THE KEYSTROKE TAX IN DIGITAL HEALTHCARE: GIVING DOCTORS THEIR VOICE IN UZBEKISTAN’S MEDICAL TRANSFORMATION

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Abstract

The digitalisation of healthcare promises greater efficiency, yet electronic health records (EHRs) may unintentionally increase physicians’ administrative workload. This paper introduces the concept of the *keystroke tax*: the time, effort and organisational resources consumed by manual clinical documentation. Drawing on a quasi-experimental investigation involving 120 physicians in Uzbekistan, the study examines automatic speech recognition (ASR) as an alternative to keyboard-based medical record creation. The findings indicate a 41% reduction in documentation time per 100 words, a 30.4% increase in recorded text volume and improved physician satisfaction. Nevertheless, persistent copy-and-paste practices reveal that technological convenience alone cannot transform established clinical behaviour. A hybrid, physician-supervised documentation framework is consequently proposed to connect digital innovation with sustainable healthcare management.

Keywords: healthcare management, digital transformation, automatic speech recognition, electronic health records, clinical documentation, cognitive load, Uzbekistan.

1. Introduction

A hospital may acquire modern computers, install sophisticated information systems and replace paper archives with electronic databases, yet still struggle to

become genuinely efficient. The reason is deceptively simple: someone must enter the information.

In many healthcare institutions, that responsibility falls on physicians whose professional expertise lies in diagnosing and treating patients rather than producing lengthy digital documents. Consequently, the transition towards electronic healthcare creates an administrative paradox. Technologies designed to simplify medical services may simultaneously divert valuable clinical time towards typing, correcting and navigating computer interfaces.

This paper conceptualises that hidden administrative burden as the **keystroke tax**. Unlike a financial tax, it is paid through physicians’ working hours, mental effort and reduced flexibility during patient consultations.

International evidence confirms that successful EHR implementation depends on much more than infrastructure. Human factors, organisational readiness and interface usability play decisive roles [1, 2]. Speech recognition offers a potentially valuable response by enabling doctors to record medical information through dictation instead of conventional keyboard entry.

However, technological adoption must be assessed through managerial outcomes rather than software capabilities alone. The central research question is therefore: *Can voice-assisted documentation reduce administrative inefficiency without introducing new risks to the quality and reliability of medical information?*

2. Research Methodology

The research employed a mixed-methods, quasi-experimental approach in two healthcare facilities in Bukhara, Uzbekistan, involving 120 physicians from different professional backgrounds.

Conventional keyboard entry and automatic speech recognition were compared in the preparation of electronic medical records. The investigation considered documentation duration, spelling inaccuracies, record length, physicians’ attitudes and their tendency to reuse previously prepared clinical notes.

Quantitative observations were supplemented with questionnaires and practical assessments of clinicians’ experiences. Documentation speed was also standardised per 100 words because the two input methods generated records of different lengths.

The methodological framework drew upon Human–Computer Interaction and Cognitive Load Theory. These perspectives suggest that technologies become useful not simply by automating operations, but by reducing unnecessary effort and aligning with users’ established professional activities.

3. Results: Measuring the Invisible Administrative Burden

The most pronounced improvement concerned documentation efficiency. Physicians required an average of **8.8 minutes to enter 100 medical words manually**, compared with **5.2 minutes using speech recognition**. This difference corresponds to an approximately 41% reduction in standardised documentation time.

When measured per complete electronic record, average documentation duration decreased from 23 to 17.8 minutes. The smaller percentage reduction at record level reflects an important finding: doctors produced longer documents when dictating.

Indeed, the average record increased from 273 to 356 words, representing a **30.4% expansion in documented text volume**. This suggests that the difficulty of typing may discourage physicians from recording certain details, whereas spoken input can make more extensive documentation practically manageable.

The quality of written information also exhibited measurable changes. The average number of recorded spelling inaccuracies fell from 16.7 to approximately 14 per record. Although this represents an improvement in observed textual accuracy, spelling indicators cannot independently establish clinical correctness or patient safety.

A particularly revealing outcome emerged from the behavioural investigation. Before the experiment, 95% of physicians acknowledged relying on copying and

pasting existing medical documentation. Even after experiencing ASR, approximately 87% continued to favour this practice.

Thus, removing the physical inconvenience of typing did not eliminate an established administrative shortcut. Physician satisfaction presented a more encouraging picture. Of the 120 respondents, 105 expressed positive attitudes towards speech-assisted documentation, while only 42 indicated a preference for manual typing.

Taken together, these findings suggest that ASR can reduce documentation effort and improve the user experience, but cannot independently solve deeper organisational problems.

4. Discussion: Why Faster Technology Does Not Automatically Produce Better Management

The findings challenge a common assumption about digital transformation: that making a task technologically easier will necessarily make the entire organisation more effective.

The persistence of copy-and-paste behaviour illustrates the limitations of such reasoning. Physicians may continue reusing existing records because of habitual working practices, limited confidence in unfamiliar systems, complex medical terminology or pressure to complete administrative responsibilities quickly.

Technical efficiency concerns how quickly information can be entered; managerial effectiveness concerns whether the resulting information is accurate, useful and appropriately governed.

Furthermore, longer documentation should not automatically be interpreted as better documentation. Additional words may provide a more complete clinical narrative, but they may also introduce irrelevant details or transcription mistakes. The value of digital information ultimately depends on its relevance, accuracy and accessibility.

Related international research has similarly observed that speech-generated clinical notes can be more detailed, while improvements in speed and accuracy are not necessarily consistent across every setting [3].

For Uzbekistan, these observations support a more cautious approach to healthcare automation. Voice recognition should assist professional judgment rather than replace the clinician’s responsibility for validating medical information.

5. A Proposed Hybrid Management Framework

Based on the empirical findings, this paper proposes a five-stage **Voice–Verify–Structure–Approve–Audit framework** for integrating speech recognition into clinical documentation.

The process begins with voice-based capture of the physician’s observations. The automatically generated text is then verified by the physician, with particular attention to diagnoses, medications and other clinically significant terminology.

At the third stage, the validated narrative is organised into the appropriate electronic record fields. The physician subsequently reviews and approves the completed record before it becomes part of the patient’s medical history.

Finally, healthcare administrators monitor documentation quality, recurring transcription errors and the inappropriate reuse of existing records.

This hybrid arrangement deliberately preserves human supervision. Its purpose is not to automate medical judgment, but to reduce repetitive administrative work while strengthening accountability.

Successful adoption would also require terminology adapted to Uzbekistan’s linguistic environment, practical staff training, appropriate data-protection safeguards and reliable technical infrastructure.

Rather than introducing voice technologies uniformly across all healthcare institutions, policymakers could begin with controlled deployments in facilities where documentation burdens are demonstrably high, followed by independent evaluation before wider implementation.

6. Conclusion

The findings demonstrate that healthcare digitalisation cannot be evaluated solely by the number of computers installed or electronic records created. The real measure of success is whether technology makes clinical work more effective without compromising information quality.

The Uzbek clinical investigation indicates that speech recognition can substantially reduce standardised documentation time, increase the volume of recorded information and improve physicians’ experience of electronic systems. Yet the persistence of copy-and-paste behaviour highlights the importance of organisational culture, training and quality control.

The proposed hybrid framework offers a management-oriented direction for addressing these challenges, although its effectiveness requires further empirical validation.

Ultimately, **the purpose of digital healthcare should not be to make doctors work harder for computers, but to make computers work more effectively for doctors.**

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