

**USE OF PAIN MEDICINES IN THE REPUBLIC OF NORTH MACEDONIA
(KNOWLEDGE, ATTITUDES AND PRACTICES)**

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Abstract: Pain is a universal human experience and remains one of the most significant public health challenges worldwide because of its wide-ranging physical, emotional, and social effects. It is one of the most common reasons people seek medical care and continues to be a leading cause of reduced daily functioning, lower productivity, and a diminished quality of life. Despite its impact, most patients do not seek medical attention when experiencing pain but instead rely on self-medication with over the counter (OTC) analgesics. These medicines can be effective when used responsibly; however, inappropriate use, excessive dosing, or combining multiple products without professional guidance can lead to serious health risks, including adverse reactions, masking of underlying diseases, medication interactions, or even long-term complications. The growing availability of OTC pain medicines, together with limited public knowledge about their risks, has contributed to rising rates of self-treatment both globally and in the Republic of North Macedonia. Modern lifestyle demands, the high prevalence of chronic pain, and increased trust in non-prescription products further support this trend. Although OTC analgesics are widely perceived as safe, scientific evidence consistently shows that misuse may lead to gastrointestinal, cardiovascular, renal, hepatic, psychological, and dependency-related complications. This underscores the need for better public education and reliable counseling from pharmacists and other healthcare professionals.

This paper examines the use of pain medicines in North Macedonia by exploring knowledge, attitudes, and practices related to self-medication with OTC analgesics. It analyzes global and national trends in consumption, identifies key factors influencing increased use, and discusses potential risks associated with inadequate pain management. In addition, the study highlights the importance of proper patient education, regulatory control, and the role of healthcare providers in promoting rational and responsible use of analgesics. By presenting these insights, the paper aims to improve understanding among individuals who rely on OTC analgesics for self-treatment and to encourage safer strategies for addressing pain at the population level.

Keywords: analgesics, concerns, OTC, over-the-counter medications

1. INTRODUCTION

Pain is a common experience and a global public health issue with significant physical, emotional, and social impacts (IM, 2011). It is among the most frequent reasons for seeking medical care and is the leading medical complaint worldwide (WHO, 2022a). Pain ranges from mild, temporary discomfort, to severe, chronic conditions that impair daily functioning and quality of life. Over 20% of the global population suffers from chronic pain, which reduces productivity and causes local economic losses (Smith, Taylor and Brown, 2023). People with pain often experience anxiety, irritability, frustration, and depression, further limiting their functionality (Baker and Johnson, 2024). Chronic pain also increases cardiovascular risk, affects immunity, and can cause cognitive problems. Inadequate management may lead to medication misuse, a serious public health challenge (CDCP, 2023).

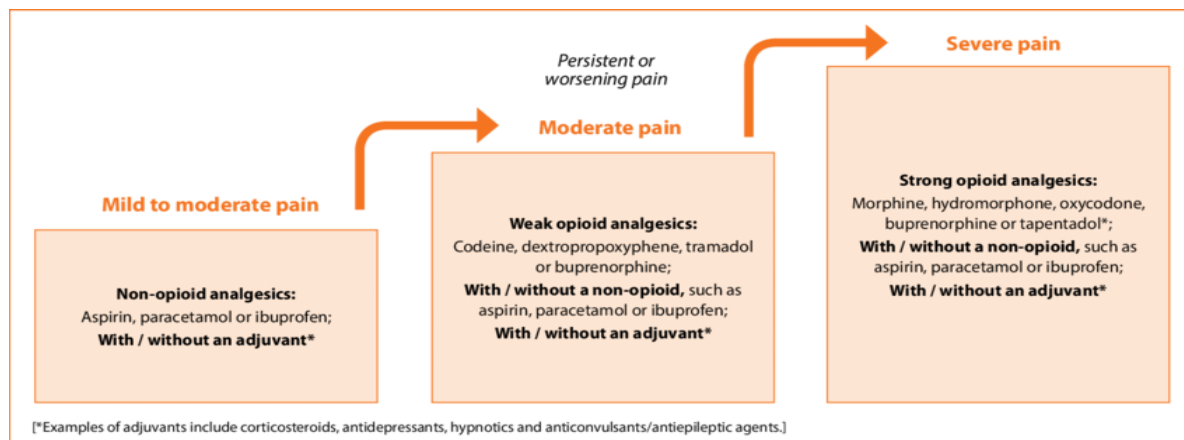
Despite these risks, people frequently self-medicate for minor pain using OTC analgesics. Availability varies, but most countries provide paracetamol, NSAIDs (aspirin, ibuprofen, naproxen), and low-dose codeine, alongside complementary remedies such as herbal extracts, vitamins, and minerals (WHO, 2022b).

Self-medication is complicated by the many pharmaceutical forms—tablets, effervescent tablets, fast-acting capsules, powders, ointments, gels, and liquids—which can confuse consumers. People may combine drugs with other actives or vitamins for added effect. Packaging and branding can complicate comparisons of similar products (Smith and Taylor, 2021). These factors make analgesic choice challenging and highlight the importance of guidance from health professionals when managing pain or self-medicating with OTC products.

2. PAIN, TYPES AND PAIN MEDICATIONS

The International Association for the Study of Pain – IASP (2020) defines pain as an unpleasant sensory and emotional experience linked to actual or potential tissue damage. According to The British Pain Society (2010), pain may originate from skin, muscles, joints, bones (nociceptive), internal organs (visceral), nerves (neuropathic), injured tissue (inflammatory), or from mixed mechanisms. Pain perception is shaped by psychological, cultural, and environmental factors, making it highly subjective (Watson, 2012).

Figure 1. Adaptation of the World Health Organization Analgesic Ladder



Source: Adapted from WHO Analgesic Ladder (WHO, 2022b)

For mild pain, non-opioid analgesics such as paracetamol or NSAIDs are recommended, but these have an analgesic ceiling, above which no further effect occurs. Moderate pain may require a combination of non-opioids/NSAIDs with a weak opioid, while severe pain is best managed with a strong opioid like morphine, which has no ceiling (Botea, 2020). Many NSAIDs, such as aspirin and Nalgesin S, are available OTC, but opioids are strictly prescription-only (MHNM, 2024), with regulations varying by country. Patients need to understand pain types and treatments, while healthcare professionals must recognize its complexity to provide effective management and relief.

3. SELF-TREATMENT WITH OTC ANALGETICS

Self-medication is defined as “the selection and use of medicines by individuals to treat self – identified illnesses or symptoms” (WHO, 2010). Self-medication should not be a patient’s first choice in seeking a weapon in the fight against pain, especially since pain affects different people in different ways and an individualized approach should always be considered. In addition, although these medicines are considered safe, they can have consequences (even if used responsibly), which range from mild to very serious. Occasional use may relieve symptoms temporarily, but can mask or worsen underlying conditions, sometimes causing severe or fatal outcomes. These include: *psychosocial impacts* (Builders and Aguwa, 2012); *increased risk of side effects and adverse events* (Cook, 2008); *masking of underlying conditions*; *addiction* (Mumtaz et al., 2011); *infections* (Le Grand et al., 1999); *hypersensitivity* (Cook, 2008); *gastrointestinal disorders* (NLM, 2021); *kidney dysfunction*; *liver damage* (Cook, 2008); *cardiovascular risks*; *negative impact on chronic diseases*; *hospitalization* (Sesiuk et al., 2023) and *death* (Kamaldeen et al., 2012).

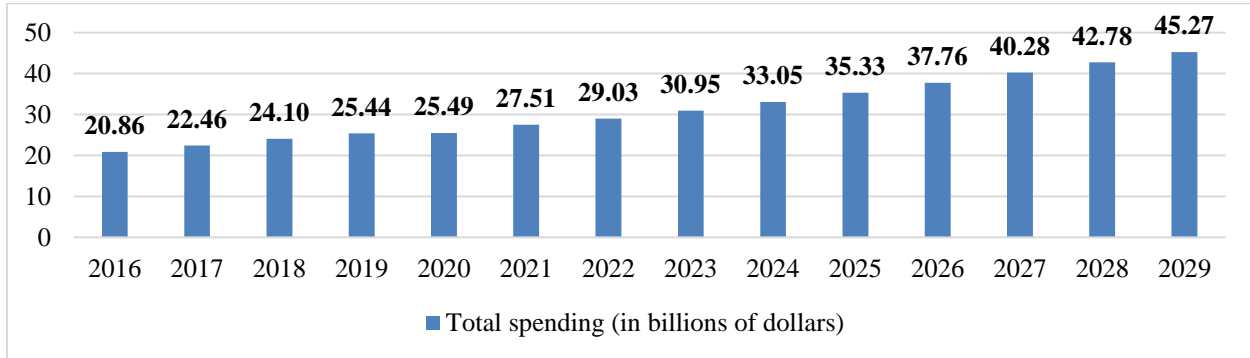
The safety of OTC medications depends on their correct use, including compliance with dosage, not combining with the wrong substances (due to undesirable interactions with other medications), frequency of use, individual health conditions, and seeking advice from a health professional in case of suspected side effects or interactions with other medications (WHO, 2022b). The consequences of inappropriate use of these medications are increased by self-medication compared to prescribed use, and their incorrect use can lead to adverse reactions or overdose, especially in vulnerable patients, such as, children, the elderly or pregnant women (Smith, Taylor and Brown, 2023).

4. USE OF OTC ANALGETICS IN THE WORLD

Self-medication with OTC medicines is recognized as a global public health issue (Sarahroodi et al., 2012), especially in developing countries (Ehiguator et al., 2013), including North Macedonia. Figure 1 shows a consistent upward trend in the global OTC analgesics market, with consumption expected to rise by nearly USD 25 billion between 2016 and 2029. Market size increased from USD 20.86 billion in 2016 to USD 33.05 billion in 2024, with

projections reaching USD 45.27 billion in 2029. Annual growth has remained relatively stable (5.53% – 7.92%), except for a notable slowdown in 2019 (0.2%). For example, sales were USD 29.03 billion in 2022, USD 30.95 billion in 2023, and USD 33.05 billion in 2024, reflecting growth rates of 6.61% and 6.79%. Further continuous growth is expected between 2024 and 2029, averaging around 7% annually, with a slight decline to 5.82% in 2029. Overall, the market is projected to expand by 32.51% over this five-year period, surpassing USD 45 billion by 2029.

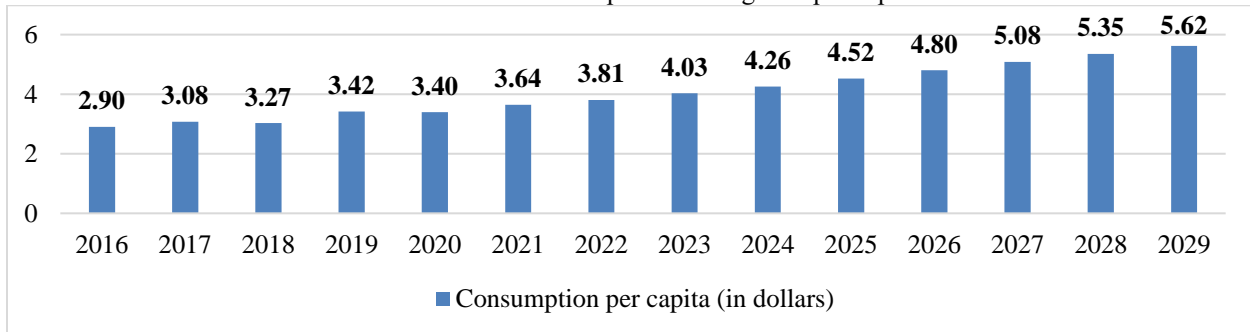
Chart 1. Revenue generated from sales of OTC analgesics worldwide



Source: Statista (2025a)

Per-capita consumption of analgesics has also risen, indicating increased individual usage globally. Per-capita OTC analgesic consumption was USD 2.9 in 2016 and is expected to reach USD 5.62 by 2029, nearly doubling over 13 years. In 2024 it was USD 4.26, rising to a projected USD 4.52 in 2025 (6.1% growth). By 2029, consumption is expected to be over 24% higher than in 2025. Annual increases of USD 0.2–0.3 show a stable upward trend, with stronger growth expected after 2024.

Chart 2. Global consumption of analgesics per capita



Source: Statista (2025a)

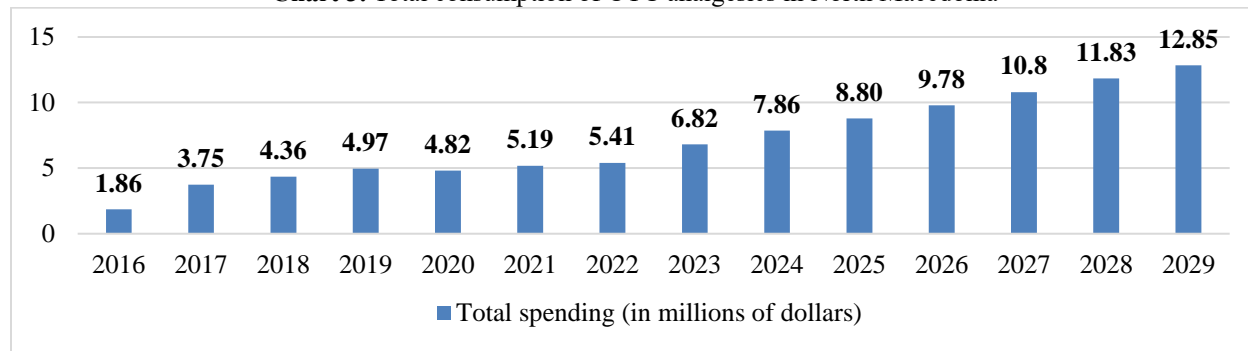
5. USE OF OTC ANALGETICS IN NORTH MACEDONIA

As in the world, in North Macedonia, the consumption of OTC analgesics has been steadily increasing over the past decade, following global trends in self-medication and the availability of pain relief medications (Chart 3).

Spending grew from USD 1.86 million in 2016 to USD 5.41 million in 2022 and USD 7.86 million in 2024. Between 2016 and 2019, consumption rose rapidly, nearly doubling (USD 1.86–4.97 million). The market stabilized from 2019 to 2022, with a slight drop in 2020 (USD 4.82 million) and moderate recovery in 2021–2022.

Forecasts for 2025–2029 indicate rapid expansion, reaching USD 12.85 million by 2029—almost 100% growth in six years, aligned with global self-medication trends. From 2016 to 2024, revenues increased 322.58%; by 2025 the rise will reach 373.12%, and by 2029 an estimated 590.86%. The projected 2029 growth rate of 8.62% indicates continued rising demand for OTC analgesics.

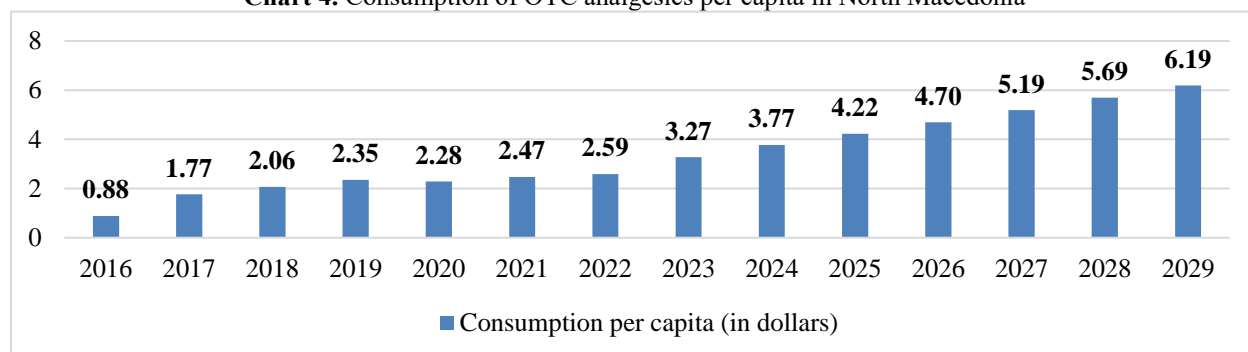
Chart 3. Total consumption of OTC analgesics in North Macedonia



Source: Statista (2025b)

Per-capita consumption shows the same upward trend: from USD 0.88 in 2016 to USD 2.35 in 2019 and USD 3.77 in 2024. By 2029, per-capita spending is expected to grow 9–12% annually after 2024, reaching USD 6.19—a rise of USD 5.31 (603.41%) over 2016. Over the past eight years, consumption increased 328.41%. The highest annual growth occurred in 2017 (101.14%), while the lowest were in 2021 (8.33%) and 2022 (4.8%); only 2020 saw a decline (–2.98%). Compared with 2024, per-capita use will rise by USD 2.42 (64.19%) by 2029.

Chart 4. Consumption of OTC analgesics per capita in North Macedonia



Source: Statista (2025b)

6. FACTORS FOR UPWARD TREND IN CONSUMPTION

The growing consumption of OTC analgesics reflects the increasing role of analgesics in modern life, especially in the context of the accelerated pace of life that contributes to the rise of stress and pain-related diseases (Goyal et al., 2021). Factors likely influencing this trend include the increasing global population, the aging population, the increasing prevalence of chronic pain conditions, the widespread availability of OTC medications, and the increasing awareness of pain treatments (Goyal et al., 2021).

The range of available OTC medications is often more restrictive than those available by prescription. However, in recent years, there has been a trend of deregulation, with some drugs moving from prescription to OTC category, and in addition, the large number of local pharmacies and the emergence of online pharmacies have enabled significantly easier availability of drugs (Bessell et al., 2003). In addition, research shows that public awareness of the risks of excessive or incorrect use of analgesics is low. Given the fact that frequent use of these drugs above a certain threshold has no additional positive effect but is manifested by the appearance or further increase of side effects, this can lead to inappropriate dose increases or unnecessary extension of the duration of use (Diener et al., 2018).

The most common reasons for incorrect use of analgesics are lack of knowledge, self-diagnosis, excessive trust in OTC drugs, failure to comply with the duration of treatment, combining drugs and drug dependence. Patients often do not understand the instructions for use or ignore warnings about side effects. They self-assess their condition and use medications without consulting professionals. Incorrect indication (such as taking medications for anxiety or insomnia, instead of treating pain), can cause serious problems. Many people consider OTC medications to be completely safe, which leads to excessive or prolonged use. Some people, however, discontinue the medication before the recommended period is over or continue using it after symptoms have disappeared, for fear of relapse.

Furthermore, the abuse of OTC medications is a growing public health problem, but unfortunately, it is often perceived as less dangerous compared to the abuse of controlled substances. This perception is due to their easy availability, social acceptability, and the fact that the use of these medications is rarely detected in standard toxicology tests (Hall et al., 2012). However, abuse is often associated with self-medication, which has been detected as an important risk factor for increasing the possibility of illicit drug use and addiction (Mumtaz et al., 2011).

7. NEED FOR PUBLIC EDUCATION

Educational campaigns are needed to inform patients about the risks of uncontrolled medicine use. Programs and monitoring by health professionals are essential to reduce misuse and ensure safe pain management. Labeling and electronic tools, such as QR codes linking to instructions, can improve user knowledge (Baker and Johnson, 2024).

8. CONCLUSION

Analgesics remain the foundation of pain management, with many non-opioid options widely available as OTC products. Their easy accessibility and general public familiarity with their indications contribute to frequent use, often without professional supervision. Although generally safe, misuse and inappropriate self-medication make analgesics one of the most commonly abused drug classes worldwide.

In North Macedonia, as elsewhere, self-medication with OTC analgesics is common for both minor and chronic pain. Therefore, broad educational campaigns—especially targeting high-risk groups—are essential to promote safe use, prevent misuse, and reduce negative effects among individuals already experiencing problems related to these medications.

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