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PROCESS IMPROVEMENT: REPLACING HANDWRITTEN PATIENT ASSET BORROWING FORMS WITH INTEGRATED SOFTWARE AT YEN BAI GENERAL HOSPITAL IN 2024

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ABSTRACT

Objective: To evaluate the effectiveness of implementing an integrated software system for patient relative cards and asset borrowing forms in the management of textile asset lending and returning, replacing the manual, handwritten method at Yen Bai General Hospital.

Methods: The study subjects comprised all asset-borrowing-return transactions from July 22, 2023, to February 28, 2024. A pre-post comparative design was used. Data were collected from the Infection Control Department's records and the hospital's asset management software.

Results: The processing time per transaction was reduced from 3–5 minutes to 30 seconds–1 minute. During the trial period (July 22, 2023 – February 28, 2024), with 15,777 asset-borrowing transactions, the solution saved over 42 million VND compared to the manual method. It also improved asset tracking accuracy, reduced loss, and facilitated payment procedures.

Conclusion: The solution is highly feasible and effective, contributing to improved service quality, cost savings, time efficiency, and enhanced hospital management. It has potential for broader application across other healthcare facilities.

Keywords: Management software, asset borrowing form, patient relative card, hospital, Yen Bai.

1. INTRODUCTION

Currently, the management of hospital textile borrowing and returning is still performed entirely manually. The Infection Control Department lends items to patients by manually filling out two copies of the asset borrowing form and issuing a patient relative card for the clinical department. When patients need to borrow additional textile items, the Infection Control Department records the details on two copies of the textile borrowing form (one copy kept by the patient and one retained for filing). Upon returning the items, staff must confirm on the borrowing form or temporary receipt, note any shortages, and declare the corresponding service before transferring the documents to the Accounting Department to verify and retrieve payment information from the HIS system. This process typically takes 3–5 minutes per transaction. It relies heavily on manual communication, making it prone to errors caused by handwriting, pronunciation, and discrepancies in reconciliation between clinical departments and the laundry service unit.

Although the staff has implemented the manual method proficiently, it still poses several limitations. It is time-consuming and costly in terms of data storage, and it is difficult to verify the borrower's identity and the condition of the assets. The reporting and data compilation processes are performed entirely by hand, often resulting in inaccuracies and a lack of transparency. Notably, discrepancies in textile reconciliation between clinical departments and the laundry service unit persist, directly affecting service quality and patient experience.

According to Decision No. 1895/1997/QD-BYT, hospitals are responsible for the comprehensive management of human resources, infrastructure, equipment, and professional activities to ensure efficiency and quality of patient care. Therefore, the management of asset and textile borrowing–return activities in hospitals also needs to be standardized and strictly controlled, in accordance with the hospital's operational scale and the requirements of comprehensive patient care[1]. In addition, Decision No. 6858/QD-BYT, which promulgates 83 hospital quality criteria, and Circular No. 19/2013/

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TT-BYT, which provides guidelines on healthcare service quality management, encourage hospitals to apply information technology to improve efficiency, accuracy, and transparency in administrative tasks as well as in patient care[2,3]. The research and implementation of an automated asset and linen management system not only meet legal requirements but also help minimize errors, optimize resources, and enhance the quality of healthcare services.

2. RESEARCH'S SUBJECTS AND METHOD

2.1. Research subjects

All patient transactions involving the borrowing and returning of hospital textiles at Yen Bai Provincial General Hospital from July 22, 2023, to February 28, 2024.

2.2. Study design

The study was conducted using a pre–post comparative design.

2.3. Quality Improvement Process

The quality improvement process includes:

- Review of Current Status: Analysis of weaknesses in the textile borrowing–return process was conducted through observation, record comparison, and interviews with staff of the Infection Control Department.

- Process Standardization: A standardized procedure was established, encompassing the initial borrowing, additional borrowing, returning, and payment processes.

- Software Design and Integration: The software was developed and integrated with the Hospital Information System (HIS), featuring barcode generation, storage of textile and borrower images, and real-time management of borrowing and returning statuses.

- Training and Pilot Implementation: Training sessions were organized for healthcare staff, followed by pilot application of the system.

- Continuous monitoring and assessment were conducted after implementation.

2.4. Data Collection Method

Data were collected from records archived at the Infection Control Department and from the hospital's asset management software system. The collected information included transaction processing time, number of borrowing transactions, estimated cost per transaction, asset loss status, and the level of convenience in the payment process.

2.5. Data Processing and Analysis Methods

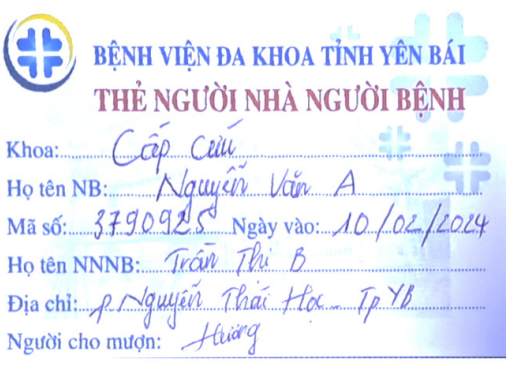
Descriptive statistical methods were used to compare the effectiveness of the two approaches: manual recording and integrated software. The key indicators included average processing time, average cost per transaction, total cost, and accuracy in asset management.

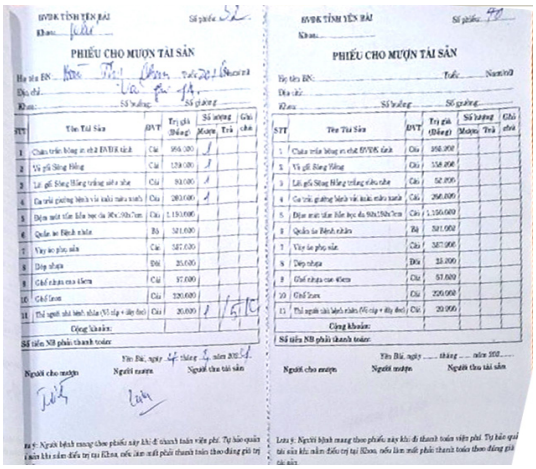
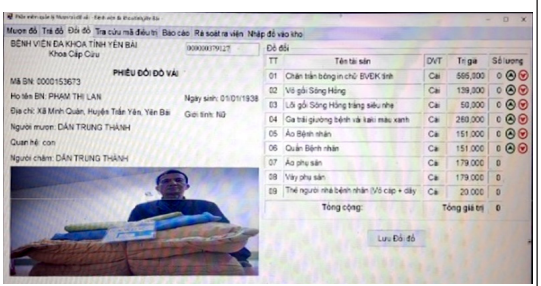
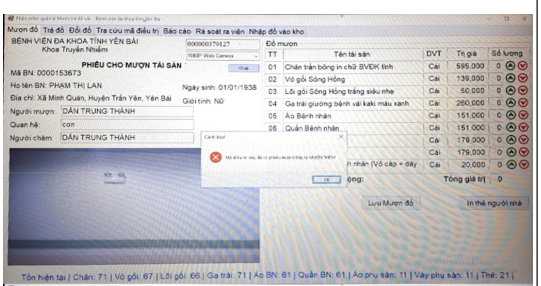
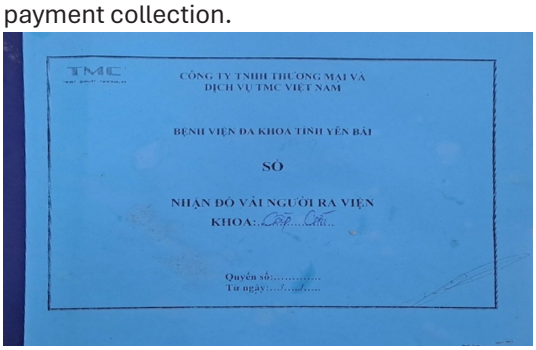
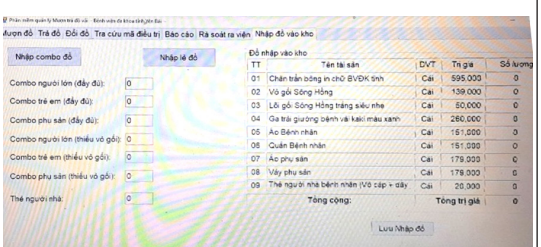
2.6. Research Ethics

Our study did not involve any intervention in patient treatment or care; all data were collected solely from administrative management activities. Patient identities were anonymized and used only for research purposes.

3. RESULTS

Table 1. Comparison between the Manual Method and the Integrated Software Using Patient Relative Card and Asset Borrowing Form in Textile Borrowing–Returning Management

Criteria	Manual Method	Integrated Software
Professionalim	- Information collection through verbal communication may cause inaccurate or incomplete data - Unclear handwriting by some individuals may lead to information errors - Long time waiting.  BỆNH VIỆN ĐA KHOA TỈNH YÊN BÁI THẺ NGƯỜI NHÀ NGƯỜI BỆNH Khoa: Cấp Cứu Họ tên NB: Nguyễn Văn A Mã số: 3790925 Ngày vào: 10/02/2024 Họ tên NNNB: Trần Thị B Địa chỉ: p. Nguyễn Thái Học Tp.YB Người cho mượn: Hường	- Application of an information management system integrated with the HIS platform. - Retrieval of information using the patient's treatment code, ensuring accuracy. - Clear printed text, minimizing errors. - Reduced waiting time.  BỆNH VIỆN ĐA KHOA TỈNH YÊN BÁI THẺ NGƯỜI NHÀ Khoa: Khoa Sản Họ tên NB: L Thời gian mượn: 03/03/2024 13:10:29 Họ tên NNNB: T Địa chỉ: Xã Nga Quán, Huyện Trấn Yên, Yên Bái Người cho mượn: Trần Thị Thanh Thuỷ

Criteria	Manual Method	Integrated Software
Human resources	Time per patient transaction: 3–5 minutes. Information is recorded on two copies of the asset borrowing log and on one patient relative card, followed by the customer's signature confirmation.	Time per patient transaction: 30 seconds to 1 minute Scan the barcode, print the card, and lend textile items.
Borrowed item verification	- Only signature recorded; no images of the borrower or borrowed items.  PHIẾU CHO MƯỢN TÀI SẢN	- Images of the borrower and borrowed items are stored instead of a signature. 
Borrowing management	- Unable to notify when a patient has previously borrowed items.	- Notify when a patient has previously borrowed items. 
Exchange and return of items	- Recorded manually in logbooks; items are returned by department. - Departments are unable to monitor the process. - Not connected to the software system; during payment, it is necessary to stamp "items returned" on the payment statement, or in case of lost assets, staff must personally inform the accounting department to provide a basis for payment collection.  CÔNG TY TNHH THƯƠNG MẠI VÀ DỊCH VỤ TMC VIỆT NAM BỆNH VIỆN ĐA KHOA TỈNH YÊN BÁI SỔ NHẬN ĐỒ VẢI NGƯỜI RA VIỆN	- Scan the barcode on the stored card. - Departments can effectively monitor patients' borrowing, exchanging, and returning activities. - Directly linked to the payment statement without the need for stamping; in case of lost assets, information is immediately available. 

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<tr><th>Criteria</th><th>Manual Method</th><th>Integrated Software</th></tr>
<tr><td>Economic efficiency</td><td>
<table>
<tr><th>No</th><th>Item</th><th>Unit</th><th>Quantity</th><th>Unit price (VND)</th><th>Total (VND)</th><th>Notes</th></tr>
<tr><td>1</td><td>Asset borrowing form</td><td>Sheet</td><td>01</td><td>36.777</td><td>367.77</td><td></td></tr>
<tr><td>2</td><td>Patient relative card</td><td>Piece</td><td>01</td><td>2000</td><td>2000</td><td></td></tr>
<tr><td>3</td><td>Lanyard and card holder</td><td>Set</td><td>01</td><td>7000</td><td>50</td><td></td></tr>
<tr><td>4</td><td>Staple</td><td>Set</td><td>01</td><td>6600</td><td>13.46</td><td></td></tr>
<tr><td>5</td><td>Retractable pen</td><td>Set</td><td>01</td><td>16000</td><td>6.4</td><td></td></tr>
<tr><td>6</td><td>Ballpoint pen</td><td>Set</td><td>01</td><td>5280</td><td>4.4</td><td></td></tr>
<tr><td>7</td><td>Patient admission logbook</td><td>Day</td><td>01</td><td>6000</td><td>200</td><td></td></tr>
<tr><td>8</td><td>Textile return register</td><td>Day</td><td>01</td><td>6000</td><td>200</td><td></td></tr>
<tr><td>9</td><td>Waste disposal</td><td>Kg</td><td>0.004</td><td>9.000</td><td>36</td><td></td></tr>
<tr><td></td><td>Total cost</td><td></td><td></td><td></td><td>2878.03</td><td></td></tr>
</table>
</td><td>
<table>
<tr><th>No</th><th>Item</th><th>Unit</th><th>Quantity</th><th>Unit price (VND)</th><th>Total (VND)</th><th>Notes</th></tr>
<tr><td>1</td><td>Thermal paper</td><td>Sheet</td><td>01</td><td>6000</td><td>60</td><td></td></tr>
<tr><td>2</td><td>Lanyard and card holder</td><td>Set</td><td>01</td><td>7000</td><td>50</td><td></td></tr>
<tr><td>3</td><td>Power supply for computers</td><td>Kw/h</td><td>0.04</td><td>1.650</td><td>66</td><td></td></tr>
<tr><td>9</td><td>Waste disposal</td><td>Kg</td><td>0.004</td><td>9.000</td><td>36</td><td></td></tr>
<tr><td></td><td>Total cost</td><td></td><td></td><td></td><td>185</td><td></td></tr>
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Compared with the previous solution, the new solution demonstrates multiple advantages and high applicability. Its enhanced professionalism ensures greater reliability, while the reduced transaction time per patient minimizes congestion and waiting during peak admission periods. The system allows effective control over the borrowing, exchange, and return of items, as well as accurate reconciliation of lost assets during payment. It also significantly reduces the cost incurred per patient transaction.

Table 2. Practical Comparison Results Between the Manual Method and the Integrated Software Using Family Member Card and Asset Borrowing Form in Textile Borrowing–Returning Management

From 22/07/2023 to 28/02/2024	Quantity	Manual Method		Integrated Software	
		Unit price (Dong)	Total cost (Dong)	Unit price (Dong)	Total cost (Dong)
Number of patient asset borrowing transactions	15.777	2878.03	45.406.679	185	2.918.745

From July 22, 2023, to February 28, 2024, there were 15.777 patient asset borrowing transactions, with a cost difference of 42.487.934 VND between the manual method and the software-based system.

4. DISCUSSION

The implementation of the integrated software using patient relative cards and asset borrowing forms at Yen Bai Provincial General Hospital provides clear advantages over the manual paper-based process. First, processing time has been significantly reduced: previously, staff had to handle paperwork manually, whereas digitization now allows much faster retrieval, approval, and storage. Similar studies indicate that digitizing medical forms often saves substantial time. For example, Yilmaztürk (2023) reported that, in an ICU setting, each nurse saved approximately 56.8 minutes per day after switching to an electronic system. When extrapolated across the number of beds and care shifts, the study estimated annual labor cost savings of millions of dollars due to reduced manual workload.[4] This time saving not only improves patient satisfaction but also alleviates pressure on healthcare staff during peak hours.

Regarding accuracy, the electronic system significantly reduces errors compared to manual methods. Data are entered into mandatory fields and automatically validated, minimizing input mistakes and information loss. Paulsen (2012) reported that processing via automated forms yielded a very low error rate (0.041%), substantially lower than that of manual data entry, even after multiple checks.[5] Consequently, information recorded on family member cards and asset borrowing forms is complete, transparent, and less prone to typographical errors, data loss, or handwriting confusion. In terms of professionalism, the use of software enhances the hospital's modern image and credibility. Staff and patient family members perceive the process as more transparent and more convenient. For instance, implementing digital solutions such as online appointment registration and cashless payment has been shown to reduce waiting times, increase patient satisfaction, and improve the quality of healthcare services. The initiative also demonstrates management benefits: reduced paperwork, increased accuracy, and enhanced professionalism. Additionally, the software supports better control and reconciliation of borrowed assets (e.g., alerts when a patient has already borrowed items, integration with the HIS payment system), addressing the shortcomings of the previous manual method. Thus, compared to traditional handwritten procedures, this technology-integrated solution saves time and costs, improves accuracy, and promotes professionalism in hospital management.

These directions are also suitable with the Ministry of Health's Digital Health Transformation Strategy through 2025 and its orientation toward 2030, which prioritizes the application of information technology to enhance

management efficiency, increase transparency in patient care processes, and reduce the workload of healthcare staff[6]. The implementation of integrated software for asset management not only addresses internal operational issues but also contributes to achieving the long-term goal of comprehensive digital transformation in the healthcare sector.

However, to ensure the new initiative achieves its full potential, several factors must be considered. First, information technology infrastructure is crucial: the local network must be stable, and servers and end-user devices must be capable of handling the load and supporting high-speed Internet connectivity. Second, human resources and training are essential. Healthcare and administrative staff need training on the new software and a clear understanding of workflow through the electronic interface. Transitioning from manual to digital systems requires changes in work habits and necessitates comprehensive, continuous training, especially for senior staff. Training programs should be conducted regularly, with detailed instructional materials and technical assistance channels to address user queries.

5. CONCLUSION

The implementation of the integrated software solution, using patient relative cards and asset borrowing forms to replace the traditional manual method, has demonstrated apparent effectiveness at Yen Bai Provincial General Hospital. This solution has enhanced professionalism in management, minimized errors in data recording and reconciliation, and saved processing time and operational costs. Trial results indicate a significant reduction in processing time per patient, tighter control over the asset borrowing–return process, and a notable decrease in costs. The solution is highly feasible, easy to implement, and applicable to other healthcare facilities to improve both patient service quality and hospital management efficiency.

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