Analysis of the range of anxiolytic medicinal products on the pharmaceutical market of Ukraine and prospects for the development of a nasal dosage form of a benzodiazepine derivative

V. O. Chmyr[A,B,C,D,E], B. S. Burlaka[A,F]

Zaporizhzhia State Medical and Pharmaceutical University, Ukraine

A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation; D – writing the article; E – critical revision of the article; F – final approval of the article

Post-traumatic stress disorder and concomitant anxiety disorders constitute significant medical and social problems, particularly under martial law. Standard pharmacotherapy often lacks sufficient clinical efficacy, while oral drugs present limitations such as delayed onset of action and systemic adverse reactions. The nasal route is promising for targeted delivery to the central nervous system. An analysis of the Ukrainian anxiolytics market is essential to rationalize the development of a new dosage form.

The aim of the study was to analyze the range of anxiolytic medicinal products on the pharmaceutical market of Ukraine and to determine the prospects for developing a nasal dosage form based on a benzodiazepine derivative.

Materials and methods. The assortment of anxiolytic drugs on the Ukrainian pharmaceutical market was analyzed as of April 15, 2026. Structural-logical, comparative, and analytical methods were utilized. Data were sourced from the State Register of Medicines of Ukraine (http://www.drlz.com.ua), Compendium (https://compendium.com.ua/), and Tabletki.ua (https://tabletki.ua/).

Results. An assortment analysis of ATC group N05B (anxiolytics) showed that diazepam had the highest representation (9 products), followed by 1-(hydrazinocarbonyl)-methyl-7-bromo-5-phenyl-1,2-dihydro-3*H*-1,4-benzodiazepin-2-one / gidazepam (benzodiazepine derivative; 7 products). Other active substances included buspirone and lorazepam (6 each), alprazolam (5), hydroxyzine and phenazepam (3 each), etifoxine and fabomotizole (2 each), and Lavandulae aetheroleum (1). Tablets predominated among the dosage forms (29 products, including 16 produced domestically). Overall, Ukraine was identified as the leading manufacturing country (27 products), and prescription drugs predominated (41 products).

Conclusions. The analysis of the range of anxiolytic medicinal products in ATC group N05B on the pharmaceutical market of Ukraine showed that diazepam had the highest representation (20.5 %), followed by the benzodiazepine derivative (gidazepam – 15.9 %). Solid dosage forms predominated (81.8 %), while no nasal dosage forms were identified within the analyzed range. The absence of nasal formulations indicates a potential market opportunity for further pharmaceutical development of a nasal dosage form based on a benzodiazepine derivative. Its technological feasibility, safety, pharmacokinetic characteristics, and potential clinical advantages require further investigation.

Keywords: pharmaceutical development, dosage form, pharmaceutical market, marketing research, active pharmaceutical ingredient.

Current issues in pharmacy and medicine: science and practice. 2026;19(3):282-287

Аналіз асортименту анксіолітичних лікарських засобів на фармацевтичному ринку України та перспективи розроблення назальної лікарської форми похідного бензодіазепіну

В. О. Чмирь, Б. С. Бурлака

Посттравматичний стресовий розлад і супутні тривожні розлади становлять значну медико-соціальну проблему, особливо в умовах воєнного стану. Стандартна фармакотерапія не завжди забезпечує достатній клінічний ефект, а пероральні препарати можуть мати обмеження, пов'язані з повільним початком дії та системними побічними реакціями. Назальний шлях введення є перспективним для доставки активних речовин до центральної нервової системи. Аналіз асортименту анксіолітичних засобів в Україні є необхідним етапом обґрунтування нової лікарської форми.

Мета роботи – проведення аналізу асортименту анксіолітичних лікарських засобів на фармацевтичному ринку України та визначення перспективи розроблення назальної лікарської форми на основі похідного бензодіазепіну.

Матеріали і методи. Об'єкт дослідження – асортимент анксіолітичних лікарських засобів, представлених на фармацевтичному ринку України станом на 15.04.2026 року. Використано структурно-логічний, порівняльний, аналітичний та узагальнювальний

ARTICLE INFO

UDC 615.451.3-032:611.21]:615.214]-043.83-047.54
DOI: 10.14739/2409-2932.2026.3.365134

Current issues in pharmacy and medicine: science and practice. 2026;19(3):282-287

Keywords: pharmaceutical development, dosage form, pharmaceutical market, marketing research, active pharmaceutical ingredient.

Received: 30.06.2026 // Revised: 20.08.2026 // Accepted: 28.08.2026

© The Author(s) 2026. This is an open access article under the Creative Commons CC BY 4.0 license

методи. Дані отримано з Державного реєстру лікарських засобів України (http://www.drlz.com.ua), Компендіум (https://compendium.com.ua/), Tabletki.ua (https://tabletki.ua/).

Результати. За результатами аналізу асортименту анксіолітичних лікарських засобів групи АТС N05B встановлено, що найбільша кількість препаратів зареєстрована для МНН diazepam – 9 найменувань. Категорія 1-(hydrazinocarbonyl)-methyl-7-bromo-5-phenyl-1,2-dihydro-3*H*-1,4-benzodiazepin-2-one / гідазепам (похідне бензодіазепіну – 7 найменувань). Buspirone та lorazepam – по 6 найменувань. Alprazolam наявний у 5 найменуваннях, Hydroxyzine та Phenazepam – по 3 найменування Etifoxine та Fabomotizole – по 2 найменування. *Lavandulae aetheroleum* – 1 найменування. У структурі лікарських форм найбільшу частку асортименту становлять таблетки – 29 найменувань, серед них переважають препарати українського виробництва – 16 найменувань. У загальній структурі за країнами-виробниками домінує Україна – 27 найменувань. За умовами відпуску переважають рецептурні препарати – 41 найменування.

Висновки. Проведено аналіз асортименту анксіолітичних лікарських засобів групи АТС N05B на фармацевтичному ринку України. Встановлено, що найбільшу частку становлять препарати з діючою речовиною diazepam (20,5 %), далі – препарати на основі похідного бензодіазепіну (гідазепам – 15,9 %). У структурі асортименту переважають тверді лікарські форми (81,8 %), а назальних лікарських форм у проаналізованому сегменті не виявлено. Це свідчить про наявність потенційно незайнятого сегмента фармацевтичного ринку та визначає перспективність подальшої фармацевтичної розробки назальної лікарської форми на основі похідного бензодіазепіну. Її технологічна здійсненність, безпека, фармакокінетичні характеристики та потенційні клінічні переваги потребують продовження вивчення.

Ключові слова: фармацевтична розробка, лікарська форма, фармацевтичний ринок, маркетингові дослідження, АФІ.

Актуальні питання фармацевтичної і медичної науки та практики. 2026. Т. 19, № 3(52). С. 282-287

Post-traumatic stress disorder (PTSD) and co-occurring anxiety disorders represent one of the most complex challenges in modern psychiatry and neurology. Over the past five years, the paradigm for understanding these conditions has undergone significant transformation. Historically, PTSD was first included in the DSM-III classification in 1980, which sparked debate due to the requirement of an external etiological factor: a “trauma”. The clinical course of PTSD resulting from armed conflicts has demonstrated that the classical cognitive model, which views PTSD exclusively as a disorder of memory and threat appraisal, is incomplete [1,2].

Under conditions of martial law, a significant proportion of anxiety disorders arise not only from psychological stress but also against the background of organic brain injury, specifically blast-induced neurotrauma or acoustic trauma. This has led to the identification of the phenomenon of “blast-induced PTSD”, which is characterized by a high level of resistance to standard pharmacotherapy, systemic neuroinflammation, and a complex interplay of somatic and psychopathological symptoms [3,4].

The global prevalence of anxiety disorders has risen sharply amid military actions, particularly following the full-scale invasion of Ukraine. According to the World Health Organization (WHO) estimates, one in five people in a conflict zone is at risk of developing a mental disorder. According to the National Health Service of Ukraine (NHSU), the number of patients with PTSD increased fourfold between 2021 and 2023, creating a critical burden on the healthcare system. Among the civilian population in combat zones, the prevalence of anxiety disorders reaches 38.6 %, and that of post-traumatic stress is 25.7 % [5,6].

The situation is even more critical among military personnel. Within the structure of battle casualties, acoustic trauma accounts for 6.6 % to 7.1 % of documented injuries. Meanwhile, researchers report that blast wave exposure causes 56 % to 78 % of all combat injuries, with mild blast-induced traumatic brain injury frequently remaining undiagnosed [7,8].

Despite the existence of approved clinical protocols and the widespread use of first-line drugs, developing new dosage forms for the treatment of PTSD remains a highly urgent task. Current standard baseline pharmacotherapy, represented by selective serotonin and norepinephrine reuptake inhibitors (specifically sertraline, paroxetine, and venlafaxine), demonstrates only moderate efficacy: the therapeutic response rate is approximately 39 %, and no more than 30 % of patients achieve full remission [9,10].

Standard pharmacotherapy for PTSD is based primarily on the use of antidepressants and other medicinal products in accordance with current clinical guidelines. At the same time, patients with PTSD may experience pronounced anxiety states, panic symptoms, and episodes of acute psychoemotional agitation, which supports interest in medicinal products with a rapid onset of action. In this context, the intranasal administration of benzodiazepine derivatives may be considered a promising direction for pharmaceutical development in specific clinical situations requiring a rapid anxiolytic effect. Current baseline therapy with oral medications is frequently accompanied by gastrointestinal disorders and systemic adverse effects, which cause patients to discontinue treatment [11,12]. In contrast, the nasal route of administration ensures direct delivery of the active substance to the central nervous system via olfactory and trigeminal nerve pathways, effectively bypassing the blood-brain barrier and avoiding first-pass metabolism in the liver and gastrointestinal tract [13,14]. This guarantees an exceptionally rapid onset of therapeutic action, which is critical for the swift management of acute hyperarousal, panic attacks, and intrusive flashbacks.

Analyzing the range of medicinal products of the domestic pharmaceutical market is an essential stage preceding the development of a new dosage form, as it justifies the feasibility of its creation from the standpoint of real therapeutic and market needs. Studying existing drugs allows for evaluating the level of competition in the relevant pharmacotherapeutic segment, determining the representation

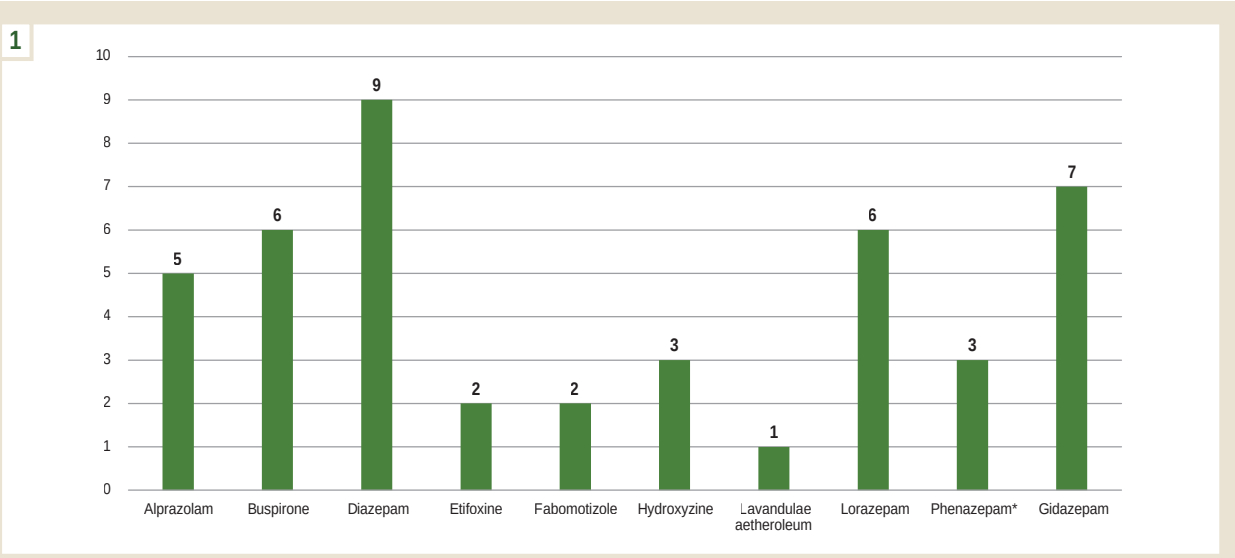


Fig. 1. Structure of the range of medicinal products in ATC group N05B on the pharmaceutical market of Ukraine by active substance.

of international nonproprietary names (INNs), assessing the frequency of use of specific active pharmaceutical ingredients (APIs), and establishing the dominant dosage forms and their manufacturing formats.

Aim

The aim of the study was to analyze the range of anxiolytic medicinal products on the pharmaceutical market of Ukraine and to determine the prospects for developing a nasal dosage form based on a benzodiazepine derivative.

Materials and methods

In the course of analyzing the range of medicinal products of the domestic pharmaceutical market, structural-logical, comparative, analytical, and generalizing methods were applied, alongside methods for the systematization and interpretation of the obtained data. The information baseline of the study comprised data from the State Register of Medicines of Ukraine (http://www.drlz.com.ua) as of April 15, 2026, supplemented by information from the reference resource Compendium – Medicinal Products (https://compendium.com.ua/), .and the online platform Tabletki.ua (https://tabletki.ua/).

The analysis included medicinal products classified within ATC group N05B that had valid registration in Ukraine on the specified date. Medicinal products not belonging to ATC group N05B or without valid registration status as of April 15, 2026, were excluded. The Compendium and Tabletki.ua resources were used to verify and supplement information on trade names, dosage forms, manufacturers, countries of origin, and dispensing status. Actual availability of medicinal products in individual pharmacies was not used as an inclusion criterion and was not assessed in the present study.

The analysis was performed according to the following criteria: active substance, trade name, dosage form, country of origin, manufacturing enterprise, and dispensing status.

Results

The analysis of the range of medicinal products was performed according to the ATC classification: N – Nervous system; N05 – Psycholeptics; N05B – Anxiolytics. The analyzed segment comprised 44 medicinal products *(Fig. 1)*.

The largest number of medicinal products is registered for diazepam, with 9 items, which accounts for 20.5 % of the total number of products analyzed. A significant share is also held by the category (active substance: 1-(hydrazinocarbonyl)-methyl-7-bromo-5-phenyl-1,2-dihydro-3*H*-1,4-benzodiazepin-2-one, or gidazepam), with 7 items (15.9 %). Buspirone and lorazepam are represented by an equal number of products – 6 items each, corresponding to 13.6 % for each position. The share of alprazolam stands at 11.4 %, as there are 5 product items with this international nonproprietary name available on the market.

Hydroxyzine and phenazepam were represented by 3 medicinal products each, accounting for 6.8 % of the total number of products analyzed. Etifoxine and fabomotizole were represented by 2 products each (4.5 %). *Lavandulae aetheroleum* had the lowest representation, with 1 medicinal product (2.3 %).

Based on the results of the dosage form, the range of medicinal products analysis *(Fig. 2)*, it was established that the largest share consists of products in tablet form, with 29 items, which corresponds to 65.9 % of the total count. Solutions for injection occupy the second position with 5 items (11.4 %). Sublingual tablets are represented by 4 items (9.1 %), while capsules and film-coated tablets have an equal number of entries – 3 items each (6.8 %).

Within the structure of oral tablet dosage forms, products of Ukrainian manufacture predominate, accounting for 16 out of 29 items, which represents 55.2 % within this group. Manufacturers from Latvia and Hungary (4 items each), England (3 items), and Slovenia (2 items) also produce tablets

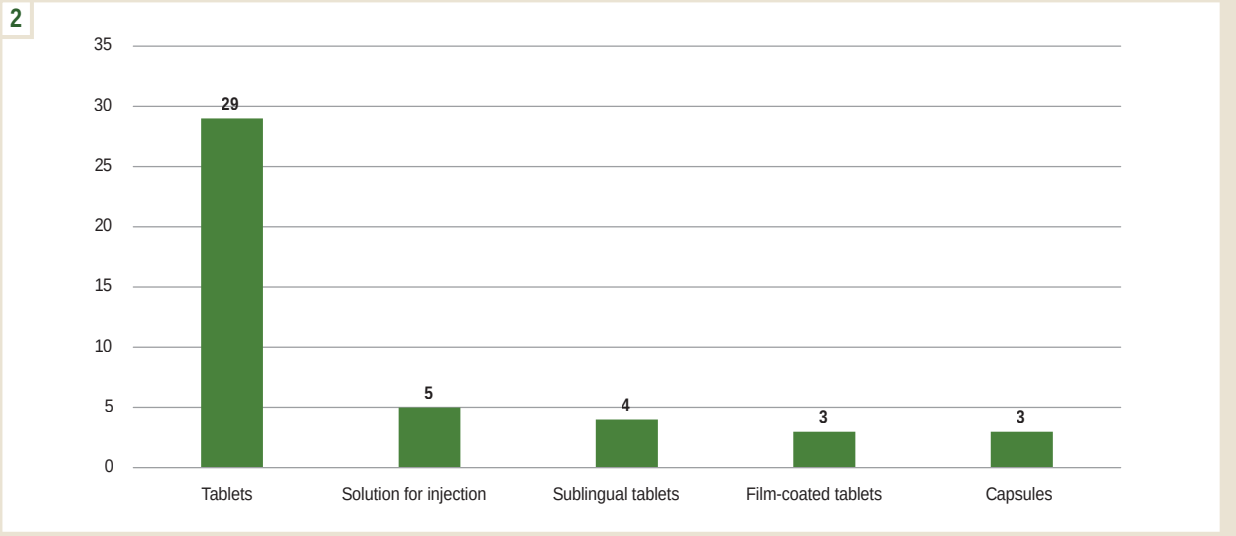


Fig. 2. Structure of the range of medicinal products in ATC group N05B on the pharmaceutical market of Ukraine by dosage form.

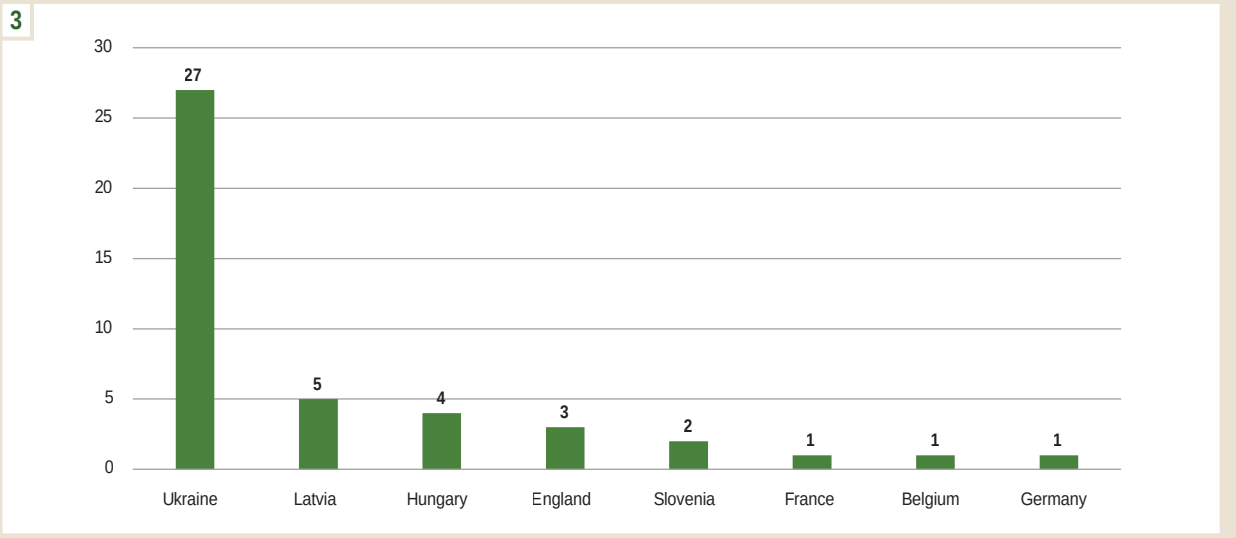


Fig. 3. Structure of the domestic market of the range of medicinal products for the ATC group N05B by manufacturing country.

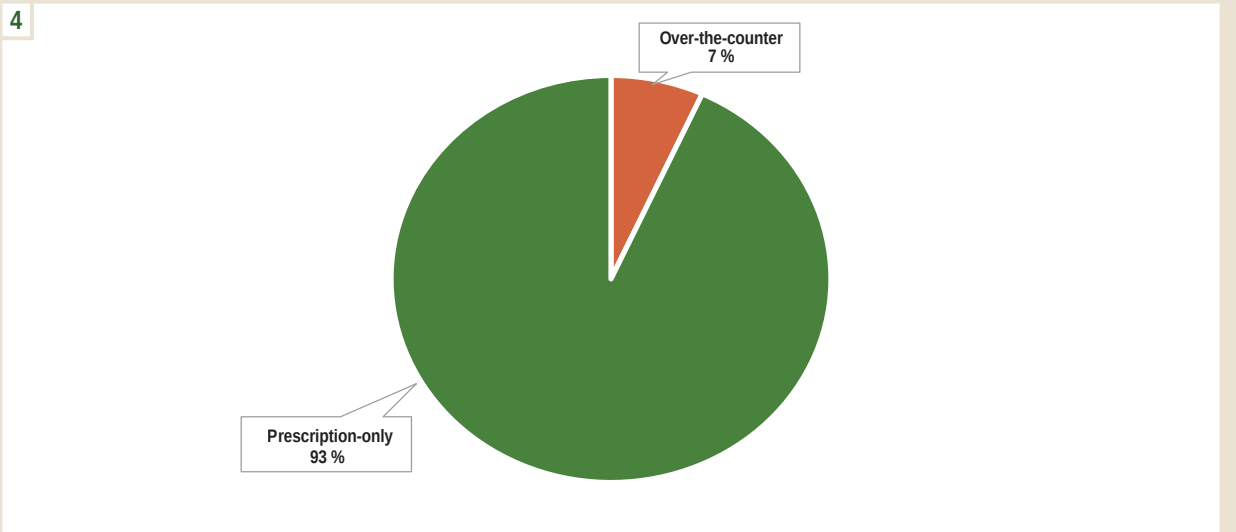


Fig. 4. Structure of the domestic market of the range of medicinal products for the ATC group N05B by dispensing status.

(Fig. 3). Solutions for injection are likewise predominantly represented by domestic products, which comprise 4 out of 5 items, while 1 entry is from Latvia. Sublingual tablets are fully supplied by Ukrainian manufacturers (4 items). Among capsules, one item each is recorded from Germany, Ukraine, and France. Film-coated tablets are represented by two items of Ukrainian manufacture and one from Belgium.

In the overall structure by manufacturing country, Ukraine dominates with 27 items (61.4 %). The share of Latvia stands at 11.4 % (5 items), Hungary at 9.1 % (4 items), England at 6.8 % (3 items), and Slovenia at 4.5 % (2 items). Germany, France, and Belgium are represented by one entry each, corresponding to 2.3 % for each country.

Based on the analysis by dispensing status *(Fig. 4)*, prescription-only medicines predominated, with 41 products accounting for 93.2 % of the total number of products analyzed. Over-the-counter (OTC) medicinal products were represented by 3 products (6.8 %).

Among the over-the-counter (OTC) medicinal products, fabomotizole was represented by 2 products, accounting for 4.5 % of the total number of products analyzed and 66.7 % of the OTC group. Lavandulae aetheroleum was represented by 1 product, corresponding to 2.3 % of the total number of products analyzed and 33.3 % of the OTC group.

Among prescription-only medicinal products, diazepam had the highest representation, with 9 products, accounting for 20.5 % of the total number of products analyzed and 22.0 % of the prescription-only group. The benzodiazepine derivative 1-(hydrazinocarbonyl)-methyl-7-bromo-5-phenyl-1,2-dihydro-3*H*-1,4-benzodiazepin-2-one(gidazepam), was represented by 7 products (15.9 % of the total number of products analyzed). Buspirone and lorazepam have 6 items each (13.6 % for each position). Alprazolam is represented by 5 items (11.4 %). Hydroxyzine and phenazepam account for a smaller share – 3 items each (6.8 % respectively). Etifoxine is represented by 2 items, which constitutes 4.

Discussion

The obtained results indicate an uneven structure of the anxiolytic drug market in Ukraine by INN. The range of medicinal products is predominantly formed by diazepam, buspirone, lorazepam, and alprazolam products, whereas other active substances are represented by a smaller number of items. Comparing these data with the ATC classification allows us to consider the investigated segment as pharmacotherapeutically heterogeneous, since the N05B group encompasses both benzodiazepine derivatives and anxiolytics of other chemical groups.

Within the structure of dosage forms, a pronounced predominance of tablet products was established. The combined share of conventional tablets, sublingual tablets, and coated tablets accounts for 81.8 % of the total range of medicinal products. This indicates the market's orientation primarily toward oral and oromucosal administration. At the same time, no nasal dosage forms were identified in the investigated segment, which is fundamental for justifying further pharmaceutical development.

Comparison with international experience [15,16,17] shows that the nasal route of administration for benzodiazepines has already been implemented in medicinal products for emergency therapy. Specifically, diazepam nasal spray is used for the acute management of seizure episodes in patients with epilepsy, while midazolam nasal spray is used for the short-term treatment of seizure clusters. Although these products are not direct analogs of anxiolytic drugs in terms of indications, they confirm the technological feasibility and practical significance of the nasal delivery of benzodiazepines.

It should be emphasized that a nasal dosage form of a benzodiazepine derivative is not considered an alternative to standard maintenance pharmacotherapy for PTSD. Its potential application may be associated with specific clinical situations accompanied by pronounced anxiety symptoms and requiring a rapid anxiolytic effect. Therefore, the present market analysis should be regarded as a preliminary pharmaceutical rationale for further investigation of this dosage form rather than evidence of its clinical efficacy in PTSD.

The predominance of products of Ukrainian manufacture (61.4 %) highlights the significant role of domestic enterprises in shaping this segment. At the same time, the predominance of traditional dosage forms indicates that the potential of domestic manufacturing could be directed toward expanding the range of medicinal products through the introduction of innovative drug delivery systems.

The rationale for further development of a nasal dosage form should be considered from several distinct perspectives. From a market perspective, the absence of nasal dosage forms in the analyzed range of anxiolytic medicinal products indicates an unoccupied segment of the pharmaceutical market of Ukraine. From a technological perspective, the existence of approved nasal benzodiazepine products for other indications confirms the feasibility of formulating and administering compounds of this class intranasally. From a clinical perspective, the potential advantages of the nasal route, including a faster onset of action and possible enhancement of systemic or nose-to-brain delivery, require separate pharmacokinetic and clinical evaluation and cannot be inferred from the present market analysis alone.

The high proportion of prescription-only medicines (93.2 %) is expected for the anxiolytic segment, particularly for benzodiazepine-class drugs. This should be taken into account in further pharmaceutical development, with particular attention to dosing accuracy, safety, dosage form stability, and the control of misuse risks.

Conclusions

1. A market analysis of the range of anxiolytic medicinal products in Ukraine belonging to the ATC group N05B was conducted. It was established that the largest share consists of products containing the API diazepam – 20.5 %, as well as products based on a benzodiazepine derivative – 15.9 %.

2. Solid dosage forms predominated in the analyzed range of medicinal products (81.8 %), whereas no nasal dosage forms were identified. This indicates a limited representation

of alternative drug delivery systems among anxiolytic medicinal products. Products manufactured in Ukraine accounted for 61.4 % of the total number analyzed, while prescription-only medicines constituted 93.2 %.

3. The obtained market data indicate a potential opportunity for further pharmaceutical development of a nasal dosage form based on a benzodiazepine derivative. Its technological feasibility and potential clinical advantages require further formulation, pharmacokinetic, safety, and clinical studies.

Prospects for further research. It is advisable to conduct an analysis of pharmacy availability, price range, and the cost per unit dose of the products.

AI statement

During the preparation of this article, ChatGPT (OpenAI) and Grammarly were used for language editing, translation, and improvement of the clarity and grammatical correctness of the manuscript. All text fragments generated or processed using these tools were critically reviewed and edited by the authors, who bear full responsibility for the accuracy, integrity, and final content of the article.

Funding

The study was performed without financial support.

Conflicts of interest: authors have no conflict of interest to declare.
Конфлікт інтересів: відсутній.

Information about the authors:

Chmyr V. O., Postgraduate Student of the Department of Medicinal Preparations Technology, Zaporizhzhia State Medical and Pharmaceutical University, Ukraine.
ORCID ID: 0009-0004-3901-5493

Burlaka B. S., PhD, DSc, Professor of the Department of Medicinal Preparations Technology, Zaporizhzhia State Medical and Pharmaceutical University, Ukraine.
ORCID ID: 0000-0003-4539-7331

Відомості про авторів:

Чмирь В. О., аспірант каф. технології ліків, Запорізький державний медико-фармацевтичний університет, Україна.

Бурлака Б. С., д-р фарм. наук, професор каф. технології ліків, Запорізький державний медико-фармацевтичний університет, Україна.

Bogdan Burlaka (Богдан Бурлака)
burlakabogdan@gmail.com

Referenses

1. Billings J, Nicholls H. PTSD and complex PTSD, current treatments and debates: a review of reviews. Br Med Bull. 2025;156(1):ldaf015. doi: 10.1093/bmb/ldaf015
2. Ooi R. The Psycho-Somatic-Noetic Paradigm in Trauma Treatment: A Critical Review of Gaps and Integrative Solutions. J Biomed Res Environ Sci. 2025;6(12):1929-50. doi: 10.37871/jbres2241
3. Perez-Garcia G, Gama Sosa MA, De Gasperi R, Tschiffely AE, McCarron RM, Hof PR, et al. Blast-induced "PTSD": Evidence from an animal model. Neuropharmacology. 2019;145(Pt B):220-9. doi: 10.1016/j.neuropharm.2018.09.023
4. Prysiazhniuk O, Palyvoda R, Chepurnyi Y, Pavlychuk T, Chernogorskyi D, Fedirko I, et al. War-related maxillofacial injuries in Ukraine: a retrospective multicenter study. Arch Craniofac Surg. 2025;26(2):51-8. doi: 10.7181/acfs.2024.0074
5. Brackstone K, Head MG, Perelli-Harris B. Effects of blast exposure on anxiety and symptoms of post-traumatic stress disorder (PTSD) among displaced Ukrainian populations. PLOS Glob Public Health. 2024;4(4):e0002623. doi: 10.1371/journal.pgph.0002623
6. Nationalnyi instytut stratehichnykh doslidzhen. Polipshennia psykholohichnoho stanu naselennia v umovakh dovhotryvaloi viiny [Improving population during a prolonged war] [Internet]. Kyiv: Nationalnyi instytut stratehichnykh doslidzhen; 2025 Mar 19 [cited 2026 Jun 28]. Ukrainian. Available from: https://niss.gov.ua/doslidzhennya/sotsialna-politika/polipshennya-psykholohichnoho-stanu-naselennia-v-umovakh
7. Husieva SA, Osyodlo GV, Goncharov IP, Antonyuk OY, Kotyk YY, Gusev AV, et al. Hematological features of mine-blast trauma, accompanied by acubarotrauma, among servicemen – participants in high-intensity combat operations. Ukrainian. Journal of Military Medicine. 2024;5(4):118-27. doi: 10.46847/ujmm.2024.4(5)-118
8. Biloshytsky VV, Zavaliy YV, Pachevska AV, Biloshytskyi IV. [Post-concussion syndrome: Part 1. Overview of the epidemiology and pathophysiology of mild blast-related traumatic brain injury]. Ukrainian Neurosurgical Journal. 2025;31(4):20-5. Ukrainian. doi: 10.25305/unj.333267
9. Alorfi NM. Pharmacological Management of Post-Traumatic Stress Disorder; A Qualitative Analysis of ClinicalTrials.gov. Drug Des Devel Ther. 2025;19:9697-708. doi: 10.2147/DDDT.S550371
10. Jia Y, Ye Z, Yang F, Chai J, Xu H, Yang J, et al. Pharmacotherapy for post-traumatic stress disorder: systematic review and meta-analysis. Ther Adv Psychopharmacol. 2025;15:20451253251342628. doi: 10.1177/20451253251342628
11. DeBattista C, Schatzberg AF. The Black Book of Psychotropic Dosing and Monitoring. Psychopharmacol Bull. 2024;54(3):8-59. doi: 10.64719/pb.4493
12. Hertenstein E, Trinca E, Wunderlin M, Schneider CL, Züst MA, Fehér KD, et al. Cognitive behavioral therapy for insomnia in patients with mental disorders and comorbid insomnia: A systematic review and meta-analysis. Sleep Med Rev. 2022;62:101597. doi: 10.1016/j.smrv.2022.101597
13. Huang Q, Chen X, Yu S, Gong G, Shu H. Research progress in brain-targeted nasal drug delivery. Front Aging Neurosci. 2024;15:1341295. doi: 10.3389/fnagi.2023.1341295
14. Belenichev I, Aliyeva O, Burlaka B, Burlaka K, Kuchkovskyi O, Savchenko D, et al. Development and Optimization of Nasal Composition of a Neuroprotective Agent for Use in Neonatology after Prenatal Hypoxia. Pharmaceuticals. 2024;17(8):990. doi: 10.3390/ph17080990
15. Higdon LM, Sperling MR. A review of a diazepam nasal spray for the treatment of acute seizure clusters and prolonged seizures. Expert Rev Neurother. 2021;21(11):1207-12. doi: 10.1080/14737175.2021.1965880
16. Niraj N, Mahajan S, Prakash A, Sarma P, Medhi B. The Evaluation of the Efficacy and Safety of Midazolam Nasal Spray in Patients With Seizure Clusters: A Systematic Review and Meta-Analysis. Cureus. 2023;15(1):e34064. doi: 10.7759/cureus.34064
17. Wang H, Huang J, Yang S, Zhang XF, Yang X, Cui C, et al. Bioavailability and Safety of a New Highly Concentrated Midazolam Nasal Spray Compared to Buccal and Intravenous Midazolam Treatment in Chinese Healthy Volunteers. Neurol Ther. 2022;11(2):621-2. doi: 10.1007/s40120-022-00329-9