

Macroarea di Medicina Dipartimento di Biomedicina e Prevenzione Dottorato di Ricerca in Scienze Infermieristiche e Sanità Pubblica Coordinatore: Prof. Ercole Vellone

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Titolo tesi: Analysis of health literacy in the hospital setting: understanding its dimensions through a

Nursing Minimum Data Set

## ABSTRACT

BACKGROUND: The relevance of HL in public health is noticeable yet it represents an ever-expanding concept, recently defined as a potential risk factor for health outcomes. This expansion HL definitions and dimensions, is also closely related to the quality of the information provided and the ability of health professionals to properly approach and dialogue with people, measuring the level of HL and adapting to that level, in order to then, if necessary, activate strategies for its improvement. Interest in HL assessment in hospital setting has grown a lot due to the need to establish a suitable communication between patient, family and health professionals for participating in the treatment process, to guarantee the standards of quality of care, to develop individualized interventions, and guarantee that patients are prepared and ready for discharge from the hospital. HL is considered a stronger predictor of an individual's health status than age, level of education and race and should be included systematically in EHRs. However, it is not clear in the literature whether HL is included and documented in the EHRs of the hospital setting. EHRs can differ in form and content collecting different variables and using different standardized nursing terminologies (SNTs), such as NDs. NDs as the clinical nurse's judgement of the patient's needs, produce knowledge and evidence helpful for research and decision-making and are collected with other fundamental data, within a NMDS. The NMDS is one of the most recognized approaches for the documentation of standardized nursing data in the literature. NDs and their related NIs, classify patients according to their nursing dependency and represent the measure of complexity of care. The nursing assessment phase, starting from an accurate assessment of patient's functional patterns of health, is a guarantee of NDs quality thus a complete and accurate nursing assessment should include a patient's HL level. By entering data in EHRs using a variety of accepted and widely used SNTs, nurses have the opportunity to contribute to the description of the patient's complexity of care in diverse hospital settings. It has been documented that complexity predicts some hospital outcomes, such as mortality and LOS. However, knowledge related to the relationship between HL and NDs as an expression of complexity of care is lacking. Literature researches underline that it is important to study the appropriateness and completeness of nursing documentation to increase its quality, better understand nursing phenomena and the complexity of care because still today high-quality nursing records are not widespread. Different studies reported varied outcomes in terms of how comfortable nurses are using computers, gathering data methodically and electronically, and documenting on technological supports. The experience of the pandemic era from Covid-19 has made it possible to bring nurses and health professionals closer, also regarding the use of technology. These experiences suggest working on the implementation of electronic documentation, develop training strategies to make health systems easier to use, training healthcare providers in utilizing simple language but also digital modalities. Additional suggestions focus on the testing of educational strategies to assist healthcare professionals in becoming familiar with health information systems and recording accurately and completely in the digital era.

**AIMS AND OBJECTIVES OF THE PhD:** The aims of the doctoral research program were to 1.describe whether HL is systematically detected in the hospital setting and in nursing documentation, 2.describe the most commonly instruments used to gauge HL in hospital settings and who is in charge of the HL assessment, 3.investigate the relationship between HL levels and NDs, NIs, as an expression of the complexity of care, and nursing measures for clinical risks (NMCRs) during patient hospitalization and understand if HL can be a predictor of the complexity of care, 4.describe the need for HL education for qualified health professionals.

**METHODS:** Three studies were designed and realized to implement the aims of this doctoral thesis. For the first and second objectives, a systematic review was conducted. PubMed Medline, CINAHL, Scopus, Web of Science and Educational Resources Information Centre databases were searched. The PRISMA guidelines



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were applied, and the protocol of the study was registered with PROSPERO (CRD42021236029). The quality of the included studies was appraised using the STrengthening the Reporting of OBservational Studies in Epidemiology (STROBE) guidelines for cross-sectional studies. For the third objective, a retrospective study was conducted. The study was conducted from December 2020 to December 2021 and a sample of 1067 nursing records of adult patients was randomly selected from the PAI system and the hospital discharge register. The Single-Item Literacy Screener (SILS) was used to measure HL. Measures for clinical risks were systematically assessed by nurses using Conley Index score, the Blaylock Risk Assessment Screening Score, Braden score, and the Barthel Index. A univariable linear regression model was used to assess the associations of HL with NDs. Quantitative variables included NDs and the HL level, which was assessed using SILS, a self-reporting instrument that identifies adults who need help understanding written medical health information; SILS was systematically reported on PAI. HL, sociodemographic and clinical data were tested as potential determinants of the complexity of care. Univariable and multivariable linear regressions were used to examine the relationship between the HL score and the number of NDs. For the fourth objective a descriptive qualitative study was performed on a proactive sample of 34 nurse practitioners, pediatric nurses and midwives attending the Master's degree course. The data was collected in January-February 2021 through an online form, built ad hoc. The answers were analyzed with deductive content analysis.

**RESULTS:** Our first study highlights that the HL routine assessment is still underestimated. Our systematic review included only 5 studies that record HL assessment inside EHRs of hospital settings and provides relevant information to improve HL assessment in clinical practice, as it describes both the strategies used to introduce HL instruments into hospital routine practice and the tools used for its evaluation. The strategies used include nurses' leadership, nurses' education and performance outcome measurement. Our study describe that HL assessment is documented in admission section related to the patients' communication needs or in generic admission section or in discharge section of EHRs. To implement routine HL evaluation, the majority of the selected studies describe that a team of professionals was formed to select the suitable HL instruments, recognize the role of the nursing leadership in supporting the implementation of EHR and nursing data documentation. The importance of the education and training process on the use of HL instruments before the implementation phase is confirmed from 3 studies. Three validated HL instruments were identified and used by nurses as evaluators: three-question BHLS instrument, the three-question Expanded Brief Health Literacy Screening (EBHLS), the seven-item Rapid Estimate of Adult Literacy in Medicine—Short Form (REALM-SF) and these findings respond to scarce research on HL routine assessment in hospital settings, and none of the reviewed studies included the HL reassessment during hospitalization.

In our second study, a total of 1067 nursing records were identified. The mean score of the SILS was 1.90 (1.18). HL levels were low (SILS > 2) in approximatively 29% of the hospitalized patients (N = 317; 29.7%). The admission from the emergency department was more frequent in the low HL subgroup (n = 85; 26.8% vs. n = 114; 15.2%, p < 0.001). The median hospital LOS was 4 (IQR: 6) days. Compared to patients with low HL, patients with adequate HL had a shorter LOS (median hospitalization 4 [IQR: 5] vs. 6 days [IQR: 9],  $p < 10^{-10}$ 0.001). A statistically significant Spearman's correlation was observed between the SILS score calculated on admission and the LOS (r = 0,237, p < 0.001). The Kruskal-Wallis H test demonstrated that statistical differences existed between each SILS score and the median of LOS (F=72,953; p<0,001). In total, 4047 NDs were identified on admission, corresponding to a median of 4 NDs (IQR: 3) per patient (range: 0-18). Infection risk was the most selected ND in the total sample (n = 758, 71.0%). The median number of NDs was significantly higher in the low HL group than in the adequate HL group (median, 4 [IQR: 3] vs. 4 [IQR: 1], p < 0.001]. A total of 7130 NIs were planned and delivered (median, 7 [IQR: 19] per patient; range 0–19). Patients with adequate HL had a lower prevalence of NIs compared to those with low HL (median, 7 [IQR: 5] vs. 8 [IQR: 9], p < 0.001). The results showed a significant increase linked to the risk of falls in patients with low HL compared to those with adequate HL [1.68 (2.2) vs. 0.47 (1.1), p < 0.001)]. The results reveal changes in functional independence related to the daily living activities in patients with adequate HL [mean 93.17 (18.66)] and low HL [mean 72.10 (37.88)]; these differences (indicative of deterioration in the group with low HL) were significant (p < 0.001). The risk of developing dependency-related pressure injury was higher in patients with low HL compared to patients with adequate HL, and this difference was statistically



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significant [mean 19.20 (4.66) vs. 21.70 (2.44), p < 0.001]. The analysis of BRASS risk classes identified a significant predominance of patients at risk of difficult discharge in the low HL group compared to patients with adequate HL [mean 4.78 (4.14) vs. 8.73 (6.2), p < 0.001]. Finally, the number of NDs increased with higher HL scores in the univariable [0.31 per 1-point increase, 95% confidence interval (CI) 0.20–0.42, p < 0.001] and multivariable [0.27 per 1-point increase, 95% CI 0.15–0.40, p < 0.0001] linear regressions.

Our third qualitative study results reveal 4 main categories from the analysis of the texts about the perceptions of health professionals involved in training through digitally augmented teaching and e-learning. The first category is related to the educational impact of the new digital and distance-learning modality. Despite the initial difficulties, the new method has proved to be a great teaching and growth tool. The second category is represented by time management and appears as a dominant aspect in the stories of the participants since most agree in stating that online teaching has allowed for better organization and planning of daily commitments. The third category is related to disadvantages of online teaching: learning is strongly conditioned by the difficulties related to technical limitations frequently attributed to lack of digital and technical skills, difficulty of use and connection problems. The fourth category is connected to distance learning-teaching. Digitally augmented learning has been perceived as a 'response to new needs'. Finally, an important achievement is that the study sample clearly affirmed the importance of social processes in the way they approached the new educational challenges.

**CONCLUSION:** Through this doctoral thesis, we demonstrated that, despite literature suggests that HL should be included methodically in patients' clinical records, it does not appear to be systematically measured in EHRs of hospital setting. Literature describes the use of 3 validated instruments in hospital setting such as three-question BHLS instrument, the three-question Expanded Brief Health Literacy Screening (EBHLS), the seven-item Rapid Estimate of Adult Literacy in Medicine—Short Form (REALM-SF). HL could be a predictor of the complexity of care and it has been shown to be associated with the number of NDs. The implementation of systematic HL assessment, in a NMDS, as the PAI system, can contribute with NDs to the deep description of the hospitalized patients. Literature shows the need for HL education for qualified health professionals and prepare them in using computers, gathering data methodically, electronically, and documenting on technological supports. Improving nurse education about HL and how to customize discussions with patients will improve the nursing process and improve the patient's HL. The experiences of nurses and midwives in the Master's degree on digitally augmented learning during the SARS-CoV-2 pandemic reflect the need of integrating traditional learning strategies with digital and e-learning strategies.

Keywords: Health Literacy, Electronic health records, Nursing diagnoses, Patient outcomes, Standardized nursing terminologies, Interoperability of healthcare data, Nursing training, Nurse experience, Digital augmented learning