Innovation in Applied Nursing Informatics
G. Strudwick et al. (Eds.)

doi:10.3233/SHTI240301

Speech Recognition Technology for Nursing Charting: A Literature Review

Sally NEWTON-MASON,[a,b,1] Clement CHUI,[a] Saima HIRANI,[b] and Leanne M. CURRIE[b]
[a] *Vancouver Coastal Health Authority, Vancouver, BC, Canada*
[b] *University of British Columbia School of Nursing, Vancouver, BC, Canada*
ORCiD: Sally Newton-Mason, https://orcid.org/0000-0003-3390-8253

Abstract. This literature review explores the impact of Speech Recognition Technology (SRT) on nursing documentation within electronic health records (EHR). A search across PubMed, CINAHL, and Google Scholar identified 156 studies, with seven meeting the inclusion criteria. These studies investigated the impact of SRT on documentation time, accuracy, and user satisfaction. Findings suggest SRT, particularly when integrated with artificial intelligence can speed up documentation by up to 15%. However, challenges remain in its implementation in real-world clinical settings and existing EHR workflows. Future studies should focus on developing SRT systems that process conversational nursing assessments and integrate into current EHRs.

Keywords. Speech recognition technology, nursing documentation, artificial intelligence

1. Introduction

Nursing documentation in EHR flowsheets is time-consuming, with intensive care nurses spending 19%-35% of their shifts documenting [1]. Demanding workflows can lead to incomplete charting, causing communication issues and potentially poor patient outcomes [2]. SRT may reduce manual charting time.

2. Methods

A search was conducted using PubMed, CINAHL and Google Scholar using search terms such as 'nursing documentation', 'speech recognition', and 'charting time'. Studies were excluded if participants had not used an SRT intervention, SRT was not used for nursing assessment documentation, or the study was published before 2014 when SRT was less mature. All study designs were eligible for inclusion.

3. Results

The searches yielded 156 studies: CINAHL = 23, PubMed = 57, Google Scholar = 76. 13 duplicates were removed. Seven studies met inclusion criteria. Study designs and findings are shown in Table 1 below.

[1] Corresponding Author: Sally Newton-Mason: sallynew@student.ubc.ca.

Table 1. Findings from Included Studies

First Author, year	SRT type	Setting	Time	Accuracy & Errors	User Satisfaction
Fratzke, 2014	Nuance	Simulation	Faster to talk than type	Not specified	End-users frustrated
Mairittha, 2019	Google Assistant	Simulation	SRT increased charting speed by 15%	96% accuracy	High user satisfaction with DSCR
Joseph, 2020	Varied	Simulation	Can reduce documentation time	Varied, up to 99% accuracy	Mixed results
Mayer, 2021	Dragon Medical 360	Simulation	SRT reduced charting time by 6.1 minutes	3-5 errors/ scenario	80% preferred SRT avg score 8/8/10
Everett, 2022	Nuance	Clinical practice	Reduced charting time by 9-9.7%	Not specified	Not Specified
Dinari, 2023	Not specified	Not specified	Not specified	Not specified	3.96/5 satisfaction
Lee, 2023	VAIMA	Simulation	No difference between keyboard charting and SRT	95.57% accuracy	Preferred SRT

Note: DSCR: Dialogue System Care Record [9]; **VAIMA:** Voice AI Medical Assistant [8]

4. Conclusions

SRT has reached a state of maturity that makes it a promising tool to support nursing documentation. Challenges persist in applying AI to classify conversational speech for nursing flow sheet integration. Modest reductions in charting time suggests a need for more intuitive, workflow-friendly solutions.

References

[1] A. Hendrich, M.P. Chow, B.A. Skierczynski, and Z. Lu, A 36-hospital time and motion study: how do medical-surgical nurses spend their time?, Perm J 12 (2008), 25-34.
[2] T.E. Mutshatshi, T.M. Mothiba, P.M. Mamogobo, and M.O. Mbombi, Record-keeping: Challenges experienced by nurses in selected public hospitals, Curationis 41 (2018), e1-e6.
[3] F. Dinari, K. Bahaadinbeigy, S. Bassiri, E. Mashouf, S. Bastaminejad, and K. Moulaei, Benefits, barriers, and facilitators of using speech recognition technology in nursing documentation and reporting: A cross‐sectional study, Health Science Reports 6 (2023), e1330.
[4] M. Everett, J. Redner, A. Kalenscher, D. Durso, and S. Nguyen, Speech Recognition Technology for Increasing Nursing Documentation Efficiency, Online Journal of Nursing Informatics 26 (2022), 7-12.
[5] J. Fratzke, S. Tucker, H. Shedenhelm, J. Arnold, T. Belda, and M. Petera, Enhancing nursing practice by utilizing voice recognition for direct documentation, J Nurs Adm 44 (2014), 79-86.
[6] J. Joseph, Z.E. Moore, D. Patton, T. O'Connor, and L.E. Nugent, The impact of implementing speech recognition technology on the accuracy and efficiency (time to complete) clinical documentation by nurses: A systematic review, Journal of clinical nursing 29 (2020), 2125-2137.
[7] T.-Y. Lee, C.-C. Li, K.-R. Chou, M.-H. Chung, S.-T. Hsiao, S.-L. Guo, L.-Y. Hung, and H.-T. Wu, Machine learning-based speech recognition system for nursing documentation–A pilot study, International Journal of Medical Informatics 178 (2023), 105213.
[8] T. Mairittha, N. Mairittha, and S. Inoue, Evaluating a Spoken Dialogue System for Recording Systems of Nursing Care, Sensors (Basel) 19 (2019).
[9] L. Mayer, D. Xu, N. Edwards, and G. Bokhart, A Comparison of Voice Recognition Program and Traditional Keyboard Charting for Nurse Documentation, CIN: Computers, Informatics, Nursing 40 (2022), 90-94.