of the time required in the treatment of breast milk and umbilical cord using dry Sterile gauze then compared and conclusions drawn an average release time of each media.

The population in this study is all mothers with infants aged < 1 month/new mothers and infants, who have living in the Village Sooko Mojokerto. The sample collection technique using total sampling with a sample size

of 17 people divided into 2 groups. Determine umbilical cord care group using breast milk and cord care using dry Sterile gauze. This obtained 9 babies umbilical cord care was given to breast milk and 8 babies using dry Sterile gauze. The sample in this study is all mothers with newborns in the village Sooko Sooko Mojokerto who met the study criteria were determined researchers, namely:

- 1) Infants born to normal.
- 2) Babies who do not have an infection or require special care.
- 3) Parents of infants who are willing to become respondents in the study.

The research data obtained by researchers using observation sheet then the data is tabulated. Results of the observation of the time required in the treatment of breast milk and umbilical cord using dry Sterile gauze then compared and conclusions drawn an average release time of each media. Long research data release cord care using breast milk and dry Sterile gauze then tabulated for further correlation test Mann-Whitney with significance level $\alpha = 0.05$. To facilitate the calculation and reduce the error rate in data analysis, SPSS software used tool for windows 17:00

3. Ethical Clearance

Umbilical cord care methods used in this research is to use dry gauze and breast milk. This method selected in order to see the effectiveness of each method of treatment umbilical cord. This study was conducted over a period of 3 months, starting in April 2015 until June 2015. This study was approved by the local ethics commissions are derived from hospital institutions Wahidin Sudiro Husodo Mojokerto. This study was approved by the local ethics commissions are derived from hospital institutions Wahidin Sudiro Husodo Mojokerto (056/RSU/EC/II/2015). For the determination of the area used as a study was approved by the Research Commission Mojokerto

4. Results

Infants were included in this study did not have an infection or require special care. From Analysis of research data obtained from the data (**Table 1**): umbilical cord care using Sterile gauze obtained the fastest time of the release cord 151.50 hours; time release of the longest umbilical cord 159.83; average time to release the cord 157.38 and the standard deviation is 3.30. Umbilical cord care using breast milk obtained the fastest time of the release cord 126.83 hours; time release of the longest umbilical cord 128.50; average time to release the cord 127.41 and the standard deviation is 0.50. From the Mann-Whitney test analysis obtained significance value of 0.001 so the research hypothesis is accepted which means breast milk effective for treatments umbilical cord.

Table 1. Data analisys research.

	Using breast milk	Using dry Sterile gauze
Mean	127.41	157.38
SD	0.50	3.30
Minimum	126.83	151.50
Maximum	128.50	159.83
N	9	8
Mann-Whitney U	0.00	
Wilcoxon W	45.000	
Z	-3.466	
Asymp. Sig. (2-tailed)	0.001	
Exact Sig. [2*(1-tailed Sig.)]	0.000 ^a	

Release time measurement results in the baby's umbilical cord.

5. Discussion

- 1) The amount of time required for the baby's cord separated by treated using breast milk.

From the results, the average time of the release of the umbilical cord using breast milk is for 127.41 hours.

Acceleration of the release cord made possible because the treatment of breast milk contains nutrients found in breast milk can help the healing process.

Stol *et al.* [5] suggests that effective breastfeeding protects babies against infections and allergies. Breast milk contains substances that are effective in accelerating the release cord. Breast milk contains antibodies, anti-infective, anti-inflammatory and bioactive factor so high that can kill germs in the growth of the baby's body. This opinion is reinforced by Rordan and Auerbach [5] who show that breast milk contains colostrum where in the colostrum itself has a content of protein levels high, especially gamma globulin in order to provide power protection of the body against infection, which have factor of bioactive and contain substances antibodies that can protect infants from infection. Milk in the womb there are a variety of nutrients is very good and suitable for use in the treatment of the umbilical cord. This causes the breast milk is suitable and can be used as one of the media treatment of the umbilical cord in infants. In Handbook of Procedures for the Newborn in Hospital [7] the average time of the release of the umbilical cord with a dry treatment takes 9 days. Average of the time, proving that the breast milk cord care using proven effective for use in the treatment of the baby's umbilical cord.

Umbilical cord care using breast milk a new method in the treatment of the umbilical cord. This is because the content of nutrients in breast milk in the form of lactose, protein, fat and minerals have directly into the cell so that the milk can be used as a medium for cord care. Protein in breast milk that is high enough role in the repair process of damaged cells, accelerate the healing process so as to speed up the release of the umbilical cord. By using the breast milk as a media umbilical cord care, mother and baby will get the most benefit. For mother several benefits such as easy to get the milk and do not need to pay to get media treatment used in the care of the baby. For babies a few benefits gained among babies can avoid the risk of infection due to the content of nutrients in breast milk that can prevent infection and infants can avoid the risk of allergy use of antibiotics such as alcohol and povidone iodine. By using the breast milk as a media umbilical cord care, make time release of the umbilical cord will be more brief and ensure no infection in infants due to the use of media treatment of the umbilical cord is not suitable for babies.

2) The amount of time required for the baby's cord separated by treated using dry Sterile gauze

From the research, the average time of the release of the umbilical cord using a dry Sterile gauze is for 157.38 hours. Treatments using umbilical cord is often referred to as a dry Sterile gauze care open umbilical cord, cord care covered, wet or cord care. The use of gauze had been believed to be effective and efficient to prevent infection and speed up the breakdown of cord. Basically umbilical cord infection can be prevented by performing cord care is good and right, namely the principles of clean and dry treatments [3].

Most cord care in Indonesia tends to use dry Sterile gauze. This is in addition to effective treatment using umbilical cord dry Sterile gauze also suppresses the incidence of infection of the umbilical cord. This is what makes a dry Sterile gauze is always used as a medium of cord care along with alcohol and povidone iodine. Because of the effectiveness of which has been proven, made largely on infant umbilical cord care using open dry Sterile gauze and make something that is common if treatment is identical to the umbilical cord using a dry Sterile gauze. Dry Sterile gauze is widely used by health workers to perform cord care. This is a culture and practice of science that continues to be done by nearly every health workers, especially midwives and neonatal nurses in the room. This practice is done because the umbilical cord care using dry Sterile gauze to reduce the risk of infection in infants.

3) The effectiveness of treatment using umbilical cord in infants breast milk and dry Sterile gauze

From the results of correlation Mann Whitney test with significance level α (0.05) is obtained significance value (p) of 0.00. Because the significance value (p) obtained $< \alpha$ (0.05), then the hypothesis in this study received, breast milk effective means for use in the treatment of the baby's umbilical cord.

Breast milk has been only used as baby food and breast milk with the development of science began to be used as a liquid to take care of the umbilical cord in infants because breast milk is considered safe and effective for treatment of the umbilical cord in infants. Breast milk is effectively used as a medium cord care because the nutrients are contained in breast milk itself. Breast milk is protein. Protein serves as forming bonds of essential body, regulate body fluid balance, maintaining the neutralization of the body to react to acidic wet so that PH balanced body, forming antibodies, as well as an important role in transporting nutrients into tissues [5], This opinion is reinforced by the theory put forward (Corwin, 1996) (cited by Sumaryani) which suggests that breast milk contains lymphocytes which consists of two cells, namely B cells and T cells B cells functioning as humoral immunity, immunoglobulin receptors that can recognize foreign antigens and can develop as a antibody-forming plasma cells. T cells function as helper cells in forming antibody B, have specific receptors on antigen

and plays a role in suppressing the immune response. Physiologically when there is a foreign object in the body of B cells or T cells will be activated and make a response to makroag against foreign objects, resulting in B cells and T cells will proliferate in macrophages and mitotic division occurs. This process makes breastfeeding effectively as a medium that can be used in the treatment of the cord based on the nutrient content and cost efficiency in its use compared with treatment using umbilical cord with dry Sterile gauze. Breast milk contains nutrients that have various kinds such as protein, fat, carbohydrates, minerals and vitamins effective for use as a media cord care in infants.

Research conducted showed the average time of the release of the umbilical cord that was treated using the breast milk is 127 hours 31 minutes, and the mean time of the release of the cord treated using dry Sterile gauze is 159 hours 17 minutes. The results showed that the timing of the release cord taken care of by using the ASI 32 hours 14 minutes faster than the treatment using dry Sterile gauze ($p = 0.00$). According Widowati (2003, cited by Sumaryani) excellent nutrient content in the milk, such as lactose, protein, fat, minerals and vitamins in milk, has the effect of directly into the cell. Breast milk contains a high enough protein. Protein function is to form a bond of essential body, regulate body fluid balance, to keep neutralization of the body with a wet acid that reacts to body pH balanced, forming antibodies, and plays an important role in transporting nutrients to the tissues.

The content of nutrients in breast milk such as fat, carbohydrates, minerals, vitamins, and proteins as well as the composition of breast milk changes every staged as colostrum, transitional breast milk/intermediate, mature breast milk plays an important role in every phase of wound healing in the umbilical cord. The content of nutrients such as colostrum (the formation of antibody/globulin), fat (formation/regeneration of cells), lactobacillus (activating the immune system), lactoferin (inhibits bacterial growth) and carotene (inhibits the growth of bacteria) is indirectly active role in the regeneration of cells and help the wound healing process in the umbilical cord. By using the breast milk as a media cord care, time release cord is needed more quickly, efficiently and in a cost effective and safe for use as an alternative media cord care.

6. Conclusion

Umbilical cord care is an important factor in the future growth and development of infants. This is because as long as umbilical cord care, each baby is at risk of umbilical cord infection and most fatal consequence is the occurrence of death in infants. The use of dry Sterile gauze is a medium that has been used for umbilical cord care. The latest breakthrough in umbilical cord care is using breast milk. In addition to efficient, breast milk is used as a medium umbilical cord care to avoid maternal postpartum breast milk of the dams. Besides being able to prevent the mother from the dam breast milk, cord care by using breast milk is much more efficient in economics/finance family because breast milk in the care of the umbilical cord does not need at all costs or is relatively more economical. The impact of the use of breast milk as a medium cord care is minimal. This is because of the content of the milk itself. Various kinds of content of nutrients and substances that exist in breast milk may reduce the risk of incidence of the infection so that the baby can avoid the incidence of umbilical cord infection.

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Relationship between Self-Care and Hand Foot Syndrome Specific Quality of Life in Cancer Patients

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Abstract

Purpose: The purpose of this study was to describe adherence to self-care for hand-foot syndrome (HFS) and the relationship between self-care and health-related quality of life (QOL). **Methods:** A cross-sectional study was conducted on 105 consecutive outpatients with HFS. To assess self-care for HFS and QOL, the participants were asked to complete self-care and HFS-14 (hand-foot syndrome specific QOL) questionnaires, respectively. Multiple regression models were used to identify the relationship between self-care and QOL. **Results:** Adherence to self-care for HFS was low, less than 50% for most of the items. Multivariate analysis revealed that poorer self-care ($\beta_s = -0.19$; $P = 0.03$), depressive symptoms ($\beta_s = 0.43$; $P < 0.0001$), and being employed ($\beta_s = 0.20$; $P = 0.04$) were independent predictors of poorer QOL scores. **Conclusions:** We have identified a need for further research to develop effective programs of self-care in HFS.

Keywords

Chemotherapy, Hand-Foot Syndrome, Neoplasm, Quality of Life, Supportive Care

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1. Introduction

Hand-foot syndrome (HFS) is a common result of adverse effects of anti-cancer agents. It is characterized by dysesthesia and tingling of the palms, fingers, and soles [1]. The condition may progress over a few days, resulting in burning pain with diffuse erythema and swelling. In severe cases, there may be scaling, blistering, erosions, or ulcerations of the skin. The lesions can be very painful, and may interfere with even the simplest activities of daily living such as walking or gripping objects [1].

The drugs that most frequently cause HFS are pegylated liposomal doxorubicin [2], capecitabine [3] [4], sorafenib [5], sunitinib [6] and regorafenib [7]. The incidence of HFS in patients receiving these drugs is very high, exceeding 50%. HFS is not life-threatening, but can seriously reduce QOL [8] [9]. Most reports describing patients with severe HFS indicate that this condition results in poor compliance with cancer treatment, or discontinuation of treatment [9]-[13].

While many side effects of chemotherapy are amenable to both pharmacologic and non-pharmacologic intervention, HFS is a side effect for which effective management continues to be sought. Randomized controlled trials have examined multiple agents for the prevention or treatment of HFS, including vitamin B6, steroid ointment, and celecoxib (a non-steroidal anti-inflammatory drug or NSAID) [14]-[16]. Some of these agents including celecoxib have demonstrated promising effects in subsets of patients [17], but require further research to substantiate preliminary findings. Research in non-pharmacologic intervention for the prevention or treatment of HFS is limited, resulting in an inability to establish effectiveness [18].

Recently, hydrocolloid dressings with a low-friction external surface, which are used for pressure ulcer care, have been reported to alleviate HFS pain [19]. Moisturizer has also been reported to alleviate HFS pain [20]. We have assumed that traditional self-care such as moisture retention (**Patients should use moisturizer frequently, for example**) or avoiding physical stimulus (**Patients should avoid hot water, wear tight socks, and vigorous exercise, for example**) may improve QOL by alleviating pain caused by HFS.

However, prior research has yet to describe the relationship between self-care and health-related quality of life in patients with HFS. Therefore, the purpose of this study is to evaluate adherence to self-care for HFS and to identify the relationship between self-care and QOL in patients with HFS.

2. Methods

2.1. Data Collection

This multi-centercross-sectional study was conducted from December 2012 to September 2013. Participants were selected from cancer patients who consecutively attended the outpatient clinic in Tokyo (The University of Tokyo Hospital, St Luke's International Hospital, Mitsui Memorial Hospital, and Kyoundo Hospital). The eligibility criteria were as follows: 1) age >20 years; 2) able to communicate in Japanese; 3) judged as able to participate in the study by an attending doctor; 4) receiving chemotherapy (capecitabine) or targeted therapy (sorafenib, sunitinib); 5) patients who had symptoms of HFS (CTCAE grade 1-3); and 6) consented to participation in the study. At the time of the study, pegylated liposomal doxorubicin and regorafenib were not available in Japan, so we did not include these agents. Patients who had symptoms of HFS were diagnosed by the medical staff. The severity of HFS was graded according to the CTCAE criteria: grade 0, patients without HFS, grade 1, minimal skin changes or dermatitis (e.g., erythema, edema, hyperkeratosis) without pain; grade 2, skin changes (e.g., peeling, blisters, bleeding, edema, hyperkeratosis) with pain, limiting activities of daily living; or grade 3, severe skin changes (e.g., peeling, blisters, bleeding, edema, hyperkeratosis) with pain, limiting activities of daily living. Patients without evidence of HFS were excluded from the study. All the patients had been informed of the possibility and symptoms of HFS before the initiation of chemotherapy.

Patients self-administered the questionnaires. Medical data were collected by reviewing the medical records. The investigator checked for absent responses after receiving the questionnaire, and asked the patients to respond to missing items when possible. Ethics committee approval to conduct the study for all participating institutions was obtained.

2.2. Measures

On the basis of previous studies and expert opinion in oncology, we established a conceptual framework of pa-

tient-related factors that were assumed to be associated with QOL and divided these factors into the following 4 categories: modifiable health behavior (self-care), clinical condition, psychological status, and sociodemographic factors. Details of these factors and our assumptions about their relationships with QOL are provided below.

2.2.1. Measurement of Quality of Life

HFS-14 is a self-administered questionnaire including 17 items that is specifically designed for assessment of QOL in patients with HFS [21]. Each item is scored on a three-point Likert scale: 0, “no, never”; 3, “yes, from time to time”; or 6, “yes, always”. There is also a question to score limb involvement (1, only hands or only feet affected; or 3, hands and feet both affected), a question to score pain (1, not painful; 2, moderately painful; or 3, very painful), and a visual analog scale for pain (scored 0-10). The total score is calculated by summation of the item scores, with a maximum score of 100 and a minimum score of 2. A higher score indicates poorer QOL. The reliability and validity of the Japanese version of HFS-14 have been confirmed [22] (Appendix).

2.2.2. Measurement of Self-Care for Hand-Foot Syndrome

We developed a self-care scale on the basis of previous studies [15] [16] [18]. Content validity of the resulting questionnaire was confirmed by specialists in oncology and dermatology. Following a pilot test in ten patients, self-care for HFS was measured using an eight-item self-administered questionnaire with a 5-point ordinal scale ranging from 1 (*not at all*) to 5 (*completely agree*). The total score is calculated by summation of the item scores, with a maximum score of 40 and a minimum score of 8. Higher scores indicate better self-care. Cronbach’s alpha coefficient for this scale was 0.86.

2.2.3. Measurement of Depressive Symptoms

Depressive symptoms were measured using the Japanese version of the Center for Epidemiologic Studies Depressive Symptoms Scale (CES-D). The CES-D is a 20-item self-report questionnaire designed for the screening of depressive symptoms. Scores for each item are summed to give a range of total scores from 0 to 60. A higher score indicates a greater tendency toward depressive symptoms. A score of 16 points or higher suggests the presence of clinical depressive symptoms. The reliability and validity of the Japanese version of the CES-D have been confirmed. In the Japanese version [23], the cutoff value of 16 was also optimal, assessed by comparing the proportion of patients with CES-D scores of 16 points or higher in a normal control group with that in a group of patients with mood disorders.

2.2.4. Sociodemographic Characteristics

The following sociodemographic information was collected from the self-administered questionnaire: employment status, educational level, and cohabitant status.

2.2.5. Clinical Characteristics

The following clinical information was collected from the medical records of each patient: sex, age, type of cancer, Eastern Cooperative Oncology Group Performance Status (ECOG PS), anti-cancer agent, time since treatment, and grade of HFS. The severity of HFS was graded according to the Common Terminology Criteria for Adverse Events (CTCAE) criteria: grade 0, no signs or symptoms of HFS; Grade 1, minimal skin changes or dermatitis (e.g., erythema, edema, hyperkeratosis) without pain; Grade 2, skin changes (e.g., peeling, blisters, bleeding, edema, hyperkeratosis) with pain, limiting activities of daily living; or Grade 3, severe skin changes (e.g., peeling, blisters, bleeding, edema, hyperkeratosis) with pain, limiting activities of daily living.

2.3. Statistical Analysis

Descriptive statistics were used initially. In this study, we defined good adherence operationally as a score of 5 (5 is “I completely agree”) or 4, and poor adherence as a score of 3, 2, or 1 (1 is “I do not agree at all”), for each item of the self-care scale. Bivariate analysis was performed to identify the factors associated with HFS-14 score using t-test, analysis of variance, or Spearman’s rank correlation coefficient, where appropriate. After checking that there was no multicollinearity between the variables, multiple regression analysis was performed. Variables with a P value of 0.2 or less were included in a backward variable selection. Multicollinearity was assessed by

correlation coefficients between variables and the variance inflation factor. For all statistical tests, $P < 0.05$ (two-sided) was regarded as statistically significant. All statistical analyses were performed using SAS, version 9.3 (SAS Institute Inc., Cary, NC, USA).

3. Results

3.1. Study Flow and Response Rate

Among 196 eligible patients, 9 refused to participate in the study (owing to lack of time). The remaining 187 patients from four centers were included in this study (response rate 95.4%). Among 187 patients, 105 patients had CTCAE Grades 1-3 HFS (56.1%). We analyzed the 105 patients with HFS.

3.2. Characteristics of the Study Subjects

The sociodemographic and clinical characteristics of the study subjects are shown in **Table 1**. The mean age of patients with HFS was 62.3 ± 12.0 years, and most were living with family or other adults. Most subjects had good performance status (ECOG PS 0, **77.1%**) and CTCAE Grade 1 HFS (**63.8%**). The mean time since start of treatment with relevant drug was 4.6 ± 5.7 months.

3.3. Adherence to Self-Care

Table 2 shows the percentage of good adherence to self-care according to our operational definition. 5 of the 8

Table 1. Sociodemographic and clinical characteristics of the study subjects.

	n (%)
Male gender	55 (52.4)
Age, y*	62.3 ± 12.0
Employed fulltime or part-time	38 (36.2)
Education	
≤12 years	70 (66.7)
Living with family or other adults	99 (94.3)
Cancer type	
Breast cancer	35 (33.3)
Colorectal cancer	30 (28.6)
Hepatocellular carcinoma	31 (29.5)
Renal cell carcinoma	9 (8.6)
ECOG performance status	
0	81 (77.1)
1	23 (21.9)
2	1 (1.0)
Anti-cancer agents	
Capecitabine	65 (61.9)
Sorafenib	31 (29.5)
Sunitinib	9 (8.6)
Time since start of treatment with relevant drug, month*	4.6 ± 5.7
CTCAE grade of HFS	
Grade 1	67 (63.8)
Grade 2	36 (34.3)
Grade 3	2 (1.9)

Values are numbers (%) otherwise specified. *Data are expressed as mean (standard deviation).

Table 2. Percentage of “good adherence” and mean scores on the self-care scale for each item.

	Percentage of good adherence	Score of the self-care
Frequent use of moisturizer	75.2	4.2 ± 1.1
Avoiding unnecessary walking, jogging, or vigorous exercise	59.1	3.7 ± 1.3
Avoiding tight socks	50.5	3.6 ± 1.2
Wearing soft shoes that fit one's feet	37.2	3.1 ± 1.3
Using soft sole insert or wearing sick socks	33.3	3.1 ± 1.2
Avoiding activities that cause rubbing of skin surfaces or even slight pressure on hands	32.4	3.0 ± 1.1
Avoiding exposure of hands and feet to heat such as hot water	30.4	3.0 ± 1.3
Avoiding exposure to sunlight	21.0	2.3 ± 1.2

The response to each item was scored between 1 (I do not agree at all) and 5 (I completely agree). In our study, patients were divided into 2 categories: either “good adherence” with a score of 4 or 5, or “poor adherence” with scores of 1, 2, or 3.

self-care techniques had “good adherence” of less than 50%. Item that avoiding exposure to sunlight, hands and feet to heat, rubbing of skin surface or even slight pressure on hands, using soft sole insert, and wearing soft shoes had scores lower than 50%. The mean total self-care score was 25.8 ± 7.5 .

3.4. Self-Care and Quality of Life in Patients with HFS

The results of bivariate analysis are shown in **Table 3**. Significant and negative associations were observed between self-care and HFS-14 score ($\rho = -0.21$; $P = 0.02$). Other relevant clinical variables associated with poor quality of life (elevated HFS-14 scores) were: depressive symptoms ($P < 0.0001$); having ECOG PS of 0 ($P = 0.01$); and being employed ($P = 0.03$). The results of multivariate analysis are shown in **Table 4**. Self-care score ($\beta_s = -0.19$; $P = 0.03$) was an independent predictor of HFS-14 score. Depressive symptoms ($\beta_s = 0.43$; $P < 0.0001$) and being employed ($\beta_s = 0.20$; $P = 0.04$) were also independent predictors of HFS-14 score.

4. Discussion

Our study evaluated adherence to self-care for hand-foot syndrome and identified an association between self-care and QOL in patients with hand-foot syndrome. The major findings of this study are as follows: 1) Adherence to self-care for HFS was low, less than 50% with most of the items; and 2) level of self-care for hand-foot syndrome is an independent predictor of QOL in patients with hand-foot syndrome.

Adherence to self-care for HFS was low. This result is similar to previous studies in patients with HFS, which reported that patients showed poor self-care due to a lack of educational opportunities [24]. However, our study patients showed poor self-care despite receiving education. Low adherence to avoid hot water may be related to bath-loving Japanese cultural background. Low adherence to avoid sunlight may arise from a lack of knowledge, because few brochures write about avoiding sunlight. Avoiding pressure on hands may be hard, because we need to use hands for housekeeping and works. Programs for improving adherence to self-care are needed, in addition to providing knowledge and techniques of self-care for HFS.

Multivariate analysis revealed that self-care for HFS was an independent predictor of QOL. Traditional self-care such as moisture retention or avoiding physical stimulus may improve QOL by alleviating pain caused by HFS. This study was a cross-sectional design, and therefore no causal relationship between self-care and QOL could be established. However, our results suggest the potential benefit of self-care.

It is noteworthy that depressive symptoms were an independent predictor of poorer HFS-specific QOL. The prevalence of depressive symptoms in this population (30.5%) was slightly higher than that reported in a meta-analysis of the prevalence of depression in cancer patients (8% - 24%) [25]. It has been suggested that depressive symptoms strongly affect QOL [26] [27]. In many studies, a reciprocal interaction between somatic symptoms and depressive symptoms has been shown [28]. For example, there is higher risk of depressive symptoms in patients with uncontrolled pain and an enhanced perception of pain amongst depressed patients [29]. In addition, antidepressants have been shown to be effective as adjuvant therapy for several symptoms, such as pain, insomnia, and anorexia [30]. Our findings also suggest an association between depressive symptoms and decreased QOL in HFS patients. Fortunately, depressive symptoms are treatable. Numerous random-

Table 3. Univariate analysis for factors related to HFS-14 score.

Variables	N (%) or mean \pm SD	HFS-14 score (or ρ)	P-value
Gender			
Male	55 (52.4)	20.3 \pm 18.3	0.51
Female	50 (47.6)	22.8 \pm 22.0	
Age, y*	62.3 \pm 12.0	0.05	0.60
Employment status			
Employed	38 (36.2)	27.6 \pm 24.1	0.03
Unemployed	67 (63.8)	18.0 \pm 16.6	
Education			
\leq 12 years	70 (66.7)	22.7 \pm 20.9	0.35
$>$ 12 years	35 (33.3)	19.1 \pm 18.2	
Cohabitation status			
Living with family or other adults	99 (94.3)	21.2 \pm 19.3	0.67
Living alone	6 (5.7)	27.0 \pm 31.9	
ECOG performance status			
0	81 (77.1)	23.4 \pm 21.8	0.01
1 or 2	24 (22.9)	15.3 \pm 11.1	
Type of cancer			
Breast cancer	35 (33.3)	24.4 \pm 20.3	0.22
Colorectal cancer	30 (28.6)	15.5 \pm 13.1	
Hepatocellular carcinoma	31 (29.5)	22.2 \pm 25.0	
Renal cell carcinoma	9 (8.6)	27.8 \pm 17.5	
Anti-cancer agent			
Capecitabine	65 (61.9)	20.3 \pm 17.8	0.46
Sorafenib or Sunitinib	40 (38.1)	23.5 \pm 23.5	
Time since treatment, months*	4.6 \pm 5.7	0.19	0.05
Depressive symptoms			
Yes	32 (30.5)	37.9 \pm 22.3	<0.0001
No	73 (69.5)	15.5 \pm 15.5	
Self-care score for hand foot syndrome	25.8 \pm 7.5	-0.21	0.02

Values are expressed as number (%) unless otherwise specified.

*Data expressed as mean (standard deviation).

Higher HFS-14 scores indicate poorer QOL.

Higher ECOG performance status scores signify better performance status.

Higher self-care scores indicate better self-care.

Table 4. Multiple regression analysis of factors relate to HFS-14 score.

Variable	$s\beta$	P-value
Employment status		
Employed	0.20	0.04
Unemployed (ref)		
ECOG performance status		
0	0.16	0.08
1 or 2 (ref)		
Time since treatment, months	0.11	0.19
Depressive symptoms		
Yes	0.43	<0.0001
No (ref)		
Self-care for HFS	−0.19	0.03

$s\beta$ = standard partial regression coefficients.

Variables described were selected by backward methods ($P < 0.2$).

Higher HFS-14 scores indicate poorer QOL.

Higher ECOG performance status scores signify better performance status.

Higher self-care scores indicate better self-care.

mized controlled trials show that psychological distress, including depressive symptoms, can be alleviated by pharmacologic and non-pharmacologic interventions [31]. Therefore, we may be able to alleviate pain and improve QOL of patients suffering from HFS by treating their depressive symptoms.

Interestingly, being employed was also significantly related to poorer QOL. Workers need to use their hands and feet more frequently, for computer work or commuting by foot and so on. These may afflict patients with HFS who need to work. Healthcare professionals need to support these patients individually depending on their content of work.

This study has several limitations. First, the patient population was relatively small and the patients were limited to outpatients at four hospitals in Tokyo. Self-care might vary under different circumstances or in different groups of patients. This point must be taken into consideration when interpreting our results, and further studies are necessary to address this limitation. Second, self-care for HFS was measured only by self-reporting. Non-adherence to treatment regimens might tend to be underreported and adherence might tend to be over-reported. Therefore, adherence as reported by patients may have been overestimated in our study. Finally, because of the cross-sectional nature of our survey, we could not test for a cause-effect relationship. Longitudinal studies would be required to establish that treating depressive and improving self-care would or would not have an effect on QOL.

5. Conclusion

This study investigated the level of adherence to self-care for HFS and the relationship between self-care and QOL in patients with HFS. Adherence to self-care for HFS was low, less than 50% for most of the items. Moreover, we found that self-care for HFS was an independent predictor of QOL. Depressive symptoms and being employed were also independent predictors of QOL. These findings emphasized the need to educate patients with HFS to take appropriate action if HFS worsened. Also, healthcare professionals should pay more attention to the possibility of decreased QOL among HFS patients who were employed or who had depressive symptoms.

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Conflict of Interest Statement

The author did not have any potential conflicts of interest in the research reported.

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Appendix

次の質問は、手足症候群があなたの生活にどれくらい影響を与えたかについてお伺いするものです。手足症候群とは、化学療法の副作用であり、見た目の変化として手足の皮膚が赤くなったり、水泡、ひび割れ、皮がはがれたり、硬くなったりし、症状としてピリピリ、ひりひり、感覚がいつもと違うなどから始まり、進行すると痛みを生じ、ものがつかめなくなったり歩くのが難しくなったりする症候群といわれています。それぞれの質問で、最もよくあてはまるものに一つだけ○を付けてください。

手足症候群がある体の部分を具体的にお答えください。

1. 手

2. 足

3. 手と足

4. なし

ご自分の手足症候群に、次のような症状があると思われますか。

1. とても痛い

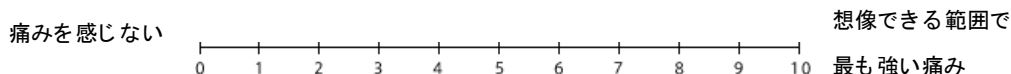
2. まあまあ痛い

3. 全く痛くない

次の文章がご自分に当てはまるか、あまり深く考えず、できるだけ感じたようにお答えください。正しい答えや間違った答え、というものはありません。ご自分の経験に基づいてご回答ください。

	常にある	時々ある	全くない	ここの質問はあてはまらない
1. 手足症候群のために、ドアの鍵が回しにくい。	1	2	3	-
2. 手足症候群のために、食事の用意がしにくい。	1	2	3	-
3. 手足症候群のために、毎日の活動に支障がある。	1	2	3	-
4. 手足症候群のために、身体を洗ったり、化粧（またはひげ剃り）したりするのが難しい。	1	2	3	-
5. 手足症候群のために、車の運転をするのが難しい。	1	2	3	4
6. 手足症候群のために、ストッキング/タイツ（または靴下）を履くのが難しい。	1	2	3	-
7. 手足症候群のために、服を着るのに以前より時間がかかる。	1	2	3	-
8. 手足症候群のために、靴を履くのが難しい。	1	2	3	-
9. 手足症候群のために、立ち上がるのが難しい。	1	2	3	-
10. 手足症候群のために、短い距離でも歩くのが難しい。	1	2	3	-
11. 手足症候群のために、座ったままでいたり、横になっていたりすることが多い。	1	2	3	-
12. 手足症候群のために、眠りにつきにくい。	1	2	3	-
13. 手足症候群のために、仕事に支障がある。	1	2	3	4
14. 手足症候群のために、他者との人間関係が円滑でない。	1	2	3	-

「痛みを感じない」から「想像できる範囲で最も強い痛み」までの尺度の中で、あなたの感じる痛みの程度を直線上に印をつけて表して下さい。



Effects of a Nurse-Led Educational Intervention for Chinese Adult Patients with Psoriatic Arthritis: A Case-Control Study

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Abstract

The aim of this study was to evaluate the effect of an individual nurse-led educational intervention for patients with psoriatic arthritis (PsA). This was a case-control study. The case group consisted of six individual educational sessions delivered by a nurse. A total of 40 patients with PsA joined in this study: the case group (n = 20) and the control group (n = 18). After a 6-week intervention, the case group had significantly better management for the severity of arthritis symptoms ($p < 0.05$), better psychological well-being and significant lower levels of anxiety ($p < 0.05$), and depression score ($p < 0.01$), and reported better improvement of physical and psychological domain of quality of life (QOL) (both p values < 0.05) than the control group. In conclusion, this nurse-led individual education intervention has statistically significant benefits for the management of clinical symptoms of arthritis and for psychological well-being and QOL in patients with PsA.

Keywords

Nurse-Led Interventions, Psoriatic Arthritis, Chinese Patients, Case-Control Study

1. Introduction

Psoriatic arthritis (PsA) is a chronic inflammatory arthritis condition [1]. It is a long-term condition that can

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have a significant psychological effect on the patient's life [2]. If left untreated, patients with psoriatic arthritis may suffer pain, reduced quality of life (QOL), joint damage, and disability [1]. Patients with psoriatic arthritis are also at higher risk for psychological distress of anxiety and depression [1]. PsA affects men and women equally (typically those between the ages of 30 and 55) [3]. The estimated prevalence of PsA in patients with psoriasis is 30% - 40% [4].

Effective patient education for those diagnosed with psoriatic arthritis is essential [5]. In studies on the effect of patient education for patients with PsA, the majority of the interventions have been delivered to groups of patients and less in a one-to-one format [6]. Research evidence shows that patient outcomes may be improved through individual nursing interventions [7]. Previous studies find that patients with arthritis are mostly preferred to individual nurse-delivered education by one-to-one communication on certain themes [8] [9]. While existing studies [10]-[12] investigate the effects of nursing education on the management of psoriasis, these studies do not focus on the specific type of psoriasis, psoriatic arthritis, and may be failed to include the educational component of how to manage symptoms of arthritis. Therefore, the aim of this study is to evaluate the effect of an individual nurse-led educational intervention for patients with PsA.

2. Methods

2.1. Study Design and Sample

The study design was a case-control study. Inclusion criteria included Chinese adult patients (aged 18 or older) with a diagnosis of psoriatic arthritis, duration of psoriasis with 5 years or longer (patients with psoriasis developed into psoriatic arthritis need at least 5 years). According to the pre-agreed study protocol, in order to achieve a 1:1 ratio in the intervention and control groups, patients were chosen based on age (within 3 years), gender, and duration of psoriasis at diagnosis (within 2 years), in order to form the matched control group. Initially, there were a total of 66 patients with psoriatic arthritis approached: 62 were willing to participate and four declined. Patients who accepted the offer of a nurse-led educational program formed the intervention group ($n = 22$). The control group was selected from the 40 volunteer patients who would receive this educational intervention at the end of study periods (6-week post intervention assessment). In order to match demographic characteristics of subjects in the intervention and comparator groups, patients in the control group were chosen based on age, gender, duration and age onset of psoriasis in years ($n = 18$).

2.2. Nurse-Led Educational Intervention

The intervention group received an individual nurse-led educational intervention. All participants in both groups received usual care. The intervention was an educational program and the nurses who delivered the program. The intervention consisted of 6 sessions, one week per session. The educational components of this education intervention comprised disease progression of PsA, types of medications and how to observe side effects, how to cope with pain or other symptoms, advices on exercise and nutrition.

2.3. Outcome Measures

Intervention effectiveness of clinical severity of psoriasis was assessed by the Psoriasis Area and Severity Index (PASI), which is the most extensively studied psoriasis clinical severity score and the most thoroughly validated [13]. High scores indicated more severity of arthritis. The clinical severity of arthritis was assessed by a numeric rating scale from 0 to 4 in the domains of joint pain, tenderness, swelling and stiffness [14]. High scores indicated more severity of arthritis. The psychological symptoms of anxiety and depression were measured by Self-rating Anxiety Scale (SAS) [15] and Self-rating Depression Scale (SDS) [16]. Lower scores indicate lower levels of anxiety and depression. The QOL of patients with psoriatic arthritis was measured by the World Health Organization Quality of Life—Brief Form (WHOQOL-BREF), which comprises four specific domains: physical, psychological, social relationship and environment. Higher scores indicate better QOL [17].

2.4. Data Collection and Analysis

This study was undertaken at Guangdong Provincial Dermatology hospital in South China from January to December 2015. Ethical approval was obtained from the ethics review committee of the studied hospital. All patients participated on a voluntary basis and gave written informed consent before data collection. A staff nurse

was responsible for recruiting and collecting the outcome. All data were collected by a staff nurse with research training. Data were collected from January to December 2015. SPSS version 20.0 was used for statistical. Comparison analysis of the data was used the Chi-Square test or the independent samples t-test. All statistical tests were two-tailed, and $p < 0.05$ was taken to indicate statistical significance.

3. Results

A total of 60 eligible patients were allocated into two groups according to their willingness, 22 in the intervention group and 18 in the control group. **Table 1** shows the demographic characteristics of patients in both groups. The mean age in the intervention group was 42.7 years (Standard Deviation, SD = 7.7). The mean age in the control group was 43.1 years (SD = 7.1). More than half of patients were male (72.7% in the intervention group, and 72.2% in the control group). The mean duration of psoriasis was nearly 20 years in both groups. The mean age onset of psoriasis was 22.7 years (SD = 14.2) in the intervention group and 23.3 years (SD = 14.2) in the control group. All demographic characteristics had no statistically significant differences between the case and control group.

From **Table 2**, the nurse-led educational intervention has positive effects for clinical severity of arthritis at post-intervention assessment ($p < 0.05$). In addition, the nurse-led education interventions have significant effects for reducing the symptoms of anxiety and depression in the case group ($p < 0.05$, and $p < 0.01$, respectively) (**Table 3**). In terms of the improvement of QOL, this intervention has positive effects for the enhancement of physical and psychological domain of QOL (both p values < 0.05) (**Table 4**).

4. Discussion

Consistent with previous studies [10] [11], the effects of a nurse-led interventions was positive, especially in psychological and QOL outcomes, although the effectiveness of psycho-educational interventions for the physic-

Table 1. Demographic characteristics of participants.

Variables	Case (n = 22)	Control (n = 18)
Age (years), mean \pm SD	42.7 (7.7)	43.1 (7.1)
Gender (n, %)		
Male	16 (72.7)	13 (72.2)
Female	6 (27.3)	5 (27.8)
Duration of psoriasis (years), mean \pm SD	20.6 (11.2)	19.2 (11.1)
Age at onset of psoriasis (years), mean \pm SD	22.7 (14.2)	23.3 (12.4)

Table 2. Comparison of clinical severity of psoriasis and arthritis symptoms.

Variables	Case (n = 22)	Control (n = 18)
Clinical severity of psoriasis by PASI score at pre-intervention	21.45 (10.52)	20.35 (10.26)
Clinical severity of psoriasis by PASI score at post-intervention	2.69 (1.76)	2.03 (1.71)
Clinical severity of arthritis score at pre-intervention	8.45 (1.56)	8.39 (1.64)
Clinical severity of arthritis score at post-intervention	1.25 (1.06)	3.19 (1.15)*

* $P < 0.05$. Abbreviation: PASI, Psoriasis Area and Severity Index.

Table 3. Comparison of anxiety and depression score.

Variables	Case (n = 22)	Control (n = 18)
Self-rating Anxiety Scale score at pre-intervention	44.68 (7.57)	44.42 (8.31)
Self-rating Anxiety Scale score at post-intervention	40.05 (9.46)	43.95 (13.62)*
Self-rating Depression Scale score at pre-intervention	41.46 (9.22)	41.37 (8.67)
Self-rating Depression Scale score at post-intervention	37.25 (11.02)	41.04 (11.47)**

* $P < 0.05$, ** $P < 0.01$.

Table 4. Comparison of QOL score.

Variables	Case (n = 22)	Control (n = 18)
Physical QOL score at pre-intervention	12.65 (1.35)	12.86 (1.45)
Physical QOL score at post-intervention	14.78 (1.86)	13.48 (1.34)*
Psychological QOL score at pre-intervention	11.64 (1.52)	12.06 (1.12)
Psychological QOL score at post-intervention	13.89 (1.96)	12.81 (1.45)*
Social QOL score at pre-intervention	12.57 (1.66)	12.47 (1.74)
Social QOL score at post-intervention	12.87 (1.44)	12.78 (1.31)
Environmental QOL score at pre-intervention	10.45 (1.46)	10.68 (1.34)
Environmental QOL score at post-intervention	10.88 (1.52)	10.52 (1.42)

*P < 0.05. Abbreviation: QOL, quality of life.

cal severity of psoriasis was inconsistent. This study uniquely found that the nurse-led educational intervention has positive effects on reducing the clinical severity scores of arthritis. This individual education intervention shows positive effects in improving the symptom management of arthritis, psychological well-being and QOL. The reason for designed this individual intervention was offering the opportunity to focus on individual learning needs in one-to-one communication with a nurse [6]. And effective patient education is essential to ensure individuals have a good understanding of their own conditions, which in turn will improve adherence with their individual management plan [5].

Nurse delivered interventions have the opportunity to focus on individual learning needs [8]. By an individual delivery format, this nurse-led education intervention may be able to confirm that the patients are being individualized to each patient's health experience [14]. Findings of this study were consistent with a review of effects of psycho-education interventions for the management of psoriasis [18].

Dermatology nurses play an important role in screening and assessment of patients with early PsA. Active monitoring of psoriasis patients for signs of joint or arthritic involvement and familiarity with PsA screening, diagnosis and treatment options can help dermatologists positively impact the clinical course of psoriatic disease [19]. As PsA is a long-term and impact both cutaneous and joint disease, a multidisciplinary approach to support patients for the management of PsA is needed. Effective patient education as well as regular assessment of the PsA by nurses could have additional benefits to ensure the efficacy of treatments [18].

There is a couple of study limitation. Firstly, due to practical limitation, it is difficult to blind patients to the fact that they are taking part in an educational intervention. Secondly, this study was only assessed the intervention effect at immediate post-interventions. Future research should investigate whether the benefits are sustained in a longer follow-up period.

5. Conclusion

This nurse-led individual education intervention has statistically significant benefits for the management of clinical symptoms of arthritis and for psychological well-being and QOL in patients with PsA.

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Examining Handwashing Care in Assisted-Living Facilities from the Perspective of Hand and Finger Stimulation to Induce Brain Activation in the Residents

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Abstract

The elderly who is confined to bed or demented may choke if their cerebrum is not sufficiently aroused while eating. Therefore, this study focused on determining if hygienic care of the hands and fingers would have a biologically stimulative effect and on verifying whether using a warm cloth or warm water was more effective for cerebral activation. The results suggest that when assisting the elderly in washing their hands, from the perspective of cerebral activation, using warm water is better than using a warm cloth.

Keywords

Electroencephalogram, Cerebral Activation, Sitting Position, Handwashing Care, Elderly

1. Introduction

Bedridden elderly and elderly with dementia may choke if their cerebrum is not sufficiently aroused when they are to eat. From this vantage point, providing nursing care that will raise the level of alertness before a meal may be necessary.

According to the 2013 Vital Statistics compiled by Japan's Ministry of Health, Labour and Welfare, accidental death was the sixth leading cause of death for people over 65 years of age. When cases of accidental death are categorized by the specifics, in the order of highest to lowest for those between ages 65 and 79, it can be seen that 25.3% of the cases involve accidental drowning and near drowning, 20.7% involve other accidental choking, and 17% involve tripping/falling. For those older than 80 years of age, 31.4% of accidental deaths are

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due to other accidental choking, 24.1% due to tripping/falling, and 17% due to accidental drowning and near drowning, making choking the biggest cause of death among accidental deaths. The breakdown of choking-related deaths shows “swallowing food the wrong way causing respiratory tract obstruction” being the biggest cause at 11.6% for the 65 to 79 age group and 14.5% for the 80 or older age group [1].

According to the ICD-10 (International Statistical Classification of Diseases and Related Health Problems, 10th revision) by the WHO, inhalation and ingestion of food causing obstruction of the respiratory tract is listed as a cause of death under section W79 [2]. In addition, there are also reports that the elderly over the age of 65 in the United States of America experience higher incidents of choking on food [3].

Based on the above, choking on food is an accident commonly seen in the elderly population, and it is important to keep the choking factor in mind when providing nursing care. Therefore, providing nursing assistance that will help awaken the cerebrum is vital.

Up until now, I have studied the cerebral activity produced by the postural change from supine to sitting position in healthy adults, healthy elderly, and the elderly residents in facilities as my subjects. The results of these studies show that in the case of the elderly in assisted living facility, the cerebral activation does not take place when they are raised to a sitting position on the bed; therefore, assisting them to sit on a chair or a wheelchair is necessary [4] [5]. Based on these studies, I postulated that if we were to reduce incidents of choking on food, it would be necessary to awaken the brain. Therefore, as much as possible, when helping the elderly eat, we should assist them out of the bed and into a sitting position on a seat as long as they are capable of doing so. Our hands are important sensory organs, as it is aptly said, “the hand is the visible part of the brain”. Therefore, I surmise that combining the sitting posture with hand stimulation may raise the alertness or wakefulness of the brain. Thus, caregiving through assisting handwashing before meals is conceived as the idea behind this research.

Thus far, whenever I have randomly checked nursing textbooks available on the market, I find that at least in Japanese nursing education, handwashing before meals is categorized under “assisting hygiene” by keeping the hands and fingers clean [6]–[9]. As to the effect of hand bathing, in addition to maintaining hygiene, relaxation [10] [11] and increase in peripheral skin temperature [12] [13] were reported. The clinical effects of hand bathing include sensory stimulation in children with acute encephalopathy [14] and aiding sleep in the elderly [15] [16]. There are also some reports on efforts to improve the level of consciousness through hand bathing in patients with cerebrovascular disease in academic gatherings, but so far, there are hardly any published papers on handwashing and alertness in Japan. Additionally, in Japanese hospitals and facilities for the elderly, many places provide warm cloths as a way to keep the hands and fingers clean before meals, but they do not assist in washing hands.

As described thus far, neither education nor caregiving focuses on the relation between handwashing and the level of alertness. If this study could show that handwashing is more effective in increasing one’s alertness than using warm cloths, this could be meaningfully presented as a method of providing nursing care that will help raise the level of alertness before starting a meal.

However, it is not easy to simply compare handwashing against the use of a warm towel as cleaning agents may be used, or it may involve complex movements such as hand rubbing, and the water pressure and differences in water temperature may have an influence as well. Therefore, this study was designed to perform basic verification of comparing the differences in cerebral activity during the use of a warm towel or warm water in a basin.

2. Methods

2.1. Data Collection

Two sets of studies were set up, one with healthy adults (Experiment 1) and one with the elderly residents in an assisted living facility (Experiment 2). I conducted Experiment 1 in 2010, and Experiment 2 in 2011, and both researches were conducted before lunchtime.

In this basic research study, a set up was designed to provide heat stimulation to hands and fingers by using warm cloths or warm water for the purpose of hygienic care, after which tactile sensory stimulation was provided through drying off with a dry towel. Each activity was evaluated for cerebral response by the measurement of brain waves.

In addition, in preparation for this study, brainwaves of healthy adults were analyzed for their response to

stimulation of the hand and fingers by warm cloths, and comparisons were made between the supine state and sitting position. Significant activation of the cerebrum was observed when in the sitting position. The subjects were 9 individuals, and as it presented significant differences, I set the number of the subjects as 10 or more individuals.

2.2.1. Experiment 1

1) Subjects

Healthy adults in their 20 s to 30 s were selected as subjects. Since it is known that there are differences between the sexes in autonomic nervous activities, in Experiment 1, only females were selected.

2) Measured Items

a) Electroencephalographic (EEG) Data

Two measuring points (Fp₁: left frontal lobe and C₃: left centroparietal regions) based on the International 10 - 20 System were selected.

b) Subjective Survey

I evaluated the subjects for the level of alertness when receiving tactile sensory stimulation.

3) Study Procedure (Figure 1)

All participants were subjected to both warm cloth and warm water. In both cases, stimulation was only given on the right hand. The posture was set in a sitting position, with the back against the back of a chair and bottom of the feet touching the floor.

In the study using a warm cloth, first both hands from the tip of the finger to the wrist were covered with a warm cloth at a temperature range of 39°C to 42°C (heat stimulation: 1 minute), and then a dry towel was used for wiping (tactile sensory stimulation: 1 minute).

In the study using warm water, the right hand up to the wrist was soaked in a basin of warm water at a temperature range of 39°C to 42°C (1 minute) and afterwards wiped with a dry towel (1 minute). Pat drying was the method used for wiping rather than rigorous wiping. This measurement time was set to be similar to the normal daily behavior, and to provide time necessary to analyze the brain waves.

After each experiment, the subjects were given a subjective survey. They were asked (using a self-administered questionnaire), between the use of a warm cloth or the use of warm water, which did they feel raised their level of alertness more?

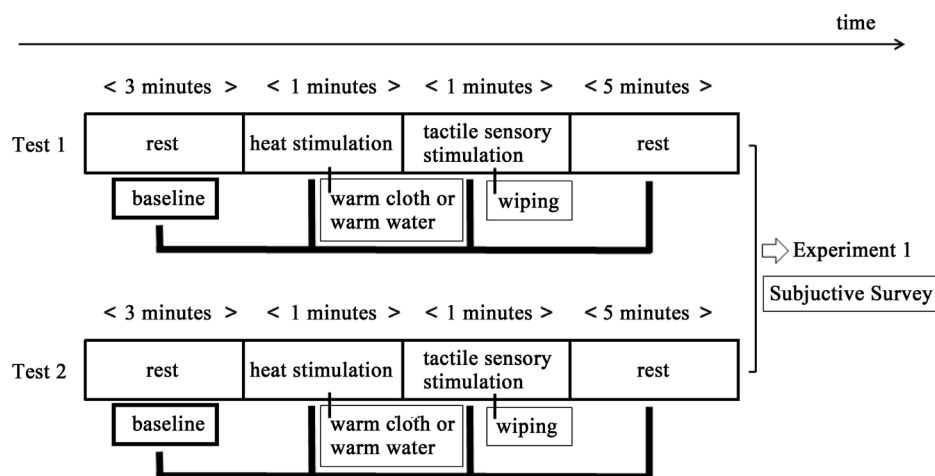
4) Analysis Method

a) Setting the Data Points

Data points for analysis were set as “resting (baseline 3 minutes)”, “heat stimulation (1 minute)”, “tactile sensory stimulation (1 minute)”, and “resting (5 minutes)”.

b) Analysis of the Signal Processing of the Brainwaves and Its Power Values

α -band (8 ~ 13 Hz) and β -band (13 ~ 30 Hz) were analyzed, and the brainwave power values in those band-



Note: All participants were subjected to both warm cloth and warm water.

Figure 1. Study procedure.

widths (Unit: $\mu V2$) were calculated for each data segment. The power values used for comparison were selected from the stable periods of each time segment and the average of 6 segments at 10 seconds each (totaling 1 minute at each segment) were used as the power value.

c) Statistical Analysis

Multiple comparisons were made between the power values of the brainwaves at baseline and when using a warm cloth or warm water as well as during tactile sensory stimulation. Additionally, results from the two groups using warm cloths or warm water were compared.

Since the resulting EEG data did not have a normal distribution, a nonparametric technique for statistical analysis was used.

In comparing the resting state with each stimulus, I conducted multiple comparisons using Wilcoxon signed-rank test along with Bonferroni corrections to adjust the level of significance (Level of Significance = $0.016 \div 0.05/3$). In comparing the use of warm cloth and warm water, Wilcoxon signed-rank test was used, and the values were based on the differences from the respective baselines.

For the subjective survey, the answers were simply compiled and evaluated to obtain the ratio.

2.1.2. Experiment 2

1) Subjects

The subjects were selected from the elderly residents of an assisted-living facility. The dementia level (determination of the ability for the elderly diagnosed with dementia to live an independent life) was set from “no sign of dementia” to level “II”. The “the independence degree of the elderly diagnosed with dementia” is a standard set by the Ministry of Health, Labour and Welfare. “II” means that one is in a state where “independent living is still possible as long as someone is there to watch over the individual though there are signs of symptoms, behavior, actions, and difficulties in mutual understanding seen at home that affect one’s daily life.”

2) Measurement Items

EEG data were obtained from the subjects in Experiment 2.

Four measuring points (Fp₁: left frontal lobe, Fp₂: right frontal lobe, C₃: left centroparietal, and C₄: right centroparietal regions) based on the International 10 - 20 System were selected.

3) Study Procedure

The same procedure as that used in Experiment 1 was followed.

The subjective survey was not conducted in Experiment 2, but all other procedures were the same as in experiment 1 (Figure 1).

4) Analysis Method

The same method as used in Experiment 1 was followed.

2.2. Ethical Consideration

This study was reviewed and approved by the ethics committee of Meiji University of Integrative Medicine as the researcher’s previous workplace. All personal information obtained through the research is kept private, and significant precautions were taken to protect the privacy of the individuals in conducting this study.

The subjects of Experiment 1 were the students of the university the researcher belongs to, and the subjects of Experiment 2 were the residents of an assisted-living facility in the area where the university is located.

For both Experiment 1 and 2, the subjects were invited to participate through a public appeal, and those who applied to join the study were explained the following orally and in writing: the purpose of the study; the method of the study; the nature of cooperation in the participation of the study as well as the freedom to decline; the protection of private information; and the reporting of the results. After this, an agreement was signed. Experiment 2 was conducted by providing the explanation with the help of the facility staff, and the consent to the study was obtained from the subjects themselves and their legal caregivers, such as their family members, as well.

3. Results

3.1. Results of Experiment 1 (Table 1 and Table 2)

3.1.1. Subjects (Table 1)

Sixteen healthy adult females consented to their participation in the study. The average age and the standard

Table 1. Basic demographic data of healthy adults.

Subject	Age	Sex	Dominant Hand
A	21	female	right
B	21	female	right
C	20	female	right
D	21	female	right
E	26	female	right
F	24	female	right
G	23	female	right
H	21	female	right
I	21	female	right
J	21	female	right
K	21	female	right
L	21	female	right
M	21	female	right
N	20	female	right
O	21	female	right
P	21	female	right
average	21.1		
standard deviation	0.74		

Table 2. α -Band brainwave power values of healthy adults.

	Warm Cloth		Warm Water	
	Power Value	Wilcoxon Test	Power Value	Wilcoxon Test
Fp₁				
Resting (baseline)	19.2 \pm 3.7	—	17.4 \pm 3.3	—
Heat Stimulation	16.0 \pm 2.8	0.438	18.0 \pm 2.2	0.134
Tactile Sensory Stimulation	15.0 \pm 2.3	0.301	13.8 \pm 2.2	0.959
Resting	17.1 \pm 3.0	0.278	17.2 \pm 2.6	0.717
C₃				
Resting (baseline)	24.1 \pm 5.3	—	18.4 \pm 4.0	—
Heat Stimulation	14.1 \pm 2.7*	0.006	15.4 \pm 1.9*	0.605
Tactile Sensory Stimulation	13.4 \pm 2.3	0.015	11.4 \pm 2.3	0.109
Resting	18.9 \pm 3.4	0.163	20.5 \pm 4.9	0.255

Note: n = 16. Fp₁: left frontal lobe region, C₃: left centroparietal region.

Power Value is an average value \pm SE (μV^2).

p-value is used to show the results of multiple comparisons.

p < 0.016 is set as the level of significance (with Bonferroni correction).

*: Significant difference data, Comparison between Warm Cloth and Warm Water, Mann-Whitney U test.

deviation were 21.10 ± 0.74 years. There were no missing data, so the entire data was used for analysis.

3.1.2. Electroencephalographic Data (Table 2 and Table 3, Figure 2)

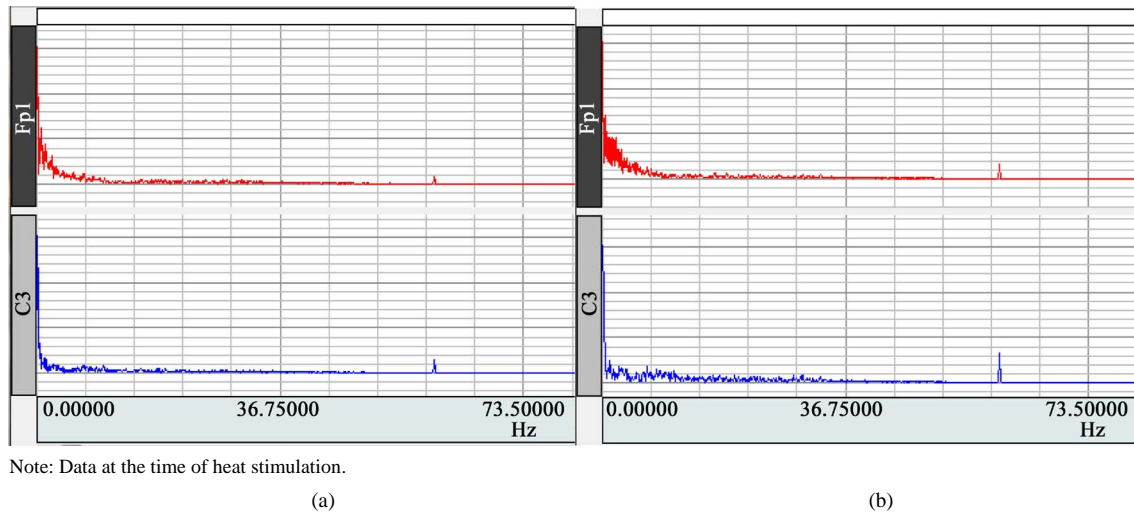
At Fp₁, there was a significant increase in the β -band power value ($p < 0.05$) with heat stimulation produced by a warm cloth compared to the resting state. In comparing the resting state at C₃, during heat stimulation and tactile sensory stimulation, α -band power value decreased significantly ($p < 0.05$).

When comparing the use of warm water to the resting state, with its heat stimulation, a significant increase in the β -band power value ($p < 0.05$) at Fp₁ was seen.

Table 3. β -Band brainwave power values of healthy adults.

	Warm Cloth		Warm Water	
	Power Value	Wilcoxon Test	Power Value	Wilcoxon Test
Fp₁				
Resting (baseline)	10.2 \pm 1.6	—	10.2 \pm 1.8	—
Heat Stimulation	14.4 \pm 2.3	0.001	12.5 \pm 1.8	0.000
Tactile Sensory Stimulation	12.8 \pm 2.5	0.134	10.2 \pm 1.4	0.756
Resting	12.3 \pm 2.3	0.234	15.8 \pm 3.5	0.098
C₃				
Resting (baseline)	8.9 \pm 1.0	—	8.4 \pm 0.8	—
Heat Stimulation	9.8 \pm 0.9	0.196	10.5 \pm 0.9	0.004
Tactile Sensory Stimulation	10.3 \pm 2.0	0.959	8.0 \pm 0.8	0.552
Resting	9.2 \pm 1.0	0.569	8.9 \pm 1.0	0.234

Note: n = 16. Fp₁: left frontal lobe region, C₃: left centroparietal region.
 Power Value is an average value \pm SE (μV^2).
 p-value is used to show the results of multiple comparisons.
 p < 0.016 is set as the level of significance (with Bonferroni correction).

**Figure 2.** Electroencephalographic data of healthy adults. (a) Heat stimulation (warm cloth); (b) Heat stimulation (warm water).

In comparison to the resting state, using warm water for heat stimulation showed a significant increase in the β -band power value ($p < 0.05$) for both for Fp₁ and C₃. When the stimuli of the warm cloth and warm water were compared at C₃, the α -band power value showed a decrease during heat stimulation with a warm cloth, significantly more so than with the use of warm water.

In comparing the use of a warm cloth and warm water, the heat stimulation from the warm cloth caused a more significant decrease in α -band power value at C₃ compared to the use of warm water ($p < 0.05$). β -band power value did not show any significant difference.

3.1.3. Subjective Survey

Between the warm cloth and warm water, 13 out of 16 people said they felt more awake with warm water ($p = 0.021$).

3.2. Results of Experiment 2

3.2.1. Subjects (Table 4)

Ten individuals (eight females and two males) who were residents in an assisted living facility agreed to partic-

Table 4. Basic demographic data of the elderly in an assisted living facility.

Subject	Age	Sex	Dementia Level*
A	81	female	independence
B	63	male	independence
C	85	male	independence
D	86	female	IIa
E	85	female	IIb
F	98	female	I
G	89	female	I
H	84	female	I
I	91	female	IIb
J	94	female	IIa
average	85.60		
standard deviation	9.40		

Note: *Independence degree of daily living for the demented elderly (Ministry of Health, Labour and Welfare, Japan).

Level I: He/She has certain condition(s) of dementia, but can lead mostly independent day-to-day life at home and in the society.

Level II: Though he/she may have some condition(s) that interfere with his/her daily life, or have difficulties to communicate with others, he/she can be independent with someone watching.

Level IIa: He/she is observed with the condition(s) of the above-mentioned II outside home.

Level IIb: He/she is observed with the condition(s) of the above-mentioned II at home as well.

Level III: He/she is observed with condition(s) and behaviors that interfere with his/her day-to-day life, and he/she is in need of care.

Level IIIa: He/she is observed with the condition(s) of above-mentioned III mostly in daytime.

Level IIIb: He/she is observed with the condition(s) of above-mentioned III, mostly during night time.

Level IV: He/she is frequently observed with condition(s), behaviors and difficulties to communicate with others, and he/she is in need of care throughout the day.

Level M: He/she is observed with severe mental condition(s) and peripheral condition(s), or serious physical disorder(s), and he/she is in need of medical attention.

ipate in this study. The average age and the standard deviation were 85.6 ± 9.4 years. There were no missing data, so the entire data was used for analysis.

3.2.2. Electroencephalographic Data (Table 5 and Table 6, Figure 3)

In comparing the use of a warm cloth to the resting state, the β -band power value significantly increased with heat stimulation at C_3 ($p < 0.05$). At C_4 , in comparing the resting state to that during heat stimulation and tactile sensory stimulation, the β -band power value had significantly increased ($p < 0.05$).

In the use of warm water, the α -band power value showed a significant increase with heat stimulation at C_3 as well as at C_4 and in comparison to the resting state, tactile sensory stimulation also caused a significant increase ($p < 0.05$). In all measurement points, in both heat stimulation and tactile sensory stimulation, β -band power value showed a significant increase compared to the resting state ($p < 0.05$).

In the comparison of the warm cloth and warm water, there were no significant differences in α -band or β -band power values.

4. Discussion

When comparing the β -band power value that shows the activated state of the brain to that of the resting state of the brain, an increase in the β -band power value was seen in both the use of warm cloth and warm water in both research 1 and 2. However, the use of warm water was more consistently seen as having a statistically significant difference. It was clear that in the case of the elderly residing in the assisted living facility, in all its measuring points, in both heat stimulation and tactile sensory stimulation, the power value of the β -band brainwave increased significantly compared to the resting state, demonstrating that these actions were stimulating the cerebrum.

The above results suggest that when assisting the elderly to wash their hands, the use of warm water is better than using warm cloths from the perspective of cerebral activation.

In healthy adults, no significant increase in brainwave power value can be observed with tactile sensory

Table 5. α -Band brainwave power values of the elderly in an assisted living facility.

	Warm Cloth		Warm Water	
	Power Value	Wilcoxon Test	Power Value	Wilcoxon Test
Fp₁				
Resting (baseline)	12.6 \pm 2.8	—	10.6 \pm 2.0	—
Heat Stimulation	16.1 \pm 2.9	0.285	13.4 \pm 1.6	0.028
Tactile Sensory Stimulation	17.9 \pm 4.3	0.799	14.5 \pm 2.0	0.169
Resting	11.9 \pm 2.3	0.575	9.8 \pm 2.5	0.959
Fp₂				
Resting (baseline)	12.2 \pm 3.5	—	10.5 \pm 2.3	—
Heat Stimulation	17.5 \pm 3.2	0.059	14.8 \pm 2.4	0.007
Tactile Sensory Stimulation	20.0 \pm 4.1	0.202	14.3 \pm 1.4	0.098
Resting	13.6 \pm 2.8	0.575	10.4 \pm 2.9	0.799
C₃				
Resting (baseline)	23.2 \pm 7.5	—	15.4 \pm 3.8	—
Heat Stimulation	26.1 \pm 5.8	0.575	20.4 \pm 4.1	0.017
Tactile Sensory Stimulation	20.4 \pm 3.4	0.721	16.9 \pm 2.4	0.575
Resting	19.5 \pm 4.1	0.878	19.4 \pm 7.1	0.575
C₄				
Resting (baseline)	26.2 \pm 8.2	—	17.1 \pm 4.0	—
Heat Stimulation	28.8 \pm 5.8	0.445	25.5 \pm 4.7	0.013
Tactile Sensory Stimulation	24.2 \pm 3.7	0.799	22.6 \pm 4.1	0.047
Resting	22.1 \pm 5.2	0.386	22.8 \pm 7.6	0.241

Table 6. β -Band brainwave power value of the elderly in an assisted living facility.

	Warm Cloth		Warm Water	
	Power Value	Wilcoxon Test	Power Value	Wilcoxon Test
Fp₁				
Resting (baseline)	15.7 \pm 3.7	—	13.9 \pm 3.0	—
Heat Stimulation	21.5 \pm 6.5	0.093	19.8 \pm 4.0	0.005
Tactile Sensory Stimulation	30.5 \pm 8.0	0.022	20.4 \pm 3.2	0.009
Resting	16.4 \pm 4.3	0.799	11.8 \pm 2.8	0.374
Fp₂				
Resting (baseline)	17.2 \pm 5.2	—	14.7 \pm 3.4	—
Heat Stimulation	27.0 \pm 9.7	0.114	24.5 \pm 4.8	0.005
Tactile Sensory Stimulation	30.6 \pm 6.5	0.028	25.5 \pm 5.6	0.011
Resting	14.8 \pm 3.1	0.878	13.2 \pm 3.4	0.241
C₃				
Resting (baseline)	17.3 \pm 3.5	—	14.8 \pm 3.4	—
Heat Stimulation	26.8 \pm 6.3	0.005	24.5 \pm 5.3	0.005
Tactile Sensory Stimulation	27.7 \pm 5.8	0.114	25.5 \pm 3.7	0.009
Resting	18.1 \pm 3.7	0.646	16.7 \pm 4.3	0.169
C₄				
Resting (baseline)	20.3 \pm 4.0	—	18.4 \pm 4.8	—
Heat Stimulation	42.9 \pm 17.3	0.007	36.2 \pm 9.9	0.005
Tactile Sensory Stimulation	41.8 \pm 11.5	0.013	37.9 \pm 9.4	0.009
Resting	21.7 \pm 5.4	0.959	17.6 \pm 5.2	0.721

Note: n = 10. Fp₁: left frontal lobe region, C₃: left centroparietal region.

Fp₂: right frontal lobe region, C₄: right centroparietal region.

Power Value is an average value \pm SE (μV^2).

p-value is used to show the results of multiple comparisons.

p < 0.016 is set as the level of significance (with Bonferroni correction).

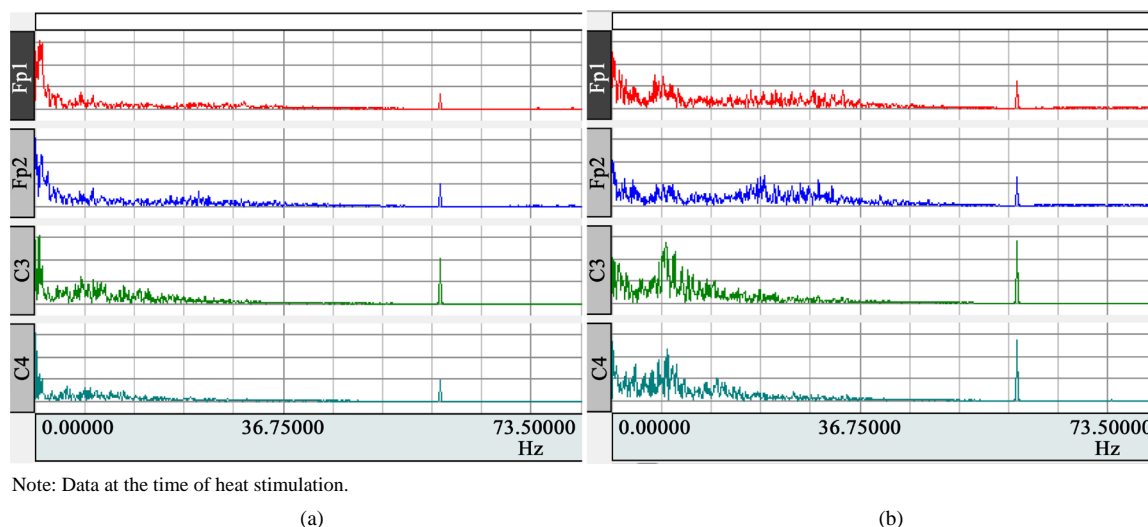


Figure 3. Electroencephalographic data of the elderly in an assisted living facility. (a) Heat stimulation (warm cloth); (b) Heat stimulation (warm water).

stimulation through drying the hands with a dry towel; however, this is likely because they regularly receive stimulation on their fingers and hands, and it is not perceived as noticeable stimulation. On the other hand, the elderly living in the facility are less likely to receive stimulation on their fingers and hands, and thus the brain picks up the experience as something stimulating.

In this research, the setting is such that the stimulation is provided through soaking the hand in warm water and then patting dry with a dry towel. However, in real life handwashing, people will likely use soap or rub their hands together and will experience a greater stimulation, and thus will have a more significant effect on cerebral activation. From the perspective of stimulating the senses of the elderly, once again using warm water over warm cloths can be seen as being more preferable.

This study shows the effectiveness of using warm water as a way to stimulate the brain in the elderly in a sitting position, and it is thought to be applicable in providing care before meals. There are reports of a correlation between the elderly choking on food and those who have Alzheimer's disease or Parkinson's [3] [17]. In Japan, mochi (sticky rice cakes), mini-cup gelatins, and other candies are categorized as dangerous choking hazards [18]. It is important to keep these facts about food and diseases in mind when providing handwashing care to raise the alertness before meals.

For future studies, widening the range of the subjects to include individuals with severe cases of dementia and checking for the alertness level before and after handwashing with warm water, as well as studying the condition of swallowing itself will be necessary.

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Support Provided by Public Health Nurses for Fathers Who Have Abused Their Children—As Observed in Cases of Child Neglect and Physical or Psychological Abuse

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Abstract

This study aims to identify the support to provide to fathers who have abused children as reported by public health nurses (PHNs). In this study, a qualitative descriptive design was applied to the data analysis. Interviewees were 10 public health nurses (PHNs) in charge of child abuse services for at least 5 years at public health centers. The study analyzed 13 cases reported in the interviews. Measures to support fathers who abuse their children as suggested by PHNs were classified into direct support to the father, support to other family members, and support to be provided by others involved including related organizations. The direct support to the father includes “gaining an in-depth understanding of the abusive situation and psychological states of those involved”, “refraining from involvement in areas where it is difficult to understand the personality of the father”, and others. Support of other family members includes “understanding the marital relationship and assessing the qualities of the relationship”, “refraining from matters that will involve divorce”, and others. Support to be provided by others including related organizations includes “understanding the value of social exchange and assessment of the ability to create and maintain interpersonal relationships”, “establishing support arrangements to enable intervention when necessary”, and others. The interviews report that PHNs arrange support measures that enable intervention as it becomes required, and that this enables learning about child-abuse preventing activities.

Keywords

Public Health Nurse, Child Abuse, Father, Support Contents

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1. Introduction

The Japan report on “Verification of causes of deaths from child abuse” outlines details of deaths from all child abuse cases. The incidence of deaths of children below one year of age due to child abuse is the highest among abuse cases, and the total for children up to five years of age is about 90% [1]. This shows early infancy as an especially critical time for supportive intervention in child abuse cases. The PHNs at public health departments and health centers provide maternal and child health services for infants and women in childbirth based on the Maternal and Child Health Law of Japan [2].

Many studies conducted outside Japan have focused on fathers to establish risk factors contributing to child abuse, including studies of fathers displaying a high incidence of being the source of physical abuse and neglect, general risk assessments, and the roles of fathers in abuse and neglect cases [3] [4]. From Japan, there are reports comparing the characteristics of biological mothers and fathers, as well as there are reports of intervention with groups of fathers in Tokyo [5] [6], and this field has recently attracted research attention. However, there are few studies that focus on the characteristics of fathers. A reason why the research in Japan differs from that of other countries may be due to differences in societal perceptions, including differences in the periods of the studies researchers have focused on child abuse as a social issue and in behaviors pertaining to child abuse.

The results of the review of the literature on the characteristics of fathers in cases with child abuse and neglect clearly show that the characteristics of fathers in child abuse case involve negative feelings and attitudes towards the family [7]. There is a preliminary study with the objective to describe how public health nurses (PHNs) understand the characteristics of the interpersonal relations and behaviors of fathers who cause child abuse [8].

The present study conducted interviews with experienced PHNs who had been involved in child abuse cases while providing maternal and child health services, and investigated opinions (understanding) of the kinds of support provided for fathers.

2. Methods

2.1. Operational Definitions of Terminology

1) Child abuse

There are different definitions of child abuse. The Child Abuse Prevention Law of Japan defines physical abuse such as striking, kicking, and sexual abuse, as well as psychological abuse and neglect under the umbrella term “child abuse”. In the study here “child abuse” is defined as physical abuse, psychological abuse, and neglect as stipulated in The Child Abuse Prevention Law. Some studies have reported that the pathology of sexual abuse originates in factors of the perpetrator, such as the desire for emotional contact, sexual stimulation, and for other reasons [9]. Sexual abuse was excluded from the study here because the pathology of sexual abuse may be seen to differ from that of the other types of child abuse.

2) Father

“Father” here refers to either a biological father or to a person viewed as the father to the children, the male who plays the role of father to a child.

2.2. Design and Sample

The study applied a qualitative descriptive design to the data analysis. In a prefecture the study identified a region where social resources such as medical welfare services for children are well established, and made a request for cooperation from health care centers where permission to approach the personnel had been obtained. At these health care centers, we recruited participants (interviewees) from among experienced PHNs, personnel in charge of maternal and child health services at the time of the study and with at least five years experience in dealing with child abuse cases. The types of abuse that the participating PHNs would be interviewed about were limited to physical abuse, mental abuse, neglect, or a combination of these, but no specific identification of the family member instigating the abuse in the family was indicated.

Interviewees were 10 public health nurses (PHNs). The interviewees were asked to recall one or two fathers they had assisted in their capacity as a PHN and tell about the case. The study analyzes 13 cases reported in the PHNs interviews.

2.3. Interview Methods

Data were collected with semi-structured interviews based on interview guidelines between July and August 2011. The interviewer of this study was author. Upon obtaining consent (details in the Ethical Considerations section below), the narratives were recorded using an integrated circuit recorder, and the interviews lasted an average of 56 minutes (range 45 - 86). The interviewees were requested to recall a father they had assisted in their capacity as PHNs and tell about the case. All the interviewees talked about the cases referencing the case records which were available at the interview. Firstly, the participants were asked to outline the causes of the case, including details of the family structure. The main questions in the interviews were the kind of support to give the fathers. The kind of support contents were classified into direct support to the father, support to family members, and support provided by others involved including related organizations. The participants were asked to detail in these support. The interview was conducted in the work place of the interviewee in a location where privacy could be ensured.

2.4. Data Analysis

The data obtained by recording and transcribing the narratives were analyzed by employing a qualitative descriptive design, and classified by the relevance of a sentence or of expressions/topics that appeared to suggest a matter of importance. Examining the contexts which showed characteristics of the fathers and assigning a code marker which would not hide the meaning, a list with the codes for these items was created for each interview. With the cases to be analyzed, organizing by the codes for similar matters, and reviewing the concepts represented by these, the data were classified into subcategories. Then, identifying similarities in the subcategories and examining the items, each subcategory was assigned a name to be abstracted. In this process the level of abstraction was carefully monitored with a final assignation to a category, from subcategories, code, and data. The validity of the categories was assured by repeated coding and discussion among the participating researchers. For verification of the results, the interviewees were asked to check for variance with the facts or for other problems they felt that there were in the extracted categories and subcategories and whether the categories reflected the matters those interviewees had told.

2.5. Ethical Considerations

This study was carried out after obtaining informed consent from the participating centers by providing an outline of the study to the director of the participating health care center orally and through a letter requesting co-operation in the study. The outline of the study was also explained to the participating PHNs (interviewees) orally and through the letter to request participation in the study, and written consent was obtained. All participants were assured that confidentiality would be maintained at all times, research findings would not be used for purposes other than the study here, and that the cases would be carefully handled as would the anonymity of both PHNs and others involved in the cases. We obtained approval to conduct the study from the Ethics Committee of Sapporo Medical University.

3. Results

3.1. Research Participants and Outline of the Cases

A total of thirteen cases were brought up by the interviewees. All cases were caused by neglect by the parents, and involved abuse of a physical or psychological nature. All the interviewees working at the health care centers were female with an average of 8 years and 6 months (range 6 - 13 years) of experience in dealing with child abuse cases.

3.2. The Kinds of Support for the Fathers Who Had Abused Their Children

The analysis yielded 18 categories and 35 subcategories, for a total of 57 code designations.

The 18 categories were classified into direct support for the father, support for other family members, and support provided by others involved including related organizations. The categories are expressed with single quotation marks (“”) in the following, and the parts quoting interview data are expressed by the interviewees, the PHNs.

3.3. Direct Support to the Father

- 1) “gaining an in-depth understanding of the abusive situation and psychological states of those involved”

When fathers hit/slap their children with their hands, they may think it natural to do so to discipline their children because their own parents raised them in the same way.

- 2) “considering the history of the development as displayed by the father”

The father may be a person who feels it is difficult to get through life. He may have problems like with getting angry easily, and have difficulty in communicating what he wants to say. His parents may have raised him strictly because it was difficult to deal with him as a child.

- 3) “identifying the intentions and psychological state of the father that contributes to the abuse”

When the father pushes his child away with excess force if child comes too near when he (the father) is playing a TV game, he gives priority in what he wants to do. He is not angry at his child but the child senses the father thinks the child troublesome.

- 4) “refraining from involvement in areas where it is difficult to understand the personality of the father”

Even if we get new information about the fathers from other sources (authorities), we do not disclose what we know about the domestic violence because we did not hear this ourselves. This makes it difficult to respond to some situations and assess the need for intervention.

- 5) “confirming the state of child development and assessing the environment where the child is brought up and ability of the family”

I think the best opportunity for us to know about fathers is at a physical check-up for infants. Parents bring their children to the check-up when the youngest child is 18 months old. We have to confirm that fathers will have their children come in for the check-up, and then we are able to check the development of the children.

- 6) “thinking about the development of the child within the framework of the family and providing instructions for the father to assist in furthering the development of the child”

We follow up the development of children while contacting medical institutions to share information. We assist in the development of the children by confirming the development and family circumstances.

- 7) “understanding the life experience and assisting the financial ability to support the family”

The father obtains just any sort of employment, but changes jobs irregularly. We have to determine whether the father can be expected to continue working to ensure the livelihood of the family.

- 8) “assisting the family in making improvements in the life style”

The father is out of work and on welfare, and has no plans to seek employment. Further, he uses the help services of welfare programs. We make arrangements for him to become enrolled in existing services.

3.4. Support to Family Members

- 1) “understanding the marital relationship and assessing the qualities of the relationship”

The husband and wife insist on their own different opinions. If it appears that the wife speaks up too readily, there may remain some room to improve the marital relationship. We evaluate what it is possible to do by listening to them both and trying to understand hidden messages.

- 2) “telling the father about a father’s role in supporting the mother and attempt to stabilize the marital relationship”

We assist the family by suggesting what the father can do to support the mother’s mental condition and to share in the child care.

- 3) “refraining from matters that would involve divorce”

While listening to the family, I thought it was a problem between the husband and wife, and I drew back from making suggestions. I told them they have to settle the problem of a possible divorce, and that a public health nurse cannot be involved in that kind of matters.

- 4) “understanding who the main person in the family is and how this person supports the family, and also assessing the child-rearing environment of the family”

There is no one to hold the family together. If the father falls ill, the family will be unable to secure a livelihood. Here we assess the child-rearing environment of the family while paying attention to the health condition of the father.

- 5) “encouraging acceptance of support advice in the bringing up the children and informing of the kinds of support the family can receive”

When the father's health is good, we tell him the good points in his child care, and praise him.

3.5. Support Provided by Others Involved Including Related Organizations

1) "understanding the value of social exchange and assessment of the ability to create and maintain interpersonal relationships"

We have never heard any friends. Both the father and mother have a very small social network. But we still know they are not socially isolated because they associate with limited number of friends.

2) "creating links with involved parties and telling the kind of roles they may play"

They are rarely involved with their neighbors and parents. This is why authorities concerned have to support the family. First of all we try to create a relationship where the family can tell about their problems to public health nurses.

3) "establishing support arrangements to enable intervention when necessary"

I think he will reject any intervention regardless of which authority intervenes. Then we have to just wait, and watch for an opportunity like when the father is working. The father does not seek for our help. I will then make the necessary arrangements with the authority concerned. I prepare to introduce interventions immediately when they are needed.

4) "alerting relevant organization to be in contact with the family to detect signs of abuse earliest possible"

We felt relieved to know that the children started to go to nursery school. The authority concerned has been keeping a close eye on whether there are signs of child abuse.

5) "sharing information and establishing support frameworks to provide interventions as required"

We contacted the child consultation center. So, we think a child welfare worker will provide intervention. Public health nurses will provide and share information during a care meeting.

4. Discussion

The kinds of support in this study are classified into direct support for the father, support for other family members, and support provided by others involved including related organizations. Kahn & Antonucci have proposed a convoy model related social network [10].

This model represents the structure of a network centered on fathers. The results in the present case are also similar: the public health nurse (hereinafter, PHN) has structurally conceptualized the social circles comprising close family members and other acquaintances of the father.

In supporting the father, the PHN has a strong awareness of the contexts of abuse and situations that gave rise to such abuse, as well as a detailed understanding of the father's psychological state while abusing his children. It seems that the father support begins with the PHN trying to understand the father's image.

The PHN tries to understand not only the psychological state of the father but also the environment in which he is raised. In understanding the background of the father's abusive psychology, it is important to know how the father expresses his emotions; therefore, the psychological state of the father must be understood in a comprehensive manner [6].

In this case, it is revealed that it is difficult to assess the details of the father's image, which results in not being able to evaluate the intervention. As the International Labor Organization has reported recently, medical professionals are likely to be subjected to violence in their work environment. Violence in the medical environment is a very serious social problem [11]. Violence in an at-home care setting also has to be examined. It is essential to find new methods to approach cases such as how to handle the situation when the PHN experiences fear when visiting the father alone at his home.

As indicated in previous studies on support for mothers [12], thinking about children's growth and development with their parents and providing parents with concrete advice on how to interact with their children are equally essential roles of PHNs, irrespective of the parent being a mother or a father.

The PHN ascertains whether the relationship between the husband and wife is stable, and provides support to maintain the spousal relationship. In order to encourage the father to adjust to his role as a father, preparation for the role, education, as well as spousal communication is necessary [13]. It is essential to provide learning opportunities for the father to be educated on his role and to support so that the father can build a stable family relationship.

The PHN determines the key person(s) in the family and considers solutions for child-rearing issues with the

family. In recent years, social environment surrounding child rearing in Japan has changed significantly, e.g., the trend of nuclear families and changes in local communities [14]. It has been indicated that the family alone often cannot bear all the responsibilities of raising children, which leads to abuse. It is necessary to activate the cooperation and network in the local community, such as relatives and neighbors [15]. All the cases in the current study are nuclear families. The PHN assesses the support status and provides support to improve the child-rearing ability of the whole family. It seems that the PHN is empowering the father and the family members.

The PHN ascertained father's the relationships people who surrounded him to verify whether he was socially isolated or not. Furthermore, the PHN helped the father build relationships with those who are involved, and provided him with the roles others play. When the family is isolated from the surroundings, it delays the child abuse from being noticed, which leads to serious risk. By constantly understanding the father's relationship with non-family members, the PHN seemed to be trying to determine whether the father had the ability to form relationships with non-family members. In this case, the PHN mediated the father to start forming relationships with people that the father could build a trusting relationship, when the father exhibited rejective tendency to people surrounding him. It is important to create a space where the father can express himself with a sense of security and build relationships [16].

In Japan, network collaboration of related agencies has been legislated to prevent child abuse [17]. Health authorities are anticipating collaboration between child consultation centers and network construction. The result of building the support system as seen in this case is in concert with the government measures. It was found that PHNs arrange support measures that enable intervention as it becomes required, and that this enables learning of suggestions for child-abuse preventing activities. Also, the findings show the difficulties of intervention where it is difficult to understand a father's personality when identifying the existence of an abusive situation. This emphasizes the necessity to understand a father's mental state to be able to establish a supportive relationship with the father. It became clear that the support provided for fathers in collaboration with related organizations includes efforts to obtain knowledge of the fathers and share information as well as establish a support framework for implementation of the support. It was found that PHNs arrange support measures that enable intervention as it becomes required, and that this enables learning of suggestions for child-abuse preventing activities. Also, the findings show the difficulties of intervention where it is difficult to understand a father's personality when identifying the existence of an abusive situation. This emphasizes the necessity to understand a father's mental state to be able to establish a supportive relationship with the father.

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The research team expresses thanks to the participants for accepting to be interviewed and making room in their busy schedules.

Limitations

The present study has the following limitations: we addressed only cases that were dealt with by PHNs who worked in public health centers. The support contents of the fathers were not reported by the fathers themselves or others involved, but the support contents perceived by the PHNs.

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