

Prescription Errors in a Mental Healthcare Facility: A Content Analysis of Brief Interviews

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ABSTRACT

Background. The role of prescription errors (PE) in mental healthcare environments is not well understood. There are few studies that have examined PE in psychiatric hospitals. Although the occurrence of PE in mental health facilities is less frequent than in general hospitals, the specifics of PE remain unclear.

Objective. The study aims to shed light on both the circumstances of each PE in a regional psychiatric hospital in Germany and the factors that shape the nature of PE.

Methods. This qualitative narrative investigation was part of a large-scale one-year observational study (January 2023 – 2024) conducted at St. Josef psychiatric hospital AMEOS Oberhausen in Germany. The therapeutic protocols of the patients were anonymized, and PE were identified according to a modified EQUIP method. For each PE, a double-blind interview was conducted and recorded. Through the interviews, we extracted the keywords based on their frequency and by using NVivo 13 software we build up a codebook followed by a Delphi consensus to clarify the nature of the PE. The observers also recorded the prescriber's behavioral patterns. An analysis of the thematic patterns, semantic groups, and principal factors was executed.

Results. In total, 6020 therapeutic plans were compiled, and 150 PE were detected, leading to an error rate of 2.5%. The predominant PE were associated with medications for musculoskeletal and joint disorders, followed by gastrointestinal drugs and central nervous system (CNS) medications, including psychotropics. The mean duration of the interviews was 2.6 ± 0.8 minutes. The average age of the prescribers was 35.5 ± 4.9 years, with 52.1% being male. Through the interviews, we extracted the following keywords: minimum - shortest time, time - under pressure, unrecognizable - unidentifiable script, vision loss - lack of lighting, lack of knowledge, stress - work stress. There were few cases reported where prescribers failed to pay attention, experienced communication breakdowns, suffered from lack of sleep, had concentration issues, issued unnecessary prescriptions, responded to patient requests, and made misspellings. The average meeting duration was 20 ± 4.2 minutes. The Delphi consensus indicated that there are four primary semantic groups: features of time, reading - spelling challenges, poor lighting, and communication difficulties. These are identified as key factors contributing to PE in mental health contexts, and a hypothesis regarding the nature of writing PE is discussed.

Conclusions. Although nearly all PE were classified as minor in severity, the qualitative research indicated variability in the responses from prescribers regarding each PE. Nonetheless, there are prominent semantic categories, such as temporal aspects, the act of writing, and environmental conditions, that could clarify the



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characteristics of PE. We suggest that the process of documenting PE is a complex undertaking with checkpoints that should be adhered to. More research is needed to clarify the risks and factors associated with the nature of PE, in a way to develop interventions to address them.

Keywords: *mental hygiene, medical errors, quality of healthcare, psychiatry*

INTRODUCTION

Prescription errors (PE) serve as a distinctive indicator of healthcare quality, yet they are often undervalued in various dimensions, including severity, type, and nature.¹ Within mental health institutions, such as psychiatric hospitals, PE is documented; however, the repercussions remain inadequately articulated.² Indeed, extensive studies like EQUIP and PRACTICE have demonstrated methodological rigor in establishing PE as a significant quality factor within healthcare systems.³⁻⁵ The implementation of educational interventions in pharmacotherapeutics is crucial, despite the aforementioned studies indicating that PE typically results in minimal or no clinical consequences.

In the pursuit of clarifying the characteristics of PE, numerous investigations have been carried out within psychiatric environments.⁶⁻¹⁰ However, there are limited accounts regarding PE in German mental health institutions.¹¹⁻¹³ An earlier extensive observational study conducted by our team demonstrated that the majority of PE incidents in psychiatric hospitals were of minor severity, frequently involving written PE and related to medications for musculoskeletal – joint disorders, gastrointestinal issues, and central nervous system – psychotropic conditions. Our findings suggest that the occurrence of written PE may be attributed to the reliance on paper-based prescribing, a prevalent practice in German psychiatric hospitals.¹⁴ The importance of documentation is evident, however there is a lack of standardized documentation with great heterogeneity considering the documentation of drug related problems across Europe.¹⁵

Nonetheless, there are limited qualitative studies addressing safe prescription and PE within mental health units.¹⁶⁻¹⁸ The characteristics of each PE, defined as both the process and the development of a PE, remain ambiguous. The objective of this study is to elucidate this gap in qualitative research, which is crucial for comprehending the various dimensions of PE in mental healthcare environments.

MATERIAL AND METHODS

Study Design

This qualitative narrative research is an independent component of a larger 12-month prospective observational study that was carried out at St. Josef AMEOS Psychiatric Hospital in Oberhausen, Germany. To summarize, we

collected and analyzed 6020 paper-based therapeutic plans between January 2023 and January 2024 under the framework of interim quality control. From these plans, we isolated and identified 150 cases of PE for further examination (severity, localization, type, pharmacotherapeutic group).¹⁴

The hospital offers psychiatric care solely to the urban population of Oberhausen within a specified catchment area (*Versorgungsgebiet*), which reduces population diversity and enhances the robustness of the findings. The hospital administration approved the study as a quality audit, and ethical clearance was obtained from the AMEOS Ethics Committee (approval number: AMEOS-ETH-2023-001). The analysis utilized anonymized routine data, thus negating the need for individual patient consent. Data were securely stored on hospital servers and managed in accordance with EU Directive 536/2014 and German Medicines Law (§§40–42a AMG, GCP-V). Upon the study's conclusion, data will be archived and disposed of in line with relevant regulations. Furthermore, an independent quality control expert (C.D) monitored data protection and methodological integrity throughout the duration of the study.

For each PE, the prescriber (responsible person – R.P) was identified and invited to participate in a retrospective personal interview. To reduce the potential for bias, these interviews were carried out no later than three days following the incident, ensuring sufficient information was available to validate the PE. The participants included the staff from St. Josef AMEOS Psychiatric Hospital, and the coordination of the interviews was managed by two individuals (K.M and T.K).

Procedures

The interviews conducted were of an open-ended nature, lacking a defined set of questions or a structured framework. This approach represents a distinctive method for examining PE in a temporal context.¹⁹ Nevertheless, the interview process was guided by a pre-established variable framework that was contingent upon the severity and characteristics of each PE, as determined by the two evaluators, K.M and T.K. In the case of a severe PE or a complicated PE, the evaluators *proforma* made extended requestions upon their usual presentation to elucidate the complexity of the PE. The documentation of the specifics and context surrounding the error will be captured in notes that are randomized and anonymized. The selection of the two evaluators was based on hierarchical considerations: K.M serves as the chief and is the individual responsible for quality control in the hospital, while T.K functions as a consultant.

The aim of the qualitative assessment was to elucidate the PE incident, thereby emphasizing new data and factors that extend beyond the reported determinants and variables.¹⁴ This personal interview provides the RP with an opportunity to articulate their thoughts and feelings retrospectively.²⁰ Consequently, it is crucial that both observers possess board certification in psychiatry and certified proficiency

in the German language ($\geq C1$). Each interview took place in the principal investigator's (K.M) private sound-isolated office, ensuring adequate lighting and a comfortable room temperature (21–22 °C).

The modified methodology for collecting data from interviews with those involved in the identified PE was based on an earlier qualitative by Slight and colleagues, which also concerned PE in the United Kingdom.²¹ The RP was faced through this interview with the PE from one of the evaluators. In each interview session was discussed only one PE per time. Each interview was conducted only once per PE. The prescribers who do not want to be recorded, notes were only taken. In this study, all RP have been audio recorded. An identification code for the patient was applied in each case. The hierarchy status of the RP in the hospital was noted, and an information sheet explained the procedure was given in each case. The transcripts of the interview have been prepared and given to the two evaluators from J.E. The recordings were securely stored in the hospital server, so as the J.E, a researcher administrator, to write down each of the recording using three basic principles: accuracy, formatting and confidentiality. The transcripts were given separate to each of the evaluators. The validity of the transcripts was tested by C.D as quality control expert.

The transcripts from each interview were distributed five days ahead of the anticipated consensus meeting, enabling the two observers to study and analyze them without any contact. Each month, the evaluators gathered to discuss and pinpoint the significant aspects of each interview through a critical perspective. To analyze the transcription data, we extracted keywords in a deductive way from each research participant. These keywords are vital for the framework analysis. For this purpose, we employed NVivo 13 software (Release 1 or 2020) to code the keywords. The keywords were organized in an Excel database (Microsoft Excel 2021 - Version 2107) along with their frequency. This data collection process allowed us to conduct quality control and analysis of the program evaluation to identify external factors that affect this process. The recording and assessment of the data mentioned above are supported by the research framework developed by Pope and her colleagues.²² Thus, pilot reviews prior to data collection resulted in a high interrater reliability ($\kappa = 0.85$).

Utilizing a comparative Delphi technique to analyze the facts from each interview, the chief investigator K.M and the evaluator T.K aimed to approach the process of each PE. The Delphi technique was employed to organize the meanings of the most frequent keywords into semantic categories and to develop a hypothesis for the PE in psychiatric settings. In the case of disagreement upon the semiology, a second round of meeting was accomplished in order to revise opinions without any pressure until convergence upon the process of each PE. The coordinator and quality control professional C.D was accountable for the formation of the semantic groups once a consensus was achieved.

The qualitative methodologies and outcomes were documented in compliance with the guidelines outlined in the Consolidated Criteria for Reporting Qualitative Studies (COREQ).²³

RESULTS

Study Population and Parameters of the Interview Process

The population consisting of 59 prescribers, was predominantly middle-aged, with an average age of 35.5 ± 4.9 years, and a slight male majority of 52.1%. There was no refusal or non-response by each call for an interview. As outlined in a previous publication, the majority of PE were mainly attributed to residents ($n=16$) and consultants ($n=9$), reflecting their important role in daily prescribing practices. In contrast, vice chief physicians ($n=2$) were rarely accountable, and nurses ($n=32$) were only occasionally involved.¹⁴

We conducted between 12 and 13 interviews each month, based on the number of identified PE. In each interview session was discussed only one PE per time. The average duration of these interviews was 2.6 ± 0.8 minutes, while the mean duration of the meetings was 20 ± 4.2 minutes. Table 1 displays the drug substance, the pharmacotherapeutic group, and the frequency of PE.

From the transcripts, we analyzed and extracted 150 keywords from the RP responses, categorizing them based on their frequency of mention (Table 2).

Minimum – Shortest Time

Throughout the interviews, about 18.6% of the keywords pool identified minimum or shortest time as an important factor for PE. The combination of minimum or shortest time was commonly referenced, as demonstrated by the cases AAAA and AAAH.

Case AAAA

- K.M** *Can you explain us how you came in this particular PE. The patient has stomach pain.*
T.K *According to the patient, he had reflux.*
R.P *I did not think too much, time was minimum and too short to think about it.*

Case AAAH

- K.M** *Another case of dismissed the administration of the medication, a prescribing error that is often...*
T.K *My feeling is that we have this case frequently and in patients with chronic pain. I do not understand why this matter is.*
R.P *I know this substance, due to lack of time and shortage I forgot to write it down.*

Table 1. Frequency of PE and the involved pharmaceutical substance

Pharmacotherapeutic group	Substance	Frequency (n)	Pharmacotherapeutic group	Substance	Frequency (n)
Gastrointestinal system	Pantoprazole	20	Infectious diseases	Clindamycin	1
	Omeprazole	4		Ceftriaxone	1
	Esomeprazole	1		Cefuroxime	5
	Macrogol	2		Cefpodoxime	7
	Total	27		Clarithromycin	1
Cardiovascular system	Aspirin	6		Amoxicillin and potassium clavulanate	1
	Simvastatin	2		Fosfomycin	2
	Atorvastatin	1		Azithromycin	1
	Ramipril	1		Total	18
	Lercanidipine	1	Endocrine system	Levothyroxine	4
	Certoparin	1		Total	4
	Total	12	Gynaecology, Obstetrics and Urogenital system	n.a.	n.a.
Respiratory system	Salbutamol	2		n.a.	n.a.
	Montelukast	1	Neoplastic and immune system disorders	n.a.	n.a.
	Advair (combi Fluticason Salmeterol)	1		n.a.	n.a.
	Beclomethasone	1	Nutrition and hematopoietic system	Vitamin B12	1
	Total	5		Iron complex	4
CNS	Lorazepam	2		Total	5
	Bromazepam	1	Musculoskeletal and joint disorders	Ibuprofen	17
	Oxazepam	1		Metamizole	20
	Lithium	2		Oxycodone and naloxone	5
	Diazepam	2		Paracetamol	3
	Duloxetine	1		Etoricoxib	8
	Levomethadone	3		Allopurinol	1
	Haloperidol	1		Meloxicam	2
	Olanzapine	1		Diclofenac	2
	Baclofen	1		Naproxen	2
	Phenobarbital	1		Total	60
	Fluoxetine	2	<i>n.a.: not available</i>		
	Sumatriptan	1			
	Total	19			

Of course, most of the cases concerned analgesics and medications for musculoskeletal and joint diseases such as the cases AAAY and BAAM,

Case AAAY

K.M *I see another case of pain killers that were not be written in the medication list of the patient.*

T.K *For sure they forgot to prescribe Novalgin.*

R.P *I did not have so much time, I am terribly sorry for not write down.*

Case BAAM

T.K *In this case is a misspelling case of the medication Arcoxia?*

K.M *Yes, we write it down as Arcaxia. What is this medication?*

R.P *It was short writing, I wrote the medication wrong, I did not have so much time to control my prescription.*

Time Pressure – Under Pressure

The term pressure, whether referring to time pressure or being under pressure, encapsulates the sentiment experienced

by each RP, which elucidates the characteristics of the PE. This group of keywords comprises sixteen percent of the cases. We illustrated the cases CAAB, CAAJ, and DAAC.

Case CAAB

T.K *Haloperidol has no extra t when you prescribed.*

K.M *Misspelling;*

R.P *No not at all, I have time pressure, and I write it all wrong.*

Case CAAJ

T.K *I cannot understand why this has happened.*

K.M *You should prescribe aspirin in this patient.*

R.P *I was under pressure, so I omitted this prescription.*

Case DAAC

T.K *Arcouxia does not exist, Arcoxia is named*

K.M *The correct prescribing is an issue.*

R.P *Sadly, I write it wrong, it was the pressure of time.*

Table 2. Keywords from interview process and their frequency

Keyword(s)	Frequency (n)
Minimum – shortest time	28
Time pressure – under pressure	24
Unrecognizable – unidentifiable script	20
Vision loss – lack of lighting	18
Lack of knowledge	18
Stress – work stress	13
Don't pay attention	7
Lack of communication – breakdown	6
Unnecessary prescription	5
Misspelling	3
Lack of sleep	2
Lack of concentration	2
Wish of the patient	2
No education	2

Unrecognizable – Unidentifiable Script

Identifying a PE presents significant challenges, largely due to the fact that each RP was informed of and demonstrated their prescription. The occurrence of unrecognizable or unidentifiable scripts, which constitutes 13.3%, serves as an objective indicator of the dysagnosia affecting both the RP and the evaluators. For example, the cases DAAW, EAAE, and EAAM highlight this concern.

Case DAAW

K.M *This is another case of overdose of pantoprazole as medication.*

T.K *That is not logic, why is that?*

R.P *Certainly, I cannot read my own prescription, my own words.*

Case EAAE

T.K *The antihypertension medication is written incorrect.*

K.M *I think you should explain us, why is this prescription all wrong.*

R.P *I cannot read my prescription, is in fact unidentifiable.*

Case EAAM

T.K *The poor Arcoxia...*

K.M *Again, that is a prescription error, I cannot read it at all.*

R.P *Actually, I cannot recognise my own script.*

Vision Loss – Poor Lighting

It is quite fascinating that 12% of RP cases involved either vision loss or insufficient lighting. The disturbances in vision were linked to the inadequate lighting, which accounted for various environmental factors. Cases like EEAP, EEAW, and FAAY were noted and recorded.

Case EEAP

K.M *I may see a prescription error of lithium.*

T.K *Yes, that is an important error concerning a psychiatric clinic.*

R.P *Due to the poor lighting, I could not see clear.*

Case EEAW

T.K *We have a double error.*

K.M *We have a writing and a dosage error.*

R.P *I could not see very clear; there was bad lighting.*

Case FAAY

K.M *I find it unusual, but we have a prescription error of paracetamol.*

T.K *That is a writing error.*

R.P *Yes, I could not see so clear.*

Lack of Knowledge

A total of 12% of interviewers have reported a pronounced lack of knowledge when it comes to prescribing medications. The notion of this knowledge deficiency is specific and is tied to a personal critique of each RP. Some cases exemplifying this include CAAT, DAAP, and FAAW.

Case CAAT

T.K *That is the case of prescribing medications for chronic diseases. If it is this case, you should probably ask a colleague.*

K.M *For chronic diseases, the duration is important.*

R.P *I have a lack of knowledge for how long I should prescribe this medication.*

Case DAAP

T.K *In the case of pantoprazole, we should take care how long we should give this medication.*

K.M *Many of you do not know this thing, however we cannot prescribe as a basic medication for long time.*

R.P *I did not know this parameter of prescribing pantoprazole.*

Case FAAW

K.M *For the therapy of gastroesophageal reflux disease, we should prescribe more than 20 mg of pantoprazole.*

T.K *Yes, I think that it is something to know.*

R.P *I do not know this; I am very sorry.*

Stress – Work Stress

The experience of stress and tension in the work environment is a clear indication of this specific trigger that may lead to a PE (rate: 8.6%). This indication has been noted in various interviews with RP, particularly in the cases of BAAQ, CAAG, CAAK, and FAAK.

Case BAAQ

- T.K** *We noticed that Levothyroxine was prescribed two times daily.*
- K.M** *And yes, after thyroidectomy we cannot administrate two times daily.*
- R.P** *Right, there was so much stress that I could not identify this error.*

Case CAAG

- K.M** *Certainly, this medication and its dosage, also how frequent we administrate this substance, it is a daily base discussion and part of daily questions.*
- T.K** *Those mistakes should not be done.*
- R.P** *There is a lot of stress, stress in work.*

Case CAAK

- K.M** *This medication and its dosage are part of discussion. But an antibiotic therapy for two days?*
- T.K** *Those errors are a trouble for antimicrobial resistance.*
- R.P** *Due to stress in work, I could not identify the mistake.*

Case FAAK

- T.K** *The duration of an antibiotic therapy is an important issue.*
- K.M** *For otitis should be given more than two days*
- R.P** *I was in stress; I should be more careful and notice that.*

PE and Allergic Reaction

Given the seriousness of the PE in the subsequent cases of AAAE and BAAB, we engaged in an in-depth discussion during the interview with the RP. Indeed, this represents a crucial element of quality assurance in pharmacotherapy and highlighted the significance of obtaining a comprehensive history, including any allergies. Furthermore, regarding the case of BAAB, there exists a deficiency in understanding antibiotic treatment for a patient diagnosed with pneumonia.

Case AAAE

- K.M** *This mistake is something common. From the history it was already known that she was allergic to Novalgine.*
- R.P** *I did not look on the file of the patient, to know if she has any allergy.*
- T.K** *This medication, metamizole, is well known that you must explain to the patient that she will receive that for any possible allergies and alterations in the laboratory values.*
- K.M** *Of course, the allergic reaction is handled from the staff. Something that from the first place should not be an issue in the shift. But why this error happened?*
- R.P** *In this point, I should say that I did not know too much about this medication and its possible allergies so as the laboratory abnormalities. I did not know that I should explain all that to the patient.*

Case BAAB

- K.M** *In this case we should discuss thoroughly about the administration of ceftriaxone. Is it common to administrate ceftriaxone in case of pneumonia?*
- T.K** *Of course we could administrate ceftriaxone for pneumonia, but is there any other antibiotic as best choice?*
- K.M** *For community acquired pneumonia we could give the combination Amoxiclav, three times per day. If it was a hospital acquired, then there are other antibiotics. It was already known that the patient has an allergy.*
- R.P** *I could not easy choose what is the best antibiotics, it is a matter of knowledge.*
- T.K** *We should clarify why you prescribe ceftriaxone from the first place.*
- K.M** *Let me tell you, I think it was an easy way. One shot per day intravenous. But is not the best choice for the patient, and with allergy. For hospital acquired pneumonia, which is this case we have other better antibiotics in choice.*
- T.K** *But that is a lack of knowledge concerning antibiotics, isn't it?*
- R.P** *You have right, that is a lack of knowledge in the use and implementation of antibiotic therapy. I did not know also that the patient has an allergy.*

Utilizing the Delphi technique, we identified four primary semantic categories, which are detailed in Table 3. These categories play a crucial role in forming a hypothesis that supports a PE within a mental healthcare setting.

Table 3. Semantic groups identified through Delphi technique

Semantic group	Comments
Features of time	Time remains a constant, largely for individuals moving in a unidirectional manner, although it is experienced differently by each person. Time is an essential element in the concepts of motion and velocity, and thus, it could also be a contributing factor to pressure.
Reading – spelling barriers	There are obstacles in both reading and spelling, primarily related to phonological processing and the structure of words, which can be associated with dysanagnosia. Challenges arise in reading and in recognizing one's own handwriting.
Poor lighting	An environmental aspect influences the obstacles encountered in reading, often described as impaired vision. A decline in visibility can result in tiredness, sleep issues, and a lack of concentration.
Communication problems	Biaxial communication refers to the exchange of information directed towards oneself as well as towards others. A deficiency in attention and the presence of misinformation have surfaced in both dimensions. The core elements of communication are rooted in articulation and phonology.

DISCUSSION

This qualitative narrative analysis offers a distinctive perspective on PE within a mental health care setting. To the best of our knowledge, this represents the first comprehensive and large-scale qualitative investigation of PE, encompassing 150 cases. All responses from the RP were audio recorded and obtained using a modified methodology developed by Slight and colleagues, which is a qualitative approach designed to identify PE.²¹ This is particularly noteworthy as a qualitative study conducted in a psychiatric hospital, emphasizing both the strengths and limitations of our findings.

The most prevalent type of PE noted was writing errors, which may occur as a result of using paper-based prescriptions. The terms minimum or shortest time are frequently cited in many interviews. Our findings indicate that time limitations can contribute to PE in psychiatric hospitals, as they hinder the careful review of prescriptions. This conclusion is consistent with previous research that points to cognitive overload during periods of time pressure, which increases the risk of PE.^{18,24,25} For instance, Kolvoort and colleagues suggest that individuals under time constraints may engage in less thoughtful consideration, leading to a higher incidence of errors in medication orders.²⁶ Our findings reveal a semantic category that encompasses time-related characteristics. A significant feature is the direct link between time pressure and cognitive overload among healthcare professionals. When practitioners operate under tight time constraints, they often experience increased mental stress, which can lead to cognitive failures. The cognitive demands rise when practitioners are required to switch tasks rapidly, thereby increasing the potential for errors due to lapses in attention or memory.²⁷

The next most common keywords were unrecognizable – an unidentifiable script from the perspective of RP. Undoubtedly, illegible handwriting and other aspects of PE represent substantial challenges in the healthcare field, impacting patient safety and treatment efficacy.^{28,29} Understanding the physiological process of writing a prescription is essential to clarify the nature of PE. The process of writing prescriptions is a multifaceted cognitive activity that involves several critical steps in decision-making, communication, and risk assessment. This process is not merely an act of transcription but instead requires careful consideration of various factors to ensure that the prescription is both accurate and effective for patient treatment. Our findings suggest that the RP or the prescriber must engage in clinical decision-making, where they assess patient information, medical history, and the necessity for medications. This requires synthesizing complex sets of information—a task that is inherently cognitive and can be significantly impacted by external stressors such as time pressures and workload. In addition, research indicates that the quality of prescribing declines as physicians face increased cognitive load, which

can lead to errors in dosage, drug interactions, and omissions of critical patient information.^{30,31}

The procedure of drafting prescriptions underscores the second semantic group related to difficulties in spelling and reading. As a result, the probability of generating unclear prescriptions, especially stemming from poor handwriting, rises in situations of stress or fatigue, which can occur alongside cognitive impairments. For example, Fallaize and colleagues reported cases in which poor handwriting caused severe repercussions, such as patients receiving wrong medications due to the misinterpretation of unreadable notes.³²

According to our research, inadequate or poor lighting is a significant contributor to vision loss associated with RP. Therefore, this matter is identified as the third proposed semantic group of our study. Poor lighting is frequently an overlooked environmental factor that has a substantial effect on the PE process. The interaction between visibility and cognitive load during the prescription writing process can result in a range of errors, from misinterpretations to illegible handwriting. The existing literature contains numerous reports regarding poor lighting and its impact on PE.³³⁻³⁵ In contrast to many other studies, our research has emphasized the theme of vision loss. It is assumed that due to inadequate or poor lighting, individuals with RP may struggle to clearly see their scripts. Thus, fatigue and chronic stress may also be coexisting factors that contribute to decreased visibility. For instance, a study by Johnson et al. pointed out that poor lighting, in addition to factors such as workspace organization and high noise levels, significantly contributes to the challenges faced by nurses, who are often responsible for transcribing and administering medications.³⁵ Further studies considering vision disturbances and quantification of light (Lumens, Candela and Lux) will clarify the nature of the PE with significant contributions in occupational health and decrease the risk of PE.

Nearly 12% of the reported cases indicated that insufficient knowledge could be a contributing factor to PE in psychiatric hospitals. Our earlier research established that the majority of these errors were primarily linked to residents and consultants, highlighting their pivotal role in everyday prescribing practices and likely reflecting a deficiency in pharmacotherapeutic knowledge. In contrast, chief and vice chief physicians were seldom accountable, while nurses were only occasionally implicated.¹⁴ We may infer that the lack of knowledge within the medical profession is related to the hierarchical structure. Previous extensive studies, such as EQUIP and PRACTICE, corroborated these findings.³⁻⁵ Our narrative analysis indicated a significant necessity for educational interventions focused on pharmacotherapeutics for specific groups, including antibiotics and medications with potential allergic reactions. This conclusion is consistent with earlier reports regarding prescribing errors among junior doctors. These errors encompassed issues related to antibiotic usage, administration routes, essential calculations, and medication interactions.^{25,36-38}

One of the significant documented reasons for PE is stress, particularly that which arises in the workplace. Stress is both an objective experience and a trigger within the work setting. Therefore, we have created a fourth semantic group that also includes factors related to stress. There are multiple reports discussing workplace stress, occupational health, and the quality of healthcare services.³⁹⁻⁴¹ Our findings reveal that particular stressors, such as time pressures and inadequate communication among healthcare teams, are substantial contributors to the incidence of PE. To prevent PE, Professor Avery highlighted the necessity of effective communication and monitoring.⁴² This report addresses the issue of communication between the RP and the patient, as well as between the RP and other physicians (both primary and secondary care).

In this study we proposed a new hypothesis regarding communication between the RP and the environment (healthcare staff, patients) that features a biaxial characteristic. Communication (articulation, phonology) has two axes: one directed towards oneself and the other towards the environment. Any disturbances, such as lack of focus or misinterpretation, result in a bilateral effect. We refer to the term biaxial to denote the strain effect, which is a common pattern in many stressful situations. In psychiatry, a biaxial system is a relatively recognized approach in various aspects of mental healthcare support, including diagnosis and social determinants.⁴³ According to our findings, communication and stress interact in a way that tends to overlap.⁴⁴

Qualitative research in psychiatry and especially in PE offers important insights that quantitative methods may overlook, particularly in understanding complex human behaviours, patient experiences, and the social determinants of health. Our findings are significant, because this study is conducted in a defined catchment area, therefore the population heterogeneity is minimized. The results of our study could be a strong basis of further research in psychiatric hospitals and mental healthcare facilities in Germany. We should recognize that there are limits on generalizability of our findings.

Consequently, our qualitative report is also susceptible to various weaknesses and limitations that may compromise the strength of its findings. A notable limitation is the intrinsic subjectivity present in qualitative research, including our study, which can result in bias during data collection and interpretation.⁴⁵ In the existing literature, there are qualitative studies addressing PE that concentrate on the behaviour of the prescriber through a specific COM-B model (Capability, Opportunity, Motivation, Behaviour).⁴⁶⁻⁴⁹ These reports have a clear objective to comprehend PE from a behavioural standpoint. However, none of these studies specifically target substances or engage in discussions regarding the identification of PE and its repercussions. For this reason, we implemented a double-blind approach to data collection and interpretation to reduce evaluators' bias. Transparency is a crucial aspect; thus, the data and transcripts from the interviews were prepared by a third member of

the team. The Delphi technique is a recognized method for confronting facts, thereby establishing trustworthiness in the final organization of the semantic groups.

Another notable constraint is the dynamics involved in the interactions between the evaluators and the RP. These dynamics can lead to further bias due to the interviewer's influence on the participants' responses.⁵⁰ In every instance, both evaluators presented the PE and its implications, rather than the underlying reasons for the nature of PE. Furthermore, all interviews were carried out in a pleasant environment (daylight), with adequate lighting and temperature. This is crucial to ensure that the RP felt at ease to share his or her feelings and thoughts.

A minor limitation pertains to the turnover of healthcare personnel within the hospital. During the study period, merely five individuals from the total of 260 healthcare workers at St. Josef AMEOS Hospital Oberhausen departed from their positions. This staff turnover represents a rate of 1.9%, which, while relatively low, may still influence our results.

CONCLUSIONS

This study underscores that the act of writing PE in a mental health care environment is a complex issue and a measure of healthcare quality. Various factors play a role in shaping the final version of each PE, which in turn impacts clinical outcomes. We suggest four key checkpoints that are fundamental to the PE process, each possessing its own relevance. Time is a significant element in the PE process; for many, it is perceived as a linear journey, while for others, it becomes a source of pressure. Time often accompanies pressure; therefore, prescribers should avoid making interpretations or estimations regarding time. Occasionally, RP experience time as having movement and speed, which the RP may not be able to attain. Frequently, difficulties are noted in both the reading and spelling of medications. Beyond being a specified cognitive task, the activities of reading and spelling a prescription may be influenced by pressures and workload factors.

For this reason, visibility stands out as a significant checkpoint. The prescriber or RP should have a clear view of his or her script. The level of visibility is contingent upon the environmental lighting or the light source available in a building or room. To mitigate fatigue, lack of focus, and sleep disorders, lighting is a critical factor in minimizing the risk of PE. Although many interviewers remarked on workplace stress, we found that communication difficulties are a major factor contributing to the increased risk of PE. We hypothesize that issues with articulation and phonology, combined with underlying stress factors, are triggering elements for PE. We concluded that there is a biaxial communication process, with stress acting as a strain factor. Our findings indicate the complex nature of PE in mental healthcare environments, with specific checkpoints that help reduce the risk of PE.

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Statement of Authorship

All authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

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