



A description of Canadian epilepsy monitoring units: An initial step toward developing nursing practice consensus guidelines



Margo DeVries-Rizzo* on behalf of the Canadian Epilepsy Nursing Group

Children's Hospital, London Health Sciences Centre, London, ON, Canada
Western University, London, ON, Canada

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ABSTRACT

Objective: The epilepsy monitoring unit (EMU) is a well-established resource for investigating patients' seizures but is known to be heterogeneous in organization and clinical practice. The purpose of this study was to gain a better understanding of similarities and differences in EMU characteristics across Canada, with specific emphasis on EMU organization and nursing resources, which were currently unknown. Results would be used to develop a consensus on best nursing practice guidelines in EMUs with the goal to improve patient care and safety during epilepsy monitoring admissions.

Methods: An 18-item survey was developed addressing EMU locations, types, nursing ratios, nursing roles, and other allied health resources. Surveys were distributed to lead nurses, physicians, and administrators in 29 EMUs across Canada. Results were tabulated and presented for each question in the survey.

Conclusion: All EMUs were located in urban, teaching centers and divided similarly by patient age. The survey demonstrated considerable variability in EMU bed location and organization with the majority of EMUs being smaller, open units embedded in wards rather than larger, closed units. Independent of patient acuity, variability also existed in nurse-to-patient ratios, nursing skill level, specialty nursing support, and EEG technician availability. These findings highlight that EMU heterogeneity contributes to the challenges in the development of standardized safe care practices and that nursing education and nursing best practice recommendations need to be developed with baseline EMU nursing competencies, skills, and knowledge in mind.

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1. Introduction

The epilepsy monitoring unit (EMU) is where long-term video electroencephalography (VEEG) monitoring occurs, making it an essential resource in the comprehensive diagnosis and management of seizures [1,2]. The EMUs are recognized as mainstays in specialized epilepsy centers [3], and long-term VEEG monitoring is generally considered a safe procedure [4–8]. However, a paucity of research exists regarding the management of patient care during EMU monitoring, illuminating a significant lack in patient safety guidelines and standardized care practices [2,4,7–9]. Heterogeneity in EMU composition, access to technology, and human health resources further complicate the process of developing standardized care. Additionally, variations in health care systems make EMU comparisons difficult, sometimes even within the same country. This diversity negatively impacts the development of care standardization, which may ultimately constrain patient care and safety [10,11].

Recently, research has emerged with expert consensus recommendations about standardizing EMU practice in order to improve patient

outcomes, with a particular emphasis on patient safety [2,4,7,9,12,13]. Although injury is reported to be rare in EMUs, little evidence exists on death and adverse event rates; thus, the true impact on patient safety is not well understood [5,6,12]. Variations in EMU settings, individualized management practices (administration of rescue medication, drug withdrawal, patient supervision), differences in health care providers, and lack of protocols and policies [1,2,8,9] further illuminate the need for standardized clinical practice protocols as possible solutions for enhancing patient safety, a critical element in ensuring excellence in patient care.

The Canadian Epilepsy Nursing Group (CENG) is a group of expert epilepsy nurses and nurse practitioners across Canada. Created in 2011, the purpose of CENG is to share expert knowledge and resources about the collective clinical care of patients in EMUs to strive for optimal safe patient-centered care. This was in direct response to the paucity of literature on standardized practices in EMUs and existing research that identified variations and gaps in unit organization and care, reinforcing that information for nursing care for epilepsy patients is “sparse and... on EMUs is even more so...with no consensus on quality care” [1]. Current literature suggests general nursing recommendations for seizure assessment and monitoring [14] and provides some guidelines for services, personnel, and facilities in US tertiary and quaternary epilepsy centers [3], but additional data are needed to continue to

* Children's Hospital, London Health Sciences Centre, 800 Commissioners Rd E, London, Ontario, Canada. Tel.: +1 5196858500.

E-mail address: margo.devries-rizzo@lhsc.on.ca.

improve care for EMU patients. As others have noted, when systematic review known to influence standardization is absent, a broader expert consensus may be key in the development of best practices to promote patient safety [2,4,13]. As such, CENG members identified the need for a national project to develop EMU nursing practice consensus recommendations. Members believed that each hospital where long-term VEEG monitoring was occurring could be identified in Canada and that a national perspective of EMU characteristics would best inform this endeavor.

Canada has a publically funded, socialized health care system and large national nursing presence allowing for comparisons of EMU organization and nursing roles across the country. The current study reports on a national descriptive survey of current EMUs in Canada in order to identify general characteristics such as unit location, types of monitoring, nursing support, nursing-to-patient ratios, EEG technician and other allied health support, and imaging resources. The survey was undertaken as part of an initial evaluation in preparation for a larger project (in progress) being conducted by several members of the CENG to develop best practice consensus nursing guidelines to promote excellence in care and protect patient safety.

2. Methods

The CENG network identified 31 possible EMUs, which were defined as units that had hospital inpatient beds dedicated to the prolonged VEEG monitoring of patients. Epilepsy monitoring services were not occurring at two centers, resulting in a final sample of 29 EMUs. Between July 2014 and January 2015, e-mails were sent to all centers inviting participation in the study, outlining project intent, and containing an 18-item focused questionnaire (Appendix 1). Although ethics approval was not required as it was a program evaluation study, Canadian federal research policy [15] was complied with and relevant quality improvement reporting guidelines [16] adhered to. Participation was voluntary, and all participants provided consent for their data to be used for program evaluation purposes.

3. Results

Twenty-eight questionnaires were returned for a 97% response rate. Twenty-seven questionnaires were completed by expert epilepsy nurses, and one was completed by a hospital director. Responses were not anonymous.

3.1. General characteristics of EMUs

The participating EMUs were located within eight of the ten provinces [Fig. 1]. Ontario, Quebec, and Alberta accounted for the majority (68%) of epilepsy monitoring services in the country. This was reflective

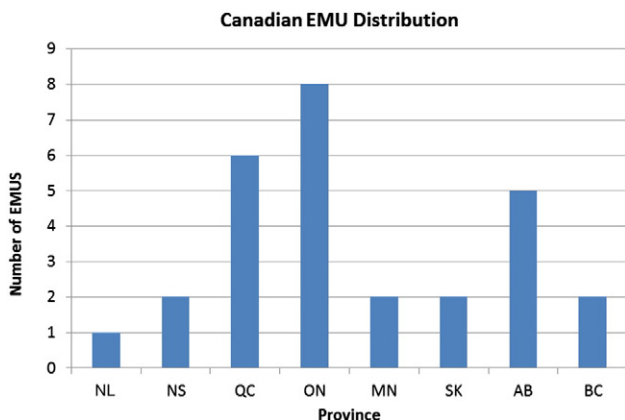


Fig. 1. Canadian EMU geographic distribution. BC: British Columbia, AB: Alberta, SK: Saskatchewan, MN: Manitoba, ON: Ontario, QC: Quebec, NS: Nova Scotia, NL: Newfoundland.

of the population distribution in Canada, in which Ontario and Quebec account for 62% of the national population [17]. No EMUs existed in New Brunswick, Prince Edward Island, or the three Northern Territories. General EMU characteristics are summarized in Table 1.

3.2. Bed allocation

The EMU bed capacity ranged from one to eleven beds (mean = 2). Twenty-one EMUs (75%) reported operating 1–2 beds, three (11%) reported 3–4 beds, and four (14%) reported 5–11 beds. Overall, telemetry bed location was variable. Four centers (14%), all with four or more beds, had closed (stand-alone) EMUs. One larger epilepsy monitoring service (>5 beds) was embedded in a general neuroscience ward. The majority of EMUs (24 centers or 86%), ranging in bed size from 1–7 beds, were open units, embedded in general neuroscience, neuro-observation, medicine, surgery, general pediatric wards, or pediatric intensive care units (Fig. 2). One 3-bed surgical EMU reported that, during the daytime, patients would move to beds located in the outpatient epilepsy clinic and then return to the inpatient neurology unit for overnight supervision. Three medical EMUs (≤ 3 beds) reported being embedded in either step down or intensive care units. Results suggest that unit size and location were at times independent of each other.

3.3. Nurse-to-patient ratios

Nurse-to-patient ratios are shown in Table 2. The majority of EMUs ($n = 19$, 68%) reported nurse-to-patient ratios of 1-to-4 or less. Only eight EMUs (42%) reported that they reduce their nurse-to-patient ratios during invasive monitoring. Overall, nurse-to-patient ratios did not vary between daytime/nighttime shifts or days of the week with only one center (surgical) reporting that they changed from a daytime nurse-to-patient ratio of 1:3 to 1:4 at night. Two additional adult centers did not report reducing nurse-to-patient ratios at night but did indicate using a dedicated “watcher” or “sitter”, defined as either a nursing assistant or an unlicensed health care provider “trained to recognize” seizures. Centers did not show differences in nurse-to-patient ratios when comparing pediatric and adult monitoring services.

3.4. Nursing resources

Results of nursing skill mix for the provision of direct patient care and nurse specialist resources are shown in Table 3. Several centers employed expert epilepsy nurses with various specialty titles. Given this heterogeneity, three distinctions were made in the analysis based on educational requirements for nursing scope of practice in Canada: a) registered nurse (baccalaureate prepared), b) clinical nurse specialist (master's prepared), and c) nurse practitioner (master's or doctorate prepared with additional licensing to diagnose and prescribe). Only 39% (11/28) of total EMU services reported having advanced practice nursing roles (CNS/NP), with 27% (3/11) being dedicated to nonsurgical EMUs. One of the largest EMUs reported no extended nursing roles, whereas other smaller EMUs had both dedicated and shared extended nursing roles suggesting that bed census and nursing resources were at times independent of each other.

3.5. EEG technologist, interprofessional support, and imaging resources

Interprofessional support, imaging resources, and EEG technologist availability are summarized in Table 4. For interprofessional support, all 28 centers reported having neuropsychology, pharmacy, and psychiatry services with the majority being shared services. In addition, all EMUs reported having MRI availability.

After hours and weekend EEG technologist support was difficult to summarize given much variability and often determined on a case by case basis. Text examples noted that a technologist would be called in for emergencies with physician approval or scheduled in advance if an

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