

Medicine Wastage in Private Clinics: Drug Suppliers' Perspective on the Causes and Measures to Reduce It

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Abstract: This study examines the issue of medicine wastage in private clinics from the perspective of drug suppliers in Hong Kong. Medicine wastage refers to unused or expired medication along the supply chain, and it poses significant challenges to healthcare systems worldwide. In the private healthcare sector of Hong Kong, there is a notable issue of medicine wastage, resulting in considerable economic costs and environmental hazards. The paper explores the causes of medicine wastage, including the inefficient business model of private clinics, the frequent use of general medicines, the decline in medical tourists, disruptions in the supply chain due to the COVID-19 pandemic, and the lack of medicine recycling policy and facility. Additionally, the paper suggests implementing a centralized medicine procurement and inventory management system, separating medicine prescribing and dispensing, and developing a medicine recycling policy to reduce medicine wastage in Hong Kong.

Keywords: *Medicine Wastage, Private Clinics, Drug Suppliers, Hong Kong.*

1. Introduction

Medicine wastage refers to any medicine that remains unused or expired anywhere along the medicine supply chain (West, Diack, Cordina, & Stewart, 2015). It includes any drug products, including those dispensed by physicians or pharmacies or those purchased by patients over the counter, that are not consumed eventually (Abou-Auda, 2003). Medicine wastage could occur at different levels (prescriber, patient, pharmacist, or even clinic level). For instance, doctors may prescribe excessive quantities of drugs to patients. Sometimes, patients may intentionally or unintentionally fail to take medications as prescribed, thereby resulting in accumulated unused drugs (Bekker, Gardarsdottir, Egberts, Bouvy, & Van den Bemt, 2018). There are also cases in which medicines are wasted because they are left to expire in pharmacies and clinics due to excess inventory. Medicine waste is one of the big challenges to the healthcare system of countries and cities worldwide, including Hong Kong.

Hong Kong has led the world in healthcare and has long been reputed to have one of the best healthcare systems in the world (Kong et al., 2015; Mok, 2001). With a population of 7.4 million, the city's total expenditure on healthcare reached HK\$168 billion in 2018. Hong Kong's healthcare system currently operates on a dual-track basis consisting of the public sector and private sector. The public healthcare sector is managed and financed by the Hong Kong government through its Health Bureau (HB). The private healthcare sector is provided by around 5,000 private clinics/hospitals and over 7,500 registered private doctors. However, due to the lack of a centralized procurement and inventory management system for medicines in the private healthcare sector, there are over HK\$22 million of medicine wasted in private clinics in Hong Kong each month (Yuen, Cheng, & Wong, 2023).

The medicine wastage in private clinics not only leads to tremendous economic costs to Hong Kong but also poses a hazard to the environment. Many private clinics dispose of their medicines through garbage, toilets, or sinks, creating a high risk of environmental pollution. A study conducted by Hong Kong Baptist University found that leachate from landfills in Hong Kong contained human antibiotics originating from medical wastes (Legislative Council Secretariat of the HKSAR Government, 2021). Besides, some media reports highlighted that medical wastes were found on beaches in Hong Kong, posing a threat to human health in the long run.

This study aims to investigate the causes of medicine wastage in private clinics in Hong Kong from the drug suppliers' perspective. It also explores the possibility, challenges, and worthiness of implementing a centralized medicine procurement platform for private clinics in Hong Kong. Further, it provides suggestions to the Hong Kong SAR Government for reducing medicine wastage in Hong Kong.

2. Literature Review

Medicine waste is a common problem in both developed and developing countries worldwide (Gebremariam, Gebregeorgise, & Fenta, 2018). For example, in New Zealand and the United States, more than 20% of medicines are wasted and returned to pharmacies each year. In Tanzania, over 50% of medicines dispensed are wasted eventually. In the United Kingdom, the annual costs associated with unused medicines are estimated to be £300 million (Bertie & Ross, 2015).

Past studies have identified numerous factors that contribute to medicine wastage. In developed countries, medicine wastage is mainly due to poor compliance, side effects, discontinuation or switching of medication, death of patients, or expiration (West, Diack, Cordina, & Stewart, 2014). In developing countries, medicines are usually wasted due to deterioration or expiration resulting from poor and inefficient medicine supply management systems (Kagashe, Makenya, & Buma, 2014). Medicine wastage also results from the overstocking of medication and the selection of medicines not using reliable data or supporting evidence (Alemu, Ibrahim, & Argaw, 2023). Other main contributing factors include the provision of near-expiration medicines to clinics or patients, non-participation of clinicians in the quantification and selection of medicines, abrupt change in treatment practices, and lack of accountability for the wastage of medicines.

Studies found that medicines frequently wasted varied across countries. In the United Kingdom, the most commonly wasted medicines were gastrointestinal (12.4%), skin medicines (11.2%), pain medicines (10.5%), and cardiovascular medicines (10.3%) (Trueman et al., 2010). In Egypt, the most frequently wasted medicines were antibiotics (20.2%), gastrointestinal medicines (16.3%), and gastrointestinal medicines (10.7%). In Ethiopia, anti-infective medicines (including antibiotics) were the most wasted medicines (58.3%), followed by endocrine medicines (16.0%) and gastrointestinal medicines (9.1%) (Alemu et al., 2023).

3. Research Methodology

This study employed a qualitative research approach by adopting an in-depth interview technique for the data collection and a content analysis technique to analyze the data. Sales representatives of one of the largest drug suppliers which supply medicines and medical products to private clinics in Hong Kong participated in the in-depth interview. The in-depth interview has several advantages over other data collection methods. First, it allows the respondents to talk freely and express their feelings and beliefs about the topic in detail (Webb, 1992). Second, it helps engage the respondents to share about sensitive or personal topics (Robson & Foster, 1989). Third, it allows greater control over the selection of respondents (Cassell & Symon, 2004). Lastly, it yields higher-quality data because of the opportunity to build rapport and trust with the respondents (Webb, 1992).

4. Results

Based on the interview results, there are several reasons why medicine wastage has become a common issue in private clinics in Hong Kong in recent years.

Inefficient business model of private clinics

Private clinics are medical facilities financed and owned by a healthcare professional (Karadayi-Usta & Bozdog, 2020). In Hong Kong, a private clinic in tradition is owned and run by one practicing doctor. It has to provide both medical consultation and medication to patients. Given that private clinics are operating by themselves and without any support from the Hong Kong government, private clinics have to purchase and manage the inventory of the medicines and drugs themselves. In addition, there is no central procurement or sharing platform in the private clinics market in Hong Kong. Private clinics therefore usually stock more than enough drugs in their clinics to ensure that each patient can get the medication needed after his or her visit. The overstock of drugs causes medicine wastage once the medicines pass their expiry date. The problem has become more serious when the demand for private clinics decreases due to population decline in Hong Kong.

Frequent use of general medicines by private clinics

Medicines fall into two main categories, namely general medicines and specialty medicines. General medicines

are medications that are used to treat common illnesses and symptoms, for example, headaches, colds, flu, and fever. Specialty medicines are medications used to treat complex and chronic conditions, such as cancer, hepatitis C, growth hormone deficiency, and HIV. In Hong Kong, general medicines are not prescription drugs. They also do not require special handling, storage, or disposal procedures. General medicines are usually more frequently prescribed for patients than specialty medicines. Therefore, private doctors in Hong Kong bulk purchase general medicines for their private clinics to achieve lower per-unit costs. Many of those unused general medicines end up becoming waste.

Decline in the number of medical tourists

Medical tourist refers to a person who travels overseas for health care services. The number of worldwide medical tourists has grown rapidly since the late 1990s due to the uneven health resources among countries, the expansion of global travel, and easier access to medical and health information and services. The main sources of medical tourists are people from countries like the United States, China, the United Kingdom, and the Middle East.

With its well-developed and sound private medical system, Hong Kong has long attracted medical tourists from around the world, in particular from China. Each year, many mainland Chinese medical tourists visit private clinics in Hong Kong for vaccination, body check, delivery, and treatment. However, the recent socio-political instability and travel restrictions have significantly affected the medical tourism market, resulting in fewer medical tourists coming to Hong Kong. Therefore, drugs and medical products have become in excess for those private clinics targeting mainland Chinese medical tourists. This eventually leads to medicine wastage.

Disruptions in the supply chain of medicines by COVID-19

The healthcare supply chain is vital in ensuring the availability of medicines and medical products in the private clinic market. The high-performing healthcare supply chain can save budgets and positively influence the quality of private clinics. In Hong Kong, the transportation of medicines for private clinics is mainly carried out by four big logistics companies, namely DKSH, Kerry Logistics, Li & Fung, and DCH Logistics. As these logistics companies have resource advantages, extensive global networks, and good collaboration with pharmaceutical companies, most practicing private doctors rely on them to handle their medical needs. However, the COVID-19 pandemic starting in 2020 in Hong Kong and worldwide has drastically affected the logistics industry and the operation of the four big logistics companies, resulting in an unstable supply chain of medicines in Hong Kong. Many private clinics have to procure excess medicines for just-in-case purposes. This leads to large quantities of medicines being disposed of and wasted.

Lack of Medicine Recycling Policy and Facility in Hong Kong

Many unopened or unusual medicines could be recycled and redistributed to those who need them. Medicine recycling is common and well-supported in Western countries where people can recycle medicines at recycling points or pharmacies. However, the Hong Kong government does not support nor provide facilities for the recycling of medicines in the city. There is no way for private clinics to recycle their excess or unused medicines even if the medicines are in good condition. This results in medicine wastage.

Research participants suggested several measures to reduce medicine wastage in private clinics in Hong Kong.

Introduction of centralized medicine procurement and inventory management system

The Hospital Authority in Hong Kong has adopted a centralized medicine procurement and inventory management system in public hospitals. The system helps to streamline the ordering and supply of medicines, reduce purchasing costs, and track and monitor medicine inventory in each public hospital. It can avoid unnecessary overstocking of medicines and thereby reduce medicine wastage due to expiration, spoilage, or incorrect storage. If a centralized medicine procurement and inventory management system can be introduced to the private clinics market in Hong Kong, it can greatly reduce the medicine waste generated by private clinics and benefit the environment in the long run. However, as the research participants pointed out, introducing such a system in the private clinic market in Hong Kong is not easy and faces various obstacles. First, it is extremely high cost to set up and maintain a good centralized medicine procurement and inventory management system. This requires many new hardware and software components, a secure network, modifications to existing systems, and technical support at each stage of the supply chain. No single drug supplier, distribution company, or private clinic can bear the cost. Second, a centralized medicine procurement

and inventory management system may involve the exchange of data and information about drugs, drug functions, drug formulas, prescriptions, stock levels, inventories, and patients among drug suppliers, distribution companies, and private clinics. Many of these data are sensitive and private, or even a business secret. Third, for a centralized medicine procurement and inventory management system to succeed, it requires the adoption by key drug suppliers, distribution companies, and private clinics. However, some of these players have already established their own procurement and inventory systems, e.g. Quality Healthcare and Town Health. It is not easy to convince them to abandon their system and switch to a new centralized system.

Separation of prescribing and dispensing of medicines

Unlike many other Western countries, in Hong Kong, the prescribing and dispensing of medicines are both done by private clinics. Patients are used to visiting a private clinic for both medical consultation and medication. Private clinics therefore need to stock both common and uncommon medicines for dispensing to their patients. If medicine prescribing and dispensing can be separated in Hong Kong, such that the doctors of private clinics provide medical prescriptions while the pharmacists of pharmacies provide the prescription medicines, private clinics will no longer need to keep and manage their medicines. It can avoid medicine wastage in private clinics and has the benefit of reducing conflicts of interest in medication choice for patients. However, as the research participants believed, it is difficult for Hong Kong to adopt the system of separation of prescribing and dispensing of medicines because most private clinics rely on medicine dispensing as their main revenue source. Many private doctors do not want to release their prescriptions to the pharmacists. They also worry that their prescriptions may be amended by the pharmacists.

Development of medicine recycling policy

The research participants found that part of the medicine waste generated by private clinics in Hong Kong consists of unused medicines. These medicines are unopened, not expired, not damaged, and in good condition. They can be collected and recycled for use by another patient in need. The research participants suggested that the Hong Kong government could develop and implement a medicine recycling policy targeting private clinics in the city. The policy may include a guideline on which medicines can be recycled, the recycling procedure, and the setup of medicine collection points. This could facilitate medicine recycling among private clinics and help reduce medicine wastage in the city. Those collected unused medicines could, later on, be reused and dispensed through the public hospitals. For the medicine recycling policy to be successful, the Hong Kong government could provide incentives, like cash rebates or financing for medical equipment, to those participating private clinics.

5. Conclusion and Limitations

Medicine waste in private clinics is an ever-increasing problem in the healthcare system of Hong Kong. On average, over HK\$22 million of medicine is wasted in private clinics in Hong Kong each month. The current study revealed that there are five reasons why medicine wastage is common among private clinics: (a) the inefficient business model of private clinics; (b) frequent use of general medicines by private clinics; (c) the decline in the number of medical tourists; (d) disruptions in the supply chain of medicines by COVID-19; and (e) lack of medicine recycling policy and facility in Hong Kong. To reduce the medicine waste generated by private clinics, it is suggested that a centralized medicine procurement and inventory management system similar to that used in public hospitals should be introduced to the private clinics market in Hong Kong. Such a system will allow private clinics to streamline their ordering of medicines and better manage their medicine inventory. Besides, it is suggested that the Hong Kong government should consider adopting the system of separation of prescribing and dispensing of medicines, thereby reducing the need for private clinics to stock and monitor medicines. This can avoid medicine wastage. Last but not least, the Hong Kong government should develop and implement a medicine recycling policy. With such a policy, unused and unneeded medicines from private clinics can be collected and reused by patients of public hospitals.

The limitation of this study is that it used only a qualitative method to collect information about the causes of medical wastage in public clinics and the measures to reduce it. Empirical research, i.e. survey with a larger sample size, can be conducted in the future to investigate different factors influencing medicine wastage in private clinics. In general, the study is sound for practitioners and governments to develop proper policies and

measures to reduce medical wastage in the private clinic market.

Acknowledgment: This work was supported by the Faculty Development Scheme of the Hong Kong Research Grants Council (Ref: UGC/FDS24/B17/21).

References

- Abou-Auda, H. S. (2003). An economic assessment of the extent of medication use and wastage among families in Saudi Arabia and Arabian Gulf countries. *Clinical Therapeutics*, 25(4), 1276-1292.
- Alemu, A. B., Ibrahim, N. A., & Argaw, K. W. (2023). The magnitude of medicine wastage and perceived contributing factors among public health facilities in Dire-Dawa city administration, in mid covid-19 pandemic in Ethiopia: Retrospective, cross-sectional study. *Integrated Pharmacy Research and Practice*, 12, 61-75.
- Bekker, C. L., Gardarsdottir, H., Egberts, A. C., Bouvy, M. L., & Van den Bemt, B. J. (2018). Pharmacists' activities to reduce medication waste: An international survey. *Pharmacy*, 6(3), 94.
- Bertie, H., & Ross, R. (2015). *Pharmaceutical waste reduction in the NHS*. London, UK: The National Health Service Commissioning Board Retrieved from <https://www.england.nhs.uk/wp-content/uploads/2015/06/pharmaceutical-waste-reduction.pdf>
- Cassell, C., & Symon, G. (2004). *Essential Guide to Qualitative Methods in Organizational Research*. London: Sage.
- Gebremariam, E. T., Gebregeorgise, D. T., & Fenta, T. G. (2018). Extent of medicines wastage and its contributing factors in public health facilities of southwest Shoa Zone, Oromia Regional State, Ethiopia: a cross-sectional survey. *Ethiopian Pharmaceutical Journal*, 34(2), 143-152.
- Kagashe, G. A., Makenya, F. B., & Buma, D. (2014). Medicines wastage at a tertiary hospital in Dar Es Salaam Tanzania. *Journal of Applied Pharmaceutical Science*, 4(6), 98-102.
- Karadayi-Usta, S., & Bozdogan, C. E. (2020). Healthcare service provider type selection of the medical tourists by using neutrosophic sets. *Journal of Intelligent & Fuzzy Systems*, 39(5), 6475-6485.
- Kong, X., Yang, Y., Gao, J., Guan, J., Liu, Y., Wang, R., . . . Ma, W. (2015). Overview of the health care system in Hong Kong and its referential significance to mainland China. *Journal of the Chinese Medical Association*, 78(10), 569-573.
- Legislative Council Secretariat of the HKSAR Government. (2021, 29 April). Handling of unwanted medicines from households. Retrieved from <https://www.legco.gov.hk/research-publications/english/essentials-2021ise19-handling-of-unwanted-medicines-from-households.htm>
- Mok, E. (2001). Hong Kong's healthcare system and its challenges. *JONA: The Journal of Nursing Administration*, 31(11), 520-523.
- Robson, S., & Foster, A. (1989). *Qualitative Research in Action*. London: Hodder and Stoughton.
- Trueman, P., Taylor, D., Lowson, K., Bligh, A., Meszaros, A., Wright, D., . . . Jani, Y. (2010). *Evaluation of the scale, causes, and costs of waste medicines*. Retrieved from London, United Kingdom: <https://discovery.ucl.ac.uk/id/eprint/1350234/>
- Webb, J. R. (1992). *Understanding and Designing Marketing Research*. London: The Dryden Press.
- West, L. M., Diack, L., Cordina, M., & Stewart, D. (2014). A systematic review of the literature on 'medication wastage': An exploration of causative factors and effect of interventions. *International Journal of Clinical Pharmacy*, 36, 873-881.
- West, L. M., Diack, L., Cordina, M., & Stewart, D. (2015). Applying the Delphi technique to define 'medication wastage'. *European Journal of Hospital Pharmacy*, 22(5), 274-279.
- Yuen, S. S. M., Cheng, C., & Wong, S. M. H. (2023). *The cooperation and adaptation in healthcare supply chain in Hong Kong: A literature review*. Paper presented at the 6th International Conference on Applied Research in Management, Business and Economics (ICARBME) Vienna, Austria.