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PRACA ORYGINALNA
ORIGINAL PAPER

The situation of inmates in Poland between 2002 and 2023, considering healthcare, health-promoting behavior, and well-being maintenance

Sytuacja więźniów w Polsce w latach 2002–2023 z uwzględnieniem opieki zdrowotnej, zachowań prozdrowotnych oraz utrzymania dobrostanu więźniów

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ABSTRACT

INTRODUCTION: Protecting health is a priority for every modern democratic country. No one should be discriminated against in any sphere of life, obligating the national authorities to protect all citizens. The aim of the study is to assess the health condition and healthcare needs of prison inmates in light of the costs of prisoners' maintenance (including expenses for healthcare) over the course of 20 years, from 2002 to 2023.
MATERIAL AND METHODS: The methods were analysis and synthesis of source material obtained from Statistics Poland, the central statistics authority. The results are presented with descriptive and comparative methods of statistical analysis.
RESULTS: We observed increases in the number of natural deaths, reported addictions (to medications and alcohol), psychiatric consultations (resulting in fewer acts of self-aggression), and declarations of addiction (resulting in more prisoners being identified and treated).
CONCLUSIONS: We concluded that there is a need to improve medical care in prisons.

KEYWORDS

healthcare, well-being, prisoners, medical needs, health service

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STRESZCZENIE

WSTĘP: Zdrowie oraz jego ochrona są priorytetem w każdym demokratycznym kraju. Nikt nie może być dyskryminowany w jakiejkolwiek sferze życia, co nakłada na władze obowiązek, by chronić każdego obywatela. Celem pracy jest ocena stanu zdrowia oraz potrzeb leczniczych więźniów w korelacji z kosztami ich utrzymania (z uwzględnieniem wydatków na ochronę zdrowia) na przestrzeni 20 lat (2002–2023).
MATERIAŁ I METODY: Zastosowano metody analizy i syntezy materiału źródłowego otrzymanego z Głównego Urzędu Statystycznego w Polsce. Wyniki zaprezentowano z użyciem opisowych oraz porównawczych metod analizy statystycznej.
WYNIKI: Zaobserwowano wzrost liczby zgonów naturalnych, zgłaszanych uzależnień (od leków i alkoholu), konsultacji psychiatrycznych (co skutkowało zmniejszeniem liczby aktów autoagresji) i deklaracji uzależnienia (co skutkowało większą liczbą zidentyfikowanych i leczonych więźniów).
WNIOSKI: Opieka zdrowotna w więzieniach wymaga poprawy.

SŁOWA KLUCZOWE

opieka zdrowotna, dobrostan, więźniowie, potrzeby lecznicze

INTRODUCTION

The protection of health is a priority for every modern democratic country [1]. Winston Churchill once said that a society is measured by the treatment of its prisoners [2].

The Constitution of the Republic of Poland, ratified on April 2, 1997, is the supreme law in Poland [3]. It is written there that no one shall be discriminated against in any sphere of life; this imposes an obligation on the national authorities to protect all citizens. Undoubtedly, being imprisoned violates personal dignity and may cause a sense of abasement [2]. Moreover, the role of the authorities is to provide special care for the inmates. This includes protecting their health, as guaranteed in Article 68(1) of the Constitution [3]. The obligation of the government in terms of the life and health of the prisoners is a result of health being treated as a public good as well as a personal one [4]. It can be said that protecting the health of inmates is a part of their future social rehabilitation [5]. Prisoners have a constitutional right to medical care [4]. Healthcare for prisoners is regulated by medical law, penitentiary law, and the Penal Enforcement Code [1]. According to Article 115 of the Penal Enforcement Code, free medical care, medications, and sanitary articles are guaranteed to the inmates. If a lack of any additional articles – such as dentures or orthopedic remedies – make it impossible to serve a sentence, the prisoner should receive such article. Inmates do not have the right to choose their nurse or doctor in either ambulatory or primary healthcare. They cannot choose the provider of basic outpatient procedures, dentists, or hospitals. Medical care for prisoners is primarily provided by the assigned medical institutions [6].

The rules, range, and mode of providing health services are regulated by the Regulation of the Minister of Justice published on June 14, 2012. The Prison Health Service is obliged to provide medical procedures regarding prophylaxis, diagnostics, nursing, psychological care, dental care, and medical care. Special care is guaranteed for inmates who are disabled, pregnant, or in labor and for newborn children [7].

It is strictly described in the law when medical procedures for inmates can be provided by the public healthcare system. Those special situations are when immediate medical aid is necessary due to a life- or health-threatening condition or when there is a need for specialist examination, specialistic treatment, or rehabilitation. If any of these conditions occurs, appropriate transport is provided to the prisoner. Prisoners who are granted a day off from prison can be treated by all the specialists mentioned above [6,7].

There is a schedule of medical examinations that includes preliminary, periodic, and medical check-ups. Preliminary examinations must be conducted within 3 days of the inmate's admission. During first 14 days, a prophylactic x-ray of the thorax and a dental examination must be conducted. A medical doctor or dentist may recommend additional examinations. The first x-ray of the thorax may not be taken if the inmate provides one taken no later than 6 months before admission to the prison or if the prisoner is pregnant. Subsequent x-rays of the thorax must be taken no less often than every 24 months. It can only be omitted if the x-ray was taken due to another reason or because of pregnancy. Medical check-ups are performed if the prisoner is transferred to another penitentiary or before the prisoner is released from prison [7].

The Prison Service is an institution that strictly follows the rules and directions described in the Executive Penal Code, the European Prison Code, and the Standard Minimum Rules for the Treatment of Prisoners. The Prison Service, a uniformed and armed apolitical formation with its own structural organization, is directly responsible to the Minister of Justice. According to the legal act on the Prison Service, published on April 9, 2010, it is responsible for organizing activities that promote the acquisition of professional qualifications; teaching, cultural, and educational activities; and physical culture and sport. The Prison Service must respect the rights of the prisoners, especially regarding their living conditions,

respect of their dignity, healthcare, and religious care [8].

The international community claims that the health of prisoners should be treated as a public health issue [4,9,10]. The harmfulness of imprisonment has been confirmed [11]. Two very important, international documents were created in order to improve the conditions in penitentiaries. The first of them is the European Prison Code, which was adopted on January 11, 2006 and is the recommendation of the Committee of Ministers of the European Union. On its basis, the healthcare of prisoners became unified with the public healthcare system. Each prisoner has a right to be treated by a primary care physician, surgeon, psychiatrist, ophthalmologist, or dentist. The Prison Service should provide medical care in case of any emergency. If treatment cannot take place in the penitentiary, a sick prisoner should be transported to a specialist healthcare unit [12].

The United Nations' Standard Minimum Rules for the Treatment of Prisoners – also known as the Nelson Mandela Rules – were adopted by the United Nations Assembly on December 12, 2015. Nelson Mandela, a South African activist who served 27 years in prison, said, "It is said that no one truly knows a nation until one has been inside its jails" [13]. The standards described in that document require that each prison should have a qualified, interdisciplinary medical staff and that their decisions cannot be ignored by the Prison Service. The healthcare service should be tasked with promoting, protecting, and improving the physical and mental health of prisoners, paying particular attention to those with special healthcare needs. The healthcare service is obliged to prepare an accurate, up-to-date, and confidential individual medical history. All prisoners should be ensured prompt access to medical aid in any urgent cases. All prisons should offer appropriate psychological, psychiatric, and dental care. Prisoners who require specialized treatment or surgical treatment should have access to specialist or general hospitals [12].

Both documents similarly describe the medical procedures that are required when a prisoner is admitted to prison. The examination on admission is necessary not only to diagnose any physical disability, but also to learn whether any psychological problems regarding imprisonment may occur. Those procedures are intended to limit acts of self-aggression, including suicide attempts and withdrawal symptoms. If any symptom of torture or inhumane or humiliating treatment is observed, it should be immediately noted and reported. It is very important to avoid the spread of any infectious disease by treating it and immediately isolating infected prisoners. It is the responsibility of the physician to inform the prison authorities if any signs of deterioration in the prisoners' health is observed. Any medical experiments that can cause the deterioration of prisoners' health are also forbidden. Additionally, the Rules recommend getting the opinion of a physician in terms of the prisoners' diet, hygiene, and accommodation [12].

The aim of this article is to assess the well-being, health status, and healthcare needs of inmates over the course of 20 years, from 2002 to 2023.

MATERIAL AND METHODS

The methods were analysis and synthesis of source material obtained from the Prison Service, Statistics Poland, the Institute of Labour and Social Studies, and the Office of the Director General of the Prison Service. The results are presented with the descriptive and comparative methods of statistical analysis. Before the appropriate material was extracted, the research thesis was formulated. The research thesis and appropriate statistical methods enabled the aim of the study to be realized [14,15,16,17,18,19,20,21,22,23,24,25,26].

The research examined the following:

- acts of self-aggression, suicide attempts, suicides, and deaths
- addictions compared with self-aggression, psychiatric consultations, and deaths
- interventions of the Emergency Medical Service with regard to psychiatric consultations, acts of self-aggression, and suicide attempts
- types of medical aid provided in penitentiaries and outside them
- long-term trends in dental consultations for Polish inmates

Statistical analysis

In this analysis, the significance threshold was set at $\alpha = 0.05$. The normality of numerical variables was assessed using the Shapiro–Wilk test. For variables that did not follow a normal distribution, the association between them was examined using Spearman's rho correlation coefficient. The p-values were determined through an asymptotic approximation based on the t-test. In the case of multiple comparisons, the p-value was additionally adjusted (p_{adj}) using the Holm method. Furthermore, the growth rate of the time series data was quantified using the compound annual growth rate (CAGR) according to the formula:

$$\mathbf{CAGR} = \left(\frac{\mathbf{EV}}{\mathbf{BV}}\right)^{\frac{\mathbf{1}}{\mathbf{n}}} - \mathbf{1}$$

where *EV* is the value of the parameter under study in the last year, *BV* is the initial value in the first year, and *n* is the number of years under observation. The analysis was conducted using the R Statistical language (version 4.3.1) [27] on Windows 10 Pro 64-bit (build 19045), using the packages *sjPlot*

(version 2.8.15) [28], *report* (version 0.5.7) [29], *ggstatsplot* (version 0.12.1) [30], and *ggplot2* (version 3.4.4) [31].

RESULTS

Analysis of incidents of self-aggression, suicide attempts, and mortality rates in Polish prisons, 2002–2023

The data provided in Table I show that in 2009 the number of self-aggression acts was the highest. Between 2020–2023, the number of natural deaths was the highest, which correlates with the increase in prisoners' age. The data spanning from 2002 to 2023 on self-aggression, suicide attempts, and mortality in prisons reveal several key trends and insights into the changing landscape of inmate behavior and institutional management (Figure 1).

The analysis of mortality rates presents a more complex scenario. There was an increasing trend in general deaths, escalating from 96 (0.12%) in 2002 to a peak of 192 (0.26%) in 2022, before slightly decreasing to 188 (0.25%) in 2023 (CAGR = 3.5%). This increase might be attributed to an aging prison population and possibly deteriorating health status over time. The deaths specifically caused by self-aggression decreased overall, from 40 (0.05%) in 2002 to 19 (0.02%) in 2023 (CAGR = -2.9%), aligning with the decreases seen in self-aggression and suicide attempts. Natural deaths showed a significant rise, from 56 (0.07%) in 2002 to 168 (0.22%) in 2023 (CAGR = 5.2%). This substantial growth could reflect an aging inmate demographic, as well as potential challenges in providing healthcare within the prison system.

Table I. Number of self-aggression incidents, suicide attempts, and deaths in prisons in particular years (the proportion of the overall number of prisoners is given in parentheses)

Year	Self-aggression overall	Suicide attempts	Deaths overall	Deaths caused by self-aggression	Natural deaths	Others
2002	948 (1.16%)	172 (0.21%)	96 (0.12%)	40 (0.05%)	56 (0.07%)	0
2003	664 (0.82%)	130 (0.16%)	127 (0.16%)	37 (0.05%)	86 (0.11%)	4 (0.005%)
2004	730 (0.91%)	135 (0.17%)	107 (0.13%)	30 (0.04%)	67 (0.08%)	10 (0.012%)
2005	773 (0.93%)	187 (0.23%)	122 (0.15%)	32 (0.04%)	84 (0.10%)	6 (0.007%)
2006	795 (0.91%)	188 (0.22%)	154 (0.18%)	42 (0.05%)	112 (0.13%)	0
2007	633 (0.70%)	174 (0.19%)	145 (0.16%)	41 (0.05%)	95 (0.11%)	11 (0.012%)
2008	715 (0.83%)	191 (0.22%)	135 (0.16%)	39 (0.05%)	93 (0.11%)	3 (0.003%)
2009	818 (0.96%)	211 (0.25%)	125 (0.15%)	41 (0.05%)	84 (0.10%)	0
2010	622 (0.75%)	147 (0.18%)	135 (0.16%)	34 (0.04%)	91 (0.11%)	10 (0.012%)
2011	433 (0.52%)	191 (0.23%)	105 (0.13%)	22 (0.03%)	102 (0.12%)	3 (0.004%)
2012	281 (0.33%)	150 (0.18%)	107 (0.13%)	18 (0.02%)	89 (0.11%)	0
2013	266 (0.32%)	188 (0.22%)	109 (0.13%)	19 (0.02%)	80 (0.10%)	10 (0.012%)
2014	217 (0.27%)	175 (0.22%)	107 (0.14%)	26 (0.04%)	75 (0.09%)	6 (0.008%)
2015	215 (0.29%)	173 (0.23%)	105 (0.14%)	23 (0.03%)	79 (0.11%)	3 (0.004%)
2016	220 (0.31%)	197 (0.28%)	123 (0.17%)	24 (0.03%)	93 (0.13%)	6 (0.008%)
2017	244 (0.33%)	223 (0.30%)	153 (0.21%)	27 (0.04%)	124 (0.17%)	2 (0.003%)
2018	223 (0.30%)	208 (0.28%)	170 (0.23%)	26 (0.04%)	135 (0.18%)	9 (0.012%)
2019	215 (0.29%)	198 (0.27%)	159 (0.21%)	24 (0.03%)	129 (0.17%)	6 (0.008%)
2020	142 (0.20%)	119 (0.17%)	174 (0.25%)	27 (0.04%)	145 (0.21%)	2 (0.003%)
2021	174 (0.24%)	145 (0.20%)	188 (0.26%)	27 (0.04%)	155 (0.22%)	6 (0.008%)
2022	130 (0.18%)	117 (0.16%)	192 (0.26%)	15 (0.02%)	166 (0.23%)	11 (0.015%)
2023	141 (0.18%)	120 (0.16%)	188 (0.25%)	19 (0.02%)	168 (0.22%)	1 (0.001%)

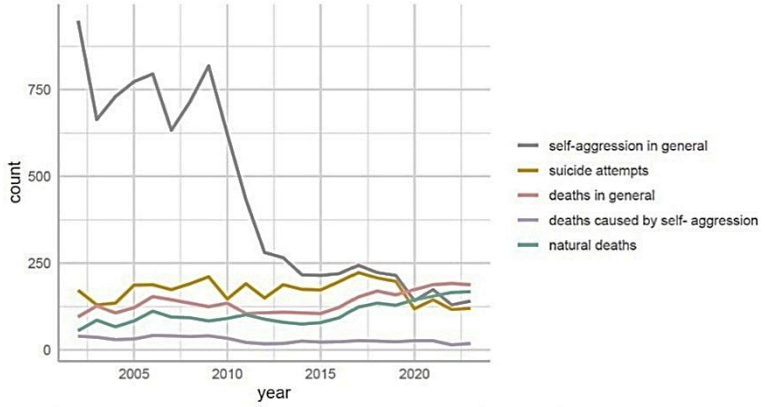

Fig. 1. Twenty-year trends in self-aggression, suicide attempts, and mortality in Polish prisons (2002–2023).

Analysis of prison population dynamics: trends in self-aggression, mortality, and substance dependence, 2002–2023

Looking at the data from 2002 to 2023, several key trends and dynamics emerge regarding addiction to intoxicants or psychotropic drugs, alcohol addiction, self-aggression, general deaths, and psychiatric counseling within the prison setting. Addiction rates, for both intoxicants/psychotropic drugs and alcohol, generally exhibit an increasing trend over the years. Starting from lower figures in 2002, with 347 (0.43%) for intoxicants and 420 (0.52%) for alcohol, these numbers had risen significantly by 2023, to 1,170 (1.53%) for intoxicants and 2,103 (2.76%) for alcohol. The rise in addiction could reflect broader trends in substance availability, changes in population demographics, or possibly evolving patterns of reporting and diagnosis. The number of psychiatric consultations started at 54,925 (67.48%) in 2002 and rose substantially to 76,421 (more than 1 per prisoner) by 2023. The correlation between self-aggression, mortality, substance dependence, and psychiatric counseling is depicted in Figure 2.

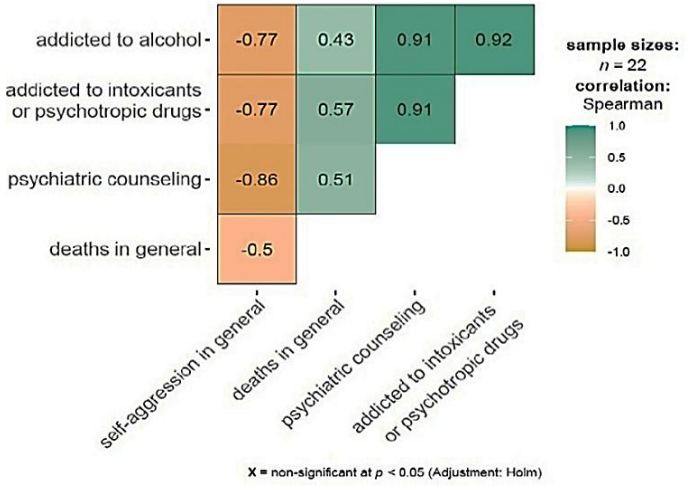

Fig. 2. Correlation matrix of the relationships between self-aggression, mortality, psychiatric counseling, and substance dependence.

Firstly, the negative correlation between self-aggression and mortality (*rho* = -0.50; p_{adj} = 0.042) suggests that as self-aggressive incidents decreased, mortality rates tended to increase. This counterintuitive relationship might indicate that while direct self-harm is being reduced – possibly due to effective interventions – other factors leading to mortality may be on the rise, potentially as a consequence of untreated or inadequately addressed underlying issues. There was a more pronounced negative correlation between self-aggression and psychiatric counseling (*rho* = -0.86; p_{adj} < 0.001), indicating a strong inverse relationship where more counseling was associated with fewer instances of self-aggression. This suggests that psychiatric interventions effectively mitigate self-aggressive behaviors, underscoring the importance

of such services in managing behavioral issues within the prison population. In contrast, a positive correlation between mortality and psychiatric counseling was observed (*rho* = 0.51; p_{adj} = 0.043), implying that as psychiatric counseling increases, mortality rates also tend to rise. This could reflect more severe cases being identified and treated as counseling services expand, or it might indicate a lag effect where the benefits of counseling on reducing mortality are delayed.

In terms of substance dependence, both intoxicants and alcohol showed strong positive correlations with psychiatric counseling (*rho* = 0.91, p_{adj} < 0.001 for intoxicants; *rho* = 0.91, *p* = 0.001 for alcohol). These high correlations indicate that increases in counseling were closely linked with the higher reported rates of substance dependence. This relationship may suggest that as more individuals receive psychiatric attention, more cases of substance dependence are identified and treated. Furthermore, substance dependence (both intoxicants and alcohol) was negatively correlated with self-aggression (*rho* = -0.77; p_{adj} < 0.001 for both substances), demonstrating that increased addiction was associated with a decrease in self-aggression. This could be interpreted as substance use serving as a maladaptive coping mechanism that reduces outward aggression. There was a notable positive correlation between deaths and substance dependence (*rho* = 0.57, p_{adj} = 0.021 for intoxicants; *rho* = 0.43, p_{adj} = 0.046 for alcohol), indicating that the higher dependency rates were associated with increased mortality. This relationship underscores the lethal risk associated with substance abuse, which may contribute directly to mortality through overdose or indirectly through health complications. Lastly, the interdependency between addiction to intoxicants and alcohol (*rho* = 0.92; p_{adj} < 0.001) was the strongest observed correlation, suggesting a significant overlap in these addiction patterns. This could reflect a common vulnerability or shared risk factors in the population, where individuals susceptible to one form of substance dependence are also likely to be dependent on the other.

Analysis of emergency service interventions and their correlation with self-aggression, psychiatric counseling, and suicide attempts in Polish prisons, 2008–2023

Table II shows that the number of emergency service interventions in Polish prisons between 2008 and 2023 was stable, taking values between 6,223 and 8,564. The data provided details on the number of emergency service interventions in detention wards (DT) and penitentiaries (P) during this period, with earlier years missing from the record. Over this 16-year period, the trends and fluctuations in the number of interventions offer significant insight into the evolving dynamics of emergency healthcare demands within these facilities (Figure 3).

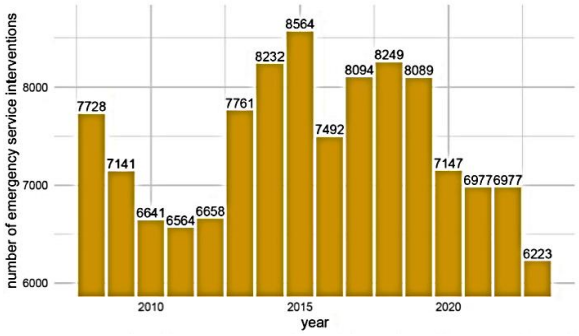

Fig. 3. Annual trends in emergency service interventions in Polish detention wards and penitentiaries (2008–2023).

Table II. Number of emergency service interventions in Polish prisons in particular years

Year	Number of emergency service interventions
2008	7,728
2009	7,141
2010	6,641
2011	6,564
2012	6,658
2013	7,761
2014	8,232
2015	8,564
2016	7,492
2017	8,094
2018	8,249
2019	8,089
2020	7,147
2021	6,977
2022	6,977
2023	6,223

Initially, the data shows relatively fewer interventions in 2008, with 7,728 (8.99%). This number initially decreases until 2010, suggesting an improvement in either the health conditions within the facilities or the effectiveness of preventive healthcare measures. However, the trend reverses from 2011 onwards, with a noticeable increase that peaks in 2015 at 8,564 (11.45%) interventions.

The year 2020 shows a more pronounced drop in interventions, to 7,147 (10.11%), which might reflect the impact of the COVID-19 pandemic. From 2021 onwards, the number stabilizes somewhat, with a slight decrease continuing into 2023, when a record low of 6,223 (8.16%) interventions was recorded. This continued decrease could be indicative of sustained improvements in healthcare provision within these settings, or possibly a decrease in the overall detention and penitentiary populations.

The correlations presented in Table III between emergency service interventions and various parameters in detention wards and penitentiaries over the period 2008–2023 reveal several nuanced insights about the relationships between these variables.

Table III. Correlations between emergency service interventions and self-aggression, psychiatric counseling, suicide attempts, and the number of prisoners, 2008–2023

Parameter	rho	p
Acts of self-aggression	-0.04	0.875
Psychiatric counseling	0.19	0.488
Suicide attempts	0.49	0.055
Number of prisoners	-0.15	0.587

Note: The number of pairs (n_{pairs}) was 16.

Comprehensive analysis of medical consultations for Polish inmates, 2002–2023

The comprehensive data from 2002 to 2023 concerning medical consultations for inmates at both penitentiaries and public health centers across various medical specializations provides a rich field for analysis. Overall, the annual mean number of consultations in penitentiaries during 2002–2023 significantly surpassed that recorded at public health centers, with 1,492,077 consultations at penitentiaries compared to just 26,198 at public health centers (Figure 4). This stark contrast underscores the central role that penitentiaries play in providing healthcare to inmates.

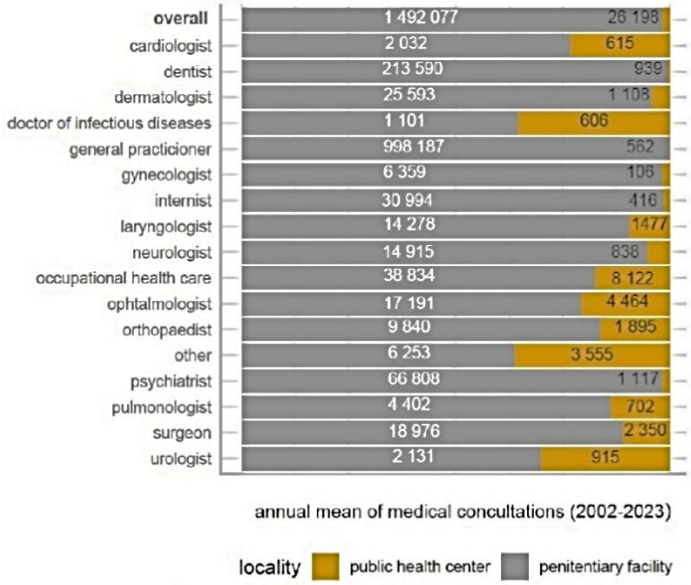

Fig. 4. Average number of medical consultations given by type of medical unit, 2002–2023.

The most frequent consultations at penitentiaries were with general practitioners (998,187), which reflects the general medical needs that are typically the first point of contact in the healthcare system. This is followed by a notably high number of consultations with psychiatrists (66,808), which could indicate a significant demand for mental health services among the inmate population. Dental consultations also showed a substantial count (213,590), highlighting the importance of dental health in the overall healthcare provided in these facilities.

Other specializations – such as dermatology, neurology, and ophthalmology – also showed considerable numbers, suggesting a broad spectrum of health needs among inmates that are being addressed within the facilities. The lower but still significant numbers in specializations such as surgery, cardiology, and orthopedics further reflect comprehensive healthcare that extends beyond basic medical care.

In general, the data illustrate a robust in-house healthcare system at penitentiaries, primarily driven by high numbers of consultations with general practitioners and psychiatrists, indicating a focus on both physical and mental healthcare. The comparatively lower numbers at public health centers suggest their more supplementary role in inmate healthcare, possibly used for services which are not readily available at penitentiaries.

Long-term trends in dental consultations for Polish inmates, 2002–2023

Over the period 2002–2023, the trend in dental consultations for Polish inmates exhibited a long-term decline in both penitentiaries and public health centers,

although the scale and implications differed significantly between these two settings (Figure 5, Table IV). Starting with penitentiaries, there was a clear, steady decline from a high of 306,172 consultations (more than 3 per prisoner) in 2002 to 131,641 (more than one per prisoner) in 2023 (CAGR = -2.75%). This reduction was not abrupt but gradual, indicating a systemic decrease in dental consultations. The most drastic reduction seems to have occurred after 2019, when the numbers dropped from 162,168 (more than 2 per prisoner) to 124,440 (more than 1 per prisoner) in 2020; this trend continued to decline, reaching a low in 2023.

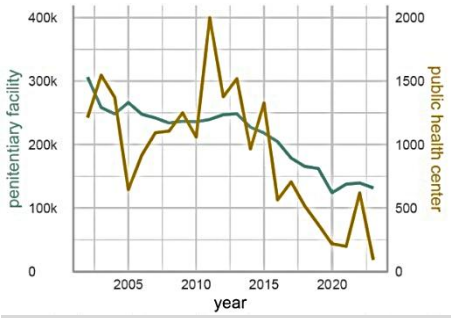

Fig. 5. Trends in dental consultations for Polish inmates in penitentiaries vs public health centers, 2002–2023.

Public health centers, on the other hand, started with much fewer consultations in 2002, totaling 1,213 (1.49%), and fluctuated over the period. Despite a peak of 1,998 consultations (2.42%) in 2011, the trend generally followed a decline, with particularly low numbers after 2019. By 2023, the consultations plummeted to just 91 (0.12%), marking a significant reduction (CAGR = -14.67%).

The statistical analysis also reveals a significant correlation with the correlation coefficient (*rho* = 0.77; $p < 0.001$). This strong positive correlation suggests that trends in dental consultations at penitentiaries closely aligned with those in public health centers over the study period. This linkage might indicate several underlying factors affecting both settings simultaneously, such as changes in national health policies or the allocation of funding.

Capacity and number of prisoners, 2002–2023

It can be observed that the number of prisoners increased from 2002 to a peak in 2009 (Table V). At the same time, the capacity of penitentiaries was also increasing. In 2009, this trend reversed until 2023. Starting in 2010, the capacity was greater than the number of prisoners until 2023, when the observed difference was 9,825.

Table IV. Number of dental consultations in Polish prisons in particular years

Year	Number of dental consultations
2002	306,172
2003	258,336
2004	248,346
2005	266,097
2006	247,677
2007	241,825
2008	233,882
2009	236,705
2010	235,831
2011	239,573
2012	247,005
2013	248,343
2014	227,320
2015	218,130
2016	204,476
2017	178,654
2018	165,521
2019	162,168
2020	124,440
2021	137,505
2022	139,336
2023	131,641

Table V. Comparison between the capacity of Polish prisons and the number of prisoners, 2002–2023

Year	Capacity of penitentiaries	Number of prisoners
2002	69,083	81,391
2003	69,469	81,321
2004	69,616	80,239
2005	70,186	82,761
2006	75,550	87,370
2007	79,213	89,995
2008	83,124	85,920
2009	84,490	85,384
2010	85,295	82,863
2011	86,123	82,558
2012	86,906	84,399
2013	87,311	83,898
2014	87,742	78,987
2015	87,395	74,814
2016	87,409	71,456
2017	86,868	73,807
2018	84,171	74,077
2019	84,021	74,564
2020	84,328	70,716
2021	84,966	71,209
2022	85,768	72,513
2023	86,109	76,284

DISCUSSION

The analysis of the mortality indices is much more complicated. There was a tendency for the overall number of deaths to rise, reaching 192 in 2022 before a slight decrease to 188 in 2023. This trend might be the result of the prison population aging and their general health worsening. The number of deaths as a result of self-aggression decreased, reaching 19 in 2023, which is in line with the data on acts of self-aggression and suicide attempts. The number of natural deaths increased from 56 in 2002 to 168 in 2023. That significant increase might be the result of population aging and it may indicate the need to improve penitentiary healthcare. There was a negative correlation between self-aggression and mortality, which might indicate that although acts of self-aggression were less frequent, other factors leading to higher mortality worsening (inadequately treated general health problems). However, it can also be observed that the higher number of psychiatric consultations could have led to the falling number of acts of self-aggression. In order to limit acts of self-aggression, the authorities should also consider changing diagnostic practices, prison administration polices, or staff training and engaging the inmates in additional activities (unpaid) [32,33,34].

Imprisonment is associated with suicide risk [35]. However, the data indicate significant improvements in managing self-aggression and suicide attempts. It highlights an urgent need to address the healthcare needs of an apparently aging inmate population. Old age is a special stage in a person's life, one that involves numerous changes in functioning [36]. That is extremely important to bear in mind when talking about prisoners, who are recognized as vulnerable to poor health and lifestyle choices, as well as accelerated aging [10]. Longer sentences imply a rise in the average age of prisoners [9]. Additionally, the persistent variability in suicide attempts suggests that prison environments remain complex, with varying degrees of psychological stressors impacting inmate behavior. Studies have shown that inadequate coping stress skills are related to an increased likelihood of both mental disorders and suicidal behavior [37]. Mental health problems such as major depressive symptoms, psychosis, anxiety, and drug misuse disorders have been identified as factors associated with, and potentially precipitating, near-lethal suicide attempts in prisoners [35].

The data reveal a pronounced decline in self-aggression incidents, decreasing from 948 in 2002 to 141 in 2023. This trend suggests effective interventions and improved management within prisons, potentially incorporating enhanced surveillance, better inmate support systems, and proactive mental health services. Therefore, prisoners need positive feedback, acceptance, and respect (i.e., emotional support) from prison staff and other inmates [35]. The substantial 85% reduction over the 21-year period (CAGR = -12.5%) underscores significant improvements in inmate conditions and, possibly, changes in reporting practices. The trend in suicide attempts mirrors that for self-aggression, albeit with less steepness, which may suggest a need to investigate high-risk behaviors in the prisons where these incidents take place [34]. Starting at 172 in 2002 and falling to 120 in 2023, there was an evident decrease (CAGR = -1.7%), although the data shows fluctuations throughout the years. The peaks at around 2017–2018 suggest periods of heightened risk, necessitating continuous evaluation of mental health and preventive measures. However, the relatively modest decrease compared to the reduction in self-aggression incidents suggests ongoing challenges in addressing extreme cases of distress among inmates. Relations with the prison staff are also important: if the staff are supportive and generally positive, prisoners' well-being is more likely to be high [35].

There was a more pronounced negative correlation between self-aggression and psychiatric counseling, indicating a strong inverse relationship where more counseling was associated with fewer instances of self-aggression. This suggests that psychiatric interventions effectively mitigate self-aggressive behaviors, underscoring the importance of such services in managing behavioral issues within the prison population. Some authors suggest that when working with prisoners, it is essential to devote attention to individuals who show depressive symptoms. They should be the first to receive the support they need, because depressive traits are a significant negative determinant of an important component of prisoners' health and is closely linked suicide risk [35]. In contrast, a positive correlation between mortality and psychiatric counseling was observed: as psychiatric counseling increased, mortality rates also tended to rise. This could reflect more severe cases being identified and treated as counseling services expanded, or it might indicate a lag effect, where the benefits of counseling to reduce mortality are delayed. On average, prisoners have a higher morbidity rate, which implies greater healthcare needs than in the overall population [10]. The indices of addiction to intoxicating substances and alcohol showed an increasing tendency: in 2002, there were 347 people addicted to intoxicating substances and 420 to alcohol, while in 2023 there were 1,170 addicted to intoxicating substances and 2,103 to alcohol. The observed increase may indicate more availability to those substances. This is confirmed by research conducted by Sierosławski [38] in 2007, in which prisoners indicated which illegal substances they were able to acquire while imprisoned. Alcoholic

beverages that the majority stated were the easiest to obtain were moonshine (indicated by 22% of the prisoners), vodka (12%), wine (5.7%), and beer (4.5%). Similarly, the inmates said that they can just as easily obtain illegal narcotics such as tranquilizing agents (39.6%), amphetamine (31.6%), cannabis (29.5%), steroids (23.9%), LSD (16.4%), cocaine (10.2%), heroin (9.9%) or crack cocaine (6.9%). This most likely stems from the fact that narcotics are easier to smuggle. The usage rate of narcotics inside penitentiaries has been established at 20.3% [5]. This contradicts the number of prisoners that have been directed to therapeutic departments, where convicts addicted to alcohol form the majority. This may be due to the fact that inmates seem to take advantage of the sporadic availability of substances supplied through "the underground" [39]. Additionally, it has been evidenced that 2% of convicted people started using illegal substances in a correctional institution or holding cell [38]. In other studies, alcohol dependence was diagnosed at a penitentiary in 6.8% and 4.5% of cases [39]. It should be emphasized that the scale of the problem in both cases is significant. The usage of narcotics can cause or exacerbate many health issues and can make it difficult to perform quick, adequate aid in a life-threatening situation [5].

The rate of addiction was strongly connected with the number of psychiatric consultations: 54,925 in 2002 and 76,421 in 2023. The peak of interventions in 2015 could potentially be attributed to several factors, including an aging inmate population or a change in reporting practices or in the threshold for what constitutes an emergency intervention. The reasons for seeking emergency care vary, although the presence of psychopathologies also leads to increased use of hospital emergency services [33]. After 2015, there was a general decline in the number of interventions, though the figures remain relatively high compared to the earliest years for which data is available. As was noted, higher expenditure on medical staff is associated with more primary care visits and fewer emergency room visits [9]. Interestingly, the year 2020 showed a more pronounced drop in interventions (to 7,147), which might reflect the impact of the COVID-19 pandemic. The pandemic could have led to stricter lockdown measures within facilities, reduced the incidence of communicable diseases other than COVID-19 by limiting contact, or possibly even impacted the reporting and response mechanisms due to a shift in healthcare priorities.

The most telling relationship was between suicide attempts and emergency interventions. This relationship was the most pronounced among the examined factors and could reflect the fact that suicide attempts inherently demand an immediate medical response, thus directly impacting the frequency of emergency interventions (Table I). The loss of privacy and increase in stress from overcrowding could also worsen mental health and induce violent and self-harming behavior [9]. Research conducted in Spain shows that trauma is the most prevalent problem requiring emergency care among inmates [33]. The other parameters, while associated, do not show strong enough correlations to draw definitive conclusions about their impact on emergency service interventions.

Comparatively, while public health centers also provide a range of services, they see much fewer consultations, with the highest numbers in general practice and dentistry (562 and 939, respectively). The average yearly number of medical consultations in 2002–2023 was much higher than noted in the public healthcare system. That visible contrast underscores the role that penitentiaries play in providing healthcare to the inmates. Most of the consultations were with general practitioners. It should be acknowledged that many of the available studies show that some convicts may use their health as leverage to gain advantages and services [5]. This can lead to the unnecessary overuse of the prison's healthcare system. Inmates feigning symptoms has been noted by 92.71% of doctors working inside of penitentiaries. However, a high number of psychiatric consultations was also noted, which may represent the needs of inmates in terms of psychiatric healthcare. This could very well be due to the fact that prison isolation has been proven to cause many adverse and often irreversible changes in one's mental health and thus leads to changes in one's social situation [5].

A significant number of dental consultations was also observed, suggesting that oral health is of greater importance and confirming that dental offices are found in prisons. It must be mentioned that other specialist consultations also took place (dermatology, neurology, and ophthalmology). All those appointments were provided at penitentiaries, so it can be concluded that the prisoners were provided with a wide range of specialists. This could suggest that these services are less accessible or they could be provided within the penitentiaries themselves. The relatively lower numbers in specializations such as cardiology and neurology at public health centers could suggest that inmates with serious conditions were more likely to be treated within the penitentiary system, possibly due to logistical, security, or policy reasons. Research conducted in 2005 measured the frequency of prison doctors diagnosing various illnesses: neurosis (37.94%), allergies (29.89%), diseases of the stomach and duodenum (29.89%), vision and hearing problems (29.71%), cardiovascular diseases (26.44%), respiratory diseases (25.29%), mental illnesses (24.14%), cancer (13.8%), dermatological diseases (13.8%), diseases of the musculoskeletal system (13.8%), and diseases of the liver (8.5%) [5]. The percentage of inmates unaffected by any kind of disease

has been estimated by doctors to be 8.05%, although none of the participants considered themselves to be completely healthy [5]. It should be clarified that the above results do not add up to 100%, since it is possible to indicate a few diseases in a single patient. The same author continued the research in 2011 and 2012. Visible differences were found in the frequency of diseases among the inmates: diseases of the digestive system (37.04%), dermatological diseases (22.23%), and neurosis and sleep disorders (29.63%) [5].

Many prisoners present with multiple health conditions that have been neglected, and prison provides their first healthcare experience in a long time [9]. The significant difference in mean consultation numbers between penitentiaries and public health centers may also highlight a potential gap in the accessibility of specialized medical services in the public system for inmates or possibly a structured policy that prioritizes in-house healthcare in order to manage inmate health effectively within the security framework of penitentiaries.

The reduction of dental consultations for Polish inmates was not abrupt but gradual, indicating a systemic decrease in dental consultations over the years. The initial numbers could suggest a high demand or an extensive backlog of dental issues among inmates that gradually got addressed or deprioritized. The most drastic reduction seems to have occurred in 2019–2020; this trend continued to decline, reaching a low in 2023. This recent sharp decline could have been influenced by external factors such as budgetary constraints, changes in prison policies regarding healthcare, or possibly the impact of pandemic-related restrictions and reallocation of health services.

The variable nature and dramatic fall in the numbers might reflect more about the accessibility and policy changes impacting how inmates interact with public healthcare services outside of penitentiary settings, possibly indicating a shift towards providing most care within the confines of penitentiaries. There was a strong, positive correlation suggesting that trends in dental consultations within penitentiaries closely aligned with those in public health centers over the study period. This linkage might indicate several underlying factors affecting both settings simultaneously, such as changes in national health policies or allocation of funding. Overall, the long-term decline in dental consultations, particularly the sharp decline in recent years, suggests that there is a need to assess the adequacy of dental care for inmates, consider the potential health effects of reduced dental services, and re-evaluate the allocation of resources to ensure that healthcare needs are adequately met within the inmate population. While considering this problem in our previous work, we decided to estimate the need for dental healthcare in prison [40,41].

Study limitations

Undoubtedly, our study faced a few limitations. The possibility of analyzing the inmates' medical history could provide a benefit from more detailed, complex data on their general and mental health status. It could indicate the particular problems that ultimately led to the suicide attempts. With the data we obtained, we were unable to assess whether a particular prisoner had one or more suicide attempts or to determine the frequency of a single prisoner's specialist visits; we can only refer to the whole population. Definitely, studying the prisoners and distributing a questionnaire could provide more detailed data.

CONCLUSIONS

In 2002–2023, the following observations were noted.

1. The number of deaths increased until 2022 (due to the aging population of prisoners and the worsening of their health); this was followed by a decrease in 2023.
2. There were fewer deaths caused by self-aggression and fewer acts of self-aggression or suicide attempts.
3. The increase in the number of natural deaths was likely due to the aging of the population and may indicate the need to improve medical care in prisons.
4. There was an increase in the reported number of addictions (to medications and alcohol), probably as a result of their easier availability.
5. The number of psychiatric consultations increased, probably due to addictions.
6. There was a negative correlation between self--aggression and mortality; despite the decrease in acts of self-aggression, the mortality rate rose (probably due to untreated general health problems).
7. The higher number of psychiatric consultations resulted in fewer acts of self-aggression.
8. There was a strong correlation between addiction to intoxicants and alcohol, probably due to fact that those addicted to one are more prone to also be addicted to the other.
9. The number of external medical interventions fluctuated: there was an increase which peaked in 2015, in 2020, a decrease was observed, probably caused by the COVID-19 pandemic; in 2021, the number stabilized; and again it decreased until 2023, probably due to improved penitentiary healthcare.
10. The number of medical consultations was higher than those in the general healthcare system – the role that the penitentiary system played in

providing healthcare increased between 2002 and 2023.
11. The most frequent medical consultations were with general practitioners and psychiatrists.
12. There was a high number of dental consultations, suggesting a sufficient number of dental offices in the penitentiary system.

Authors' contribution

Study design – R. Korkosz, M. Tanasiewicz, M. Rahnama
Data collection – R. Korkosz
Data interpretation – R. Korkosz
Statistical analysis – R. Korkosz
Manuscript preparation – R. Korkosz, A. Trzcionka, M. Tanasiewicz
Literature research – M. Kiełbratowski, A. Kuśka-Kiełbratowska

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