



Drug Overdose Prevention: Strategies for Safe Medication Use and Public Health Protection

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DESCRIPTION

Drug overdose remains an important public health concern that affects individuals of all age groups and healthcare systems worldwide. An overdose occurs when a person receives a quantity of a medicine that exceeds the recommended therapeutic amount, resulting in harmful physiological effects. Overdoses may occur intentionally or unintentionally and can involve prescription medicines, non-prescription products, herbal preparations, or combinations of multiple substances [1]. Effective overdose prevention requires coordinated efforts involving healthcare professionals, patients, caregivers, regulatory authorities, educational institutions, and community organizations. Through responsible prescribing, patient education, medication monitoring, and public awareness, many medication-related emergencies can be prevented [2].

Medicines provide significant health benefits when used according to professional guidance. However, inappropriate dosing, misunderstanding of prescription instructions, accidental ingestion, medication errors, or concurrent use of multiple medicines may increase the possibility of overdose [3]. Older adults, children, individuals with chronic illnesses, and patients receiving several medications simultaneously often require additional attention because they may be more susceptible to medication-related harm. Early recognition of risk factors contributes to safer medicine use and improved patient outcomes [4].

Prescription medicines associated with overdose include pain medications, sedatives, antidepressants, antipsychotics, cardiovascular medicines, diabetes treatments, and several other therapeutic classes. The likelihood of overdose varies according to the medicine involved, individual patient characteristics, concurrent illnesses, and the presence of other substances such as alcohol or additional medications. Healthcare professionals evaluate these factors before initiating treatment and continue monitoring patients throughout therapy [6].

Medication errors contribute significantly to accidental overdoses. Confusion regarding dosage instructions, incorrect measurement of liquid medicines, duplicate prescriptions, similar medicine names, and misunderstandings related to treatment schedules may result in administration of excessive doses. Electronic prescribing systems, standardized medication labels, barcode verification, and careful counseling by pharmacists reduce these risks while improving medication safety throughout the healthcare process [7].

Polypharmacy represents another important factor associated with overdose risk. Many patients, particularly older adults, receive treatment for multiple chronic conditions requiring several medications simultaneously. The use of numerous medicines increases the possibility of duplicate therapy, drug interactions, cumulative adverse effects, and dosing confusion. Regular medication reviews performed by physicians and pharmacists help identify unnecessary medicines, simplify treatment regimens, and improve medication safety [8].

Children remain particularly vulnerable to accidental medication overdose because of their natural curiosity and inability to distinguish medicines from food or candy. Child-resistant packaging, secure storage of medicines in locked cabinets, and proper caregiver education reduce the likelihood of accidental ingestion. Parents and caregivers should store medicines out of sight and reach of children while avoiding storage in easily accessible locations such as kitchen counters or bedside tables [9].

Early identification and appropriate management of overdose symptoms are essential for reducing serious complications. Warning signs may include unusual drowsiness, confusion, difficulty breathing, vomiting, seizures, loss of consciousness, or significant changes in heart rate. When an overdose is suspected, immediate medical assistance should be sought rather than waiting for symptoms to become severe. Providing healthcare professionals with accurate information about the medicine, estimated amount taken, and time of exposure can support

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timely assessment and treatment. Public awareness of emergency response procedures can therefore play an important role in reducing preventable harm.

Technology can also contribute to improving medication safety and overdose prevention. Electronic health records, computerized prescribing systems, medication reminders, and clinical decision-support tools can help identify inappropriate doses, potential drug interactions, and duplicate medications. Pharmacovigilance systems can further collect and analyze information about adverse drug reactions and medication-related incidents, helping healthcare authorities identify emerging safety concerns. When combined with professional supervision and patient education, these technologies can strengthen monitoring, improve communication, and support safer use of medicines across healthcare settings [10].

CONCLUSION

Drug overdose prevention requires collaboration among healthcare professionals, patients, caregivers, regulatory authorities, and public health organizations. Responsible prescribing, comprehensive patient education, medication review, safe storage practices, digital healthcare technologies, pharmacovigilance activities, and ongoing scientific research collectively reduce medication-related harm while supporting effective treatment. Continued commitment to these preventive strategies will improve patient safety, strengthen healthcare quality, and promote responsible medicine use across diverse healthcare settings.

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