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Assessing metabolic risk factors for psychiatric patients: An IT-supported task shift from physician to pharmacist

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Background: Psychiatric medication can have adverse effects such as weight gain, which is a metabolic risk factor for the development of cardiovascular disease and diabetes. This study aimed to assess whether an IT-supported task shift from physicians to pharmacists could improve clinical guideline compliance in assessing metabolic risk factors for psychiatric patients.

Method: An IT tool was designed and implemented in the electronic health record to enable pharmacists to efficiently screen patients for metabolic risk factors. The tool provided a risk score for each patient based on criteria from the cross-regional guideline. All admitted patients with a score were assessed by the pharmacists, who referred and discussed the patients with a physician when deemed relevant. We measured guideline compliance during baseline (manual screening) and intervention (automated screening) after implementing the IT tool and pharmacist assessment. After the intervention period, we conducted follow-up interviews with all participating pharmacists.

Results: Guideline compliance increased significantly from 26 % (baseline) to 63 % (intervention) (Fisher's exact test $p < .001$, $N = 98$). The task shift from physicians to pharmacists was also significant (Fisher's exact test, $p < .001$, $N = 40$). Interviews revealed that the pharmacists found the task shift meaningful and received positive feedback from the physicians. The facilitators of the task shift included interprofessional collaboration, physician shortage, provider empowerment, and the manageable nature of the task. The barriers included a need for further competence development and lack of pharmacist authorization. The IT tool was considered useful and suggestions for improvements emerged.

Conclusion: The IT-supported task shift from physician to pharmacist significantly improved guideline compliance in the assessment of metabolic risk factors in psychiatric patients. The findings support increasing the pharmacist's role in psychiatric care to improve patient outcomes.

Keywords: task shift, pharmacist, metabolic risk factors, electronic health record, psychiatry

1 Introduction

Psychiatric medication often imposes adverse effects such as severe weight gain, which can lead to metabolic risks factors [1,2]. These risk factors may counteract the psychiatric therapy and cause chronic conditions such as type 2 diabetes and cardiovascular diseases [1]. In a compartmentalized healthcare system [3,4], the complex assessment of physiologic risk factors within psychiatry is likely to be overshadowed by the focus on psychiatric issues. This imbalance is further reinforced by the physician shortage within psychiatry, leaving the physicians with time for only the patients' urgent psychiatric treatment needs [5]. Within the last decade,

more pharmacists have been employed in the hospital setting [6], available to offload the physicians by taking on new tasks.

A cross-regional guideline [7] outlines the necessity and procedure for physicians to assess metabolic risk factors in patients prescribed psychiatric medications linked to weight gain. Directing attention to metabolic risk factors for psychiatric patients has the potential to prevent or delay disease progression [8]. The aim of this study is to assess if the pharmacists can satisfactorily assess metabolic risk factors to the benefit of patients. To support the task shift, we designed and implemented an IT tool automating the risk-identification. We used clinical best-practice guideline compliance as a measurement point for the assessment and an IT-supported task shift as the means of achieving it.

Therefore, we ask the research question: *May an IT-supported task shift from physician to pharmacist improve clinical guideline compliance when assessing metabolic risk factors for psychiatric patients?*

Previous studies have shown that task shifts involving pharmacists are often associated with better outcomes [9–11]. However, it is also known that realizing sustained behavior change in interprofessional collaboration is difficult and influenced by numerous factors such as professional hierarchies and established norms [12–18]. The role of the clinical pharmacist is more recent - and thus not as well-established as those of the nurse and physician [19]. Consequently, it is ongoing work to establish the pharmacists' area of responsibility and their interprofessional collaboration with physicians in particular, thereby warranting further investigation of task shift from physician to pharmacist.

2 Method

The National Committee on Health Research Ethics exempts this type of study from notification. The study was approved by the hospital department. All pharmacists gave their informed consent to participate. The data collection was conducted by the first author, herself a pharmacist authorized to reconfigure the electronic health record (EHR) at the hospital.

2.1 Setting

The study took place at a Danish hospital with three psychiatric wards, 69 beds in total, covering all psychiatric disorders in patients aged 18 to 75 years. In 2022, the wards had 2819 admissions, a 30% increase compared to 2021. The number of pharmacists and physicians at the wards did not increase.

Three clinical pharmacists worked on the wards during regular working hours on weekdays, one pharmacist per day. They reviewed recently admitted patients' medication and answered medication-related questions from physicians and other staff. The physicians were responsible for patient treatment and had their focus on patients recently admitted or in urgent need of assessment and a treatment plan. Therefore, metabolic risk factors, such as those specified in the cross-regional guideline, were rarely addressed by the physicians. If addressed at all, it was most commonly in the discharge letter assuming that the patient's general practitioner (GP) would follow up on the issue when they saw the patient after discharge. However, many patients did not go to see their GP, or they were readmitted to hospital before doing so. This way, the patients might never be further assessed for these risk factors and their condition might deteriorate. To improve this situation, we implemented a task shift involving the pharmacist initially using the guideline, followed by collaboration with the on-ward physician when needed.

2.2 Intervention

To improve guideline compliance, we devised a two-part intervention consisting of an IT tool and a task shift. The IT tool was embedded in the hospital EHR and automated the screening of the patients for the metabolic risk factors specified in the guideline, see Table 1. For each patient, the tool calculated a risk score that increased with the number of risk factors (see Table 1 for the exact thresholds and weights used in calculating the risk score). A higher risk score simply indicated higher risk. We did not employ a cutoff value but left it

for the pharmacists to assess when a risk score warranted further action. All the data required to calculate the risk score were part of a set of tests routinely administered on admission. Missing data would be due to patient refusal, which was very rare with the exception of the body mass index (BMI). More patients refused to be weighed, making the lack of BMI data in the EHR somewhat more common. In the calculation of the risk score, any missing data were counted as not contributing risk. To ensure up-to-date risk scores, the IT tool only made use of EHR data from the past 30 days. The risk score was available in a new column that we added to a patient list already used by the pharmacists.

The task shift involved that the pharmacists took over the screening and identification of patients in need of further assessment for metabolic risk factors. Supported by the IT tool, the on-ward pharmacist would assess all new patients moving from the highest risk score to the lowest. For every patient assessed, the pharmacist would create an internal pharmacy note with the patient's risk factors, current medication, and demographics. If the pharmacist found that the patient was at risk and needed further assessment, then a note with interventions relevant to physicians was entered in the patient record. This note could, for example, recommend that the physicians considered pharmacotherapy such as statins. When deemed relevant, the pharmacist additionally informed the physician orally. If the pharmacist did not find the patient at risk, then the reason for this conclusion was included in the internal pharmacy note.

The task shift and IT tool were devised on the basis of discussions with the pharmacists. They were introduced to their new task at a meeting prior to the intervention and offered one-on-one hands-on training sessions on using the score.

Table 1. The risk factors specified in the guideline and automated in the IT tool. The risk score calculated by the IT tool was the number of parameters with abnormal values (as defined by the thresholds); all parameters had a weight of 10, except BMI which had a weight of 1.

Parameter	Threshold
Total cholesterol	> 5 mmol/L
High-density lipoprotein (HDL)	< 1 mmol/L
Low-density lipoprotein (LDL)	> 3 mmol/L
Triglycerides	> 1.7 mmol/L
Body mass index (BMI)	> 30
HbA1C	≥ 48 mmol/L
Blood pressure	> 140/90
In treatment with Clozapine, Mirtazapine, Olanzapine, Quetiapine, Sertindole, and tricyclic antidepressants (Amitriptyline, Clomipramine, Imipramine, Nortriptyline) *	> 0

* Both regular and 'as needed' use of the drugs were included in the screening

2.3 Measurements

The intervention aimed to increase guideline compliance and introduce a task shift from physicians to pharmacists. To measure these two effects, we audited the records of all patients admitted to the wards during a baseline period and the intervention period. The record audits consisted of (a) screening the patients for the presence of the risk factors specified in the guideline and (b) determining whether the at-risk patients had been referred to internal medicine or their GP for further assessment within the last two years. To bolster the quality of the record audits, the pharmacists assisted the first author in making them.

The baseline measurements spanned 17 days in July-August 2022. During this period, the patients were manually screened by looking them up in the EHR. For each patient, it was determined whether they were at risk according to the criteria specified in the guideline and, if so, whether they had been referred for further assessment. The intervention spanned 28 days in January-February 2023. During this period, the IT tool automated the screening for the presence of the risk factors specified in the guideline. All patients with a non-zero risk score were manually looked up in the EHR to determine whether they had been referred to internal medicine or their GP for further assessment. While our measurements were restricted to the baseline and intervention periods, the pharmacists continued to use the IT tool after the intervention.

2.4 Interviews

During the intervention, we had one-on-one phone conversations with the pharmacists to collect on-the-fly feedback about the IT tool and its use. At the end of the intervention, we had a meeting with the pharmacists to collect feedback about their experience from participating in the study. Four months after the intervention, we interviewed all three pharmacists one-on-one about the task shift. The interview guide for these interviews is available as an online appendix.

3 Results

3.1 Measurements

The measurements covered 138 patients admitted over a period of 17 days (baseline) and 234 patients admitted over a period of 28 days (intervention). While the two periods differed in duration, the number of daily patients – that is, the patient load – was similar (baseline: 8.12, intervention: 8.36). Table 2 shows the distribution of these patients on those meeting the guideline criteria and referred, those meeting the guideline criteria but not referred, and those not meeting the guideline criteria.

Table 2. Measurement of guideline compliance and task shift

Patient category	Baseline		Intervention	
	N	%	*N*	%
Patients referred by physician	15	11	4	2
Patients referred by pharmacist	0	0	21	9
Patients meeting the guideline criteria but not referred *	43	31	15	6
Patients not meeting the guideline criteria	80	58	194	83
Total	138	100	234	100

* The patients meeting the guideline criteria are those with a non-zero risk score

We measured guideline compliance as the number of patients referred for further assessment by either physician or pharmacist out of the total number of patients who met the guideline criteria. Guideline compliance increased from 26% (15 of 58) at baseline to 63% (25 of 40) during the intervention. A Fisher's exact test showed that this increase was significant ($p < .001$, $N = 98$). The task shift from physicians to pharmacists was also significant (Fisher's exact test, $p < .001$, $N = 40$). It reached 84% (21 of 25) during the intervention.

3.2 Interviews

To elaborate on the measurements, we analyzed the pharmacists' perception of the three elements of the intervention: guideline compliance, task shift, and IT tool.

The pharmacists agreed that the area of metabolic risk factors was important and, therefore, that the guideline was highly relevant. One pharmacist stated: *"Overall, it is an important area, which is seen often in psychiatry, so it is very relevant.* However, the pharmacists also found that during the intervention they spent time assessing patients who met the guideline criteria but were not at risk: *"Yes, there have been several borderline normal, where I would prioritize other issues over this [and thus not act on it]."* For this reason, a number of the patients flagged by the IT tool because they met the guideline criteria were assessed by the pharmacists but not referred for further assessment.

The pharmacists found their new task meaningful; one pharmacist assessed it in this way: "*Wow, we actually make a difference".* The task shift was also well received by the physicians, as stated by one pharmacist: "*They [the physicians] were very attentive to the issue, and very willing to discuss it."* The intervention also underlined the recurrent need for communicating with the physicians because the pharmacists were not authorized to independently change a patient's medication, create referrals, or make entries in discharge letters. A pharmacist explained the collaboration with the physicians by emphasizing the pharmacists' supportive role: "*we direct their attention to the existing problems [i.e., the metabolic risk factors]".* The pharmacists were sometimes unsure of the action required, as stated by one pharmacist: *"It was difficult at times […]. How bad must it [the assessment] be for me to recommend that a physician takes action?"*

The pharmacists agreed, that the risk score produced by the IT tool was very useful in carrying out the assessment: *"The score helped in giving an overview of the patients that I needed to pay more attention to".* When asked if the assessment would have been feasible without the IT tool one pharmacist stated: "*It would have made it more difficult and time-consuming*", while another pharmacist noted that *"It would not have the same focus. It is highly effective to have the score right in front of you when you open the EHR […] It serves as a reminder that there is an issue that we need to pay attention to."*

4 Discussion

There was a significant increase in guideline compliance during the intervention. We involved the pharmacists in the design of the intervention and IT tool and, thus, ensured that we met their needs in terms of applicability in the psychiatric department. The result is notable because behavior change is difficult and because the study takes place in a compartmentalized organization with established professional boundaries.

4.1 Facilitators and barriers of task shift

The COM-B model [16] identifies three key factors enabling behavior change: (1) *capability*, which refers to an individual's psychological and physical ability to participate in an activity; (2) *opportunity*, which refers to external factors that make a behavior possible; and (3) *motivation*, which refers to the conscious and unconscious cognitive processes that direct and inspire behavior. We identified six facilitators and barriers to the task shift, listed below, relating to the COM-B model's capability (items 1-2), opportunity (items 3-5), and motivation (item 6).

1. *Interprofessional collaboration (facilitator)*. The pharmacists had a collaborative relationship with the physicians based on years of working together. This relationship made the physicians trust and value the pharmacists' input and recommendations from the beginning.
2. *Insufficient competencies (barrier).* The pharmacists sometimes doubted themselves and, as a result, made referrals to the physicians resembling 'points of attention' instead of recommendations for action. This points to a need for competence development or further training.
3. *A manageable task (facilitator)*. By embedding an automatic risk-factor screening in the EHR, we made a time-consuming task manageable. The pharmacists got more time for using their expert knowledge to decide which patients to refer for further assessment.
4. *Physician shortage (facilitator).* The shortage shows no sign of improving, which creates a need to redirect tasks traditionally assigned to physicians to other clinicians in ways that match their areas of competence.

5. *Lack of authorization (barrier)*. The pharmacists are not authorized to prescribe, change, or discontinue medication. Therefore, the task shift still requires some involvement of the physicians. In other countries, pharmacists are allowed to carry out this work independently.
6. *Provider empowerment (facilitator).* The pharmacists welcomed the opportunity to take on new tasks and responsibilities. They were motivated by undertaking meaningful work to the benefit of patients, as voiced several times during the intervention.

A review by Leong et al. [10] identified key elements for successful task shifts. They identified both interprofessional collaboration, provider empowerment, lack of authorization, and training and competence that align with our findings. Specifically, the lack of authorization points to larger policy issues. In Denmark, national policies allow for a variety of task shifts through delegation from physician to pharmacist, but only physicians are allowed to prescribe, change, or discontinue a patient's medication. To shift these tasks to pharmacists in specified situations, national policies would need amendment. In other countries, national policies authorize pharmacists to perform a different set of tasks [20]. As further enablers of task shifts, Leong et al. [10] also identified financing, patient preference, shared decision making, and clear process outcomes, which were not addressed in our study. These additional elements might be of relevance if the task shift from physician to pharmacist is expanded to tasks that, for example, involve patient interviews. Döhler et al. [11] identified task-shift barriers such as communication problems, competition, partly overlapping competencies, and hierarchies. These barriers were not identified in our study, which may be attributed to the interprofessional collaboration already established between the physicians and pharmacists. Döhler et al. [11] also identified potential benefits of task shift related to quality, safety, and efficiency of care, which align with the results of our study. A review on task shifts in healthcare by Tuyl et al. [18] found that pharmacists provide the same or better quality of care than physicians, but also that pharmacists need more time than physicians to carry out the tasks. Furthermore, they address that physicians spend time training and supervising other healthcare staff to enable task shifting, thereby reducing the efficiency and cost savings of task-shifting initiatives. We did not consider these factors in our study, but it is something to be mindful of if expanding the task shift to more areas.

4.2 Improving the guideline

The intervention implements the cross-regional guideline but also provides an opportunity for reflecting on how to improve the guideline. The pharmacists carried out assessments on patients where no action was required, and this led to reflection on the score. Although the guideline is based on best practice, it could be aligned better with everyday clinical practice by adjusting the thresholds of at-risk values in the scoring criteria. Additionally, one could take a preventive approach by looking at weight trends and hereby assessing patients earlier, before they develop metabolic risk factors. Presumably, this would prevent some patients from developing risk factors and, thereby, result in fewer referrals for further assessment. The IT tool can be configured to fit local needs, so scaling up to task shifts in other areas would be possible as well.

4.3 Limitations

Three limitations should be remembered in interpreting the results of this study. First, the study is small with only three participating pharmacists, which might limit the generalizability of the results. Second, one might argue that guideline compliance is a simplistic way of measuring improvement in patient treatment. Third, we cannot rule out that the baseline and intervention periods differ in ways other than the IT tool and task shift; such differences may influence the study results.

5 Conclusion

The IT-supported task shift from physician to pharmacist significantly improved clinical guideline compliance when assessing metabolic risk factors for psychiatric patients. We contend that this improvement justifies that the pharmacists, a staff group with expert knowledge on pharmaceuticals, expand their role by taking on new tasks to the benefit of the psychiatric wards and patients.

Authors' contributions

CFB designed the study and acquired the data. All authors analyzed and interpreted the data. MH carried out the statistical analysis. CFB drafted the manuscript, which was critically reviewed and revised by all co-authors.

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Statement on conflicts of interest

The first author is affiliated with the organization where the pharmacists taking part in the study are employed.

Summary table

What was already known on this topic:

- Adverse effects such as metabolic risk factors impact many patients treated with psychiatric medication
- Pharmacists have the competences to expand their areas of responsibility to the benefit of psychiatric wards and patients

What this study added to our knowledge:

- A task shift from physician to pharmacist significantly improved clinical guideline compliance for psychiatric patients
- An IT tool embedded in the EHR made it a manageable task to screen patients for metabolic risk factors
- Pharmacists and physicians welcomed the task shift

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