

# Aspirin misuse: a case report\*

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Aspirin-use disorder is an underreported condition. Identification of the signs and symptoms of aspirin misuse are important in light of prevalent non-prescribed medicine/over-the-counter medication (NPM/OTC) misuse. We discuss here the case of a patient with a history of chronic aspirin misuse who presented to the emergency department with salicylate intoxication and described elation secondary to deliberate aspirin consumption. This case highlights the importance of screening for NPM/OTC medication misuse in at-risk populations.

## Declaration of interest

None.

## Keywords

Other specified substance use disorder; aspirin misuse; non-prescribed medication misuse; over-the-counter medication misuse; salicylism.

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Misuse of non-prescribed medicine/over-the-counter products (NPM/OTC) is widespread. A UK cross-sectional survey sent to 1000 individuals revealed the lifetime prevalence of NPM/OTC misuse to be 19.3%, abuse to be 4.1%; and dependence to be 2%.<sup>1</sup> Misuse of NPM/OTC agents can have devastating consequences. The Drug Abuse Warning Network, a US public watch system monitoring drug-related presentations to emergency departments and drug-related deaths, found that, in 2011, there were more than 1.2 million emergency room visits for non-medical use of prescription and NPM/OTC medications.<sup>2</sup> Further, according to the US National Poison Data System, NPM/OTC products represent four of the top eight causes of single medicine suicidal poisonings (acetaminophen, aspirin, diphenhydramine, ibuprofen).<sup>3</sup>

Although NPM/OTC misuse remains a fraction of emergency department visits relative to prescription medications, its misuse is particularly prevalent in paediatric and adolescent populations as they often have easier access to these products than to illicit substances or prescribed medications. National Electronic Injury Surveillance System data from the US indicates NPM/OTC agents such as non-steroidal anti-inflammatory drugs, acetaminophen, cough syrup and antihistamines remain in the ten most frequent intentional substance ingestion among adolescents.<sup>4</sup> As of 2003, as many as 4.7% of US high-school-age teens reported misusing NPM/OTC drugs.<sup>5</sup> Misuse of these medicines is also seen in populations seeking alternatives to their drug of choice because of urine drug screening, other monitoring systems<sup>6</sup> or restrictive settings.

There are significant consequences to NPM/OTC misuse. It can increase the risk of unintentional overdoses, medical complications, emergency room visits, admissions to hospital and overall healthcare costs. As a result, Reeves *et al* suggest clinicians expand their index of suspicion regarding the misuse potential of NPM/OTC medications, especially those that can have an impact on the central nervous system.<sup>2</sup>

Aspirin misuse and dependence were first detailed in the *Journal of the American Medical Association* in 1940,<sup>7</sup> and have been described in several case reports/series since then.<sup>8,9</sup> In addition to continuous or episodic intake of aspirin without pharmacological purpose, cases describe deliberate salicylism (aspirin

intoxication) to produce conditions of elation or inebriation.<sup>10</sup> Although salicylism received attention through the 1970s, the disorder has been poorly reported in the following decades. The possible mechanisms of aspirin-induced euphoria have also not been elucidated. Better understanding of this disorder may be valuable in light of the continued high prevalence of NPM/OTC misuse. We report here a case of recurrent intentional salicylate intoxication in order to achieve a sensation of elation. We discuss the challenges of identifying and treating aspirin and NPM/OTC medication misuse.

## Case

Our patient was a 49-year-old White man. He presented to the emergency department with ataxia and confusion following ingestion of an unknown amount of aspirin. On the day of admission, he was leaning towards his left when walking, and appeared confused while attending a community behavioural health programme. His past psychiatric history was significant for schizoaffective disorder, bipolar type; Tourette syndrome; multiple suicide attempts via overdose; and polysubstance dependence, including tobacco, cocaine, alcohol, synthetic marijuana (K2 and spice), marijuana and benzodiazepines. From staff at his community behavioural health programme, he was also known to take other patients' medications. He had no significant past medical history and lived in a group home. Upon arrival in the emergency room the patient was lethargic but arousable, and was oriented to date and time but not to place. He denied ingesting any other substances besides his prescribed medications that morning. All standard laboratories were within normal limits except for a CO<sub>2</sub> of 19.2 mmol/L, indicating metabolic acidosis, an anion gap of 13 mEq/L and a blood salicylate level of 43 mg/dL. His lithium level was 0.84 mEq/L. Acetaminophen levels were <15.0 µg/mL. The urine toxicology screen was negative for all illicit substances tested. A computed tomography scan of his head without contrast revealed no acute intracranial haemorrhage or midline shift. An electrocardiogram showed normal sinus rhythm, and a QTc interval of 447 ms.

On questioning, the patient admitted to taking '3 Tylenol' (acetaminophen, paracetamol) that morning because it made him 'feel good', despite having no acetaminophen in his system. He denied

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any suicidal ideation. He was admitted for further treatment of altered mental status because of salicylate toxicity.

Psychiatry was consulted for assessment and management of the patient's psychiatric medications for schizoaffective disorder and Tourette syndrome. In the community, he received lithium carbonate 300 mg three times a day, haloperidol 15 mg twice daily and benztrapine 2 mg daily. He was not prescribed any other out-patient medications. His psychotropic agents were continued in the hospital.

On examination, he was cooperative and pleasant although still lethargic. He was oriented to date and time, but named another local hospital for location. On the Mini-Mental State Examination, he scored 19/30, losing points for location, recall of 0/3 items at 5 min, inability to perform serial 7's or spell 'world' backwards, inability to complete the third instruction out of a three-step series of commands or copy the intersecting pentagons. He again denied any suicidal ideation or desire to self-harm and stated that he took '3 Tylenol' the morning of his admission and '7 Tylenol' the previous day. When asked to elaborate, he answered, 'It gives me a buzz' and 'makes me feel good'. When asked if he had ingested acetaminophen or aspirin, he responded, 'It was Tylenol'. For the duration of his stay, he believed he took acetaminophen and not aspirin. He also stated he had received the tablets from another patient at his day programme. He did not exhibit any signs or symptoms of depression, mania or psychosis. By the following day, his symptoms, including delirium and elation, had dissipated. Both the patient and his family were educated about NPM/OTC medication misuse, including potential morbidity and mortality. He returned to his group home in a stable condition.

Prior medical records showed that the patient had been admitted 5 months earlier for short-term memory loss and confusion. At that time, his blood salicylate level was 59 mg/dL and CO<sub>2</sub> was 18.3 mmol/L with an anion gap of 18 mEq/L. Again, the urine toxicology screen for illicit substances was negative, and acetaminophen levels were <15.0 µg/mL. The patient stated then too that he had taken several doses of acetaminophen because it made him 'feel good'. He had denied any suicidal ideation, and insisted that he had taken the 'Tylenol' for a 'buzz.' Following 3 days of treatment, he was discharged in a stable condition.

## Discussion

Aspirin dependence was defined in a 1964 World Health Organization Expert Committee Report (13th report, 1964)<sup>10,11</sup> to include the following.

- A desire to continue taking the drug for other than its intended analgesic purpose.
- Ingestion of variable quantities, linked to some level of tolerance.
- A psychological dependence on the effects of the medicine related to the subjective experience with it.
- A lack of physical dependence resulting in no withdrawal symptoms upon cessation.
- Production of pathological changes in some tissues with ingestion of the medication over a long period.

By DSM-5 criteria, aspirin misuse in this patient appears to be consistent with an 'other substance use disorder'.<sup>12</sup> This diagnosis represents a pattern of using an intoxicating substance not categorised within the more common substance use disorders. The use leads to clinically significant impairment or distress within a 12-month period. Some elements of the diagnosis, applicable to our patient, include the following.

- The substance was taken in greater quantities and over a lengthier period than anticipated.
- There were strong longings to use the substance.
- There was continued substance use despite social difficulties.
- Substance use occurred in dangerous conditions.
- Consumption of the substance persisted despite awareness of its harmful physical and psychological impact.

Salicylism, or salicylic acid toxicity, can occur with blood concentrations of salicylate >35 mg/dL. Signs and symptoms of toxicity include nausea, dizziness, vomiting, confusion, tinnitus, psychosis and coma. Medullary respiratory activation can arise, leading to hyperventilation with respiratory alkalosis, followed by metabolic acidosis.<sup>13</sup> Effects of chronic minor analgesic misuse and salicylate poisoning may result in organic damage, including nephropathy, peptic ulceration, infertility, as well as bleeding, anaemia or death; aspirin has also been used in deliberate self-poisoning.<sup>14,15</sup>

Some of the usually undesirable effects of aspirin intoxication such as dizziness, hyperventilation and confusion may be pleasurable for some individuals, potentially leading to deliberate aspirin consumption.<sup>15</sup> Although aspirin misuse with subjective elation received some attention in the 1960s and 1970s, the disorder has not been elucidated in the decades since then. Mentions of intentional salicylism for pleasure since 1980 arise primarily in textbooks. One 1983 text discussed misuse of minor analgesics such as aspirin and phenacetin, noting that for some, these medications induced feelings of well-being and pleasure. The definition of misuse used was consumption of 1 g daily for 3 years or total consumption of 1 kg over 3 years.<sup>16</sup> Others have also noted the phenomenon of pleasure-seeking salicylism, although a possible mechanism has not been described.<sup>17,18</sup>

Our patient demonstrated the need for NPM/OTC medication misuse screening. Current American Psychiatric Association Practice Guidelines suggest assessing for NPM/OTC medication misuse during patient interviews,<sup>19</sup> however, clinical approaches and specific questions used to assess substance use may vary,<sup>20</sup> as can practice guidelines from other medical specialties. Our patient had a prior admission to hospital for intentional salicylate intoxication and had described chronic NPM/OTC misuse for years. However, this disorder was only identified during the current admission to hospital with the benefit of toxicology. Routine and standardised screening for NPM/OTC medication misuse in both the out-patient and in-patient settings could have allowed for earlier identification and initiation of treatment. This may have reduced health complications from chronic analgesic misuse and reduced hospital admissions for aspirin overdose. Overall, early identification would help decrease NPM/OTC medication morbidity and mortality worldwide. Avoiding preventable admissions to hospital would reduce healthcare costs.


Our patient developed an aspirin-use disorder despite living in a monitored group home. This case highlights the risk of NPM/OTC medication misuse in controlled facilities, such as group homes, nursing homes, rehabilitation facilities, prisons and in other populations with restricted access to conventional substances and medications of misuse. In fact, it has been demonstrated that incarcerated patients still maintain access to aspirin and other NPM/OTC medications. Prisoners may purchase medications from the dispensary or their cell-mates. They can even obtain them via diversion from medical staff.<sup>21,22</sup> Therefore, clinicians should be vigilant for NPM/OTC medication misuse in patients living in controlled settings who are otherwise restricted from conventional substances of misuse.

Beyond proper identification of NPM/OTC medication misuse, better guidelines for intervention and treatment of NPM/OTC medication dependence and misuse are required. One limited

internet study noted that despite 66% of UK primary care and pharmacy staffs suspecting addiction to medicines, including NPM/OTC agents, in their patients, just 17% started conversations about it.<sup>23</sup> As many NPM/OTC agents carry significant and potentially life-threatening side-effects when consumed in excess, it is important that clinicians be equipped to both identify and intervene when confronted with the challenge of NPM/OTC medication misuse. Finally, as with dextromethorphan and pseudoephedrine,<sup>24,25</sup> there may be a need for government legislation to help monitor and reduce access to NPM/OTCs that are misused and/or used for self-harm.

## Implications

Aspirin misuse is a medication-use disorder underreported in the medical literature. With the continued high prevalence of NPM/OTC misuse, it remains important for clinicians to be able to identify signs and symptoms of aspirin-use disorders using directed questions and toxicology screening, which remains a vital diagnostic element. Clinicians should be prepared to recommend effective treatment modalities and educate patients about the risks and consequences associated with non-medical aspirin use.

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## References

- Fingleton NA, Watson MC, Duncan EM, Matheson C. Non-prescription medicine misuse, abuse and dependence: a cross-sectional survey of the UK general population. *J Public Health (Oxf)* 2016; **38**: 722–30.
- Reeves RR, Ladner ME, Perry CL, Burke RS, Laizer JT. Abuse of medications that theoretically are without abuse potential. *South Med J* 2015; **108**: 151–7.
- Kang AM. Substances involved in suicidal poisonings in the United States. *Suicide Life Threat Behav* 2018; Aug 15 (Epub ahead of print).
- Hines EQ. Pediatric poisonings: the risk of over-the-counter pharmaceuticals. *Pediatr Ann* 2017; **46**: e454–8.
- Steinman K. High school students' misuse of over-the-counter drugs: a population-based study in an urban county. *J Adolesc Health* 2006; **38**: 445–7.
- Lessenger JE, Feinberg SD. Abuse of prescription and over-the-counter medications. *J Am Board Fam Med* 2008; **21**: 45–54.
- Queries and minor notes. *JAMA* 1940; **115**: 798–9.
- Madden JS, Wilson CW. Deliberate aspirin intoxication. *BMJ* 1966; **1**: 1090.
- Greenberg LA. An evaluation of reported poisonings by acetylsalicylic acid. *N Engl J Med* 1950; **243**: 124–9.
- Wilson CW. Drug addiction. Pharmacological aspects of addiction to morphine and other drugs. *Proc R Soc Med* 1965; **58**: 405–9.
- WHO Expert Committee on Addiction-Producing Drugs & World Health Organization. *WHO Expert Committee on Addiction-Producing Drugs [Meeting Held in Geneva from 25 to 30 November 1963]: Thirteenth Report*. World Health Organization, 1964 (<https://apps.who.int/iris/handle/10665/40580>).
- American Psychiatric Association, American Psychiatric Association. *DSM-5 Task Force. Diagnostic and Statistical Manual of Mental Disorders: DSM-5 (5th edn)*. American Psychiatric Association, 2013.
- Madan RK, Levitt J. A review of toxicity from topical salicylic acid preparations. *J Am Acad Dermatol* 2014; **70**: 788–92.
- O'Malley GF. Emergency department management of the salicylate-poisoned patient. *Emerg Med Clin North Am* 2007; **25**: 333–46.
- The epidemiology of drugs of dependence. In *The Pharmacological and Epidemiological Aspects of Adolescent Drug Dependence* (ed CWM Wilson): 185–237. Pergamon, 1968.
- Lader MH. *Handbook of Psychiatry: Vol 2, Mental Disorders and Somatic Illness*. Cambridge University Press, 1983.
- Ghodse H. *Addiction at Work: Tackling Drug Use and Misuse in the Workplace*. Gower Publishing, Ltd, 2005.
- Wills S. *Drugs of Abuse*. Pharmaceutical Press, 2005.
- Silverman JJ, Galanter M, Jackson-Triche M, Jacobs DG, Lomax JW 2nd, Riba MB, et al. The American Psychiatric Association practice guidelines for the psychiatric evaluation of adults. *Am J Psychiatry* 2015; **172**: 798–802.
- APA Work Group on Psychiatric Evaluation, Silverman JJ, Fochtman LJ, Vergare MJ, Anzia DJ, American Psychiatric Association. *The American Psychiatric Association Practice Guidelines for the Psychiatric Evaluation of Adults (3rd edn)*. American Psychiatric Association, 2016.
- Mitchell SG, Kelly SM, Brown BS, Reisinger HS, Peterson JA, Ruhf A, et al. Incarceration and opioid withdrawal: the experiences of methadone patients and out-of-treatment heroin users. *J Psychoactive Drugs* 2009; **41**: 145–52.
- Butler B. *Prescribing and Dispensing Medications within Correctional Environments: The Role of Health Information Technology*. COCHS, May 2018 ([http://cochs.org/files/issue\\_paper/Prescribing\\_Medication\\_HealthIT.pdf](http://cochs.org/files/issue_paper/Prescribing_Medication_HealthIT.pdf)).
- Bates G, Cochrane M, Mackridge AJ. The extent that health professionals suspect and address addiction to medicines in primary care: Findings from a survey in Northwest England. *J Addict Dis* 2017; **36**: 147–50.
- Gilchrist, A. *OTC Cough Medicine Prohibited to NJ Minors Without Rx*. Pharmacy Times, 18 Oct 2015 (<https://www.pharmacytimes.com/news/otc-cough-medicine-prohibited-to-nj-minors-without-rx>).
- National Institute on Drug Abuse. *Over-the-Counter Medicines*. NIDA, 1 Dec 2017 (<https://www.drugabuse.gov/publications/drugfacts/over-counter-medicines>).

