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Test-retest reliability of the Clinical Learning Environment, Supervision and Nurse Teacher (CLES + T) scale

Margareta Gustafsson*, Karin Blomberg, Marie Holmefur

School of Health and Medical Sciences, Örebro University, SE-701 82 Örebro, Sweden

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ABSTRACT

The Clinical Learning Environment, Supervision and Nurse Teacher (CLES + T) scale evaluates the student nurses' perception of the learning environment and supervision within the clinical placement. It has never been tested in a replication study. The aim of the present study was to evaluate the test-retest reliability of the CLES + T scale. The CLES + T scale was administered twice to a group of 42 student nurses, with a one-week interval. Test-retest reliability was determined by calculations of Intraclass Correlation Coefficients (ICCs) and weighted Kappa coefficients. Standard Error of Measurements (SEM) and Smallest Detectable Difference (SDD) determined the precision of individual scores. Bland–Altman plots were created for analyses of systematic differences between the test occasions. The results of the study showed that the stability over time was good to excellent (ICC 0.88–0.96) in the sub-dimensions "Supervisory relationship", "Pedagogical atmosphere on the ward" and "Role of the nurse teacher". Measurements of "Premises of nursing on the ward" and "Leadership style of the manager" had lower but still acceptable stability (ICC 0.70–0.75). No systematic differences occurred between the test occasions. This study supports the usefulness of the CLES + T scale as a reliable measure of the student nurses' perception of the learning environment within the clinical placement at a hospital.

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Introduction

Nursing programmes include both theoretical education and clinical training. The latter takes place either in a clinical skills laboratory at the university or during clinical placements in nearby healthcare organizations. There is a need for instruments with high validity and reliability which will make it possible to find out whether clinical settings offer a good learning environment. Such instruments are important not only for the development of clinical education but also for research about nursing education. One such instrument is the Clinical Learning Environment, Supervision and Nurse Teacher (CLES + T) scale (Saarikoski and Leino-Kilpi, 2002; Saarikoski et al., 2002, 2005, 2008). Scales should always be tested in replication studies in order to quantify the measurement error (Bland and Altman, 1999). The CLES + T scale has gone through several psychometric tests but, as far as we know, never been tested in a replication study.

Background

The original instrument, called the Clinical Learning Environment and Supervision (CLES) scale, was developed for the purpose to describe the student's perceptions of the clinical learning environment. The instrument was developed on the basis of an extensive literature review and tested on Finnish student nurses and thereafter on student nurses in the UK. Factor analyses supported the theoretical construct (Saarikoski and Leino-Kilpi, 2002; Saarikoski et al., 2002). The CLES scale was further tested by means of a comparison with another instrument evaluating the learning environment. The congruence between the instruments was high, supporting the validity of the CLES scale (Saarikoski et al., 2005). The CLES scale had 27 items. However, it was decided to develop an additional sub-dimension for measurement of the role of the nurse teacher. In that process, a few items in the original scale were excluded and items concerning nurse teacher's role in clinical practice were added. This new version of the instrument, the CLES + T scale, had 34 items and had five sub-dimensions, these being "Pedagogical atmosphere on the ward", "Leadership style of the ward manager", "Premises of nursing on the ward",

* Corresponding author. Tel.: +46 19 30 36 43.
E-mail address: margareta.gustafsson@oru.se (M. Gustafsson).

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"Supervisory relationship" and "Role of the nurse teacher" (Saarikoski et al., 2008, 2009).

The CLES + T scale has been translated and used in several European countries (Johansson et al., 2010; Papastavrou et al., 2010; Warne et al., 2010; Wolff Skaalvik et al., 2011; Henriksen et al., 2012; Bergjan and Hertel, 2013; Bos et al., 2012; Bisholt et al., 2014; Sundler et al., 2014). The Swedish version of the scale was translated by nursing teachers and back-translated by an authorized translator (Johansson et al., 2010). In the next step the scale was tested among student nurses who had completed their clinical practice mostly at a hospital. The researchers performed an exploratory factor analysis and then inter-item and item–total correlation analyses, and finally they tested internal consistency. Factor analysis showed that some of the items loaded on different factors among Swedish students as compared with Finnish (Saarikoski et al., 2008; Johansson et al., 2010). This applied in particular to items concerning the "Role of the nurse teacher". Further, items in the sub-dimension "Premises of nursing on the ward" could not be separated from ones in the sub-dimension "Pedagogical atmosphere on the ward". The conclusion was that a strong factor concerning "Premises of nursing on the ward" does not exist in the Swedish version. The factor analysis supported the finding by Saarikoski et al. (2008) that "Supervisory relationship" was the most important factor contributing to student nurses' perceptions of the clinical learning environment. The internal consistency was considered good, Cronbach's' alpha being 0.95 for the total scale and between 0.75 and 0.96 for the sub-dimensions. The conclusion drawn from the psychometric test of the Swedish version of the CLES + T scale was that it had satisfactory psychometric properties (Johansson et al., 2010).

In order to distinguish between true change and change due to measurement error in the CLES + T, it is necessary to determine the stability of measurements over time. This has, to our knowledge, not been done before. So the aim of the present study was to evaluate the test-retest reliability of the CLES + T scale.

Method

Design and sampling

The study was part of a research programme, going on 2011–2012, in which the CLES + T scale was used for investigation of the organization of the clinical education within nursing programmes at three Swedish universities (Bisholt et al., 2014; Sundler et al., 2014). In order to determine the test-retest reliability of the scale, a questionnaire including the instrument was administered twice to a group of student nurses in spring 2011. The students were attending a nursing programme where courses including clinical practice accounted for approximately half of the time and credits. A convenience sample of student nurses in the fourth term of the nursing programme were informed about the research project, and asked whether they were willing to participate, when they had completed a course with clinical practice and were back at the university. Forty-two students gave their informed consent and filled out the questionnaires twice.

Data collection

Questionnaires including the CLES + T scale were answered by the student nurses in a classroom at the university, the first one a week after they had completed their clinical practice and the second one a week later. Anonymity was maintained in that the students themselves coded the questionnaires by means of drawing a personal symbol. Questions about age, sex, location of the clinical placement and satisfaction with the clinical placement were included in the first questionnaire. The students rated satisfaction on three items which taken together could give a score for total satisfaction with the clinical placement.

The Clinical Learning Environment, Supervision and Nurse Teacher scale

The CLES + T scale consists of 34 statements divided into five sub-dimensions: "Pedagogical atmosphere on the ward" (nine items), "Leadership style of the ward manager" (four items), "Premises of nursing on the ward" (four items), "Supervisory relationship" (eight items) and "Role of the nurse teacher (NT)" (nine items). The sub-dimension "Pedagogical atmosphere on the ward" concerns the psychosocial climate and opportunities for learning, "Leadership style of the ward manager" concerns whether the ward manager is democratic and supports the staff, "Premises of nursing on the ward" concerns the quality of the nursing care and "Supervisory relationship" concerns the one-to-one relationship between the preceptor and the student (Saarikoski et al., 2002; Warne et al., 2010). Finally, the sub-dimension "Role of the nurse teacher (NT)" evaluates the teacher's pedagogical and social role in the clinical practice (Saarikoski et al., 2008). The CLES + T items are responded to on a 5-point Likert-type scale with higher values indicating greater agreement with the statement. Response options are (1) "fully disagree", (2) "disagree to some extent", (3) "neither agree nor disagree", (4) "agree to some extent" and (5) "fully agree" (Saarikoski and Leino-Kilpi, 2002; Saarikoski et al., 2002, 2005, 2008). The validity evidence of the scale based on content has been established through a review of empirical studies (n = 87), literature reviews (n = 5), reports of audit instruments (n = 5) and discussion papers (n = 7) (Saarikoski et al., 2008).

Statistical analysis

The students rated satisfaction with the clinical placement on three items, which taken together could give a score between 3 and 15 for total satisfaction, with a higher score indicating greater satisfaction. Mean values ranging from 1 to 5 were calculated for each sub-dimension of the CLES + T scale. Approximately 1% of the responses to single items were missing at time 1 and time 2 and replaced with a score that did not change the student's individual mean value for the sub-dimension.

Reliability is commonly expressed in a reliability coefficient ranging from 0 to 1 indicating to what extent measurements are free from measurement error. The test-retest reliability coefficient of CLES + T was primarily determined by Intraclass Correlation Coefficients (ICCs) (Shrout and Fleiss, 1979), using a one-way analysis of variance model (i.e. ICC 1.1) at the level of individual sub-dimensions (single measures ICC for agreement). An ICC above 0.90 was considered excellent, above 0.80 was considered good and above 0.70 was considered acceptable (Vet et al., 2011). To further explore test-retest reliability, quadratic weighted Kappa coefficients were calculated for all items (Terwee, 2007). In order to analyse whether there were systematic differences between the test occasions, Bland–Altman plots were created for each sub-dimension of CLES + T (Bland and Altman, 1999). Standard error of measurement (SEM) was included for determining the precision of individual scores within the subjects in the unit of test scores (Weir, 2005). The smallest detectable difference (SDD) was calculated to provide information of the smallest change that must take place between two occasions for the test to detect a real change with 95% certainty (Schreuders et al., 2003; Beckerman et al., 2001). The SDD was calculated from the SEM: $SDD = SEM \times 1.96 \times \sqrt{2}$ (Schreuders et al., 2003). The statistical analyses

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