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ORIGINAL RESEARCH:
EMPIRICAL RESEARCH – QUANTITATIVE

Do all patients in the epilepsy monitoring unit experience the same level of comfort? A quantitative exploratory secondary analysis

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Abstract

Aims: To find out which variables may be associated with comfort of patients in an epilepsy monitoring unit.

Design: Exploratory, quantitative study design.

Methods: Data were collected from October 2018 to November 2019 in Austria and Southern Germany. A total of 267 patients of 10 epilepsy centres completed the Epilepsy Monitoring Unit Comfort Questionnaire which is based on Kolcaba's General Comfort Questionnaire. Secondary data analysis were conducted by using descriptive statistics and an exploratory model building approach, including different linear regression models and several sensitivity analyses.

Results: Total comfort scores ranged from 83 to 235 points. Gender, occupation and centre turned out to be possible influential variables. On average, women had a total comfort score 4.69 points higher than men, and retired persons 28.2 points higher than high school students ≥18 years. Comfort scores of younger patients were lower than those of older patients. However, age did not show a statistically significant effect. The same could be observed in marital status and educational levels.

Conclusion: When implementing comfort measures, nurses must be aware of variables which could influence the intervention negatively. Especially, high school students ≥18 years should be supported by epilepsy specialist nurses, in order to reduce uncertainty, anxiety and discomfort. But, since the identified variables account only for a small proportion of the inter-individual variability in comfort scores, further studies are needed to find out additional relevant aspects and to examine centre-specific effects more closely.

Impact: Nurses ensure patient comfort during a hospital stay. However, there are variables that may impair the effectiveness of the nursing measures. Our study showed that the experience of comfort was highly individual and could be explained by sociodemographic variables only to a limited extent. Nurses must be aware that additional factors, such as the situation in the individual setting, may be relevant.

KEYWORDS
comfort care, epilepsy, epilepsy monitoring unit, intervening variables, nurses, nursing concept, patient comfort

1 | INTRODUCTION

About seven in 1000 people are affected by any kind of epilepsy (Fiest et al., 2017) and despite best medication one-third of them do not become seizure-free (Pati & Alexopoulos, 2010). For some of these patients epileptologists recommend hospitalization in an epilepsy monitoring unit (EMU). However, it is not only patients with drug-resistant epilepsy who are treated as inpatients in the EMU. Patients are also admitted because it is unclear whether their seizures are of epileptic or non-epileptic origin, or when the frequency of their seizures should be quantified. The aim of the stay is to observe changes in the patient's behaviour and analyse the brain electric activity during a seizure. Therefore, patients are continuously monitored via electroencephalograms, audio- as well as video recordings and several additional tests, for example single-photon emission computed tomography (Rosenow et al., 2016). Since patients should have seizures during their stay, antiseizure medication is tapered off and additional seizure facilitating procedures, such as sleep deprivation, are undertaken. Because of an enhanced risk of injury, different safety measures, such as restricted mobility, padded guard rails and surveillance by professional staff are standard in this setting (Kobulashvili et al., 2016; Rosenow et al., 2016). Mostly, EMUs are a part of neurological or neurosurgical wards in epilepsy centres. The size of these units ranges from one to seven or more beds in single, double or multi-bed rooms (Kobulashvili et al., 2016). The rooms may be equipped with TV, radio and internet access. The length of the stay depends on the admission indication and the patient's individual situation. Mostly, it is 3–7 days; and with fees ranging up to €2200 per day, hospitalization in the EMU can be costly (Kobulashvili et al., 2016). Physicians, technicians and nurses look after the patients, with the nursing staff either caring only for the patients in the EMU or additionally for the other patients on the ward. EMU patients report violation of privacy, boredom and concerns about their health. But they also hope that based on the diagnostic findings their quality of life will improve. This should be reached by a reduction in seizure frequency or by seizure freedom (Egger-Rainer et al., 2017). There are few EMU beds in epilepsy centres and the waiting time for inpatient admission can be several weeks to months. It is, therefore, important that occupancy is well planned and that patients keep their admission appointment. Because of past experiences in the EMU some patients object to a necessary readmission. Others end their stay prematurely because of the perceived stress. In an American study, 4.1% of the patients left the EMU early (Caller et al., 2014), and in an Australian study the figure was 12.5% (Andrewes et al., 1999).

Experienced comfort can help the patients to overcome stressful situations (Kolcaba, 2003). Comfort is a basic human need and people strive for a high level of comfort (Gropper, 1992), whereby '[t]he comfort level appears to be the maximum level that a patient can bear or tolerate without becoming distressed' (Morse et al., 1994, p. 194). During a hospital stay, it is the nurses who have to ensure this experience (Kolcaba, 2003). To reach this goal, nurses must know

the patient's current comfort level and possible intervening variables on nursing comfort measures.

1.1 | Background

In the mid-19th century, Florence Nightingale described the importance of comfort for sick people and defined the care of a high level of patient comfort as a central nursing task. It is demanding to ensure patient comfort because the nurse must recognize the patient's individual comfort needs in a momentary situation. But the situation can change quickly and so can the patient's needs (Gropper, 1992). Kolcaba (2003) describes that comfort is a two-dimensional holistic construct. This construct comprises three comfort types: (1) Relief, meaning that the patient experiences having a specific comfort need met; (2) ease, relating to a state in which the patient experiences calm or contentment; and (3) transcendence, meaning that the patient can rise above a specific problem. The three comfort types are experienced in four comfort contexts: physical, psychospiritual, sociocultural and environmental. According to Kolcaba's comfort theory, each patient has specific comfort needs that arise in stressful situations. Nurses address these needs by setting individualized comfort measures within the framework of comfort care. If the comfort measures are appropriate, the patient comfort can increase. The patient feels strengthened and empowered to cope with the stressful situation and to engage in health-seeking behaviours, for example following necessary restrictions. However, nurses must be aware of intervening variables that might render the intervention ineffective (Kolcaba, 2003). Comfort levels are assessed with dedicated comfort questionnaires, such as the Epilepsy Monitoring Unit Comfort Questionnaire (EMUCQ) (Egger-Rainer et al., 2020). To provide comfort-enhancing interventions nurses select from three different measure types: (1) Technical comfort measures, which aim at physiological functions; (2) coaching, which targets anxiety reduction and realistic planning of recovery; and (3) comfort food for the soul, which means unexpected measures that target transcendence. Due to the holistic nature of comfort, measures that increase one comfort type also have positive effects on the other ones. Therefore, total comfort is greater than the sum of its parts (Kolcaba, 2003). As already mentioned, the effectiveness of the intervention depends not only on its appropriateness, but also on the intervening variables. These variables interact with each other and are inherent in a situation. They may be parts of persons, for example sociodemographic characteristics, health history and culture. Or they may comprise different factors such as the patient's previous experiences, the caring model and local conditions (Kolcaba, 2003). Since the intervening variables cannot be addressed by nursing interventions, or only to a limited extent (Kolcaba, 2003), it is all the more important that nurses learn about them. However, little is known which intervening variables may be relevant in the EMU. Therefore, we used data from the EMUCQ validity study (Egger-Rainer et al., 2020) to gain deeper insight into the topic.

2 | THE STUDY

2.1 | Aims

The aim of the study was to find out which variables might be associated with comfort of EMU patients.

2.2 | Design

We used an exploratory, quantitative study design and conducted a secondary analysis of data obtained in the multi-centre EMUCQ validity study (Egger-Rainer et al., 2020). The statistical approaches that are used in this analysis have been specified in advance, and are described in detail in the data analysis section below. However, the explanatory variables of the respective models were not selected based on previous knowledge, but rather in a data-driven way.

2.3 | Sample/Participants

Participants were recruited consecutively in 10 EMUs comprising a total of 51 beds, in Austria and South Germany. Patients with at least 18 years of age were eligible if they were hospitalized in the EMU for 5 days or longer, literate in German, not mentally disabled and had signed the informed consent form. The sample size was determined according to standard methodological recommendations for factor analysis. For more details please refer to the previous study (Egger-Rainer et al., 2020).

2.4 | Data collection

Data collection lasted from October 2018 to November 2019. The local researchers approached eligible patients and explained to them the aim of the study. Patients who agreed to participate in it filled out a questionnaire and reported the occurrence of seizures on the second and on the last day of their stay in the EMU. Additionally, at the first time point participants completed a form with sociodemographic data regarding gender, age, marital status, educational level and occupation. Patients also reported their reason for referral. Information on mobility restrictions was provided by the local researchers of the respective EMUs. The data collection procedure is reported in detail elsewhere (Egger-Rainer et al., 2020).

2.5 | The questionnaire

The EMUCQ was used to collect the data. This questionnaire was based on Kolcaba's General Comfort Questionnaire (Kolcaba, 2003) and was specially designed to assess patient comfort in the EMU. It is a self-completion, paper-pencil instrument for adult patients. The EMUCQ consists of 42 items and shows the three comfort types in three subscales. Patients rate their comfort on a six-point Likert-type scale in which 1 means 'strongly disagree' and 6 means 'strongly agree'. Before statistical analysis is performed, negatively worded items are coded inversely and, therefore, higher scores mean higher comfort levels. The minimal and maximal reachable scores are different for the comfort type 'relief' (range 13–78) the comfort type 'ease' (range 18–108) and the comfort type 'transcendence' (range 11–66). For total comfort, a minimum of 42 points and a maximum of 252 points can be reached (Egger-Rainer et al., 2020). Kolcaba (2003) recommended discussing the results analogously to the comfort contexts, too. Thus, following Kolcaba's theoretical assumptions, the EMUCQ items were assigned to four subscales corresponding to the comfort contexts: physical (range 10–60), psychospiritual (range 11–66), sociocultural (range 6–36) and environmental (range 15–95) comfort. The assignment of the items to the subscales of the two comfort dimensions can be found in the appendix in Table A1.

2.6 | Ethical considerations

In the conduct of the study, the provisions of the Declaration of Helsinki were followed. Approval was obtained of the local ethics commissions in Baden-Württemberg (B-F-2018-099), Erlangen (440_18Bc), Innsbruck (1143/2018), Linz (1104/2018), Munich (18-573), Salzburg (415_EP/73/700-2016), Tübingen (589/2018BO1) and Vienna (1672/2018). All patients were informed verbally and in writing by the local researchers and were free to participate in the study.

2.7 | Data analysis

Data of the first data collection time point, which was the second day of the patients' stay in the EMU, were used for analysis. To explore the sociodemographic characteristics of the participants, frequency, mean and standard deviation (*SD*) were calculated, as appropriate. For the comfort scores we report range, mean and *SD*. The Statistical Package for the Social Sciences (SPSS) 23 was used in this regard. An exploratory model building approach was adopted to analyse potential associations between the comfort scores and demographic/clinical characteristics. Only complete patient data sets were included in the analysis. At first, after some basic descriptive analyses, a multiple linear regression model was considered. The model included gender, age, marital status, educational level, occupation, mobility, reason for referral, occurrence of seizures and centre as explanatory variables and the overall comfort score as outcome variable. In a second step, the final model was obtained by excluding some explanatory variables that were highly correlated, in order to avoid problems due to multicollinearity. Finally, two models––including gender, occupation and centre––fitted the data almost equally well; although, one of them did not yield estimates for all explanatory variables, due to computational issues. Thus, this model is only reported as supporting information (Table S1) and the other one was chosen as the main model in the present manuscript. For the explanatory variables included in the latter model, additionally, linear regression models for the subscales of the EMUCQ, which are also reported as supporting information (Tables S2 and S3), were employed. In order to further assess the stability of the results, several additional sensitivity analyses using different sets of explanatory variables were conducted. Furthermore, the model appropriateness was also assessed by using residual and QQ plots. Results of the linear regression models are reported as regression coefficients along with standard errors (SE) and corresponding *p*-values. The significance level was set at $\alpha = .05$. All analyses were conducted by using R version 4.0.2 (R Core Team, 2020).

2.8 | Validity and reliability

Validity and reliability for the three factorial solution of the EMUCQ is reported in detail in Egger-Rainer et al. (2020). For the three subscales and the total comfort scale the convergent validity was supported with all correlations ≥.03 ($p < .001$). The internal consistency was good (Cronbach alpha values .77–.88). For the four factorial solution of the EMUCQ internal consistency ranged from .53 to .82 in this study.

3 | RESULTS

3.1 | Sample characteristics

The 267 patients, who participated in the study, were between 18 and 84 years of age with a mean age of 39.39 (*SD* 16.36) years. A total of 140 (52.4%) patients were female, 79 (29.6%) had finished high school and 89 (33.3%) were full-time employees working 38–40 h per week. While epilepsy as the reason for referral was reported by 109 (40.8%) patients, 38 (14.3%) patients did not report any reason. Already 53 (19.9%) patients had had a seizure in the EMU before filling out the questionnaire. Full information regarding the participants' sociodemographic information can be found in Table 1. Most patients had to stay in bed except for going to the bathroom/toilet. In certain cases they were accompanied by a nurse. Depending on the severity of the disease, selected patients were allowed to walk around the room and take their meals sitting at a table in four centres (B, E, F, H). In centre F, some patients were also allowed to leave the EMU for about 30 min several times a day to go to the cafeteria or to go smoking. Patients with invasive EEG-electrodes were confined to bed in all centres. One centre did not report the regulations.

TABLE 1 Descriptive statistics for patient characteristics and EMUCQ total comfort scores (n = 267)

	Frequency	EMUCQ Score (total comfort)	
	n (%)	Range[a]	Mean (*SD*)
Gender			
Male	124 (46.5)	113–232	179.74 (25.59)
Female	140 (52.4)	83–235	182.94 (26.31)
Missing	3 (1.1)		
Age			
18–20 years	29 (10.9)	125–221	178.83 (25.81)
21–40 years	123 (46.1)	83–232	179.36 (24.93)
41–60 years	82 (30.6)	121–235	181.11 (27.53)
60–84 years	32 (12.0)	143–230	192.47 (24.11)
Missing	1 (0.4)		
Marital status			
Single	115 (43.1)	83–232	178.74 (26.86)
Married/Unmarried couple	132 (49.4)	123–235	183.88 (25.24)
Divorced	12 (4.5)	129–211	175.25 (21.14)
Widowed	7 (2.6)	139–224	189.57 (29.80)
Missing	1 (0.4)		
Education			
Compulsory School	71 (26.6)	83–233	183.32 (26.02)
High School	47 (17.6)	129–235	183.60 (23.61)
High School Diploma	32 (12.0)	121–221	174.19 (27.67)
Vocational Training	75 (28.0)	123–230	182.29 (25.24)
University Graduate	36 (13.6)	113–231	180.58 (28.57)
No school leaving certificate	2 (0.7)	177–192	184.50 (10.61)
Missing	4 (1.5)		
Occupation			
High School Student ≥18 years	8 (3.0)	125–193	162.63 (25.06)
University Student	13 (4.9)	137–221	187.77 (23.88)
Apprentice	18 (6.7)	136–216	179.00 (23.04)
Housewife/ Househusband	16 (6.0)	139–233	187.69 (22.69)
Self-employee	8 (3.0)	152–232	185.00 (27.32)
Employee full-time	89 (33.3)	113–231	179.71 (25.76)
Employee part-time	35 (13.1)	129–229	177.97 (22.57)
Unemployed/Sick leave	36 (13.5)	121–219	179.11 (25.82)
Retired	42 (15.8)	143–235	191.81 (25.64)
Missing	2 (0.7)		
Reason for referral			
Evaluation of seizure frequency	62 (23.2)	113–231	185.87 (24.93)
Epilepsy	109 (40.8)	123–235	179.34 (25.31)
Unclear epilepsy syndrome	7 (2.6)	125–205	167.86 (30.37)
Presurgical evaluation	29 (10.9)	145–222	181.21 (24.59)
Vertigo	3 (1.1)	163–190	179.00 (14.18)
Optimizing of therapy	19 (7.1)	129–219	178.53 (26.12)
Missing	38 (14.3)		
Seizure occurred			
No	194 (72.7)	113–235	181.55 (25.27)
Yes	53 (19.9)	123–231	180.87 (26.21)
Missing	20 (7.5)		
Center			
A	30 (11.2)	129–235	190.77 (27.21)
B	31 (11.6)	140–224	187.00 (23.63)
C	26 (9.7)	127–222	176.92 (24.22)
D	56 (21.0)	113–230	176.29 (24.41)
E	27 (10.1)	83–222	177.41 (31.83)
F	16 (6.0)	152–232	199.19 (24.30)
G	30 (11.2)	123–217	172.50 (25.55)

TABLE 1 (Continued)

	Frequency	EMUCQ Score (total comfort)	
	n (%)	Range[a]	Mean (*SD*)
H	10 (3.7)	139–221	179.70 (25.35)
I	33 (12.4)	145–216	181.88 (22.31)
J	8 (3.0)	143–223	183.63 (24.44)

Abbreviation: *SD*, standard deviation.

[a]EMUCQ scores range from 42 to 252 points.

TABLE 2 Results of the linear regression analysis for the main model using 'total comfort' as outcome (*n* = 263)

Variable	Coefficient (SE)	*p*-Value[†]
Gender		
Male	Reference	–
Female	4.69 (3.16)	.1392
Occupation		
High school student ≥18 years	Reference	—
University student	25.69 (10.89)	.0192
Apprentice	13.34 (10.69)	.2133
Housewife/Househusband	22.66 (10.54)	.0325
Self-employee	17.12 (12.35)	.1670
Employee full-time	14.54 (9.22)	.1160
Employee part-time	10.53 (9.65)	.2760
Unemployed/sick leave	16.09 (9.64)	.0965
Retired	28.20 (9.50)	.0033
Center		
A	Reference	—
B	−4.88 (6.25)	.4356
C	−12.73 (6.55)	.0531
D	−18.44 (5.58)	.0011
E	−9.82 (6.66)	.1419
F	8.57 (7.62)	.2618
G	−19.20 (6.40)	.0030
H	−10.90 (8.92)	.2232
I	−8.52 (6.27)	.1754
J	−7.46 (9.67)	.4412

Note: Multiple *R*-squared: 0.1524; adjusted *R*-squared: 0.08983.

Abbreviation: SE, standard error.

†*p*-values <.05 were considered statistically significant; missing data sets were excluded.

3.2 | Comfort scores

The EMUCQ scores for total comfort ranged from 83 to 235 points with a mean of 181.32 (*SD* 25.95). Higher comfort levels could be observed in women compared to men, and in patients with over 60 years of age compared to younger patients. Regarding marital status, widowed patients reported the highest total comfort, while divorced patients reported the lowest. In terms of education, the means of almost all comfort levels ranged between 180.58 (*SD* 28.57) and 184.5 (*SD* 10.61), with patients with a high school diploma reporting the lowest comfort level (174.19 [*SD* 27.67]). The mean total comfort score of high school students ≥18 was 162.63 (*SD* 25.06) points. It was about 29 points lower than that for retired persons (191.81 [*SD* 25.64]), who had the highest comfort scores. Patients, who reported an unclear epilepsy syndrome as their admission diagnosis reached the lowest comfort levels. The comfort scores were approximately the same whether the patients had already had a seizure in the EMU or not. On average, the observed comfort scores were highest in centre F while they were lowest in centre G. For detailed information please refer to Table 1. Results of the comfort scores of the subscales can be found as supporting information. Table S4 shows the EMUCQ scores by occupation and Table S5 shows the EMUCQ scores by centre.

3.3 | Influential variables of patient comfort

Gender, occupation and centre were identified as relevant influential variables. They were broadly consistent across the different models

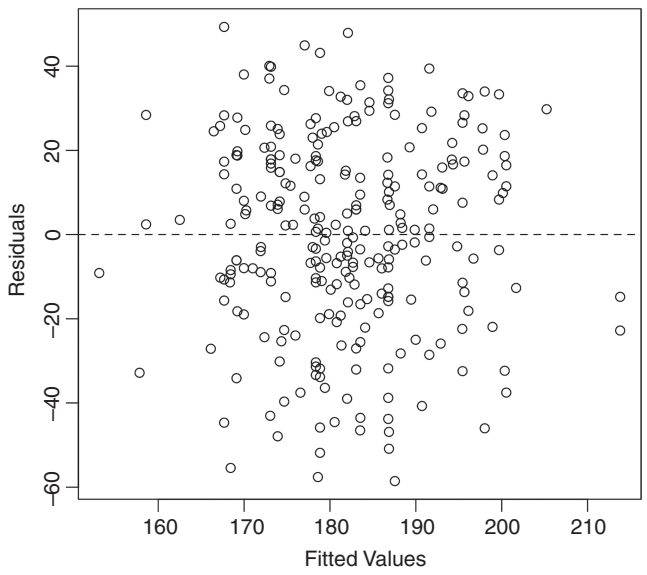

FIGURE 1 Fitted values versus residuals of linear regression analysis for the main model using 'total comfort' as outcome

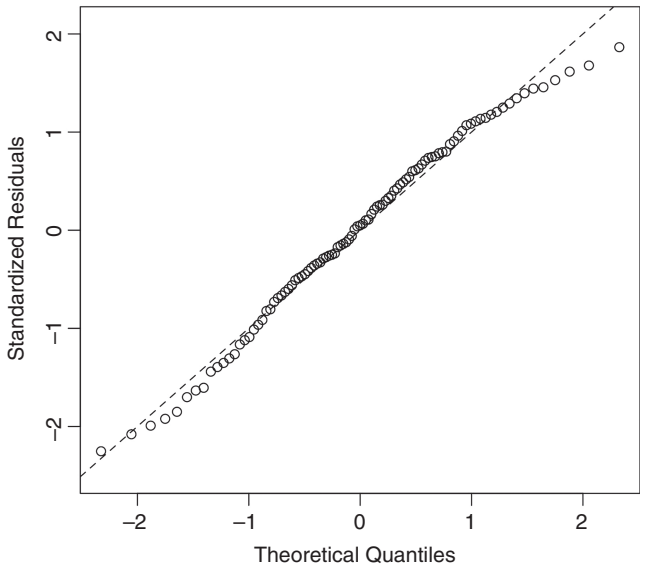

FIGURE 2 QQ-Plot of linear regression analysis for the main model using 'total comfort' as outcome

calculated. Therefore, for the sake of clarity, only the results of the final model are reported in detail in Table 2. The appropriateness of this model is supported by the residual (Figure 1) and the QQ plots (Figure 2). On average, women had a total comfort score 4.69 points higher than men had. The corresponding statistically non-significant $p = .139$ indicated a trend. Statistically significant differences could be observed depending on occupation. While high school students ≥18 years reported the lowest comfort, housewives or househusbands had higher comfort levels on average by 22.66 points ($p = .033$), university students by 25.69 points ($p = .019$) and retired persons by 28.2 points ($p = .003$). With a comfort score 8.57 points higher than in the reference centre A, patients in centre F reported the highest comfort ($p = .262$). Statistically significant lower comfort scores were observed in centre D (−18.44; $p = .001$) and in centre G (−19.20; $p = .003$).

The other models can be found as supporting information. Table S2 shows the results for the model based on the three subscales 'comfort type' and Table S3 shows those for the four subscales 'comfort context'. In these models it can be seen that high school students ≥18 years generally reported the lowest and retired persons the highest comfort, with the exception of subscale 'relief'. In this model it was unemployed persons or persons on sick leave whose comfort levels were lowest (−0.28; $p = .946$), and university students whose comfort levels were highest (10.61; $p = .026$). Overall, patients of centre F achieved the highest comfort scores. Only for psychospiritual comfort, it was the patients of reference centre A, and not those of centre F (−0.42; $p = .873$), who scored higher. On average, the comfort scores of the subscales were between 0.08 (relief) and 3.17 (environmental comfort) points higher in women than in men. However, in subscale 'psychospiritual comfort' women reported lower comfort than men did (−0.39; $p = .725$). Statistically significant differences in relation to gender could be observed in the subscales 'transcendence' (2.2; $p = .043$), 'sociocultural comfort' (1.39; $p = .012$) and 'environmental comfort' (3.17; $p = .032$).

4 | DISCUSSION

The aim of this study was to find out influential variables on comfort of EMU patients. It is known that there are factors that influence comfort measures and cannot always be addressed by nursing interventions (Kolcaba, 2003). However, explanations can be sought that account for the intervening character of the variables and these aspects can possibly be addressed. Studies dedicated to exploring influential variables pertaining to comfort are scarce. But there are several reports that, relevant variables on related concepts: patient satisfaction, patient experience, patient well-being and patient perspective on quality of care. According to Kolcaba's comfort theory, patients rate the quality of hospital care better if their comfort level is high during the hospital stay (Kolcaba, 2003). Therefore, we used these studies to compare our results.

The model that best fitted our data included gender, occupation and centre as the most important influential variables. However, the identified variables account for only about 9% of the variance. This small number indicates that the individual differences in comfort scores are highly specific and can be explained by key demographic characteristics only to a limited extent.

Several studies found that women were more satisfied and rated the quality of hospital care better than men did (Chumbler et al., 2016; Grøndahl et al., 2011). In our study, female patients reported a higher comfort compared to male patients, too. The only exception was psychospiritual comfort, in which slightly lower comfort levels could be observed in women. This could be due to the presence of items denoting anxiety and depression in this subscale. Women with and without epilepsy tend to be more anxious and depressed than men (Gaus et al., 2015). Also, in a study on patients in the preanesthesia stage, higher scores of anxiety and depression in women came along with lower comfort levels compared to men (Seyedfatemi et al., 2014). Our study supports the influencing character of the occupational status. A similar result could be observed in a Chinese study, where occupation showed a strong association with patient experience of a hospital stay (Min et al., 2019). In our study, high school students ≥18 years reported the lowest and retired persons the highest comfort levels. Probably it is the fear of the future that presses on the comfort of high school students ≥18 years. Unlike retired persons, the participating high school students ≥18 years were in a life span in which they had to decide on their future profession. A newly diagnosed or poorly controlled epilepsy can limit the career options. It is also possible that absence from school while being in hospital causes worries, as the high school students ≥18 years know that they have to catch up on their studies. Notably the differences are between the centres. Differences in the relationship between patients and health care professionals, the caring behaviour of nurses and the person-centeredness of the ward environment possibly might be a reason for this (Chumbler et al., 2016; Edvardsson et al., 2017). Especially, large windows, exposure to daylight, the view of the windows, noise levels, temperature, equipment with room dividers and the decoration with balanced colour schemes are mentioned in the literature (Eijkelenboom & Bluyssen, 2019). A

reason for the influencing character of the centres may also be seen in the different restrictions imposed on mobility. Moving freely is part of internal personal control and essential for patient comfort (Egger-Rainer et al., 2017).

Age, marital status and educational level did not show substantial effect in our study. This finding is supported by studies assessing patient experience in hospitals (Min et al., 2019). However, consistent with previous studies, the comfort levels were higher in older than in younger EMU patients (Danielsen et al., 2007; Grøndahl et al., 2011). It is assumed that older patients are better able to deal with unpleasant situations, because they have already experienced several ups and downs (Da Rocha & Ciosak, 2014). Young patients with epilepsy complain that they miss a substantial part of life, and they even think of suicide (Falcone et al., 2020). Since these problems cannot simply be pushed aside by patients, it is possible that they lead to discomfort during hospitalization. Particularly, not knowing whether the results of the examination will yield a better treatment option for seizures, or whether the stay in the EMU has to be prolonged, can be stressful (Egger-Rainer et al., 2017). Further our study showed that the comfort level was at its highest for widowed and lowest for divorced patients. It is possible that comfort-enhancing aspects, such as social contacts and relation to children, family members and friends, are supportive for widowed inpatients. Divorced patients may have lost these sources (Pinquart, 2003). Similar to other studies, EMU patients with higher education reported the lowest comfort level and patients without a school leaving certificate reported the highest (Chumbler et al., 2016; Danielsen et al., 2007; Grøndahl et al., 2011). But this is contrary to the results of an Iranian study of Seyedfatemi et al. (2014). In their study, patients with university educations had higher scores for comfort. The authors supposed that higher levels of education might lead to acquiring more information about health and illness, thus decreasing anxiety. Probably, the abundance of information on the internet about epilepsy leads to uncertainty, anxiety and discomfort.

Self-perceived health can affect patient satisfaction and the disease can cause discomfort. Therefore, the admission diagnoses might be an intervening variable on comfort (Edvardsson et al., 2017). It could make a difference whether patients are admitted for evaluation of possible epilepsy surgery or for the quantification of seizure frequency. However, in our study no relevant effect of the reason for referral could be detected. Patients with unclear epilepsy syndrome reported the lowest comfort levels. This may be due to uncertainty regarding diagnosis and future. Unfortunately, we did not know the correct admission diagnoses of the patients for sure. The patients self-reported the diagnoses to their best knowledge and we did not check the authenticity of their reports. Since most of the participants reported 'epilepsy', it seemed obvious that the information was imprecise.

4.1 | Limitations

There are some limitations in this study. Data were basically collected for the purpose of psychometric testing of the EMUCQ and not for identifying influential variables. However, with data flowing from 10 different centres, this study still makes a valuable contribution to the expansion of nursing knowledge on comfort in the EMU, even though some interesting variables could not be included. For example, retrospectively, we could not find out the correct admission diagnoses of the participants. We know the general mobility restrictions of the centres, but we do not know exactly which restrictions applied to the individual study participant. The responsible epileptologists adapted the necessary safety measure to the individual patient situation and we did not collect this data. Safety measures and restrictions for the patients are not the same in all EMUs. There are units in which patients can move freely and even go to the terrace, as it has soft flooring and rubber tiles (Craciun et al., 2017). Therefore, our results cannot be generalized. In addition, possible influential variables such as the type of accommodation and previous experiences of the patients, were not considered in our study. These aspects may also have had a relevant intervening character (Edvardsson et al., 2017; Eijkelenboom & Bluyssen, 2019). Our study should, therefore, be seen as a pilot study in order to get a first impression about which variables might be relevant in relation to patient comfort in the EMU setting. In a next step, a targeted data collection should be carried out in which these aspects are taken into account in order to obtain greater clarity.

5 | CONCLUSION

Our results support the assumption that the experience of comfort is multi-dimensional, subjective and fluctuating. As quickly as the individual needs may change, so does the state of feeling comfortable. It is difficult to estimate the effectiveness of comfort measures based on demographic variables, but we could observe a trend that gender and employment might have an intervening effect. Nurses should be aware that hospitalization in the EMU comes along with impaired comfort, especially in vulnerable groups such as high school students ≥18 years. Uncertainty of their future, for example plans pertaining to higher education or vocational training, which highly depends on seizure control, may contribute to their impaired feeling of comfort. Epilepsy specialist nurses could be called in to advise young patients on their options and this might reduce uncertainty, anxiety and discomfort (Camfield et al., 2019). Also, the situation in individual centres seems highly relevant. As there are several factors related to organization, staff and environment, which can intervene on comfort care, further research is advisable into these aspects. Especially, the insight of bedside nurses is of central importance to inform the design of a ward and its impact on patient comfort (Zborowsky, 2014).

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CONFLICT OF INTEREST

The authors have no conflict of interest.

AUTHOR CONTRIBUTIONS

All those listed as authors meet all four of the following criteria:

1. Have made substantial contributions to conception and design or acquisition of data or analysis and interpretation of data;
2. Been involved in drafting the manuscript or revising it critically for important intellectual content;
3. Given final approval of the version to be published. Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content; and
4. Agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

PEER REVIEW

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APPENDIX

TABLE A1 Assignment of items to the subscales of the respective comfort dimension

Dimension Comfort type[a]	Item	Dimension Comfort context[b]
Relief	My present condition gets me down	Physical
	I do not feel healthy right now	
	I feel good	
	I am very tired	
	I am hungry	
	I am afraid of what is next	Psychospiritual
	I am depressed	
	I am afraid of a seizure/its aftermath	
	I feel tense because I am waiting for a seizure	
	I feel out of control	
	I would like to talk to a doctor more often	Sociocultural
	I feel misunderstood	
	I feel dependent on others here	
Ease	I feel clean	Physical
	The itching of the scalp is difficult to endure	
	I would like to do physical exercises with a therapist more often	
	I feel observed	Psychospiritual
	It is boring	
	This room is nicely decorated	Environmental
	I have enough fresh air	
	The light in this room is pleasant	
	I have enough privacy in this ward	
	I can reach my personal belongings easily	
	I see things out of my window which inspire me	
	This room smells terrible	
	The temperature in this room is fine	
	This room makes me feel scared	
	There are sounds here that bother me	

(Continues)

TABLE A1 (Continued)

Dimension Comfort type[a]	Item	Dimension Comfort context[b]
	This bed is comfortable	
	I do not like it in this ward	
	I feel out of place here	
Transcendence	I am inspired to do my best	Physical
	My body is relaxed right now	
	I am content regarding the situation here	Psychospiritual
	I am confident that an appropriate therapy will be found for me	
	I feel my life is worthwhile right now	
	My faith helps me to not be afraid	
	There are those I can depend on when I need help	Sociocultural
	I have enough information about my current health condition	
	Nice people are thinking of me and are in contact with me	
	These surroundings are pleasant	Environmental
	The mood around here uplifts me	

[a]The assignment of the items is based on exploratory factor analysis.
[b]The assignment of the items is based on theoretical assumptions. The items were translated for the purpose of publication.