

# Medication Management Service for People with Intellectual Disabilities in Hong Kong: A Descriptive Analysis of Prescribing Patterns and Pharmacists' Interventions

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## Abstract

*A Pilot Project of Pharmacist Service for People with Intellectual Disabilities which launched by The Mental Health Association of Hong Kong (MHAHK) was initiated in September 2023. The project aimed at providing medication management services (MMS) for people with intellectual disabilities (PWID). This study describes the prescribing patterns among PWID receiving the MMS and summarizes the recommendations provided by pharmacists. Results indicate a high prescription rate of psychotropic medications, particularly antipsychotics (44.8%). The use of these medications poses significant health risks for PWID, including side effects and polypharmacy. Their use should be carefully monitored and reviewed regularly. Additionally, pharmacists made recommendations to address drug-related problems (DRPs), with the most common recommendation being the deprescribing of medications (44.2%).*

*Keywords: Medication management service, intellectual disabilities, psychotropic medications*

## Introduction

Intellectual disability (ID) is a neurodevelopmental condition characterized by intellectual and adaptive deficit that originates before the age of 22 (American Association on Intellectual and Developmental Disabilities, 2024). According to the Census and Statistics Department, the estimated number of people with intellectual disabilities (PWID) in Hong Kong was around 77000-90000 in the year of 2020 (Census and Statistics Department, 2021), which was approximately 1% of the total population. These individuals are facing numerous health-related challenges, including a higher prevalence of mental illness compared to the general population (Hughes-McCormack et al., 2017), and increased rates of other health problems such as cardiovascular diseases, gastrointestinal problems and seizure

disorders (McMahon & Hatton, 2021). Psychotropic medications, especially antipsychotics, were frequently prescribed to this population (Costello et al., 2022; Perry et al., 2018). These medications might be given to manage the underlying mental diseases, but they are also frequently prescribed to manage challenging behaviors in the absence of a psychiatric diagnosis (Deutsch & Burket, 2021). The frequent use of psychotropic medications, coupled with polypharmacy, posed a considerable risk of adverse drug reactions (O'Dwyer et al., 2016). Additionally, the high prevalence of drug-related problems (DRPs) among PWID is also a concern. Study showed that approximately 34% of the medication prescriptions were associated with DRPs (Scheifes et al., 2016a).

Given these challenges, medication management service (MMS) becomes important for PWID.

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Pharmacists can play a crucial role in improving the quality of medication use in this population, although conclusive evidence was lacking (O'Dwyer et al., 2015). They have the potential to identify and reduce DRPs, as well as minimize inappropriate prescribing of psychotropic medications (Lee et al., 2021). However, MMS in Hong Kong were currently limited and primarily targeting elderly patients and patients with chronic diseases (HKSAR Government Press Release, 2021; Primary Care Pharmacy Consortium, 2024; So et al., 2021). The existing services for PWID focused on assessment, community support, employment and long-term institutional care (Law & Shek, 2016). It is important to develop an MMS targeting PWID in Hong Kong.

In September 2023, a pilot project aiming to provide MMS for PWID was launched by The Mental Health Association of Hong Kong (MHAHK), in collaboration with Department of Pharmacology and Pharmacy at The University of Hong Kong and the Society of Hospital Pharmacists of Hong Kong (SHPHK). As of June 2024, the service has been implemented in nine centers of MHAHK, including Hong Ping Hostel, Hong Tsui Hostel, Jockey Club Building - MMH Hostel, Lok Fu Hostel, Lung Hang Centre, Shun Tin Centre, Yaumatei Day Activity Centre, So Uk Home, and Tsuen Wan Day Activity Centre. The approximate review interval is 1 to 6 months. Pharmacists from the team visited the care centers and conducted MMS for the PWIDs upon nurses' requests. The pharmacists collected information from clinical records and engaged in conversations with staff, PWIDs or family members. The information was used to assess PWIDs' medical conditions and medication appropriateness. If a DRP was identified, the pharmacists would provide written recommendations to physicians or nurses.

The project can also yield data for evaluating the medication usage patterns among PWID in the local community, which had not been examined in previous studies. A study conducted in 2011 reported the health and disease patterns among PWID residing in Hong Kong's residential care facilities (Wong, 2011). The results of this study were consistent with overseas studies, highlighting a higher prevalence rate of various health conditions in this population. Other studies in Hong Kong had explored the prescribing patterns of psychotropic medications among PWID, but their scope was limited to a few specialized institutions (Kwok et al., 2010; Lim, 2007; Lim, 2005). Therefore, a more generalized understanding of medication use among PWID in the community setting is needed.

This study was carried out as a part of the pilot project to: (1) identify the patterns of medication use among PWID at care centers in Hong Kong, and (2) summarize the pharmacists' recommendations and the response from healthcare providers.

## **Methods**

A series of retrospective cases was collected for descriptive analysis from September 2023 to June 2024. The latest MMS was completed on 29 June 2024, and 323 MMS were conducted on 239 PWIDs (some PWIDs may have received multiple MMS). PWIDs were included in this study if they received at least 1 MMS within the study period. The PWIDs were recruited from the nine centers of MHAHK. Data were collected on-site by the pharmacists and recorded on the MMS form. PWID characteristics, past medical history, medication list, and recommendations were documented in the MMS forms. The forms were encrypted with access limited to the pharmacists and investigators only. The responses to the recommendations were documented during subsequent reviews based on the information provided by the nurses. The data were then reviewed by the investigators and extracted from the MMS form. All analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 29.

The study's outcomes were PWID demographics including distribution of prescribed medication and categorization of recommendations. Interval data were presented as mean and standard deviation (SD), while categorical data were presented as number with percentage.

PWID demographics and medication use were reported based on data recorded in the first review. The focus of the medication use statistics was on psychotropic medications, which were further classified into different drug classes. Carbamazepine, oxcarbazepine, valproate, and lamotrigine were medications with both antiseizure and mood stabilizing properties. They were classified as either "antiseizure medications" or "mood stabilizers" depending on the PWID's medication history. If the PWID was receiving these medications with a diagnosis of epilepsy or a history of seizures, they would be regarded as "antiseizure medications". Otherwise, they were regarded as "mood stabilizers".

Recommendations were given to nurses and/or physicians and were classified into 11 categories based on the advised action. Each recommendation might

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fall into one or more categories. For example, the recommendation of “adding aripiprazole or switching from typical antipsychotics to atypical antipsychotics due to hyperprolactinemia” would belong to both the category of “Starting/increasing medication for untreated/undertreated problems” and the category of “Changing medication due to side effects/interactions/ineffectiveness”.

## Results

A total of 239 PWIDs were included in this study, with 125 (52.3%) of them being female (Table 1). The age of the PWIDs ranged from 17 to 78 years, with a mean age of 48.5 years. Most of the PWIDs were

under residential care (221 out of 239, 92.5%). A large proportion of them were reviewed once only (172 out of 239, 72%), and the maximum number of MMS received was 4. There were 118 PWIDs (49.4%) given one or more recommendations after being reviewed.

### Overview of medication use

Regarding the number of medications at the first visit, it was found that 223 PWIDs (93.3%) had at least one medication, while 138 PWIDs (57.7%) had more than five medications (Table 2). After excluding PRN (*pro re nata*, meaning when required) medications, 80 PWIDs (33.5%) had more than five medications.

**Table 1.**  
**PWID Characteristics**

Characteristics	Number of PWIDs, n=239
Age, year	
Mean±SD	48.5±15.2
Range	17-78
Sex, n (%)	
Male	114 (47.7)
Female	125 (52.3)
Residential setting, n (%)	
Residential	221 (92.5)
Non-residential	18 (7.5)
Number of MMS received, n (%)	
1	172 (72)
2	53 (22.2)
3	11 (4.6)
4	3 (1.3)
With recommendations	118 (49.4)

**Table 2.**  
**Number of medications**

	Number of PWIDs, n=239	
	Including PRN medications	Excluding PRN medications
Number of medications, mean±SD	5.5± 3.7	3.6± 2.7
Number of medications, n (%)		
0	16 (6.7)	26 (10.9)
1	26 (10.9)	33 (13.8)
2	16 (6.7)	36 (15.1)
3	19 (7.9)	36 (15.1)
4	24 (10)	28 (11.7)
≥5	138 (57.7)	80 (33.5)

In addition, 153 (64%) PWIDs were receiving at least one psychotropic medication, and 72 of them (30.1%) were receiving 3 or more psychotropic medications (Table 3). The classes of psychotropic medication prescribed were also examined. The findings revealed that the most frequently prescribed psychotropic medications were as follows: “antipsychotics” (107 out of 239, 44.8%), “benzodiazepines” (69 out of 239, 28.9%), and “antiseizure medications” (56 out of 239, 23.4%). Among the PWIDs receiving antipsychotics, 82 PWIDs (34.3%) did not have medical history of bipolar disorder, psychotic disorders, major depressive disorder (MDD), nor anxiety spectrum disorders. Additionally,

benzhexol, an anticholinergic agent used to reduce antipsychotic-induced extrapyramidal symptoms, was commonly prescribed (43 out of 239, 18%).

The antipsychotics choices were also examined, encompassing 15 different types of antipsychotics (Table 4). These antipsychotics were classified into two groups: typical antipsychotics and atypical antipsychotics. Minor differences were observed between the number of prescriptions in these two groups (67 vs. 70). Among the prescribed antipsychotics, the three most given were pericyazine (29 out of 137, 21.2%), quetiapine (21 out of 137, 15.3%), and risperidone (20 out of 137, 14.6%).

**Table 3.**  
Number and types of psychotropic medication

	Number of PWIDs, n=239
Prescribed with psychotropic medication, n (%)	153 (64)
Prescribed with ≥3 psychotropic medications, n (%)	72 (30.1)
Types of psychotropic medication, n (%)	
Antipsychotics	107 (44.8)
Without bipolar disorder/ psychotic disorder/ MDD/ anxiety disorder	82 (34.3)
Benzodiazepine	69 (28.9)
Antiseizure medication	56 (23.4)
Benzhexol	43 (18)
Mood stabilizer	28 (11.7)
Antidepressant	18 (7.5)
Z-drug	8 (3.3)
Medication for ADHD	5 (2.1)
Medication for Alzheimer’s disease	1 (0.4)
Medication for tardive dyskinesia	1 (0.4)

**Table 4.**  
Choices of antipsychotics

	Number of PWIDs with antipsychotics, n=137	Without bipolar/ psychosis, n=106	With bipolar/ psychosis, n=31
Typical antipsychotics, n (%)	67 (48.9)	53 (50.0)	14 (45.2)
Haloperidol	10 (7.3)	8 (7.5)	2 (6.5)
Chlorpromazine	12 (8.8)	10 (9.4)	2 (6.5)
Pericyazine	29 (21.2)	26 (24.5)	3 (9.7)
Sulpride	5 (3.6)	3 (2.8)	2 (6.5)
Zuclopenthixol	3 (2.2)	1 (0.9)	2 (6.5)
Trifluoperazine	5 (3.6)	2 (1.9)	3 (9.7)
Flupentixol	1 (0.7)	1 (0.9)	0 (0)
Fluphenazine	1 (0.7)	1 (0.9)	0 (0)
Pimozide	1 (0.7)	1 (0.9)	0 (0)
Atypical antipsychotics, n (%)	70 (51.1)	53 (50.0)	17 (54.8)
Amisulpride	3 (2.2)	3 (2.8)	0 (0)
Quetiapine	21 (15.3)	16 (15.1)	5 (16.1)
Risperidone	20 (14.6)	18 (17)	2 (6.5)
Olanzapine	13 (9.5)	7 (6.6)	6 (19.4)
Clozapine	1 (0.7)	0 (0)	1 (3.2)
Aripiprazole	12 (8.8)	9 (8.5)	3 (9.7)

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The use of carbamazepine, oxcarbazepine, valproate, lithium, and lamotrigine was also separately reported (Table 5). Valproate was used both as an antiseizure medication and as a mood stabilizer. Carbamazepine, oxcarbazepine, and lamotrigine were mainly used as antiseizure medications.

### Overview of recommendations

A total of 202 recommendations were made, with 142 (70.3%) given to physicians and 60 (29.7%) given to nurses (Table 6). The rate of giving recommendations decreased in the 2<sup>nd</sup> review but increases afterwards (Figure 1). After categorization, 215 categorized

recommendations were identified (Table 6). The most common type of recommendation was “deprescribing medications” (95 out of 215, 44.2%), and benzhexol was the most frequently deprescribed. Other common recommendations include “starting/increasing medication for untreated/undertreated problems” (69 out of 215, 32.1%) and “undergoing additional testing” (27 out of 215, 12.6%).

So far, only 58 replies regarding the recommendations were received, with 44 (75.9%) being accepted and acted upon (Table 7). The acceptance rate was slightly higher among physicians than nurses (79.1% vs. 66.7%).

**Table 5.**  
**Prescribing patterns of carbamazepine, oxcarbazepine, valproate and lamotrigine**

	Total=n	As antiseizure medication, n (%)	As mood stabilizer, n (%)
Carbamazepine	15	14 (93.3)	1 (6.7)
Oxcarbazepine	1	1 (100)	0 (0)
Valproate	60	32 (53.3)	28 (46.7)
Lamotrigine	5	5 (100)	0 (0)

**Table 6.**  
**Summary of recommendations**

	Number of recommendations, n=202
Time when the recommendations were given, n (%)	
1 <sup>st</sup> MMS	164 (81.2)
2 <sup>nd</sup> MMS	23 (11.4)
3 <sup>rd</sup> MMS	10 (5.0)
4 <sup>th</sup> MMS	5 (2.5)
Recipient of the recommendations, n (%)	
Physicians	142 (70.3)
Nurses	60 (29.7)
Categories, n (%)	Number of recommendations after categorization, n=215
Deprescribing medications	95 (44.2)
Deprescribing benzhexol	32 (14.9)
Deprescribing antipsychotic	25 (11.6)
Deprescribing benzodiazepine or z-drug	12 (5.6)
Deprescribing antidepressant	4 (1.9)
Deprescribing mood stabilizer	3 (1.4)
Deprescribing non-psychiatric medications	19 (8.8)
Adjusting timing/ method of medication	14 (6.5)
Starting/ increasing medication for untreated/ undertreated problem	69 (32.1)
Changing medication due to side effects/ interactions/ ineffectiveness	8 (3.7)
Undergoing additional testing*	27 (12.6)
Lifestyle modification at centres	2 (0.9)

\* including physical and laboratory tests, which may lead to medication adjustments.

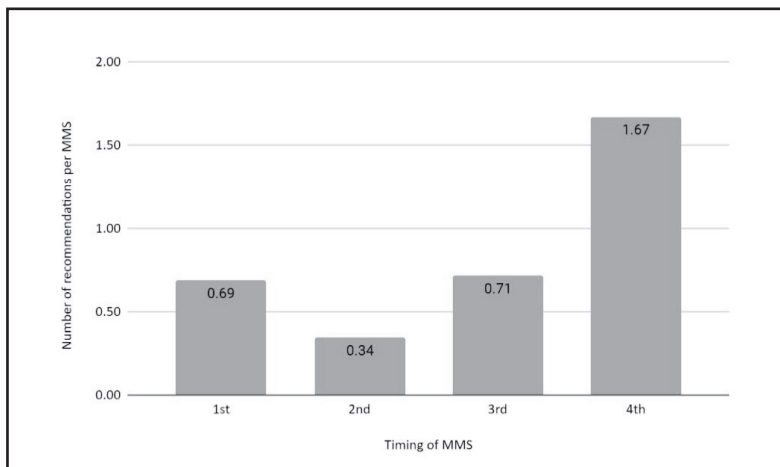


Figure 1: Rate of recommendations given

Table 7. Summary of responses

	Total=n	From physicians, n (%)	From nurses, n (%)
Number of replies received	58	43 (74.1)	15 (25.9)
Accepted with actions	44	34 (77.3)	10 (22.7)
Acceptance rate (%)	75.9	79.1	66.7

Discussion

Polypharmacy presents a significant health challenge in PWID. This population was prescribed four times more regular medications than the general population (MacLeod & MacLure, 2020). However, the definition of polypharmacy varies across literature. This study follows the definition of regular use of 5 or more medications, a definition commonly adopted in various studies (Varghese et al., 2024). After excluding PRN medications, it was found that the prevalence of polypharmacy was 33.5%, which is comparable to overseas studies using the same definition. The rate of polypharmacy was 51.6% in a recent Irish study with an ID population aged 41 or above (O’Dwyer et al., 2016). The higher prevalence was likely due to the older age of the population, as advanced age was associated with higher incidence of polypharmacy (MacLeod & MacLure, 2020; McMahon et al., 2020). Another Australian population-based study in 2014 reported that 20.9% of PWID used 5 or more medications (Haider et al., 2014). However, they had a lower mean age (41.6 years old) in their population. Additionally, they used simple random sampling to select PWIDs from the general population, thus the

rate of PWID receiving residential care was unlikely to be as high as that in our study (92.5%). Since living in residential institutions was linked to a higher prevalence of polypharmacy (O’Dwyer et al., 2016), these factors might contribute to the lower incidence observed in the Australian study.

The percentage of our PWIDs receiving psychotropic medication is 64%, was towards the upper end of the range of 45% to 70% found in other studies (Koch et al., 2021; Lunskey & Modi, 2018; O’Dwyer et al., 2019; Odalović et al., 2024; Sheehan et al., 2015). Interestingly, two previous studies focusing on PWIDs with severe to profound ID in specialized institutions of Hong Kong, reported similar proportions prescribed with psychotropic medications at 65% and 63% respectively (Lim, 2007; Lim, 2005). This suggested PWID generally receive a high number of psychotropic medications irrespective of their care settings. Psychotropic polypharmacy, as defined as the concurrent use of 3 or more psychotropic agents, was found in 30.1% of our PWIDs, slightly higher than two previous studies at 22% and 23% (Lunskey & Modi, 2018; McMahon et al., 2020).

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Antipsychotics were the most prescribed class of psychotropic medications, with the majority of the PWIDs using it without a psychiatric diagnosis, consistent with previous studies (de Kuijper et al., 2010; Sheehan et al., 2015). The three most prescribed antipsychotics for PWID in our study were pericyazine, quetiapine and risperidone. Similarly, a recent study in Ireland identified risperidone, olanzapine and chlorpromazine as the most prescribed antipsychotics among PWID (O'Dwyer et al., 2019). It was not surprising that risperidone was preferred, as it had the best evidence for mood instability and aggression among atypical antipsychotics for autism (Taylor et al., 2021). Pericyazine, a typical antipsychotic, was less frequently reported in overseas literature, but had been the most prescribed antipsychotics among PWID in Hong Kong over the past 20 years (Kwok et al., 2010; Lim, 2005).

The pattern of medication use identified in this paper indicated some health-related risk among the PWID in Hong Kong. The high prevalence of polypharmacy is a strong predictor of potential drug-drug interactions (DDIs) and drug-related problems (DRPs) (McMahon et al., 2021; O'Dwyer et al., 2018; Zaal et al., 2013). In addition, PWID have heightened sensitivity to drug side effects due to underlying brain pathology (O'Dwyer et al., 2018). Study showed that PWID were more likely to experience motor side effects from antipsychotic use (Sheehan et al., 2017). The high level of psychotropic medication use in our population led to a range of side effects, potentially resulting in a prescribing cascade. For instance, antipsychotics use, particularly typical antipsychotics, often leads to various degrees of extrapyramidal symptoms (EPS), which are frequently managed with benzhexol. The prescribed rate of benzhexol in our population was 18%, contributing to the anticholinergic burden. This was particularly concerning when PWIDs are concurrently using other anticholinergic agents, like antipsychotics. Consequently, we often saw PWIDs with severe constipation requiring multiple laxatives. Older adults were particularly vulnerable to the anticholinergic side effects and increased their risk of fall (O'Dwyer et al., 2018), an issue of greater concern in PWID due to their higher fracture risk. While the exact causes of increased fracture risk were not well elucidated, certain factors in our population may contribute, such as hyperprolactinemia caused by antipsychotic use, which can lead to osteoporosis. Hyperprolactinemia may be asymptomatic and undiagnosed unless detected through laboratory testing, leaving caregivers unaware of the need for timely intervention. Our study also found that 23.4% of PWID were using

antiseizure medications, which were also associated with osteoporosis (Srikanth et al., 2011). Additionally, most of our PWIDs live in the care centers and have limited sunlight exposure, which is further detrimental to bone health. Therefore, when the PWID falls, the risk of fracture is high.

Benzodiazepines were found to be the second most prescribed psychotropic medication among our PWIDs, and their use was associated with an increased risk of fall (Díaz-Gutiérrez et al., 2017), as well as an elevated risk of all-cause mortality (Mathieu et al., 2021). Notably, benzodiazepines can induce behavioral side effects in PWID, which may be misinterpreted as other psychiatric or behavioral conditions, potentially leading to another prescribing cascade (Kalachnik et al., 2002). Psychotropic medications including antipsychotics, mood stabilizers and antidepressants may be introduced to manage the unrecognized behavioral side effects, thereby exacerbating the issue of polypharmacy.

According to the National Institute for Health and Care Excellent (NICE) guideline regarding appropriate responses to challenging behaviors, antipsychotics should only be prescribed if problem behaviors persist after treating coexisting mental or physical conditions, or psychological or other intervention have proven ineffective, or exhibit risk of self-harm or harming others (National Collaborating Centre for Mental Health, 2015). However, in our observations, once antipsychotics were prescribed, they were often continued for many years despite the absence of clear benefits. Even when the PWID was stabilized and no longer displays challenging behaviors or labile moods, there might be no attempts to taper or discontinue antipsychotics. Similarly, benzhexol might remain prescribed even when PWIDs no longer experience EPS, leading to side effects such as dry mouth and constipation.

Therefore, a large proportion (44.2%) of our pharmacists' interventions focused on deprescribing medications lacking indications or causing intolerable side effects. The most common deprescribed medications were benzhexol and antipsychotics. Research indicated that antipsychotics could be safely tapered without worsening PWIDs' behavioral functioning (De Kuijper et al., 2014). There was also growing evidence showing that long-term use of anticholinergics medications, including benzhexol, should not be used to manage antipsychotic-induced EPS (Lupu et al., 2021; O'Dwyer et al., 2018). Recent study has shown that deprescribing anticholinergic medications can improve clinic outcomes and quality

of life, with only 10% of patients experiencing a re-emergence of EPS after gradual discontinuation (De Kuijper et al., 2014). Other medications, such as antiseizure medications, should also be assessed for the potential of withdrawal under close supervision after an extended seizure-free period if side effects occur (Branford et al., 2023). Therefore, careful evaluation of risks versus benefits is essential when considering deprescribing.

The acceptance rate of recommendations in our program was 75.9%, higher than that reported in some studies. In a medication review service targeting PWID in the Netherlands, the acceptance rate was 56.9% (Scheifes et al., 2016b). In a medication review program for hospitalized elderly patients in Hong Kong, the acceptance rate was 68.7% (Chiu et al., 2018).

### Strength and limitations

To the best of our knowledge, this is the only recent study reporting the pattern of medication use and pharmacists' intervention for PWID in Hong Kong. The samples were collected from community settings across different districts, so this study is potentially more generalizable compared to previous local studies.

However, there are several limitations in this study. First, only the PWIDs receiving services from MHAHK were included. PWID who do not require residential care or training services were not reached by our sampling method, and this may lead to selection bias. Second, our data collection regarding medication use occurred in a single time point. As discussed in other literature, a medication-overlap period could help exclude short-term medications and those currently being tapered (Stortz et al., 2014). However, since most of our PWIDs received MMS only once, obtaining longitudinal data was challenging. Thus, the number of medications might not accurately represent the prevalence of polypharmacy and having a longer follow-up period of the study would be desirable. Third, the medical history of the PWIDs might not have been fully accessible to pharmacists and investigators, as we relied on clinical notes input by nurses at centers and remote access of electronic health records at the hospitals. Without prior carers' consent, we could not assess some of the electronic health records, and some long-standing diagnoses might be difficult to trace. Therefore, this might affect the reported number of antipsychotics prescribed without underlying psychiatric disorders, and the classification of antiseizure medications as mood

stabilizers.

### Conclusion

This study evaluated the pattern of medication use among PWID from nine care centers of MHAHK. Our findings showed that 64% of the PWIDs were receiving psychotropic medications, with antipsychotics being the most prescribed. Pericyazine, quetiapine and risperidone were the three most frequently prescribed antipsychotics. Approximately half of the PWIDs received recommendations from pharmacists. The most common type of recommendation was deprescribing, particularly of benzhexol and antipsychotics. We have also highlighted the risk associated with these medications and advocate for careful deprescribing after assessing the risk and benefits. Future studies could find out risk factors for PWID to have DRPs, which can guide the future allocation of resources for MMS in this population. Future studies should also evaluate the effectiveness of the MMS for PWID in Hong Kong, and provide further insights into polypharmacy, prescribing pattern, pharmacist interventions and acceptance rate within this population. It would also be valuable to investigate the factors influencing these outcomes. Study of real-world evidence based on big data could also help evaluate the effectiveness and safety of psychotropics for challenging behaviors in this population.

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### 摘要

#### 香港智障人士藥物管理服務：描述性分析處方模式與藥劑師介入

由 2023 年 9 月開始，香港心理衛生會推行的「智障人士藥劑師服務試驗計劃」正式展開。本研究旨在探討服務受眾的用藥模式，並總結藥劑師所提供的用藥建議。研究結果顯示精神藥物的處方十分常見，當中以抗精神病藥（44.8%）為最多，使用這些藥物會為智障人士帶來健康風險，包括副作用和多重用藥的挑戰，因此我們應該定期觀察及評估用藥的需要。藥劑師亦會針對藥物相關問題提出改善意見，最常見的建議是透過精簡處方來減少用藥（44.2%）。



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