# Unutilised potential of herbal medicines - a trend analysis of the supply of medicines to privately insured patients

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Mental and neurological illnesses pose growing challenges for the healthcare system. In Germany, 27.8% of the adult population suffers from mental illness every year (Jacobi et al., 2014). The most common diagnoses are anxiety disorders (15.4%) and affective disorders such as depression (9.8%) (DGPPN e. V., 2025). The Covid-19 pandemic has led to a significant increase in anxiety and depressive symptoms (Robert Koch Institute, 2024). Risk factors such as chronic sleep disorders (insomnia) or other sleep disorders affect 26.7% of Germans (van de Straat & Bracke, 2015). In addition, 1.8 million people are affected by dementia, which corresponds to around 2.2% of the German population (Blotenberg et al., 2023). The latter is an age-related and neurodegenerative disease that is expected to increase in the course of the demographic transformation. The health and economic burden of these illnesses is considerable.

>> The direct care costs of mental illnesses already amount to 56.4 billion euros, accounting for 13.1% of all healthcare costs (Federal Statistical Office, 2022). The costs of dementia are also rising continuously: while they accounted for 2.5% of total healthcare costs in 2002 (Forster, 2005), their share in 2020 was already 4.7%, totalling 20.4 billion euros (DGN & DGPPN e. V., 2025). These developments emphasise the high demand for care and the need for effective treatment strategies.

In addition to psychiatric-psychotherapeutic treatment, drug therapy plays a central role. Medicines for the treatment of nervous system disorders are once again among the most prescribed groups of medicines for both statutory and privately insured patients every year (Jacke & Wild, 2023; Telschow et al., 2022). According to guidelines, anxiolytics, especially benzodiazepines, are used to treat anxiety disorders (Bandelow et al., 2021). For depression, drug therapy includes the use of antidepressants, which include substances such as SSRIs (selective serotonin reuptake inhibitors), SSNRIs (selective serotonin/norepinephrine reuptake inhibitors) or tricyclic antidepressants (BÄK,

KBV & AWMF, 2022). Sleep disorders are primarily treated with hypnotics and sedatives such as benzodiazepines, benzodiazepine receptor agonists or antihistamines (Spiegelhalder et al., 2025) and anti-dementia drugs, in particular acetylcholinesterase inhibitors, are used for dementia (DGN & DGPPN e. V., 2025).

**Summary**

In addition to synthetic medicines, herbal medicines are also available in Germany for the medical treatment of anxiety disorders, depression, sleep disorders and dementia. Although several clinical studies show that in indicated cases, herbal medicines have a comparable efficacy to synthetic medicines with better tolerability, they are not always part of standard therapy and are therefore often underrepresented. Greater integration of herbal medicines into treatment strategies makes sense, but there is a lack of systematic data on their actual use.

This study analyses the utilisation of privately insured patients in the period from 2019 to 2022. The data originates from the WIP drug project, which collects secondary drug-related data from participating private health insurance companies. Only data from pharmacological subgroups for which herbal medicines are available were taken into account.

The results show that the potential of herbal medicines remains untapped among privately insured patients despite their eligibility for reimbursement, particularly within anxiolytics, antidepressants, hypnotics and sedatives. In contrast, more than half of the anti-dementia drugs purchased are herbal. In some cases, opposing trends can be observed in the development of the number of herbal and synthetic medicines purchased.

Future studies should analyse the factors that influence the drug therapy decision. A better understanding of healthcare practice is necessary in order to utilise the potential of herbal medicines in a more targeted manner.

**Keywords**

Herbal medicines, drug supply, privately insured persons, health services research, psychotropic drugs, mental illness, pharmacotherapy, prescription trends

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Some therapy guidelines mention herbal medicines. However, these are not always part of standard therapy and are often underrepresented (Bittel et

al., 2022). This does not correspond to the study situation, as some studies have shown promising therapeutic effects for herbal medicinal products in selected areas of application (Salm et al., 2023).

There is currently a lack of systematically collected data and findings on the actual use of herbal medicinal products in the population. As they are generally not available on prescription and, with a few exceptions, are not reimbursable by statutory health insurance schemes for adults (Gemeinsamer Bundesausschuss, 2025), they are often used for self-medication and paid for by the users themselves as OTC products.

In private health insurance (PKV), on the other hand, reimbursement of costs is generally possible if a doctor's prescription is available (Verband der Privaten Krankenversicherung e. V., 2025). Secondary data from private health insurers is therefore a suitable data source for study purposes in order to quantify the actual use of herbal (and synthetic) medicines.

This study describes the utilisation of herbal and synthetic medicinal products in the pharmacological subgroups specific to the complaints and diseases described in the years 2019 to 2022.

## Methodology

The data from private health insurers (PKV) come from the WIP drug project, which has been collecting drug-related billing data and secondary data from participating PKVs every year since 2005 (Jacke & Wild, 2023). The outpatient drug supply data from 17 private health insurance companies for the period between 2019 and 2023 were included in the sample due to the completeness of the data reports and formed the PKV17 index. The data selection followed the logic of the resource-oriented approach (Jacke et al., 2025). The observation years 2019 to 2022, which are the focus here, were assigned the prescriptions submitted with a delay of one year in each case.

The date of each prescription referred to the reference date in the pharmacy. In a further selection step, the data with the following ATC codes (according to the Anatomical Therapeutic Chemical Classification System) were included: N05B, N06A, N05C and N06D, which identify the pharmacological subgroups anxiolytics, antidepressants, hypnotics and sedatives as well as anti-dementia drugs in which herbal medicines existed. Other ATC codes and pharmacological subgroups without available herbal medicines (e.g. antipsychotics) were excluded. Data from recipients aged 18 and over were included. The analyses of the reference numbers and proportions of herbal and synthetic medicines in the individual pharmacological subgroups were carried out using R-Studio.

## Results

Of the population of 8.7 million privately insured persons, the 17 private health insurance companies represent around 7.0 million insured persons in 2022, i.e. the external validity of the deliberately selected sample is 80.9%. This sample population consumed a total of 271.1 million packs in the years 2019 to 2022, of which 260.3 million packs did not contain the ATC codes of interest or went to recipients under the age of 18 (240 thousand packs). A total of 10.8 million packs remained for the analyses, which corresponds to around 4% of all medicinal product packs purchased for the observation years 2019 to 2022. Table 1 shows the annual change in the number of herbal and synthetic medicinal products purchased and their share of the total number of medicinal product packs purchased from 2019 to 2022.

| Zeitliche Trends pflanzlicher und synthetischer Arzneimittel in der Stichprobe (2019–2022) | | | | | |
|---|---|---|---|---|---|
| | | 2019 | 2020 | 2021 | 2022 |
| **Gesamt** | **Summe** | **2.739.929** | **2.706.834** | **2.663.454** | **2.709.474** |
| **Pflanzliche Arzneimittel** | Anzahl | 313.535 | 305.539 | 288.255 | 270.322 |
| | Änderung zum VJ, in % | - | -2,6% | -5,7% | -6,2% |
| | in % von Summe | 11,4% | 11,3% | 10,8% | 10,0% |
| **Synthetische Arzneimittel** | Anzahl | 2.426.394 | 2.401.295 | 2.375.199 | 2.439.152 |
| | Änderung zum VJ, in % | - | -1,0% | -1,1% | 2,7% |
| | in % von Summe | 88,6% | 88,7% | 89,2% | 90,0% |

*Table 1:* **Temporal trends of herbal and synthetic medicinal products in the sample (2019-2022) Legend: Database status 5.11.2024, figures refer to PKV17 index, not extrapolated to PKV. Own representation.**

The results show an average share of around 11% of herbal medicines in the sample. The number of packs of herbal medicines purchased is falling continuously - from 313 thousand packs in 2019 to 270 thousand packs in 2022. The trend shows a declining share of herbal medicines, falling from 11.4% in 2019 to 10.0% in 2022. The decline in the number of packs accelerates over the course of the observation period, as the percentage changes compared to the respective previous year show. The trend for synthetic medicines is somewhat different. From 2019 to 2021, the number of packs falls compared to the previous year, while they rise again in 2022. In 2022, the relative share of synthetic medicinal products is at a maximum of 90% and the absolute reference figures are also above the initial level of 2019.

## Trend analysis of the individual pharmacological subgroups

The development within the pharmacological subgroups of anti-dementia drugs, antidepressants, hypnotics and sedatives as well as anxiolytics is shown in Table 2.

Most drug packages come from the antidepressants group (N06A), followed by hypnotics and sedatives (N05C) and anxiolytics (N05B). The group of antidepressants (N06D) shows the lowest number of packages, but with an average of 60% the highest proportion of herbal medicines. In the antidepressants, hypnotics and sedatives and anxiolytics groups, this proportion is less than 10% in each case. For antidepressants, the average is 4%, for hypnotics and sedatives 7% and for anxiolytics 9%.

In the pharmacological subgroup of anti-dementia drugs, there is a continuous decline in the number of herbal medicines purchased. The decline is most pronounced between 2020 and 2021 (-6.8%). In contrast, the absolute number of synthetic anti-dementia drugs is continuously increasing, which is accompanied by a decline in the proportion of herbal anti-dementia drugs from 62.2% in 2019 to 56.7% in 2022. Within the antidepressants, the picture is slightly different. The decline in the number of packs of herbal medicines accelerates over the course of the observation period. The sharpest decline can be seen in 2022, with a change of -8.7%. At the same time, the number of synthetic antidepressants increases by 4.5% in the same period. The overall share of herbal medicines within this subgroup falls from 4.3% in 2019 to 3.6% in 2022.

| Zeitliche Trends pflanzlicher und synthetischer Arzneimittel in den pharmakologischen Untergruppen (2019–2022) | | | | | |
|---|---|---|---|---|---|
| **Antidementiva (N06D)** | **Gesamt** | **2019** | **2020** | **2021** | **2022** |
| | **Summe** | **259.366** | **255.206** | **245.716** | **243.419** |
| **Pflanzliche Arzneimittel** | Anzahl | 161.347 | 155.793 | 145.932 | 138.045 |
| | Änderung zum VJ, in % | - | -3,6% | -6,8% | -5,7% |
| | in % von Summe | 62,2% | 61,0% | 59,4% | 56,7% |
| **Synthetische Arzneimittel** | Anzahl | 98.019 | 99.413 | 99.784 | 105.374 |
| | Änderung zum VJ, in % | - | 1,4% | 0,4% | 5,3% |
| | in % von Summe | 37,8% | 39,0% | 40,6% | 43,3% |
| **Antidepressiva (N06A)** | **Gesamt** | **1.141.272** | **1.144.509** | **1.142.688** | **1.187.994** |
| **Pflanzliche Arzneimittel** | **Summe** | 49.261 | 47.573 | 46.322 | 42.304 |
| | Änderung zum VJ, in % | - | -3,4% | -2,6% | -8,7% |
| | in % von Summe | 4,3% | 4,2% | 4,1% | 3,6% |
| **Synthetische Arzneimittel** | Anzahl | 1.092.011 | 1.096.936 | 1.096.366 | 1.145.690 |
| | Änderung zum VJ, in % | - | 0,5% | -0,1% | 4,5% |
| | in % von Summe | 95,7% | 95,8% | 95,9% | 96,4% |
| **Hypnotika und Sedativa (N05C)** | **Gesamt** | **959.784** | **932.928** | **919.334** | **932.079** |
| **Pflanzliche Arzneimittel** | **Summe** | 75.595 | 68.216 | 62.791 | 59.365 |
| | Änderung zum VJ, in % | - | -9,8% | -8,0% | -5,5% |
| | in % von Summe | 7,9% | 7,3% | 6,8% | 6,4% |
| **Synthetische Arzneimittel** | Anzahl | 884.189 | 864.712 | 856.543 | 872.714 |
| | Änderung zum VJ, in % | - | -2,2% | -0,9% | 1,9% |
| | in % von Summe | 92,1% | 92,7% | 93,2% | 93,6% |
| **Anxiolytika (N05B)** | **Gesamt** | **379.507** | **374.191** | **355.716** | **345.982** |
| **Pflanzliche Arzneimittel** | **Summe** | 27.332 | 33.957 | 33.210 | 30.608 |
| | Änderung zum VJ, in % | - | 24,2% | -2,2% | -7,8% |
| | in % von Summe | 7,2% | 9,1% | 9,3% | 8,8% |
| **Synthetische Arzneimittel** | Anzahl | 352.175 | 340.234 | 322.506 | 315.374 |
| | Änderung zum VJ, in % | - | -3,4% | -5,2% | -2,2% |
| | in % von Summe | 92,8% | 90,9% | 90,7% | 91,2% |

*Tab. 2:* **Time trends of herbal and synthetic medicines in the pharmacological subgroups (2019- 2022) Legend: Database status 5.11.2024, figures refer to PKV17 index, not extrapolated to PKV. Own representation.**

The number of packs of herbal medicines within the ATC subgroup of hypnotics and sedatives fell even more sharply. The decline was 9.8% between 2019 and 2020 in particular. The supply figures for synthetic medicinal products will also fall slightly by 2.2% during this period. By 2022, the figures here will rise again, but without reaching the initial level of 2019. The share of herbal medicines in the total number of hypnotics and sedatives purchased fell over the entire observation period from 7.9% in 2019 to 6.4% in 2022.

By contrast, a different trend can be seen for anxiolytics. What is striking here is the significant increase of 24.2% in the group of herbal medicines between 2019 and 2020. In the following years, these pack numbers decline again, but remain above the initial level of 2019 in 2022. In contrast, the number of packs of synthetic anxiolytics decreases continuously over the entire observation period. This means that the proportion of herbal medicines within anxiolytics remains higher in 2022 at an average of 8.8% than in 2019, when it was still 7.2%.

## Discussion

In the years 2019 to 2022, medicines from the pharmacological subgroups anxiolytics, antidepressants, hypnotics and sedatives as well as anti-dementia drugs accounted for around 4% of all medicine packs purchased in the PKV-17 Index. This shows that these medicines are highly relevant to care and represent an important therapy category within these areas of complaint. The proportion of herbal medicines within the pharmacological subgroups (with the exception of anti-dementia drugs) was less than 10%. There was also a general decline in herbal medicines with different patterns and dynamics.

The results show that herbal medicines remain largely unused, despite the possibility of cost coverage for privately insured patients following a doctor's prescription. Only in the case of anti-dementia drugs does the high proportion of herbal medicines in the prescriptions observed in the analysis speak in favour of good integration into treatment practice for dementia and cognitive complaints. Herbal anxiolytics, hypnotics and sedatives as well as antidepressants also offer clear advantages over synthetic medicines in indicated cases (Wiesenauer, 2024) and could represent an alternative.

### Synthetic medicines

Synthetic psychotropic drugs can cause side effects that can lead to reduced patient adherence (Grunze et al., 2017). The habituation and dependency potential of many of these substances is particularly problematic,

especially benzodiazepines (anxiolytics) and certain synthetic antidepressants, which can lead to severe withdrawal symptoms (Soyka, 2015). There is also the increased risk of falls, which occurs particularly in older people taking benzodiazepines (Diaz-Gutierrez et al., 2017). Tricyclic antidepressants are associated with cardiovascular risks such as cardiac arrhythmias and anticholinergic side effects (Laux & Dietmaier, 2018). Newer antidepressants such as SSRIs can also cause adverse effects on the serotonergic, noradrenergic, dopaminergic and/or histaminergic neurotransmitter system (Lenz et al., 2018). Synthetic hypnotics and sedatives can cause circulatory and respiratory depression of varying severity depending on the dose. Simultaneous intake with other centrally depressant substances, especially alcohol, can cause a massive increase in the effect, which can lead to respiratory depression and impaired consciousness (Henssler et al., 2018).

**Potential of herbal medicines**

Herbal medicines are available in all the drug classes analysed. These are characterised by good tolerability and do not cause physical or psychological dependence (Wiesenauer, 2024). Their efficacy is also well documented in many cases. Studies show that extracts of St. John's wort have a comparable efficacy to SSRIs for mild to moderate depression - but have a significantly more favourable side effect profile (Cui & Zheng, 2016). Lavender preparations have been shown to be effective for anxiety disorders in clinical studies. In the treatment of generalised anxiety disorder (GAD), the lavender oil preparation Silexan was significantly more effective than placebo and showed comparable efficacy to lorazepam, but with better tolerability (Kasper et al., 2010). There is also plenty of evidence of efficacy for herbal hypnotics and sedatives. Valerian root dry extract, for example, has been shown in studies to be just as effective as oxazepam in improving sleep quality (Dorn, 2000). Ginkgo biloba leaf dry extract EGb761 can stabilise cognitive performance and/or slow down cognitive decline (Tan et al., 2015). Recent studies show that the incidence of dementia can be significantly reduced after multiple prescriptions of ginkgo preparations for mild cognitive impairment (Bohlken et al., 2022).

**Limits of herbal medicines**

Even if there is selective evidence and therapeutic benefits, it must be borne in mind that herbal medicines are primarily indicated for mild to moderate symptoms and may be limited in their effectiveness in cases of severe or acute symptoms. They are particularly suitable for the treatment of chronic and non-

life-threatening complaints. As with synthetic medicines, potential interactions with other medicines must also be taken into account. Herbal medicines therefore remain a complementary component of drug therapy, but without completely replacing synthetic medicines (Wachtel-Galor et al., 2011).

## Causes for low prescription figures

Despite good evidence regarding the efficacy and tolerability of herbal medicines, synthetic medicines are preferred. The latter are usually subject to prescription (Federal Joint Committee, 2025). For prescribing doctors and those with statutory health insurance, this means that costs are covered with a manageable co-payment. In contrast, herbal medicines are usually categorised as non-prescription medicines. These are often used for self-medication without having to be explicitly prescribed by a doctor (Pharma Deutschland, 2023). Patients are therefore encouraged to specifically ask about herbal treatment alternatives as part of the shared decision-making process. In the context of statutory health insurance, this leads to higher co-payments for adults, which can cause more prescriptions for synthetic medicines. It is quite possible that this "mechanism" is automatically transferred to the privately insured (spillover effect) (Sehgal & Sacarny, 2023). This is based on the assumption that no distinction is made between those with statutory and private insurance during the decision-making process. This means that the potential of herbal alternatives remains unutilised.

## Covid pandemic effects

The conspicuous decline in the number of herbal and synthetic medicines purchased in 2020 and 2021 may be related to the reduced number of personal doctor-patient contacts after the start of the Covid-19 pandemic and the lockdown phases. Utilisation of private medical services fell moderately in 2020. Doctor contacts rose again in 2021, with the trend returning to normal from autumn onwards. However, service utilisation in 2021 did not reach the pre-pandemic level (Schaarschmidt & Wild, 2024). This may have resulted in fewer medically prescribed medications - especially prescription synthetic drugs, but also herbal preparations - being utilised. With the end of the pandemic from 2022, the increasing prescription figures for synthetic drugs (anti-dementia drugs, antidepressants) and decreasing trends for herbal medicines then emerged. In 2022, an increase in services provided by panel doctors was observed (Mangiapane, 2022). No figures are yet available for private medical services, but a similar increase can be assumed.

## Strengths and weaknesses of the data

The data of the PKV17 Index is characterised by its high external validity, i.e. it can report on the utilisation of around 7.0 million insured persons. The data is suitable for differentiated analyses of the use of herbal medicines, as these are reimbursable according to medical prescription. In principle, trend analyses also allow high-resolution analyses by weekly, monthly or quarterly intervals.

However, this data pool also has weaknesses. Self-medication drugs with or without a doctor's prescription can, but do not have to, be submitted for billing. The results are therefore underestimated by the number of these non-submissions. Furthermore, relevant aspects for the choice between herbal and synthetic medicines, such as indication, severity of the disease and possible co-medications, cannot be taken from the WIP data. Conclusions on treatment decisions are limited. Another weakness lies in the limited observation period from 2019 to 2022, because the Covid-19 pandemic is influencing trend effects.

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In principle and independently of the PKV data, it should also be noted that there is no standardised reference value in average, defined daily or maintenance doses (DDD) for all herbal medicinal products. Instead of distorting pack numbers, however, DDDs would be necessary to enable valid quantity data, especially for comparison with synthetic preparations.

## Conclusion and outlook

Herbal medicinal products represent an important pillar of therapy and improve pharmaceutical care. Nevertheless, their potential remains largely unutilised. Despite their proven efficacy for anxiety, sleep disorders and depression, they are underrepresented in the guidelines and are rarely integrated into treatment strategies, even when reimbursement conditions are favourable, as is the case with privately insured patients. There is a lack of data on the actual use of herbal medicines, as many are available over the counter. It is unclear how well informed medical or pharmaceutical professionals are about herbal medicines. It remains unclear what differences exist in the decision-making factors between patients, doctors and pharmacists. Standardised units of measure such as DDD for herbal medicinal products should be expanded in order to generate valid comparisons. Further research is needed. <<

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## Author's statement

Annika J. Scholl, Alexandra Drebka and Teresa Ochs work in the area of drug supply research under the direction of Prof. Dr Beatrice E. Bachmeier at the Institute for Pharmaceutical Biology at the Goethe University in Frankfurt. Dr Christian O. Jacke is an employee of the Scientific Institute of the PKV

(WIP) in Cologne. All authors contributed to the analysis of the data and the interpretation of the results and declare that there are no conflicts of interest.


**Untapped Potential of Herbal Medicinal Products - A Trend Analysis of Pharmaceutical Health Care for Privately Insured Patients**

In Germany, both synthetic medicines and herbal medicinal products (HMPs) are available for the treatment of anxiety disorders, depression, sleep disorders and dementia. Although several clinical studies show that HMPs have a comparable efficacy to synthetic medicines with better tolerability when appropriately indicated, they are not always part of standard therapy and are therefore often underrepresented. Greater integration of HMPs into treatment strategies could be useful, but systematic data on their actual use is still lacking.

In this study, the utilisation figures of privately insured patients in the period from 2019 to 2022 are analysed. The data originates from the WIP drug project, which collects drug-related secondary data from participating private health insurance companies. Only data from pharmacological subgroups, for which HMPs are available, were considered.

The results show that the potential of HMPs among privately insured patients, despite their reimbursability, remains untapped, particularly within anxiolytics, antidepressants, hypnotics and sedatives. In contrast, more than half of the anti-dementia drugs are HMPs. In some cases, opposing trends in the development of the number of HMPs and synthetic medicines are observed.

Future studies should investigate the factors that influence drug therapy decisions. A better understanding of health care practice is necessary to make more targeted use of the potential of HMPs.



**Keywords**

Herbal Medicinal Products, Pharmaceutical Care, Privately Insured Patients, Health Services Research, Psychotropic Medication, Psychiatric Disorders, Pharmacotherapy, Prescription Trends





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