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1. Effects of QX-314 (N-ethyl-Lidocaine) on Slow Ventral Root Potentials in Neonatal Rats
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A quaternary derivative of lidocaine, QX-314, produces local anesthetic effects when it is administered to neurons intracellularly, because it is membrane impermeable due to its positive charge. Extracellular application of QX-314 may be effective in blocking nociceptors if applied together with capsaicin (a transient receptor potential vanilloid 1 [TRPV1] agonist), as QX-314 could permeate through the TRPV1 channels opened by capsaicin. We examined the effects of extracellularly applied QX-314 and capsaicin on the spinal nociceptive response. Spinal cord preparations (L1 to L5 level) were isolated from Wistar rats (postnatal day 0-3) under deep isoflurane anesthesia. Preparations were superfused continuously at 2.5–3 ml/min in a 2 ml chamber with artificial cerebrospinal fluid. To evaluate the effects of QX-314 on putative nociceptive response, we stimulated the dorsal root of L3 every 60 s with a 5–20 V, 200 µs square pulse and measured the slow ventral root potentials in reflex responses recorded from the ipsilateral L3 ventral root. Capsaicin (10 µM) and/or QX-314 (10, 100, 1000 µM) were bath applied for 20 min and washed out. Sole application of capsaicin induced a transient decrease of the reflex response followed by recovery. Co-application of capsaicin and 1000 µM QX-314 induced a significant decrease of the reflex response without recovery. These results suggest that co-application of QX-314 and capsaicin can produce long-lasting local anesthesia. This report provides further evidence of the basic neuronal mechanisms which support the clinical use of QX-314 for analgesic treatment, although consideration of the side effects would be necessary.

Key words: QX-314, nociceptive response, in vitro

2. Effect of Electric Foot Warmer on Changes in Body Temperature
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Electric foot (EF) warmers are often used because they can be switched on for easy thermoregulation. However, the effects of EF warmers on changes in body temperature are not well understood. Therefore, the aim of the present study was to investigate the effects of EF warmers on body temperature. Subjects (10 women) were recruited from our university and provided informed consent. The study was performed in the laboratory, with an ambient temperature of approximately 25°C and humidity of approximately 55%. Body temperature was measured from 15:00 to 16:00 hours. The EF warmer was set to approximately 40°C and placed between the feet so as not to touch either of a subject’s feet. Core and shell (hand and knee) temperatures were measured to investigate the effects of warming by the EF warmer on body temperature. Core temperature was not affected by the EF warmer, with core temperature before and after exposure of the feet to the EF warmer for 10min nearly identical (no significant difference). Conversely, the shell temperature of the hand, but not that of the knee, increased gradually following exposure to the EF warmer, peaking after 5 min warming and then declining back to control levels.

Key words: electric foot warmer, body temperature, core temperature, shell temperature, increase
3. Factors Affecting Intention to Leave among Nurses Working in Long-term Healthcare Facilities, with an Aim to Intervene on Nurse while Focusing on Work Engagement

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We live in an increasingly aging society, and the number of long-term healthcare facilities is increasing worldwide, including in Japan. Because elderly people may require continuous medical management, nurses play important roles in long-term healthcare facilities. However, the job separation rate of nurses in such facilities is high. The present study was undertaken to identify the factors contributing to job separation, and to propose a new program that focuses on engaging with nurses working in long-term healthcare facilities to increase the retention rate. A questionnaire was sent to nurses working in long-term healthcare facilities. Nurses’ job satisfaction, motivation to learn, health condition, work engagement, and intention to leave were assessed from the questionnaire using covariance structure analysis. Of the 940 questionnaires sent out, 270 were returned. Of these, 183 (67.8\%) were valid responses.

The path diagram contained four latent variables and 14 observed variables. The indices were as follows: goodness of fit (GFI) = 0.915; adjusted GFI (AGFI) = 0.878; comparative fit index = 0.973; and root mean square error of approximation = 0.059. Although the average AGFI was low, the remaining values conformed to the fit criteria. The variables for which a causal relationship with intention to leave was found were health (β = −0.30) and job satisfaction (β = −0.48); variables related to work engagement were health (β = 0.44), job satisfaction (β = 0.69), and finding purpose in the work (β = −0.16). Conversely, the correlation between motivation to learn and purpose to learn was weak (β = −0.25). These results suggest that work engagement is indirectly related to intention to leave, and paying closer attention to work engagement would likely reduce job separation.

Key words: work engagement, intention to leave, covariance structure analysis, long-term healthcare facility

4. Characteristics of Self-Care Agency in Peritoneal Dialysis Patients

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The purpose of this research is to clarify different characteristics of PD (peritoneal dialysis) patients. Research participants, who were given a written informed consent, are 87 adult peritoneal dialysis patients, aged 30–80 years old (mean age 59.4 years). The method of research is an anonymous self-report questionnaire style survey. The existing measurement Peritoneal Dialysis Self-Care Agency (PDSCA) scale was used in the questionnaire to measure patients’ Self-Care Agency. Patient attributes such as sex, age, dialysis duration, the existence of the SMAP (Stepwise initiation of peritoneal dialysis using Moncrief And Popovich technique enforcement, the peritoneal dialysis catheter exit site, and main PD enforcer was investigated. The statistical method was used to analysis the data. Mann-Whitney U Test and Kruskal-Wallis Test were conducted to examine the difference in Self-Care Agency according to the attributes of the patients, significant difference was found in Reception Agency. Reception Agency are subordinate concepts of Self-care agency and which means ability to accept burden and restriction associated with self-care. Age 70–80 years-old generation got higher scores than 20–50 and 60 years-old generations in Reception Agency. Also, the peritoneal dialysis catheter exit site at the mid abdomen part got high scores than at the right and left abdomen parts in Reception Agency. From these results, it was suggested that self-care agency needs to consider age and peritoneal dialysis catheter exit site.

Key words: peritoneal dialysis, body image, self-care agency, characteristics
5. Nursing Practice in Rehabilitation Wards: Focus on Discharge Support

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The purpose of the present study was to clarify the elements of nursing practice by analyzing the performance of veteran nurses in hospital rehabilitation wards. Ten veteran nurses were recruited from three rehabilitation wards of two hospitals; all provided a written informed consent before participating in the study. Data were collected through observations of and interviews with the 10 veteran nurses. The nurses were observed during the morning, until lunch time, when a significant amount of patient care and training is provided. The data collected during the observation period were assembled into field notes. Interviews were recorded and transcribed verbatim. Analysis of the situations and behaviors of the veteran nurses revealed three themes. The most important theme involved coordinating a patient’s life after discharge: (i) ensuring that patients had time to prepare for discharge by providing them with information regarding their decision, and making relevant arrangements; (ii) always involving family members in patient care and gradually shifting responsibility for the patient to them; and (iii) realization of support by actualizing the patient’s will and providing consultation.

Key words: nursing practice, convalescent rehabilitation wards


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The early detection of unruptured cerebral aneurysms has become possible due to advanced medical imaging, such as CT and MRI. However, the side effects of treating an unruptured cerebral aneurysm need to be considered prior to treatment. Generally, the probability of rupture is thought to be high when the aneurysm is 5 mm or larger, but there are other factors such as shape, occurrence site, lifestyle and age, which can affect this risk. Therefore, given these various risk factors, the actual probability of rupture and the need for treatment can be difficult to judge. In recent years, reports have suggested that it is possible to predict the state of an aneurysm using Computational Fluid Dynamics (CFD) software to analyze blood flow. However, analysis results are not consistent, therefore different decisions may be made depending on which results are assessed. This variability may be due to a lack of standardization of analysis conditions for medical imaging for CFD analysis. To address this, we made a phantom cerebral aneurysm and conducted CFD analysis using blood flow analysis software with standardized scan and analysis conditions. Using these standardized conditions, it was considered whether blood flow analysis software could be used effectively in the predictive evaluation of cerebral aneurysm growth and rupture.

Key words: unruptured aneurysm, blood flow analysis software, computational fluid dynamics (CFD), growth and rupture, nursing practice, convalescent rehabilitation wards

7. Effect of Pregnancy on the Development of Oxidative Stress Responses

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Oxidative stress responses are well known to play important roles in the development of pregnancy-related complications. However, there is little information on...
the relationship between oxidative stress responses and pregnancy. Therefore, the aim of the present study was to examine the effects of pregnancy on the development of oxidative stress responses. Healthy women with singleton pregnancies who were free of pregnancy complications and chronic illnesses were divided into four groups, namely those in the first, second, and third trimesters and those 1 month postpartum. Urine samples were obtained from pregnant women and non-pregnant healthy controls, and levels of the oxidative stress markers isoprostane, hexanyl-lysine, 8-hydroxydeoxyguanosine (8-OHDG), and biopyrrin were examined by ELISA. Urine samples obtained from women in their third trimester contained significantly higher levels of oxidative stress markers than those from non-pregnant women and women in their first and second trimesters. Urinary levels of the oxidative stress markers isoprostane, hexanyl-lysine, 8-OHDG, and biopyrrin decreased significantly 1 month postpartum compared with levels during the third trimester. These results strongly suggest that oxidative stress responses may occur in the third trimester of pregnancy.

**Key words**: pregnancy, oxidative stress responses, urine