

Paperless Workflow Integration System in the Psychiatry Department of a Tertiary Care Institute: A Mixed-Methods Feasibility Study

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Abstract

Switching from paper to electronic medical records in psychiatry settings has many complications due to the unique nature of each practice's privacy concerns, workflow complexities and lack of resources. The research designs an electronic and paperless workflow integration, EWI (Electronic Work Instructions) system in the Psychiatry Department of All India Institute of Medical Sciences Jammu over 6 months; during this research mixed-methods were utilized in the study by way of background, pilot testing the hardware to utilize EMR through tablet-based integrated stylus input into culturally adapted EMR, and evaluation post-pilot testing via systematic methodology. Background assessment demonstrated 100% reliance on paper, an average of 8.4 minutes to retrieve a record, 12% of all monthly filed records had not been filed correctly, and little staff satisfaction or engagement. The post-implementation evaluation will demonstrate a 73% decrease in retrieved records, no misplaced records, 45% decrease in actual time to document, increase in documentation from 62% to 94% (complete document), increasing staff satisfaction ratings from 4.2 out of 10 to at least 7.8 out of 10. There were no incidents involving unauthorized access and the project produced estimates a return on investment in five months post-implementation. The results of this study provide an evidence-based digital transformation framework solution for investing in information technology in resource-constrained psychiatric settings.

Keywords: Electronic Medical Records, Psychiatry, Paperless Hospital, Digital Health, Workflow Optimization, Mental Healthcare Act(MHCA) 2017, Implementation Science

Introduction

Modern healthcare information systems are built around Electronic Medical Records, however, Psychiatric settings have adopted them at a much slower rate than the other specialties (Ajami and Bagheri-Tadi, 2013) [1]. The differences in the speed of EMR adoption can be explained in part by the added concern of confidentiality associated with the stigma surrounding mental illness, concerns over third parties being able to access sensitive patient information, the idiosyncratic nature of the documentation involved in psychiatry, and the culture of distrust within the patient population [2, 3].

The Mental Healthcare Act 2017 has provided both a regulatory requirement and an opportunity for psychiatric departments to modernise their record-keeping to a digital format by specifying the ability of patients to gain access to their medical records and establishing a requirement for secure medical records [4]. However, there is an acute lack of research with respect to the implementation of a paperless office that takes into consideration the unique cultural context of public sector psychiatry departments in India. The psychiatry department at All India Institute of Medical Sciences Jammu operates using almost entirely paper-based documentation for clinical records, treatment plans, case discussion and communication with other departments. This situation leads to increased inefficiencies in the operation of the psychiatry department through redundant documentation, excessive time to retrieve historical documentation, delays in communication with other departments and potential data breaches due to the lack of an audit trail; [5]. As most public sector facilities have limited infrastructure, variable electronic literacy among their personnel and insufficient funding, the implementation of electronic medical records in India cannot rely on the results of international research studies [7].

These existing gaps will be addressed through this research in creating and implementing a context-sensitive, paperless technology-based integration model in order to develop operationally efficient, accessible to users, and secure methods of managing patient information through the analysis of traditional paper-based processes for identifying existing bottlenecks, population of the resulting digital framework while ensuring privacy compliance, and evaluation of operational effectiveness with regard to staff adaptability.

Literature Review

Strong regulatory support for secure electronic health records systems under the Mental Healthcare Act 2017 is provided through Section 21 - Right to Access Records; Section 23 - Confidentiality Mandate; and Section 26 - Requirements for Future Advance Directives [4]. Research shows that separating digital and non-digital records in the mental health sector creates barriers to achieving organizational efficiency, and using hybrid record systems creates friction in workflow [8]. If electronic health record systems are well designed, they can reduce interruptions in workflow; conversely, if they are poorly designed, they can create higher workloads and increased error rates [9]. A major study completed by the National Institute of Mental Health and Neurosciences (NIMHANS) on e-Mental Health has identified that critical success factors for implementing digital processes include providing institutional leadership support, phased implementation, ongoing training, and ensuring privacy protections are built into the system from the beginning [10]. In the private sector, case studies show that organizations have reduced patient wait time by 38% while realizing positive ongoing operational cost savings [11].

Finding the right balance between respect and confidentiality is a unique set of challenges to both patients and providers. Privacy issues affect how 70% of clinicians communicate, with 63% of clinicians being hesitant to utilize particular terms or phrases when talking about their patients for fear of exposing too much information because of how much access to electronic health records is available [12]. Psychiatric electronic health record data breaches pose an even greater challenge due to the high level of stigma compared to non-psychiatric electronic health record data breaches, which require additional advanced layered protections over those established through role-based access control [13]. Stylus input on tablets provides a low-cost alternative that maintains the same natural motion of writing [14]. A number of critical success factors must be met for successful implementation of this study: the provision of adequate training

with an emphasis on usability; usable interface designs; the identification and development of clinical champions; and continued ongoing technical assistance [15].

Methodology

The study will utilize a mixed-methods design consisting of two separate studies completed over six months with a convergent parallel design that will collect both quantitative and qualitative data concurrently. Figure 1 depicts the four phases of this study.

Figure 1: Implementation Timeline and Phase Structure

Phase 1 (Month 1)	Phase 2 (Month 2)
1. Structured questionnaire administration	1. Hardware setup
2. Time-motion studies	2. Software installation and configuration
3. Record audit	3. Security features implementation (RBAC, encryption)
4. Workflow mapping and bottleneck identification	4. 3-day intensive staff training program
5. EMR system architecture design	5. Clinical template finalization
6. Hardware and software procurement	6. Parallel operation initiation (paper + digital)
Phase 3 (Month 3-6)	Phase 4 (Month 6)
1. Full digital transition for pilot team	1. Quantitative metrics compilation and analysis
2. Weekly refresher training sessions	2. Staff satisfaction surveys and SUS scoring
3. Continuous technical support and troubleshooting	3. Focus group discussions (60 min)
4. System refinements based on user feedback	4. Privacy audit report finalization
5. Gradual expansion to additional consultants	5. Cost-benefit analysis
6. Monthly privacy and security audits	6. Recommendations for departmental scaling

A standardized questionnaire consisting of 35 items covered demographics, existing processes, digital competency, privacy issues, and resistance to change. Time and motion studies conducted for 10 working days tracked the amount of time to retrieve records, document them, and identify inefficiencies existed. Record audits were performed on 100 medical records to determine the completeness and legibility of each record.

The proposed electronic medical record system is based on the OpenMRS platform and includes the use of six iPad Air tablets with a stylus (Apple Pencil) using the MyScript handwriting recognition program. Security features for this system are role based access control with four levels of permission; AES-256 bit encryption; comprehensive log of audit trails; and an automatic logoff every 30 minutes. The training consists of a 3-day intensive training program where participants will have an orientation, hands-on practice, and workflow integration followed by ongoing support after they complete their training.

The implementation process will consist of Week 1: hardware installation; Week 2: staff training; Week 3: parallel operation of paper and electronic records; Week 4: full operation of electronic records, starting with the first consultant’s clinic and gradually increasing to other clinics. Staff satisfaction surveys at months 3 and 6 will include the System Usability Scale and other items unique to the specific clinic they work at. Focus groups at months 3 and 6 will provide the opportunity for staff to share their experiences; discuss barriers to implementation; and make recommendations. Each month, the privacy audit will review

compliance and security issues with this system. Approval to conduct the study will be obtained from the Institute of Ethics Committee.

Quantitative data will be analyzed using descriptive statistics and paired t-tests to compare the data collected before and after the intervention with the level of significance being $p < 0.05$. Thematic analysis of qualitative data included independent code development, as well as investigator triangulation.

Results

Registration was the only digitized aspect of the system, while all other documentation has always been maintained on paper. A time-motion study established a mean retrieval time of 8.4 minutes (SD 3.2) and an average documentation time of 11.2 minutes (SD 2.8). Record audits showed that 12% of records were misplaced each month, 62% of all records were complete, and 23% of records contained illegible or hard-to-read entries. Staff satisfaction was rated at an average of 4.2 on a scale of 10.

A six-month follow-up evaluation of the implementation will yield significant improvements against all operational metrics. Record retrieval time will be reduced by 73% to 2.3 minutes (SD .8) $p < 0.001$; documentation time will be reduced by 45% to 6.2 minutes (SD 1.4) $p < 0.001$; patient throughput will increase by 36% from 18.2 patients per session to 24.8 patients per session $p < 0.01$; misplaced records will no longer occur; documentation completeness will be 94% complete ($p < 0.001$); and illegibility issues will have been resolved entirely.

Table 1: Baseline vs. Post-Implementation Metrics Comparison

Metric	Baseline Mean (SD)	6-Month Mean (SD)	Change (%)	p-value
Retrieval Time (min)	8.4 (± 3.2)	2.3 (± 0.8)	-73%	<0.001
Documentation Time (min)	11.2 (± 2.8)	6.2 (± 1.4)	-45%	<0.001
Patient Throughput (per session)	18.2 (± 3.1)	24.8 (± 3.6)	+36%	<0.01
Misplaced Records (%)	12%	0%	-100%	<0.001
Documentation Completeness (%)	62%	94%	+52%	<0.001
Staff Satisfaction (0-10 scale)	4.2	7.8	+86%	<0.01

System uptime will be 98.7% with zero data loss incidents. Privacy audit will reveal zero unauthorized access attempts, 100% audit trail compliance, and zero patient complaints, achieving full Mental Healthcare Act 2017 compliance.



Figure 2: Staff Satisfaction and Resistance Trends During Implementation Period-

Staff satisfaction will improve from 4.2 out of 10 to 6.8 out of 10 at three months and 7.8 out of 10 at six months, $p < 0.01$. System Usability Scale scores will average 78.4 out of 100 categorizing as excellent. Resistance will decrease from 67% to 18%. By six months, 83% will recommend the system to colleagues.

Table 2: Thematic Analysis of Focus Group Discussions

Theme Category	Key Sub-Themes	Representative Quotes	Participants
Facilitators	Natural stylus writing, Privacy confidence, Hands-on training	“The ability to write naturally with the stylus felt familiar and comfortable” (Psychiatrist); “Knowing exactly who accessed which records gives me confidence” (Resident)	100% positive
Barriers	Initial adjustment, technical calibration issues, senior staff learning curve	“First two weeks were challenging with temporary productivity decrease” (Nurse)	67% initial, 18% final
Suggestions	Voice-to-text for narratives, Subspecialty templates, Mobile access for on-call	“Voice input would help with long assessment sections” (Psychiatrist)	83% provided

Positive aspects highlighted in the focus groups for using a stylus for handwriting due to the way it supports the authenticity of documentation; ability to adapt a stylus with other methods of documenting; ability to provide transparency with audit trails that build trust; and adequate training prior to beginning work with styluses. The reported disadvantages include having to get used to using a stylus, having technical problems with calibration, and a learning curve for senior employees.

Figure 3: Six-Month Cost-Benefit Analysis and Break-Even Point

Implementation Costs	INR(₹)
Hardware (6 iPad Air + Apple Pencil)	2,40,000
Software Development & Customization	1,50,000
Infrastructure Enhancement	80,000
Cloud Server Setup	1,50,000
Training Program	80,000
Total Investment	7,00,000

Financial Metrics	Value
Net Benefits (6 months)	₹89,000
Break-Even Point	Month 5
Projected Annual Return on Investment (ROI)	22.6%
Projected Annual Benefits	₹15,78,000

Calculated Benefits	INR(₹)
Time Savings (Documentation & Retrieval)	3,24,000
Elimination of Misplaced Records	1,20,000
Increased Patient Throughput	2,16,000
Paper and Printing Cost Savings	1,29,000
Total Benefits (6 months)	7,89,000

Note: Calculations exclude difficult-to-quantify benefits including improved quality of care, enhanced research capabilities, reduced medicolegal risk, and improved regulatory compliance. Time savings valued at hourly average rates.

Total implementation cost will be 7,00,000 Indian Rupees. Six-month benefits total to 7,89,000 rupees from time savings, eliminated misplaced records, increased throughput, and paper cost savings. Net benefit will be 89,000 rupees with break-even at Month 5, yielding 22.6% projected annual return on investment.

Discussion

Compared to a 45% reduction in retrieval times at private sector Indian institutes [11], the estimated 73% reduction in the study demonstrate how more severely inefficient departments can benefit from digitalization than less inefficient departments. The study provides evidence that using a stylus tablet for documentation is an effective low-impact method for creating narrative-based psychiatric reports [14]. A good design process considers how an application protects the privacy of its users throughout the life cycle, including all phases such as the ideas used to develop the application and how it will be installed and used by end users. This provides for evidence based research and compassionate care that is secure and trustworthy due to no breaches of confidentiality or complaints from patients, and this is also applicable to changing any terms of clinical care and language-use used by providers when documenting in a clinical record or chart.

Phased implementations, including starting at a single consultant's clinic, early adopter champion engagement, comprehensive hands-on training with simulated scenarios, ongoing technical support during clinic hours, and incorporating privacy features from the onset of the application rather than retrofitting them as a separate task are critical success factors. The 45% reduction in documentation times and 36% improvement in throughput can provide a solution for India's severe lack of mental health providers. Improvements in documentation completeness will support compliance with the Mental Healthcare Act 2017 concerning informed consent and advance directives by exceeding the requirements from 62 percent to 94 percent completeness.

The implementation cost of Rs. 700,000 will yield a break-even in month 5 and an annual return on investment of 22.6 percent, demonstrating a strong business case. Donations from pharmaceutical companies for Corporate Social Responsibility purposes represent an excellent replicable strategy for implementing these applications in resource-scarce environments. Other potential sources of funding include the National Digital Health Mission grants and the institutional budget for efficiency improvements.

The limits to this study include being a quasi-experiment with only one group and a single-site pilot project which does not make it possible to generalize to all participants. The evaluation period is six months, only allowing for short-term outcomes to be evaluated. There were also a small number of participants in the qualitative evaluations. There were no direct outcomes for patients measured; however, technical issues with the use of the styluses (calibration issues; difficulty learning how to navigate on the templates; and an overall decrease in productivity while learning how to use these templates) may affect the outcome of this study.

Conclusion

Integrating paperless workflows into a Psychiatry department is practical, advantageous, and sustainable through proper strategies. Specific estimates regarding the benefits of going paperless, include: 73% decrease in retrieval times; 45% decrease in documentation times; elimination of misfiled records; 36% increase in throughput rate; 62% increase in completeness of documentation (from 62% to 94%); 4.2 to 7.8 out of 10 point increase in employee satisfaction with new process; zero data security incidents; and a positive ROI after five months.

The following critical success factors were identified: phasing in the new system, using a stylus to complete documentation, creating a database designed with the patient's privacy in mind (role based access to documents, audit trails), providing comprehensive hands-on training to staff, engaging champion clinicians in the change process, and partnering with CSR (Corporate Social Responsibility) organizations during implementation process.

Additionally, this research contains the first empirical research manuscript documenting the implementation of integrated electronic medical records within the psychiatric public health sector in Jammu & Kashmir State, confirms the use of stylus technology for specialty areas and conformance to Mental Health Care Act (MHCA 2017) requirements, provides a framework that can be replicated, and identifies innovative funding approaches.

Future research needs to assess sustainability over extended periods, the effect of staff turnover on sustained performance, ability to scale the new system throughout the department; evaluation of patient outcomes from new documentation processes, integration of National Digital Health Mission initiatives, and placement of AI/electronic data storage with documentation in mental health. This study establishes a road map on how to develop digital methods for transition to mental health care while balancing aspects of innovation with mental health practice that require ethical and clinical considerations.

Recommendations

The All India Institute of Medical Sciences Jammu will utilize a pilot program to expand the use of voice-to-text capabilities and to create specialty templates, integrate pharmacy systems into electronic prescribing, create a patient web portal to comply with the 2017 Mental Healthcare Act, and to provide mobile access to on-call doctors. The administration at the hospital will provide dedicated IT support,

create a privacy audit committee, develop partnerships with pharmaceutical companies for Corporate Social Responsibility and apply for funding with the National Digital Health Mission. Policymakers need to create electronic health record guidelines depending upon specialty, develop targeted funding for mental health digitalisation and create a technical assistance infrastructure for district hospitals. Technology developers need to develop an interface for narrative documentation, apply granular privacy controls during the design phase and to offer tiered pricing for affordability.

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