

Application of Cloud Checklists to Improve the Accuracy of Patient Examination Processes

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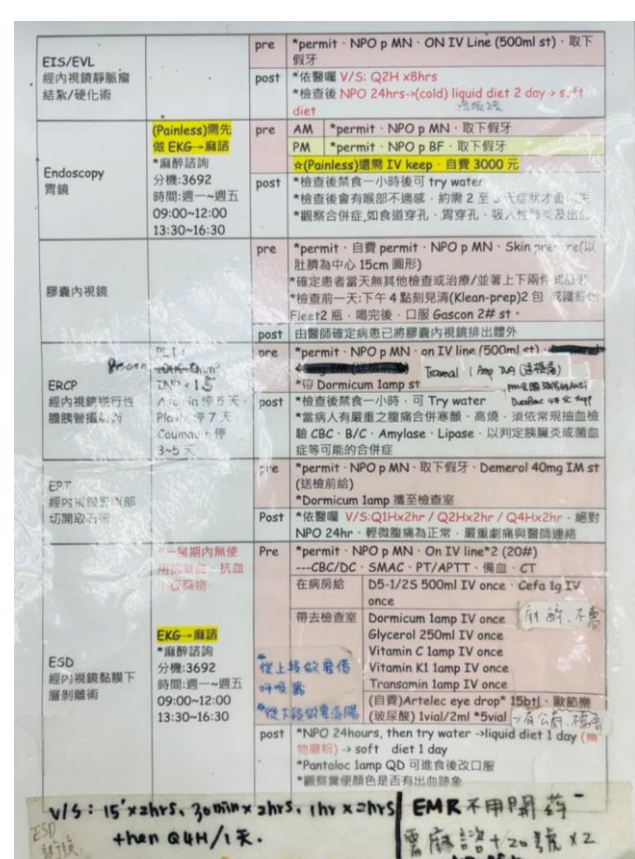
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INTRODUCTION

- A quality improvement study evaluated whether electronic health record system timers and event logs can measure the efficiency and quality of a clinical process in an electronic health record. Automating clinical workflows provides new opportunities to measure efficiency and quality (Karp et al., 2019).
- Clinical nursing operations are complicated, paper-based intravenous infusion record sheets cannot be updated according to doctor's instructions in real-time, and written updating is time-consuming and delays treatment. Therefore, information-based electronic paper should be used to reduce the time required for intravenous infusion operations (Huang et al., 2023).

AIM

- There were 419 examination items in this ward in October 2023. Although paper notices for pre-and post-examination preparation are provided in the ward for nurses to refer to the examination process, there are still cases where the examination process is incomplete and incorrect.
- This study aims to improve the accuracy of patient examination processes through cloud checklists.



Paper notices for pre-and post-examination preparation

QR-code for pre-and
post-examination
preparation



METHOD

- This study was conducted in a gastroenterology and hepatology ward with 43 beds. There are 23 nurses (including head nurse) with an average working experience of 4.9 years. The patients were diagnosed as liver cancer, hepatitis, cholecystitis, colorectal cancer, pancreatic cancer etc.
- A questionnaire survey of preparation for patient examination was used to analyze the types of patient examination and examination preparations, including to understand the procedure for all examination items and to understand the aftercare for each examination.
- Data collection from October 30 to November 6, 2023, nurses response rate reached 86%.

RESULTS

- Results of the analysis showed that about 5.3% of nurses would encounter from one to five different types of examinations, 68.4% with 6-10 types, 21% with 10-15 types, and 5.3% with more than 15 types of patient examinations for one month, among which the most common is X-ray, electrocardiogram and other routine examinations, as well as gastrointestinal examinations such as CT scan, MRI, ultrasound, endoscopic retrograde cholangio-pancreatography (ERCP), colonoscopy and endoscopy etc.
- Tracking the frequency of nurses looked over the paper notices for pre-and-post-examination preparations within three months: 31.9% of those who browsed through 1-5 times, 42.1% of those who browsed through 6-10 times, and 26.3% of those who browsed through 10 or more times, even if they looked over the paper leaflets. This inspection preparation leaflet still finds out from the questionnaire data that eleven nurses have experienced work delays and criticism due to incomplete preparation of inspection item details. It analyzes 19 examination process errors, i.e., transfer tool, wrong materials, wrong examination unit, family accompanying, giving medication, fasting, missed medications, the consent form, etc. (Figure 1)
- Based on the above data analysis results, the research team drew a cause-and-effect diagram to illustrate why the patient examination process was incomplete. The main reasons identified were: 1. Rare encounters with special examination; 2. Forgetting temporary examinations; 3. Unfamiliarity with the examination process; 4. Slow updating of information on paper examination checklists; 5. Unclear handwritten corrections on paper checklists. This study formulated strategies through literature verification and a comprehensive decision matrix analysis, which involved evaluating potential solutions based on their feasibility, cost, and impact. The improvement plan involved digitizing examination checklists in the cloud and setting up QR Codes on computer screens for downloading electronic examination checklists (Figure 2). As a result, the examination accuracy rate increased from 21% to 93%, and the percentage of nurses' errors in the examination process decreased from 79% to 7%, effectively achieving the goal of increasing the accuracy rate of patient examination .

Figure 1
The main reasons why examinations process incompleted

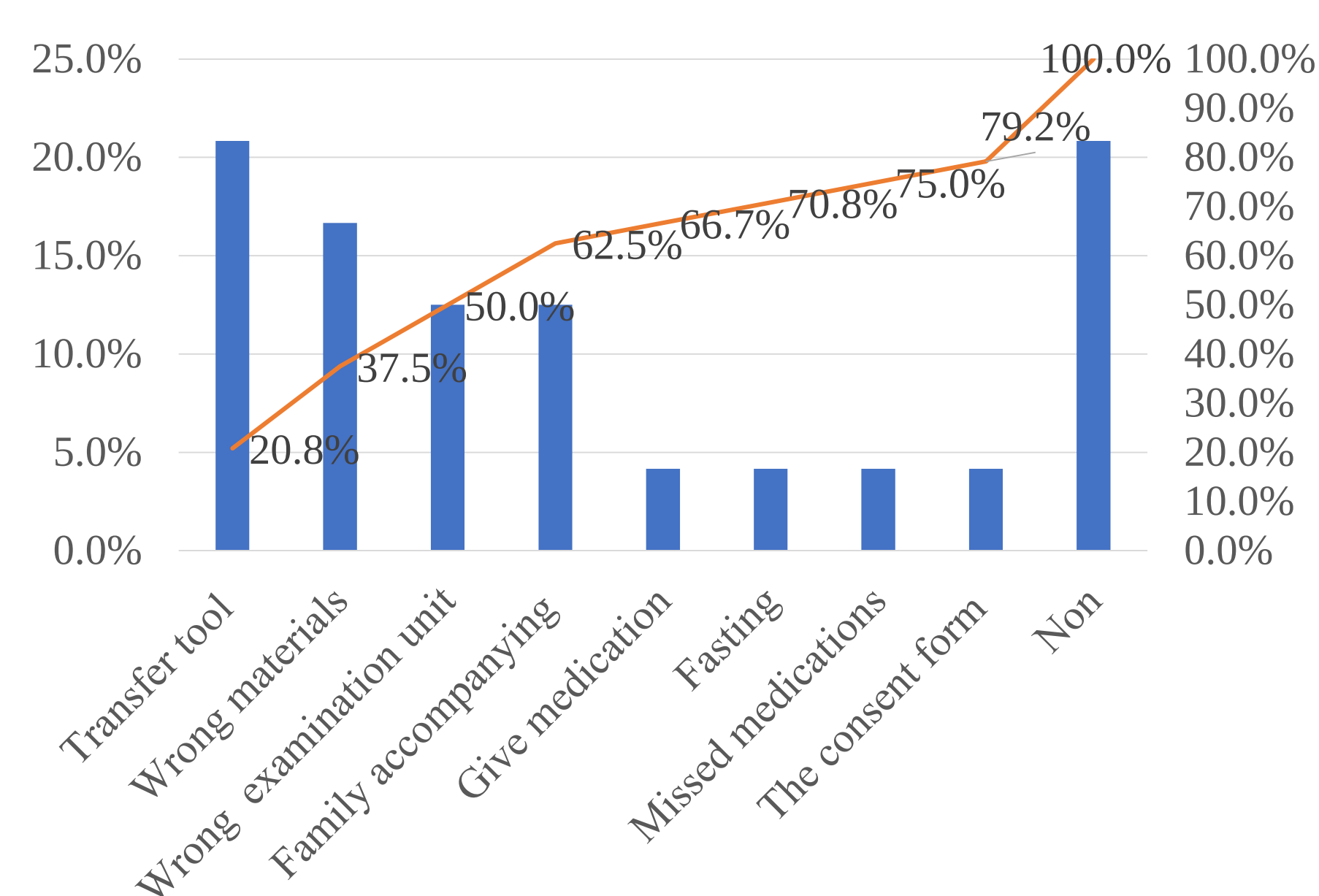


Figure 2
QR-code to present
electronic examination
preparation sheets in cloud

A122病房各項檢查前準備			
編號	檢查名稱	編號	檢查名稱
A	Abd sono	M	MRI
C	CAI		NJ
	CT	P	CT/DIPTGBD
	CTA		PEG
	CT guide RFA		PEIT
	Colonoscopy		POEM
E	Endoscopy		PORTA
	雙道E+C		PICC
	EVL - EIS - GVS	S	Sonoscopy
	EMR		Sono-guide biopsy
	ERCP		SONO GUIDE RFA
	ESD		
	EUS	T	TAE / Angiography /Y-90粒埋植結合放射
	ESU	U	Upper Electronic CUS(X-ray)
	EPS-Ablation原理		USJ Series / Small intestine
	ESD及IPD及血管鑿埋		胃腸鏡組
	ESD和IPD之check list		胃腸鏡組
I	Intestinal stent (X-ray)		腸胃科護理
	ICG test		

Endoscopy	
Pre-and post-examination preparation for ECCT	
Place	Endoscopy Center for Diagnosis and Treatment, The 13rd Floor of Chung-Cheng Building
Transfer tool	Wheelchair; if you need a hospital bed, please get in touch with the center
Pre-	(AM) NPO P MN (PM) NPO P BF (before 6 am eating breakfast) (Painless) : anesthesia consultation, Anesthesia consent form, anesthesia self-pay consent form, accompanied by family members, remove the removable dentures ON IV, NS 500ml once
Post-	Wait 1 hour after the gastroscopy for the throat swallowing reflex to recover before eating; Try a sip of water first. If there is no choking or other discomforts, the patient may proceed with eating.

CONCLUSIONS

- The main purpose of this study is to improve the completion rate of examinations in the internal medicine ward, optimize nursing operations, and utilize cloud information tools to achieve the expected project goals and reduce the workload of nursing staff by implementing nursing activity execution strategies.
- It is recommended that the information system be strengthened, nursing content be integrated to reduce the repetitive work of nurses, and clinical nursing workflow be optimized. Paper-based work should be electronic, and more electronic products are used at work. It is expected that using the notice for examination preparation on the cloud will bring more convenience to nurses and enable all clinical examinations to proceed smoothly as scheduled.

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