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Enhancing A Safe Medication Practice Through Improving Medication Reconciliation

Mustafa Hussein
Graduate School Of Healthcare Management, Royal College Of Surgeons In Ireland (RCSI), Dublin, Republic Of Ireland
St. Vincent's Private Hospital, Dublin, Republic Of Ireland

Abstract
Background
Medication reconciliation emerged as an intervention to minimise medication discrepancies and adverse drug events. Despite the simplicity of its concept, medication reconciliation proved to be a challenging task across wide healthcare settings.
Methodology
This quality improvement project was conducted in the high-dependency unit between November 2022 and March 2023. It involved three PDSA cycles and was guided through the HSE People's Needs Defining Change Model. Two evaluation models were used, the Donabedian Model of Evaluation and Kirkpatrick's Model.
Objectives
- *To increase the percentage of patients receiving a medication reconciliation by a pharmacist or a physician within 24 hours of admission to the high-dependency unit, from 83% to 90% by the end of March 2023*
- *To have physicians put their medical council number in at least 25% of medication charts by the end of March 2023*
- *To increase staff awareness about the importance of medication reconciliation as a patient safety tool*

Results
Forty medication charts were checked during the data collection period. The medication reconciliation sheet was completed in 35 charts (87.5%). The medical council number of the prescribing physician was noted in at least one medication prescription in 17 charts (42.5%). The intervention also revealed an increase in staff awareness.
Conclusion
Medication reconciliation is a helpful tool to identify medication discrepancies and limit potential adverse drug events. However, it needs to be bundled with other interventions to promote a safe medication practice.

Keywords: *medication reconciliation, medication discrepancies, quality improvement, high-dependency unit*

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I. Introduction

Medication errors and unsafe medication practices impose a significant burden on both the patient and the healthcare system. It is a leading cause of adverse drug events (ADEs) that, in some instances, can be fatal. Injury and harm resulting from medication errors are estimated to cost around $42 billion annually worldwide (WHO, 2022).

The patterns of medication errors vary widely across the literature. This can be due to differences in research designs, study areas, study population and inclusion/ exclusion criteria. A systematic review by Tam et al. noted that 27% – 54% of patients had at least one medication discrepancy at the time of hospital admission. 19% – 75% of these discrepancies were unintentional (Tam et al., 2005).

In the United States, Cornish et al. reported that 53.6% of patients admitted to general internal medicine wards had at least one unintended discrepancy, of which 38.6% had the potential to cause moderate to severe ADEs (Cornish et al., 2005). Also, in the United States, Shehab et al. estimated that ADEs were responsible for 1.3 million emergency department visits and 350,000 hospitalisations annually (Shehab et al., 2013). In its Quality Chasm Series, the Institute of Medicine pointed out that ADEs cost the American healthcare system around $3.5 billion annually (Aspden et al., 2007).

A retrospective study carried out over five years in one of Ireland's most prominent tertiary healthcare settings found that 33.4% of patients had potential medication errors and 66.6% had actual errors. However, only 5.3% of the actual errors resulted in patient harm. Actual errors were significantly linked ($p < 0.0001$) to incorrect dosing and infusion issues (Relihan et al., 2012).

Medication reconciliation (MedRec) is a tool or intervention to enhance patient safety by preventing potential ADEs. The Joint Commission International (JCI) describes it as a process of comparing the patient's medication order sheet to all the medications they have been taking (Joint Commission Journal on Quality and Patient Safety, 2006). The Health Information and Quality Authority (HIQA) of Ireland views it as a *"process of creating and maintaining the most accurate list possible of all medications a person is taking"* (HIQA, 2014). Thus, highlighting discrepancies and reviewing them with the prescriber.

This quality improvement project (QIP) was carried out to improve the MedRec process for patients admitted to the high-dependency unit (HDU) of St. Vincent's Private Hospital, Dublin. It involved raising staff awareness about the importance of MedRec as a tool to enhance medication safety and improve the patient experience. It also focused on the documentation of the medical council number of the prescribing physician as an essential element of accountability. The Health Service Executive (HSE) People's Needs Defining Change Model has been chosen to deliver the intervention. The rationale behind choosing the model relies on the fact that it originates from the Irish healthcare sector.

The objectives of the QIP were:

- To increase the percentage of patients receiving a MedRec by a pharmacist or a physician within 24 hours of admission to the HDU, from 83% to 90% by the end of March 2023
- To have physicians put their medical council number in at least 25% of medication charts by the end of March 2023
- To increase staff awareness about the importance of MedRec as a patient safety tool

II. Materials And Methods

Details of the Intervention

The project involved three sequential Plan-Do-Study-Act (PDSA) cycles. The first cycle focused on raising staff awareness of MedRec. It involved giving a presentation to all HDU staff members (physicians and nurses), shedding light on the role of MedRec in minimising ADEs and enhancing patient safety. The burden of medication errors and ADEs on the patient and healthcare system was discussed during the presentation.

The second PDSA cycle involved a presentation highlighting the JCI standards in the ordering and prescribing of medications. It emphasised the importance of documenting the medical council number as an accountability element when prescribing medications. The target audience for the second presentation was physicians. The first and second presentations were delivered in November 2022.

The third PDSA cycle represented the data collection period. It was conducted over 5 weeks between February and March 2023. It focused on two aspects, completion of MedRec within 24 hours of HDU admission and the documentation of the medical council number on the prescribing section.

Organisational Development Model

Human nature tends to resist change. This can be due to fear of uncertainties and coping abilities (Hussain et al., 2018). This led to the introduction of the change management concept and organisational development (OD).

The HSE People's Needs Defining Change Model (Fig. 1) has been chosen for this QIP. Since the project took place in the Irish healthcare service, it made sense to use a transformation framework that originates from the local context.

The flow of work in healthcare organisations can be represented as a triad of structure, system and culture. Delivering change to structure and system can be relatively easier than cultural change. This is because culture reflects the attitude and perceptions of individuals. A simple way to describe the culture in an organisation is *"this is how we do it here."* Therefore, changing the way *"we do things"* is challenging and can be time-consuming if not carried out in a structured manner. Here comes the importance of the HSE People's Needs Defining Change Model. It focuses on culture as a vital factor for transformation. Delivering change through creating a culture can help in the sustainability of the practice.

Data Collection Tools

Data related to the first two objectives were collected through a checklist. A pre and post-presentation questionnaire was used to collect data on the third objective. The response to the questionnaires was based on the Likert scale. This is a tool used to translate qualitative data into quantitative measures (Boone & Boone, 2012). The response to each question/ statement ranged from strongly disagree, somewhat disagree, neither disagree nor agree, somewhat agree and strongly agree.

Evaluation

Two evaluation models have been used, Donabedian Model of Evaluation (Fig. 2); and Kirkpatrick's Four Level Evaluation Model (Fig. 3).

Ethical Considerations

The data extracted from the medication charts were strictly numbers. No patient name, date of birth, address or other personal identifiers linking the medication sheet to the patient had been recorded. Participation in the presentations and filling out the questionnaires was voluntary.

The QIP proposal was submitted to the clinical audit committee of St. Vincent's Healthcare Group and was deemed not human subject research.

III. Results

The data collection was carried over a 5-week period. A checklist was used to gather data on the first two objectives. Data related to the third objective were collected via pre and post-presentation questionnaires. The checklist focused on two aspects, completion of MedRec within 24 hours of admission to the HDU and the medical council number of the prescribing physician on the prescription section. Eight medication sheets were checked each week.

The MedRec sheet was completed within 24 hours in 35 of the 40 checked medication sheets (87.5%). The medical council number of the prescribing physician was noted in at least one medication prescription in 17 of the 40 medication sheets (42.5%). However, having a medical council number on each prescribed medication was only found in 4 sheets (10%).

Twelve staff members responded to the pre and post-presentation questionnaires. In the pre-presentation questionnaire, 9 strongly agreed with the significant impact of medication errors and ADEs on the patient and healthcare system, while 3 somewhat agreed. For the second statement, 5 strongly agreed that medication discrepancies could result in serious ADEs, 3 somewhat agreed and 4 neither agreed nor disagreed. Most responders agreed that medication changes need to be clearly documented in the patient's chart (10). Five strongly agreed, 3 somewhat agreed and 2 were equivocal on whether MedRec is a tool to promote a safe medication practice. The response to the pre-presentation questionnaire is presented in Table 1.

For the post-presentation questionnaire, all the staff were overall satisfied with the presentation (7 strongly agreed and 5 somewhat agreed). The responses to the second statement were variable. Three strongly agreed that the provided information was relevant to their clinical practice, 4 somewhat agreed, 3 were equivocal and 2 somewhat disagreed. Most staff members found that the presentation increased their knowledge about MedRec. Eight strongly agreed that they would use the acquired information to promote a safe medication practice and 4 somewhat agreed. The response to the post-presentation questionnaire is presented in Table 2.

Communication between the staff members was a vital element of the QIP. The project's outcome was communicated to the stakeholders through different means. After the data collection period, the checklists were reviewed, and feedback was given to the prescribing physician. A poster summarising the QIP has also been shared.

IV. Discussion

The aviation industry has always been viewed as an ideal example of high-quality service provision. Various factors play a part in this. However, the adequacy of staff numbers is a crucial one. The negative influence of a shortage in staff has been evident in the post-COVID impact in Dublin airport, where inadequate staff numbers resulted in long queues for security check-ins, flight cancellations and delays.

The healthcare service is not a low-quality sector. It is clearly understood that errors and harm in healthcare provision can be fatal, but it is also critical to look at the bigger picture and have a holistic perspective. The provision of a high-quality service requires the availability of a competent and qualified workforce that is adequate in number to meet the service user's demands. Low staff numbers can create an error-prone environment even if the staff are highly skilled and competent.

In the UK, the 2023 junior doctors' strike in the National Health Service (NHS) also highlighted the issue of staff shortage and its negative impact on healthcare service delivery. During the strike, many consultants had to cover areas junior doctors usually covered. They realised the challenges that their junior colleagues face on a daily basis because of inadequate staffing. Thus, creating fertile soil for errors.

Unfortunately, the shortage of healthcare professionals is speculated to grow worse. The WHO expects the deficit in healthcare professionals will reach 10 million by 2030 (WHO, 2023). In Ireland, the recent HSE workforce report showed an increase in turnover rates among different categories between 2020 and 2022. For consultants, it increased from 8.4% to 11.4%. Medical/ Dental staff turnover rates increased from 5.8% to 12.3%. Pharmacy staff increased from 8.7% to 11.5% and staff nurse/ midwife rose from 7.0% to 11.0% (HSE, 2023).

Insufficient staff numbers have also been highlighted by the HDU staff. In an ideal situation, each unit or ward has a designated pharmacist. However, with the staff shortage, a pharmacist might be required to cover more than one area.

The setting of the HDU and its limited bed capacity had a positive influence on conducting the project. Communication between the staff members and dissemination of information was a point of strength. If the QIP had been carried out in a larger unit with more staff, communication could have been challenging.

The HSE People's Needs Defining Change Model was introduced in 2018. As a relatively new transformation model, its impact on healthcare service delivery has not been examined across a wide range of healthcare settings. There is a paucity of literature discussing the influence of the HSE model on quality improvement. Flaherty used it as a roadmap to guide a QIP for a nurse-led enuresis service for children at the primary healthcare level (Flaherty, 2019). Sheehan et al. embarked on the model for fall risk assessment among the geriatric population at the home level (Sheehan et al., 2021). Both projects revealed favourable outcomes. Worth mentioning that both projects were carried out in Ireland. Searching the literature could not identify the application of the model outside Ireland.

Another observation about the HSE People's Needs Defining Change Model is that it provides a detailed blueprint for quality improvement. Unlike Lewin's 3-step change model and Kotter's 8-step model, the HSE model lays out a comprehensive approach. Although the model has three main themes, the detailed interventions under each theme can make it complex and challenging to apply in actual practice. The details are meant to clarify all the tasks involved and to have a clear perspective on the different levels of intervention. This can be of significant importance at a corporate level. However, suppose there is no clear understanding of the different tasks between the staff members implementing the intervention in real-life practice. In that case, confusion may arise, leading to variation in practice.

The work presented here is for quality improvement purposes. The results obtained need to be viewed within the local context. Simple descriptive statistics were used to present the results of the intervention. No inferential statistics, tests of significance or statistical power were used. Therefore, the generalisability of the outcomes of the QIP is not guaranteed.

V. Conclusion

Safe medication practice has gained significant attention in the past years. MedRec emerged as a crucial tool to promote a safe medication practice, minimise medication discrepancies and limit ADEs. Although the concept behind MedRec is simple, its application to clinical practice proved to be challenging.

The positive influence of MedRec in curbing ADEs has been widely discussed. However, MedRec is not the magic wand that can fix or prevent medication-related events. MedRec is only a jigsaw piece in the broader picture of safe medication practice. It needs to be bundled with other interventions to enhance a safe medication practice and improve the patient experience.

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Disclosure Statement

The author has no conflicts of interest to disclose.

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Figures

Fig. 1 HSE People's Needs Defining Change Model

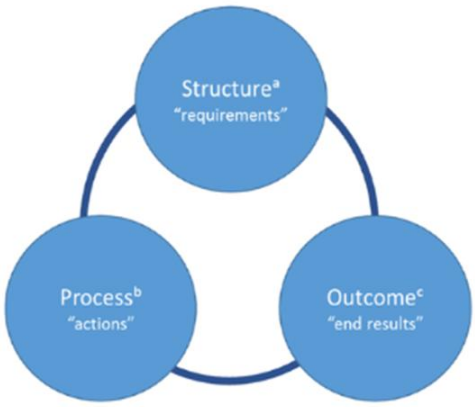

Fig. 2 Donabedian Model of Evaluation

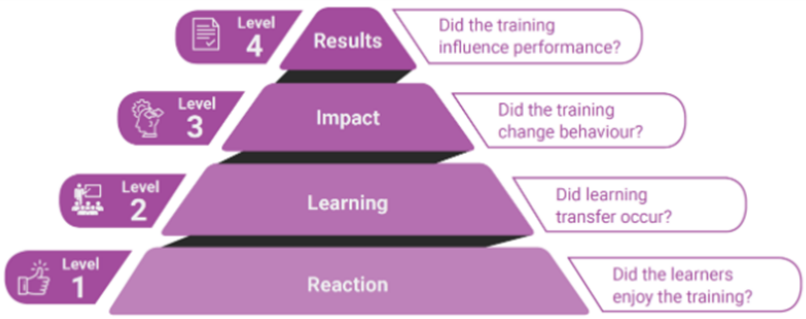

Fig. 3 Kirkpatrick's Evaluation Model

Tables

Question/ Statement	Strongly disagree *n (%)*	Somewhat disagree *n (%)*	Neither disagree nor agree *n (%)*	Somewhat agree *n (%)*	Strongly agree *n (%)*
Medication errors and ADEs impose a significant burden on patients and the healthcare system	0	0	0	3 (25%)	9 (75%)
If not clearly identified, medication discrepancies could result in serious ADEs	0	0	4 (33.3%)	3 (25%)	5 (41.6%)
Any change in medications needs to be clearly documented in the patient records	0	0	0	2 (16.6%)	10 (83.3%)
MedRec is a tool/ intervention to enhance a safe medication practice	0	2 (16.6%)	2 (16.6%)	3 (25%)	5 (41.6%)

Table 1. Response to the pre-presentation questionnaire

Question/ Statement	Strongly disagree *n (%)*	Somewhat disagree *n (%)*	Neither disagree nor agree *n (%)*	Somewhat agree *n (%)*	Strongly agree *n (%)*
Medication errors and ADEs impose a significant burden on patients and the healthcare system	0	0	0	2 (16.6%)	10 (83.3%)
If not clearly identified, medication discrepancies could result in serious ADEs	0	0	2 (16.6%)	3 (25%)	7 (58.3%)
Any change in medications needs to be clearly documented in the patient records	0	0	0	2 (16.6%)	10 (83.3%)
MedRec is a tool/ intervention to enhance a safe medication practice	0	0	2 (16.6%)	4 (33.3%)	6 (50%)
I am satisfied with the in-service presentation overall	0	0	0	5 (41.6%)	7 (58.3%)
The information provided was relevant to my current practice	0	2 (16.6%)	3 (25%)	4 (33.3%)	3 (25%)
The information provided increased my knowledge on MedRec	0	0	1 (8.3%)	4 (33.3%)	7 (58.3%)
I would use the information I learned to promote a safe medication practice	0	0	0	4 (33.3%)	8 (66.6%)

Table 2. Response to the post-presentation questionnaire