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## Summary

**Title:** The impact of the transformational style of leadership among nurses on medication safety in Intensive Care Units

**Introduction:** The medication safety is one of the key elements of patient care, as reflected in the World Health Organisation's global initiative 'Medication Without Harm', announced as the third global challenge for patient safety. Medication errors remain one of the most common threats in healthcare systems, and nursing staff (due to their direct involvement in the pharmacotherapy process) play a key role in preventing these errors. This is particularly important in high-risk environments such as Intensive care Units, where the pace of work and the complexity of procedures require special attention, competence and good work organisation. Therefore, more and more attention is being paid to the management style among nursing managers. A transformational leadership style, based on inspiration, motivation, and building trust within the team, is considered the most effective management style in healthcare. Its essence is not only striving to achieve organizational goals, but also the professional development of employees, strengthening their sense of responsibility and commitment, and creating a culture of safety. In nursing, transformational leadership promotes open communication, interdisciplinary cooperation and the implementation of preventive measures, which has a direct impact on the quality of care and reduces the number of therapeutic errors.

**Research design:** This is a two-stage, methodological, cross-sectional, quantitative study with correlation and predictive regression analysis.

**Aim of the study:** The aim of stage 1 is to adapt Finnish scales that subjectively assess the use of transformational leadership style and the medication safety by nurses in nursing teams to Polish conditions. The aim of stage 2 is to assess the relationship between transformational leadership style in nursing teams in intensive care units in Poland and the medication safety by nurses in these units.

**Methodology:** The study involved 469 nurses working in Intensive Care Units in Poland. Data was collected from March 2022 to March 2023. Two research tools were used: the Transformational Leadership Scale (TLS) and the Medication Safety Scale (MSS). Ultimately,

the TLS consisted of 54 variables and five factors, i.e. 'ethical leadership', 'nursing process management', 'feedback and rewards', 'professional development' and 'nursing director'. The MSS consisted of 45 variables and five main factors, i.e. 'working conditions', 'individual factors', 'systemic factors', 'medication administration', and 'medication knowledge'. The questionnaire included single-choice responses which were structured on the following five-point Likert scale: 1 – 'Strongly disagree', 2 – 'Rather disagree', 3 – 'It is hard to say', 4 – 'Rather agree', 5 – 'Strongly agree'. The forward-blind backward translation process with monolingual test and assessment of the expert committee was used. To determine the structure of both questionnaires, confirmatory factor analysis (CFA) was performed for the 5-factor structure of the questionnaires adopted by the authors of the tool, and the diagonally weighted least squares (DWLS) method was used as the estimation method. The reliability of the subscales was calculated using three indicators: McDonald's  $\omega$ , Cronbach's  $\alpha$ , and composite reliability (CR). To determine convergent validity, an average variance extracted (AVE) analysis was performed. In stage 2 of the study, basic descriptive statistics were calculated to assess the level of transformational leadership and medication safety. To compare two groups, the Mann-Whitney U test was used, while the Kruskal- Wallis H test was applied for comparisons involving three or more groups. Pearson's correlation analysis was performed to determine the relationship between quantitative variables. However, in order to determine the factors determining MSS and its individual dimensions, hierarchical linear regression analysis was performed using the stepwise method. In order to achieve the intended research objectives, sociodemographic factors and individual dimensions of TLS were selected for analysis. The significance level was set at  $\alpha = 0.05$ .

**Results:** The overall score for the TLS scale was 3.19 and for the MSS 3.76. Sociodemographic variables correlated with the MSS scale were female gender ( $r=0.70$ ;  $p=0.007$ ), age ( $r=0.18$ ;  $p<0.001$ ), overall work experience ( $r=0.22$ ;  $p<0.22$ ), work experience in the ICU ( $r=0.14$ ;  $p=0.008$ ), and the number of patients per nurse during a shift ( $r=-0.13$ ;  $p=0.017$ ). Correlations were found between the overall MSS score and the results of the nurses' subjective assessment of 'The application of medication safety procedures in the ICU' ( $r=0.68$ ;  $p<0.001$ ), 'The medication safety in the ICU' ( $r=0.71$ ;  $p<0.001$ ), 'Own competence in ensuring safety in medication' ( $r=0.52$ ;  $p<0.001$ ), and 'Management style of managers/supervisors in the ICU' ( $r=0.61$ ;  $p<0.001$ ). The overall scores of the TLS and MSS scales were correlated ( $r=0.64$ ;  $p<0.001$ ), as were all of their dimensions. Hierarchical linear regression analysis based on the inclusion of sociodemographic data allowed for the prediction of 9% of MSS, while taking into

account TLS dimensions made it possible to predict 50% of the variance of this scale. Significant predictors for MSS were female gender ( $\beta=0.10$ ;  $p=0.014$ ), hospital accreditation ( $\beta=-0.09$ ;  $p=0.027$ ), longer work experience ( $\beta=0.29$ ;  $p=0.014$ ), lower level of ethical leadership ( $\beta=-0.36$ ;  $p<0.001$ ), higher level of nursing process management ( $\beta=0.69$ ;  $p<0.001$ ) and stronger position of the nursing director ( $\beta=0.14$ ;  $p=0.001$ ).

**Conclusions:** The Transformational Leadership Scale and the Medication Safety Scale are reliable, accurate, translationally and culturally adapted research instruments for assessing transformational leadership and medication safety among nurses working in Intensive Care Units. The level of transformational leadership and medication safety in Intensive Care Units is moderate. Transformational leadership is significantly related to medication safety. Female gender, work experience, hospital accreditation certificate, lower ethical leadership demonstrated by leaders, more effective management of nursing processes and a strong position of the director of nursing are significant predictors of improving the level of medication safety in Intensive Care Units.

**Keywords:** validation, management, transformational leadership, medication safety, patient safety, intensive care.