Health Literacy Behind Bars: A Hidden Burden of Incarceration

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Health Literacy Behind Bars: A Hidden Burden of Incarceration. The prison environment represents a unique social setting where structural constraints significantly influence individuals' access to resources, including health information. This study investigates health literacy among incarcerated women in a selected prison in the Czech Republic, a population often marginalized in both health care access and societal discourse. The research identifies how health literacy levels are shaped by individual socio-demographic factors, such as age, educational background, and perceived social status, and how these intersect with the restrictive institutional frameworks of imprisonment. Using the standardized HLS-EU-Q47 questionnaire, this study provides a detailed analysis of the challenges inmates face in acquiring, understanding, and applying health-related information. The findings reveal systemic barriers, such as limited access to reliable health resources and opportunities for self-directed health improvement. At the same time, the results underscore the role of incarceration as a determinant of health inequalities, exacerbating existing disparities and creating new vulnerabilities. This paper argues that understanding health literacy through a sociological lens can contribute to broader discussions on prison reform and public health policy. The findings highlight the necessity of targeted interventions, such as educational programs tailored to the needs of female inmates, to mitigate the negative effects of incarceration on health outcomes. Such initiatives have the potential to foster empowerment and agency, thereby improving not only individual well-being but also prospects for successful reintegration into society.

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Introduction

The prison environment constitutes a distinct sociological setting that profoundly reshapes the trajectory of an individual's life. As articulated by Goffman (Goffman 2017) in his theory of total institutions, prisons are defined by their capacity to exert comprehensive control over the daily lives of incarcerated individuals, encompassing both physical environments and the dynamics of social interactions. This pervasive form of regulation not only restricts autonomy (van der Kaap-Deeder et al. 2017) in terms of mobility and decision-making but also deeply influences core social roles and the construction of personal identity (Lochmannová 2020). Imprisonment is characterized by significant limitations on personal autonomy, which is fundamentally dependent on the sense of agency—defined as the perception of control over one's actions and their outcomes. These restrictions can disrupt the neurocognitive

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foundations of agency, leading to profound consequences for social behavior, self-sufficiency, and overall well-being (Driessen et al. 2023). Furthermore, prisons serve as reflections of broader societal structures and norms, delineating who is subject to criminalization and why, thereby frequently reinforcing pre-existing social inequalities, including disparities in access to healthcare and the ability to manage one's own health. Consequently, upon release, former inmates may face significant challenges in navigating healthcare systems and maintaining their health, further entrenching health disparities (Hirsch 2019).

Sykes' (1958) Society of Captives represents a work that exemplifies the deprivation model of inmate culture, which is central to understanding the dynamics of imprisonment and its effects on individuals. According to Sykes and other functionalist scholars (e.g., Goffman 1961; Sykes – Messinger 1960), the intrinsic deprivations of the prison environment—such as the loss of security, liberty, autonomy, and access to goods and services—catalyze adaptive responses among inmates aimed at mitigating these hardships. These responses often manifest in self-serving and alienating behaviors, which form the basis of the inmate subculture (Kreager – Kruttschnitt 2018). This framework is also highly relevant to the access to healthcare and health information in prison. The limitations and deprivations in health-related resources within prisons can further exacerbate inmates' vulnerability, influencing their ability to manage their own health and well-being. The number of convicted persons is increasing, and their health problems are not negligible (Novisky et al. 2021). Most prisons are designed as facilities for punishment, rehabilitation and resocialisation, and these aims may conflict with the objectives of health care (Watson et al. 2004). Similarly, opportunities for growth, development and learning are limited (Rangel Torrijo – De Maeyer 2019), and therefore the development of health literacy skills important for self-care is often limited by a number of constraints and barriers (Mehay et al. 2021a). Low health literacy adversely affects the physical and mental health of convicts (Mehay et al. 2021b).

Low levels of health literacy are intrinsically linked to systemic inequalities, serving as a reflection of broader societal structures and processes of social stratification (Bather et al. 2024). Inmates often come to prison from backgrounds with low health literacy and lack of access to health care (Solbakken et al. 2024). Individuals within the prison system, often marginalized and forgotten by society, are largely excluded from public discourse and remain hidden from the general public’s view (Gill et al. 2023). Inmates suffer more disease morbidity than the general population due to the widespread incidence of communicable diseases, non-communicable diseases, mental health disorders and substance abuse (Baranyi et al. 2022; Wilper et al. 2009). The limitations of health care in the prison place greater demands on independent disease

management, which is difficult in the case of inmates with limited health literacy. It is therefore important to pay attention not only to the level of this literacy, but also to the specific difficulties that convicted persons with limited health literacy face in terms of self-management, as well as to the needs they interpret (van der Gaag et al. 2022). Health literacy is a fundamental determinant in enhancing the well-being of incarcerated individuals and, by extension, advancing public health outcomes (Sarimehmet et al. 2024).

Research shows that structural constraints, stigma and financial barriers pose challenges for inmates in accessing needed health care. This is reflected not only during incarceration, but also afterwards, when ex-convicts face challenges seeking health care upon release, leading to poorer health outcomes and, secondarily, an increased risk of recidivism (Puglisi et al. 2017). Incarceration can also result in a deterioration of already low levels of health literacy, which limits inmates' ability to understand health information and manage communication with health care providers, which, in addition to inadequate management of health problems, can make successful reintegration into society more difficult (Hadden et al. 2018; Mehay et al. 2021b).

Health literacy is also linked to psychological and social health, where learning about health can lead to improved self-esteem and motivation for positive behaviour change, which can have a positive impact on social relationships and overall wellbeing (Rosenblad et al. 2024). This is particularly important in relation to the fact that the psychological health of convicted persons, especially women, is significantly deprived both in terms of self-esteem and in terms of specific psychological problems (Lochmannová et al. 2024). Incarcerated women can often face specific health problems during their incarceration. These problems relate to reproductive and mental health and may also be related to substance abuse. Often these problems are related to traumatic experiences, including sexual violence in partnerships (Norris et al. 2022). Many of the imprisoned women are also mothers and will have to care for their children upon release. In the Czech prison system, there is even a specific department in one prison where incarcerated mothers are together with their children under the age of three, where they are cared for on a daily and continuous basis (Lochmannová et al. 2024). This is also the prison where the research was conducted. It is important to emphasize that the health literacy of incarcerated women enables them to better understand not only their health needs, but also the health needs of their children and to ensure that they receive adequate and timely care (Friedman et al. 2020). At the same time, programmes aimed at supporting women mothers in prison can strengthen their childcare skills and improve their ability to cope with parenthood after release (Tremblay – Sutherland 2017).

However, the hierarchical power dynamics (Dirga et al. 2015) inherent within correctional institutions significantly influence the distribution and accessibility of health resources and information (Mehay et al. 2021b). The control exercised by prison authorities over essential resources, including healthcare services, often results in inmates having limited autonomy in managing their health needs. This imbalance can lead to disparities in health outcomes, as incarcerated individuals may encounter obstacles in obtaining necessary care and information. Addressing these power imbalances is crucial to ensure equitable access to health resources, thereby enhancing the overall well-being of the incarcerated population. Incarceration is associated with numerous adverse health outcomes, including increased prevalence of infectious diseases, chronic conditions, mental health disorders, and elevated mortality rates. The prison environment exacerbates these health issues due to factors such as overcrowding, limited access to healthcare services, and high levels of stress. Addressing the health needs of incarcerated individuals is essential to mitigate these negative outcomes and improve overall public health (Novisky 2018).

Access to health care for convicted persons in the Czech Republic is ensured by several legal provisions. In accordance with Article 31 of the Charter of Fundamental Rights and Freedoms, citizens, including convicted persons, have the right to health protection. Under public insurance, citizens have the right to free health care and medical aids. This is further specified in Act No 372/2011 Coll., on health services and conditions of their provision. Convicted persons have the right to health care to the extent and under the conditions set out in this Act and other relevant regulations. Access to health care for convicted persons is regulated by Act No 169/1999 Coll., on the execution of prison sentences. In accordance with the provisions of this Act, convicts have the right to health care, which includes preventive examinations, medical treatment and specialised care provided both in prisons and in external health care facilities, if the care cannot be provided in the facilities of the Prison Service of the Czech Republic. Convicted persons do not have the right to freely choose a doctor or a medical facility.

The development of health literacy in prisons can be promoted through various programmes (Blackaby et al. 2023). Activities aimed at the development of health literacy not only in Czech prisons are usually part of the so-called programme of treatment of convicted persons. These programmes may include group sessions, lectures and workshops on various topics. Examples include programmes on HIV, tuberculosis and women's health education (Bonato et al., 2024). This may include education using peer educators who can help raise awareness of health issues among other inmates. Research then confirms that this approach has the potential not only to positively influence the

level of health literacy of prisoners, but also secondarily to reduce risky behaviour in terms of, for example, drug use, both during imprisonment and after release (Bagnall et al. 2015; Dirga et al. 2015).

However, the expanding incarcerated population underscores the critical role of prison health as a component of public health and as a focal point for mitigating health disparities. Incarcerated individuals often endure substantial physical and mental health challenges, resulting in suboptimal health outcomes. Addressing these disparities necessitates robust governance and accountability in prison healthcare services, ensuring the provision of quality care during incarceration and seamless integration with community health services upon release (McLeod et al. 2020). Stigma associated with incarceration (Schnittker – John 2007) significantly hinders access to healthcare post-release, thereby exacerbating existing health disparities. Released individuals often encounter prejudice and discrimination from healthcare providers and the broader society, leading to delays or complete avoidance in seeking necessary care (Reagan et al. 2024). This issue is compounded by inadequate health literacy, which is frequently further diminished during imprisonment. Limited health literacy impairs individuals' abilities to comprehend health information and effectively communicate with healthcare professionals, further obstructing access to care after release. Additionally, social determinants of health—such as unemployment, unstable housing, and restricted access to social support—further complicate reintegration and elevate the risk of recidivism (Hwang et al. 2024).

The aim of this study was to evaluate the health literacy of women in a selected prison in the Czech Republic, focusing on identifying specific factors influencing their ability to access, understand, evaluate, and apply health information within the context of the prison environment.

The objectives of this study were sought to be met through the following objectives:

1. To determine the level of health literacy of incarcerated women through the HLS-EU-Q47 questionnaire and to identify demographic factors that influence health literacy.
2. To contextualize the health literacy of incarcerated women in the context of incarceration in the Czech prison system.

Method

A cross-sectional design was used to address the defined objectives. Inclusion criteria included placement in a women's prison in the Czech Republic, at least 18 years of age, being a native Czech speaker, and being able to read and write.

Women who did not have the status of convicted persons and were in prison as accused persons were excluded from the research.

Ethical approval

Ethical approval was received from the Ethics Committee for Research of the University of West Bohemia under project number ZCU 000795/2024.

Instrument

The HLS-EU-Q47, which was used for data collection, is designed to assess individuals' ability to access, understand, evaluate and use health information. For this study, the questionnaire was administered in Czech. The translation and adaptation process followed standard procedures, including forward and backward translation, to ensure linguistic and cultural suitability for the Czech prison population. The questionnaire, widely recognized for its comprehensive evaluation of health literacy, provides a comprehensive view of individuals' health literacy, primarily by focusing on different aspects of interactions with health information. It consists of three sections, which are healthcare (HC), disease prevention (DP) and health promotion (HP) (Sørensen et al. 2015).

The HC focuses on the ability to acquire and understand information, evaluate it, and apply it to health care decisions. In the area of DP, it focuses on the ability to understand risk factors and make decisions about measures to prevent disease. The HP domain assesses an individual's ability to secure information about determinants of health in the social and physical environment and to make health decisions in collaboration with others (Japelj – Horvat 2023). Each of these sections is further divided into four subsections, which constitute the factors of this questionnaire: Access Information, Understand Information, Appraise Information, Apply information. These subsections provide information on how well individuals can access health information, understand this information, assess its quality, and apply this information to practical decisions about their health. The number of questions in the subsections ranges between three and six (Sørensen et al. 2013; Sørensen et al. 2015).

Respondents could answer the questions on a scale of very difficult, difficult, easy and very easy. Each respondent also answered 10 questions about herself (age, marital status, education, healthcare education, social status, health condition, physical activity, smoking, sentence length and recidivism).

The HLS-EU-Q47 questionnaire was chosen as the primary tool for assessing health literacy due to its comprehensive design and standardization within international research (Japelj – Horvat 2023; Menikou et al. 2023; Niedorys et al. 2020). This instrument evaluates an individual’s ability to access, understand, appraise, and apply health-related information in a systematic manner. Its relevance and adaptability to various populations have been demonstrated across

diverse international contexts, making it a reliable choice for this study (Mehay et al. 2021b). The questionnaire's ability to provide a holistic view of health literacy was particularly suited to the prison population, where access to and utilization of health information may present unique challenges.

Participant characteristics

One hundred and five women consented to take part in the study, of which 95 (90 %) completed all HLS-EU-Q47 items; thus, the dataset for analysis was based on this sample (N = 95). The total incarcerated population in the prison at the time of the study was 838[2]. This means the sample represents approximately 11.3 % of the total incarcerated population. While the exact number of women meeting the inclusion criteria is not available, the sample provides a reasonable representation for the purposes of this research.

A total of 20 respondents were younger than 30 years of age, with the largest proportion of respondents in the 30-39 age category (N=43; 45%), 24 respondents in the 40-49 age category, and the smallest proportion in the 50+ age category (N=8). Most of the participants were single (N = 61; 64%), had primary education (N = 43; 45%) or had completed an apprenticeship (N = 29; 31%). 12% of the respondents had completed medical school (N = 11). The majority of respondents (N = 58; 61%) considered their subjectively perceived economic status to be moderate; similarly, the majority rated their health status on a scale of very poor to very good as good (N = 39; 41%), very good (N = 22; 23%) or satisfactory (N = 22; 23%); they mostly rated their physical activity as sufficient (N = 46; 48%). Most respondents (N = 79; 83%) were smokers. The length of the sentence most often ranged between one and five years (N = 53; 56%) and for most respondents it was their first imprisonment (N = 60; 63%). All women were serving their sentences in the women's prison in Světlá nad Sázavou in the Czech Republic. While the demographic characteristics of the analyzed sample (N = 95) were not systematically compared to the entire population of incarcerated women in the Czech Republic or the total population of this particular prison, the distribution of key socio-demographic indicators (such as age, marital status, educational attainment, and smoking prevalence) does not suggest significant differences. The sample largely reflects the expected composition of the incarcerated female population in terms of these characteristics.

[2] The total number of incarcerated women (838) as of October 2024 is based on data from the report published by the Czech Prison Service: *Měsíční statistická hlášení – Říjen 2024*. Available at: https://www.vscr.cz/media/organizacni-jednotky/generalni-reditelstvi/odbor-spravni/statistiky/msh/msh-2024/msh10-2024.pdf.

Data Collection

The participants were recruited from one large female-only prison in the Czech Republic. Informed consent for study participation was undertaken by the researcher, and instrument completion was undertaken using pen and paper versions of the tools due to the unique context of this population of women and limited and controlled access to online tools.

The inmates were recruited through a call that the researcher distributed in the prison using educators and special pedagogues. All women who volunteered to participate in the research met with the researcher who gave them a questionnaire to complete. This was completed in the visiting room of the prison, ensuring full anonymity, as the presence of the researcher did not affect the respondent's identification. Immediately after completion, the questionnaire was placed in a sealed box designed for anonymous collection. No person other than the respondent and the researcher was present during the completion. The questionnaire was not signed or otherwise labelled to prevent retrospective identification of a particular inmate and to ensure full anonymity as well as a secure environment for completion and to promote the highest degree of authenticity in the inmates' responses. The presence of the researcher in the room was ensured to provide explanations, the possibility of ensuring the correct understanding of the questions, as well as to verify that the convict was able to read and understand the context of the questions on her own.

Participation in the research was entirely voluntary and 95 inmates returned fully completed questionnaires. A total of ten questionnaires were returned incomplete or were terminated by the respondents before completion, and therefore these are not part of the sample analyzed.

Description of Factors Assessed

The HLS-EU-Q47 questionnaire used in this study evaluates health literacy across three main domains: Healthcare (HC), Disease Prevention (DP), and Health Promotion (HP). These domains collectively assess the ability to access, understand, appraise, and apply health-related information. Specifically, the factors under examination include the ability to obtain relevant and reliable health information from various sources, comprehend information provided by health professionals, educational materials, or media, critically evaluate the credibility and relevance of health information, and effectively use this information in decision-making and health-related actions (Bas-Sarmiento et al. 2020; Sørensen et al. 2013).

In addition to the health literacy domains, the study also collected sociodemographic data to contextualize the findings. This included variables such as age, marital status, education level, healthcare background, social status, self-perceived health condition, physical activity level, smoking habits, length of

sentence, and recidivism. Informed by existing literature, the demographic variables were selected for their demonstrated impact on health literacy. These variables shape individuals' capacity to access, interpret, and apply health information, offering a comprehensive perspective on the socio-individual dimensions influencing health literacy within the incarcerated female population.

Data-analysis

The analysis was performed in R version 4.3.2 using the integrated development environment RStudio version 2023.09.1 Build 494.

In all cases, statistical significance was assessed at the 5% level. Either ANOVA or the Kruskal-Wallis test was used to test whether groups showed differences in responses for a given factor. The ANOVA test was used only if the assumptions were met, i.e. normality of the data in each group and the ratio of the highest to lowest standard deviation did not exceed 3. If the assumptions were violated, the Kruskal-Wallis test was used.

Normality was tested using the Shapiro-Wilk test. ANOVA and Kruskal-Wallis test were used in case of three or more groups. Where only two groups were tested for difference, either the t-test was used (when normality was met across groups) or the Mann-Whitney test where normality was rejected.

In the case of dependent observations (in the case of the present study, the values of the individual factors are examined for the respondents collectively), the ANOVA test is used for repeated measures to determine whether there are statistically significant differences between the groups, if the prerequisites for its use are met. If the assumptions are not met, its non-parametric counterpart are used, the Friedman test. For both the ANOVA test (both its variants), the Kruskal-Wallis test and the Friedman test, post-hoc tests are performed to identify possible different pairs.

As the HLS-EU-Q47 questionnaire was applied to a prison population that can be considered specific, it was tested whether it was possible to work with the factors defined in the questionnaire. The Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI) were used, for which a value of at least 0.9 is usually required. In addition, the Root Mean Square Error of Approximation (RMSEA) was used, where a value below 0.08 is considered acceptable. Cohen's alpha was calculated for each factor. A value of 0.7 or more is considered acceptable. For all statistics, the focus was on whether they fell significantly below the acceptable range. Thus, the author does not insist on meeting them exactly. The Cohen's alpha values are then used to decide whether the results should be interpreted with caution for any factor.

Results

The data were analyzed using ANOVA, Kruskal-Wallis tests, and subsequent post hoc tests to identify differences between the observed groups. The main results of each analysis are presented below.

The individual scores for the questions are shown in Table 1. The five questions with the lowest mean scores and the five questions with the highest scores have been highlighted.

Table 1: **The final scores for the HLS-EU-Q47 questions**.

Question	On a scale from very easy to very difficult, how easy would you say it is to: …	Mean	1 (Very difficult)	2 (Difficult)	3 (Easy)	4 (Very easy)
Q1	find information about symptoms of illnesses that concern you?	**2.47**	17	30	33	14
Q2	find information on treatments of illnesses that concern you?	2.49	16	32	31	16
Q3	find out what to do in case of a medical emergency?	2.65	13	26	35	19
Q4	find out where to get professional help when you are ill?	2.73	13	24	34	24
Q5	understand what your doctor says to you?	2.94	4	16	57	18
Q6	understand the leaflets that come with your medicine?	**3.29**	2	3	55	34
Q7	understand what to do in a medical emergency?	3.13	2	10	56	26
Q8	understand your doctor's or pharmacist's instruction on how to take a prescribed medicine?	**3.52**	1	2	38	53
Q9	judge how information from your doctor applies to you?	3.10	2	12	55	25
Q10	judge the advantages and disadvantages of different treatment options?	2.70	5	26	54	8
Q11	judge when you may need to get a second opinion from another doctor?	2.79	4	25	49	14
Q12	judge if the information about illness in the media is reliable?	**2.49**	6	42	40	6
Q13	use information the doctor gives you to make decisions about your illness?	2.78	6	23	52	14
Q14	follow the instructions on medication?	**3.37**	1	4	49	41
Q15	call an ambulance in an emergency?	3.16	11	9	28	46
Q16	follow instructions from your doctor or pharmacist?	**3.45**	0	4	44	46

Table 1: **Continued**

Question	On a scale from very easy to very difficult, how easy would you say it is to: …	Mean	1 (Very difficult)	2 (Difficult)	3 (Easy)	4 (Very easy)
Q17	find information about how to manage unhealthy behaviour such as smoking low physical activity and drinking too much?	2.96	6	21	38	29
Q18	find information on how to manage mental health problems like stress or depression?	2.52	11	41	26	17
Q19	find information about vaccinations and health screenings that you should have?	2.71	11	22	44	17
Q20	find information on how to prevent or manage conditions like being overweight high blood pressure or high cholesterol?	2.78	10	22	41	21
Q21	understand health warnings about behaviour such as smoking low physical activity and drinking too much?	3.08	4	12	51	28
Q22	understand why you need vaccinations?	3.08	2	12	56	23
Q23	understand why you need health screenings?	**3.39**	0	0	57	37
Q24	judge how reliable health warnings are such as smoking low physical activity and drinking too much?	3.15	2	9	57	27
Q25	judge when you need to go to a doctor for a check-up?	3.12	4	14	44	33
Q26	judge which vaccinations you may need?	2.84	3	28	45	19
Q27	judge which health screenings you should have?	2.83	6	19	54	15
Q28	judge if the information on health risks in the media is reliable?	**2.42**	15	34	32	11
Q29	decide if you should have a flu vaccination?	3.05	5	12	51	27
Q30	decide how you can protect yourself from illness based on advice from family and friends?	3.07	2	10	62	21
Q31	decide how you can protect yourself from illness based on information in the media?	2.72	6	32	40	17
Q32	find information on healthy activities such as exercise healthy food and nutrition?	3.05	6	12	48	29
Q33	find out about activities that are good for your mental well-being?	2.85	7	20	48	20
Q34	find information on how your neighbourhood could be more health-friendly?	2.62	9	30	44	12

Table 1: **Continued**

Question	On a scale from very easy to very difficult, how easy would you say it is to: …	Mean	1 (Very difficult)	2 (Difficult)	3 (Easy)	4 (Very easy)
Q35	find out about political changes that may affect health?	**2.43**	12	39	34	9
Q36	find out about efforts to promote your health at work?	2.67	11	20	52	11
Q37	understand advice on health from family members or friends?	3.10	3	4	68	19
Q38	understand information on food packaging?	3.01	3	14	54	21
Q39	understand information in the media on how to get healthier?	2.80	5	19	60	10
Q40	understand information on how to keep your mind healthy?	2.67	8	27	46	12
Q41	judge where your life affects your health and well-being?	2.73	4	28	51	11
Q42	judge how your housing conditions help you to stay healthy?	2.98	5	11	59	19
Q43	judge which everyday behaviour is related to your health?	2.99	3	14	58	19
Q44	make decisions to improve your health?	2.61	6	39	35	14
Q45	join a sports club or exercise class if you want to?	2.81	10	25	32	27
Q46	influence your living conditions that affect your health and wellbeing?	**2.44**	16	34	32	13
Q47	take part in activities that improve health and well-being in your community?	2.60	13	27	39	15

Questions Q1–Q4 pertain to the Healthcare domain and assess the ability to access information (Access Information), questions Q5–Q8 focus on understanding information (Understand Information), questions Q9–Q12 evaluate the ability to appraise information (Appraise Information), and questions Q13–Q16 address the application of information (Apply Information). Similarly, questions Q17–Q20, Q21–Q24, Q25–Q28, and Q29–Q32 cover the same abilities within the Disease Prevention domain, and questions Q33–Q36, Q37–Q40, Q41–Q44, and Q45–Q47 pertain to the Health Promotion domain.

Statistical dependence between questions was identified between many pairs of questions according to Fisher's exact test. To select the most important ones, a weighted Cohen's Kappa was used, which expresses the degree of agreement and can quantify the strength of the relationship between the answers. The squared distances of the responses were used as weights. The results are shown in Table 2.

Table 2: **Relationship between questions**.

Pair of questions	Cohen's Kappa
Q1 and Q2	0.81
Q26 and Q27	0.69
Q19 and Q20	0.66
Q40 and Q41	0.66
Q25 and Q27	0.66
Q18 and Q19	0.61
Q3 and Q4	0.60
Q20 and Q32	0.59
Q22 and Q29	0.59
Q29 and Q30	0.59

Validation of the Healthcare section of the HLS-EU-Q47 questionnaire shows CFI 0.801 and TLI 0.756, indicating a slightly lower model fit. RMSEA is 0.110, suggesting average fit. Cronbach's alpha for factors: Access 0.853, Understand 0.634, Appraise 0.753, Apply 0.612. The first and third factors exceed the 0.7 threshold; the others require cautious interpretation. For the Disease Prevention section, CFI is 0.831 and TLI 0.788, also indicating slightly lower fit. RMSEA is 0.121, indicating average fit. Cronbach's alpha: Access 0.841, Understand 0.619, Appraise 0.804, Apply 0.749. The first, third, and fourth factors are above 0.7; the second is lower and needs careful interpretation. In the Health Promotion section, CFI is 0.847 and TLI 0.813, suggesting slightly lower fit. RMSEA is 0.88, indicating nearly acceptable fit. Cronbach's alpha: Access 0.770, Understand 0.671, Appraise 0.666, Apply 0.724. The first and fourth factors exceed 0.7, while the second and third are slightly lower, but still reliable. Each factor consists of three to six questions. If the respondent answered all questions, it was possible to calculate the average of her responses for that factor. This data is then the basis for further analysis. This reduces the survey from 47 questions to 12 factors made up of them. Each factor takes a value between 1 and 4. If at least one answer is not available for any of the factors, the average is not calculated, and the value is marked as unavailable. As the factors are almost exclusively treated separately (except for this part) and in the worst case 5 values are missing (for the HC Appraise Information factor), the estimation of the answers and their completion were not proceeded with and left as unavailable. Table 3 shows the average values for each factor.

Table 4 then contains boxplots for each factor when including all available observations and Table 5 when including only complete observations. As normality of the data was rejected for some factors, the non-parametric Friedman test was used to determine whether there were statistically significant differences between groups (this uses pairwise observations and can therefore detect

differences even when the boxplots in Table 4 and Table 5 look identical). Based on the test, we can reject the null hypothesis and accept the alternative that the differences are statistically significant ($p < 0.001$).

Table 3: **Average values for each factor.**

Factor	Original Data			Complete Data		
	Count	Mean	Rank	Count	Mean	Rank
HC Access Inf.	93	2.57	12	75	2.52	12
HC Understand Inf.	92	3.23	1	75	3.22	1
HC Appraise Inf.	90	2.75	8	75	2.74	8
HC Apply Inf.	93	3.18	3	75	3.21	2
DP Access Inf.	92	2.73	9	75	2.72	9
DP Understand Inf.	92	3.19	2	75	3.19	3
DP Appraise Inf.	92	2.87	7	75	2.87	6
DP Apply Inf.	95	2.95	4	75	2.96	4
HP Access Inf.	93	2.71	10	75	2.69	10
HP Understand Inf.	91	2.90	5	75	2.88	5
HP Appraise Inf.	94	2.90	5	75	2.87	6
HP Apply Inf.	93	2.61	11	75	2.58	11

Table 4: **Boxplots for each factor when including all available observations** (asterisk indicates sample mean and thick line indicates sample median).

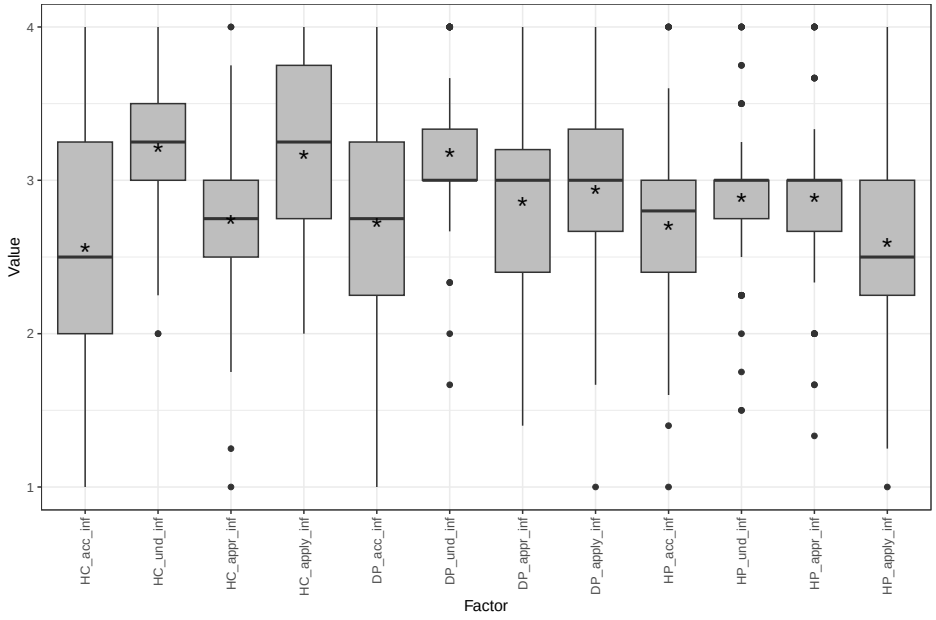
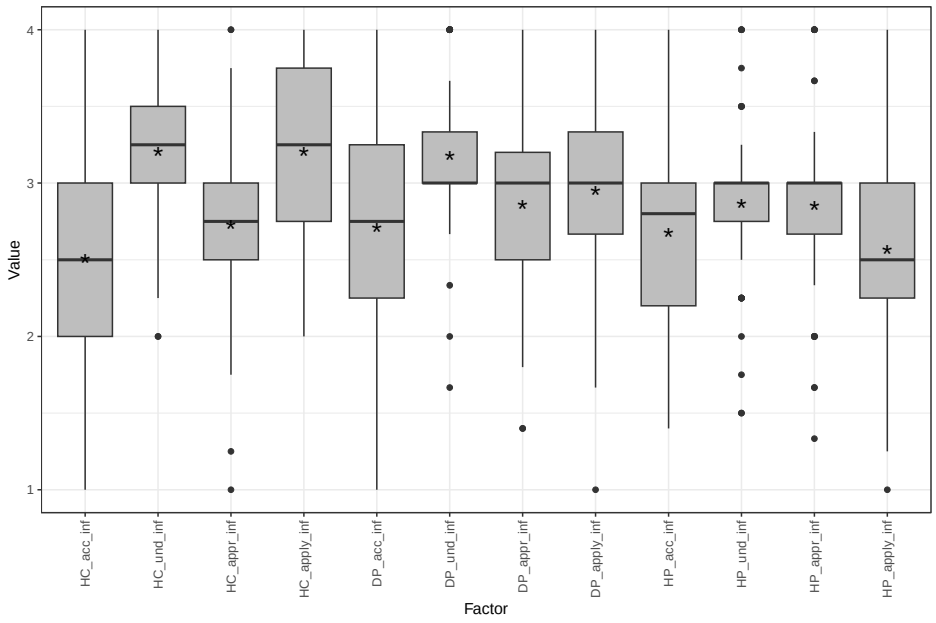


Table 5: **Boxplots for each factor when only complete observations are included** (asterisk indicates sample mean and thick line indicates sample median).



The influence of demographic factors on female inmates' health literacy was investigated, with age being a notable aspect. Table 6 shows mean responses by age, revealing that the lowest scores, indicating more difficulty, are typically in the 18-29 age group, while the highest scores are often in the 50+ group. Statistically significant differences were found in three factors: DP Understand Information (p=0.011), DP Apply Information (p=0.006), and HP Appraise Information (p=0.006), where age influenced responses.

For marital status, higher values were observed among divorced respondents, but no statistically significant differences were found, so marital status does not influence responses. Similarly, higher values were noted for respondents with a secondary education or higher, but again, no statistically significant differences were found, so education level does not influence responses.

Table 6: **Average values of responses by age category.**

Factor	Age Category				p-value
	18–29	30–39	40–49	50+	
Count	20	43	24	7	
HC Access Inf.	2.41	2.55	2.63	3.00	0.418
HC Understand Inf.	3.06	3.20	3.36	3.29	0.144
HC Appraise Inf.	2.71	2.69	2.80	2.86	0.789
HC Apply Inf.	3.03	3.13	3.29	3.43	0.180
DP Access Inf.	2.51	2.66	2.91	3.08	0.191
DP Understand Inf.	**3.07**	**3.06**	**3.46**	**3.24**	**0.011***
DP Appraise Inf.	2.68	2.78	3.08	3.06	0.108
DP Apply Inf.	**2.80**	**2.79**	**3.31**	**2.95**	**0.006****
HP Access Inf.	2.61	2.66	2.74	3.09	0.348
HP Understand Inf.	2.71	2.88	3.01	3.08	0.529
HP Appraise Inf.	**2.68**	**2.85**	**3.06**	**3.33**	**0.006****
HP Apply Inf.	2.38	2.64	2.59	3.07	0.141

However, the situation is different in the case of medical education, where in three cases it was possible to reject the null hypothesis and accept the alternative that the differences are statistically significant. The mean values of the responses according to whether the respondent had a medical degree are recorded in Table 7, in which these groups are shown in bold. It can be observed that higher scores are recorded for the category with medical education. A statistically significant difference was found for three factors: HC Access Information (p = 0,004), DP Apply Information (p = 0.038) and HP Understand Information (p=0.033), here the attainment of medical education can be considered as an aspect that influences the answers in some cases.

Table 7: **The effect of medical education on responses.**

Factor	Healthcare Education		p-value
	Yes	No	
Count	11	83	
HC Access Inf.	**3.27**	**2.48**	**0.004****
HC Understand Inf.	3.39	3.21	0.246
HC Appraise Inf.	2.91	2.73	0.254
HC Apply Inf.	3.39	3.15	0.172
DP Access Inf.	3.08	2.69	0.166
DP Understand Inf.	3.21	3.19	0.910
DP Appraise Inf.	3.02	2.85	0.332
DP Apply Inf.	**3.27**	**2.90**	**0.038***
HP Access Inf.	2.95	2.68	0.151
HP Understand Inf.	**3.18**	**2.86**	**0.033***
HP Appraise Inf.	3.12	2.87	0.100
HP Apply Inf.	2.84	2.57	0.240

Table 8 shows that respondents with Low perceived social status consistently recorded the lowest scores, indicating the most difficulty, while the highest scores were often found in the High category. Statistically significant differences were found for three factors: DP Apply Information (p=0.006), HP Access Information (p=0.025), and HP Understand Information (p=0.029), suggesting that subjective social status influences responses in some cases.

Table 8: **Average response values by subjective social status.**

Factor	Social Status			p-value
	Low	Middle	High	
Count	20	58	13	
HC Access Inf.	2.31	2.58	2.87	0.169
HC Understand Inf.	3.16	3.25	3.29	0.564
HC Appraise Inf.	2.59	2.76	2.90	0.267
HC Apply Inf.	3.06	3.17	3.37	0.243
DP Access Inf.	2.54	2.70	3.10	0.057
DP Understand Inf.	3.10	3.25	3.17	0.510
DP Appraise Inf.	2.69	2.93	2.92	0.290
DP Apply Inf.	**2.63**	**3.07**	**2.90**	**0.006****
HP Access Inf.	**2.44**	**2.72**	**3.02**	**0.025***
HP Understand Inf.	**2.60**	**3.00**	**2.90**	**0.029***
HP Appraise Inf.	2.68	2.94	3.10	0.110
HP Apply Inf.	2.43	2.62	2.90	0.173

The influence of respondents' perceived health status was assessed, with slightly higher values often observed in those with very good health and lower values in those with poor health. However, no statistically significant differences were found, so health status does not influence responses.

Two factors potentially affecting health status—physical activity levels and smoking status—were also monitored. Table 9 shows average responses by physical activity rating.

Table 9: **Mean values of responses according to the inmates' assessment of their own physical activity.**

Factor	Physical Activity				p-value
	Insufficient	**Somewhat insff.**	**Somewhat suff.**	**Sufficient**	
Count	3	20	26	46	
HC Access Inf.	**2.42**	**2.18**	**2.62**	**2.73**	**0.030***
HC Understand Inf.	3.25	3.18	3.30	3.20	0.622
HC Appraise Inf.	2.75	2.60	2.83	2.78	0.204
HC Apply Inf.	**3.13**	**2.85**	**3.21**	**3.31**	**0.004****
DP Access Inf.	**2.58**	**2.33**	**2.87**	**2.84**	**0.015***
DP Understand Inf.	3.22	3.21	3.24	3.14	0.752
DP Appraise Inf.	2.93	2.75	2.95	2.87	0.514
DP Apply Inf.	**2.78**	**2.67**	**3.15**	**2.96**	**0.024***
HP Access Inf.	**2.73**	**2.35**	**2.82**	**2.81**	**0.008****
HP Understand Inf.	**2.88**	**2.67**	**3.06**	**2.90**	**0.029***
HP Appraise Inf.	3.44	2.73	2.99	2.89	0.385
HP Apply Inf.	1.92	2.34	2.63	2.76	0.060

The lowest scores were typically recorded in the Somewhat insufficient category, while higher scores were found in the Somewhat sufficient and Sufficient categories. Statistically significant differences were observed in six factors: HC Access Information (p=0.030), HP Apply Information (p=0.004), DP Access Information (p=0.015), DP Apply Information (p=0.024), HP Access Information (p=0.008), and HP Understand Information (p=0.029), indicating that physical activity level influences responses. For smoking, higher values were often seen in former smokers and lower in non-smokers, but no statistically significant differences were found, so smoking does not influence responses in this population.

The effect of recidivism and length of imprisonment on health literacy was examined. Women serving their fourth or more sentence generally recorded slightly lower scores. A statistically significant difference was found for HC Apply Information (p=0.029), indicating that sentence length influences responses in some cases. Table 10 shows the mean values based on the number of re-sentences.

Table 10: **Effect of the number of re-sentences on responses.**

Factor	Repetition				p-value
	1	2	3	4+	
Count	60	19	7	7	
HC Access Inf.	2.52	2.85	2.46	2.36	0.407
HC Understand Inf.	3.16	3.36	3.50	3.07	0.082
HC Appraise Inf.	2.71	2.87	2.96	2.43	0.392
HC Apply Inf.	**3.07**	**3.32**	**3.61**	**3.07**	**0.029***
DP Access Inf.	2.63	2.89	2.89	2.71	0.527
DP Understand Inf.	3.13	3.26	3.19	3.29	0.490
DP Appraise Inf.	2.81	3.00	3.00	2.63	0.393
DP Apply Inf.	2.83	3.07	3.29	2.95	0.059
HP Access Inf.	2.66	2.82	2.80	2.47	0.533
HP Understand Inf.	2.86	3.04	2.89	2.79	0.650
HP Appraise Inf.	2.93	2.89	3.14	2.52	0.292
HP Apply Inf.	2.53	2.74	2.89	2.57	0.472

Table 11 shows the average response values by categorized length of imprisonment. Slightly higher scores are often found in the 5-10 years category. Statistically significant differences were observed for three factors: DP Understand Information (p=0.037), HP Appraise Information (p=0.045), and HP Apply Information (p=0.046), indicating that sentence length influences responses in some cases.

Table 11: **Effect of length of imprisonment on responses.**

Factor	Sentence Length Category [Years]				p-value
	(0–1)	[1–5)	[5–10)	10+	
Count	12	53	18	8	
HC Access Inf.	2.88	2.50	2.64	2.31	0.450
HC Understand Inf.	3.08	3.22	3.29	3.25	0.653
HC Appraise Inf.	2.84	2.73	2.72	2.78	0.920
HC Apply Inf.	3.38	3.18	3.04	2.94	0.229
DP Access Inf.	2.63	2.77	2.69	2.19	0.207
DP Understand Inf.	**3.11**	**3.07**	**3.45**	**3.33**	**0.037***
DP Appraise Inf.	2.78	2.78	2.97	3.03	0.492
DP Apply Inf.	2.78	2.88	3.02	3.17	0.600
HP Access Inf.	2.78	2.70	2.73	2.35	0.384
HP Understand Inf.	2.79	2.86	3.06	2.89	0.473
HP Appraise Inf.	**2.75**	**2.83**	**3.19**	**3.08**	**0.045***
HP Apply Inf.	**2.60**	**2.68**	**2.72**	**1.94**	**0.046***

Discussion

Respondents on average found it most difficult to find information about symptoms or illness (HC), to judge if the information about illness in the media is reliable (HC), to judge if the information on health risks in the media is reliable (DP), to find out about policy changes that may affect health (HP) and to influence their living conditions that affect their health and wellbeing (HP). On the other hand, they do not find it a major problem to understand the leaflets that come with their medicine (HC), to understand doctor's instruction on how to also take a prescribed medicine (HC), to follow the instructions on medication (HC), to follow instructions from doctor (HC), to understand why they need health screenings (DP). This largely reflects the specific nature of the prison institution in terms of access to medical care and health information. At the same time, it reflects to some extent the disciplinary nature of the prison institution, where convicts are limited in the exercise of their free will, activities are governed by a daily regime, and female convicts are mostly used to respecting this regime (Zettler 2020). In the case of defiance of the regime, the appropriate punishment for defiance of the prison rules usually follows (Dirga et al. 2015). Again, this can have a significant impact on the way inmates work with information and in many cases is uncritically accepted, where this problem can be expected even after release from imprisonment (Bozick et al. 2018).

Focusing on the differences in factor values, the Access Information (HC) domain, which indicates how easily people can get the health care information they need, seems to be the most difficult for respondents. Meanwhile, the accessibility of information in the prison environment is limited, as are the sources of this information, due to prison rules and regulations that restrict access to external sources such as the Internet, which inmates usually do not have free access to, limiting their ability to obtain up-to-date and necessary information. Instead, they are usually referred to the limited resources such as information booklets, books and television that are available in the prison institution (Solbakken et al. 2024; Semenza – Grosholz 2019). This shows that women inmates do not have access to sufficient and quality information about health services and treatment options. This aspect of health literacy is critical, as access to information affects individuals' ability to make decisions about their own health and to communicate effectively with health care personnel (Sørensen et al. 2013).

The Apply information (HP) section, which focuses on how individuals apply the information to their daily lives to improve their health, also appears problematic. This is the section that shows the individual's ability to receive and interpret information, implement changes based on that information, and

recognize relevant information to maintain good health (Sørensen et al. 2013). In addition to the aspect of lack of access to information, the prison environment is also an environment with a lack of autonomy, an environment that is strictly controlled and structured. This results in very limited opportunities for inmates to make decisions about their activities, including diet, physical activity and health care. This logically complicates their ability and capacity to make informed changes (Semenza – Grosholz 2019). At the same time, implementing lifestyle changes often requires support and access to resources, whether it is healthy food or sports equipment. This is largely limited in prison, as is the opportunity for walks, which are strictly scheduled and controlled (Solbakken et al. 2024).

Equally problematic is the Access Information (HP) area, which is due to the arguments that mostly coincide with the HC area. Obtaining information in the HP area appears to be slightly less problematic compared to the HC area. To some extent, this may be because HP information, especially on healthy lifestyle, diet and exercise, is usually more accessible as it can be disseminated through brochures, leaflets or education and prevention programmes, that are available in prisons (Bonato et al. 2024).

Considering demographic and other observed aspects in terms of assessing the health literacy of incarcerated women, it was found that the age category as an aspect influencing the responses is significant especially in the case of understand information (DP), apply information (DP) and appraise information (HP). The given seems to be easier for the category of incarcerated women aged above 50 years. Older inmates may have a better ability to understand, apply and evaluate health information because of their greater life experience with various health problems and care, which allows them to better understand and apply new information. Similarly, interest in health and prevention increases with age (Fernandez et al. 2016). At the same time, age is an aspect that may contribute to greater cognitive maturity, where older inmates may have more developed critical thinking and the ability to assess information. Interestingly, there is generally a relationship between age and health literacy levels in the general population. Older adults tend to have lower levels of health literacy, often due to a decline in cognitive abilities and less access to or active use of modern information technology. At the same time, however, older people often have a better understanding and application of health information because of greater life experience and increased motivation in relation to prevention and self-care (Chesser et al. 2016). This is clearly reflected across the population spectrum, not excluding the prison environment.

Although there was no clear relationship between the highest level of education attained and the level of health literacy in the specific prison population

studied, it appears that the focus of education rather than the level of education is significant here. The situation is different if the women prisoners had health education, where these women do not seem to have a problem in terms of access to health information, application of information in relation to disease prevention and understanding of information in terms of health promotion. Access to information itself cannot be given here by the prison institution where it is limited, but it is very likely that these women already have the relevant information. At the same time, people with health education are equipped with knowledge of professional terminology to facilitate their understanding of health care information (Shahid et al. 2022). In this regard, it can be stated that despite all the barriers and structural settings of the prison institution, it is possible to support the integration of education of convicts in topics related to health literacy, which would help female convicts, in addition to their own access to health information, to better understand this information, thereby strengthening their ability to critically evaluate different treatment and prevention options and strengthen their ability to make more informed decisions about their health. Informed women would be able to better utilize the health services available in prisons, while also preparing for the post-prison period through this education. Finally, better health literacy and understanding of their own health needs could help to reduce recidivism (Shahid et al. 2022)

In the case of incarcerated women, there appears to be a relationship between subjectively perceived social status and health literacy (Fernandez et al. 2016). When considering subjectively perceived social status, it can be observed that incarcerated women who subjectively identified their social status as High are advantaged in certain areas. Incarcerated women with this subjectively perceived status consider some tasks in relation to their level of health literacy to be less challenging, which may be due to better access to information prior to incarceration, but also to higher self-esteem. In particular, the ability to apply information (DP), access to information (HP) and understanding of information (HP) appear to be different between the social status categories. The results suggest that the subjective perception of social status of women prisoners has an impact on how women perceive their ability and how effectively they can work with health information. This may reflect the social and economic conditions before entering imprisonment, but also during imprisonment, when a woman may receive more material support from her family and thus be able to afford treatment that economically weaker convicts cannot afford in the absence of funds to pay for medication in Czech prisons. Similarly, there may be the influence of past access to education, cultural capital or other social factors that may affect the perceptions and abilities of incarcerated women.

The findings suggest that female inmates' assessment of physical activity has a significant impact on their ability to deal with health care information and health in general. This suggests that higher levels of physical activity may be associated with better health literacy. In general, there is a relationship between health literacy and physical activity, with people with higher levels of health literacy tending to be more physically active because they understand the health benefits of physical activity, which may increase motivation to exercise regularly (Buja et al. 2020). However, being in prison limits physical activity in several ways. This restriction is not only spatial, as women inmates often move around in a small space, whether it is the cells themselves or the prison grounds, and the movement is structured according to the daily prison schedule. The possibility of movement is also limited to specific hours of the day. Inmates do not have free access to exercise throughout the day and the daily prison regime is monitored and enforced. Similarly, the choice of physical activities is limited. The restriction of physical activity in prison not only affects the level of health literacy of convicts but may also have consequences in terms of their physical and mental health. Restricted access to exercise can lead to a range of health problems from weight gain, deterioration in cardiovascular health and general physical condition (Strong et al. 2020). In terms of mental illness, it can be noted that convicts with restricted movement often suffer from increased anxiety, depression and other mental health problems (Strong et al. 2020). Conversely, engaging in sports activities in prison can have a positive impact on the health of convicts. Therefore, sports programmes should be encouraged in prisons, which, in addition to increasing health literacy levels, help to improve physical fitness, reduce stress and can serve as a tool to reduce accumulated aggression (Mutz – Müller 2023). The Yellow Ribbon Run project, which is aimed at raising awareness of the issue of reintegrating former prisoners into society and combating prejudice against them, is one of the examples of good practice implemented in the prison in focus. In the prison under investigation, this run is part of the resocialisation activities aimed at helping women convicts. The women who participate in the run are part of the training for the run. This is a successful activity, however, across the prison spectrum this type of activity needs to be reinforced across the board and at a higher intensity to ensure accessibility to a wider range of inmates. This would have a secondary impact on health literacy and self-care levels in selected areas.

At the same time, the results suggest that the length of imprisonment may affect inmates' ability to understand and apply health information, as well as their ability to evaluate health care information. In particular, the category of inmates with a sentence length of 5-10 years shows slightly higher scores in

these areas. This may be influenced by several aspects, including adaptation to the prison environment, as well as greater exposure to educational programs related to longer prison stays. At the same time, partial motivation is maintained, as the length of the sentence is not substantially long compared to many other convicts and the prospect of continuing in civilian life is maintained, as well as, as a rule, ties to family and friends and often the possibility of early release if conditions are met. At the same time, inmates who spend longer in prison not only adapt to the conditions of the institution as such but may also undergo social and psychological adaptation (Dirga et al. 2015). This allows them to cope more effectively with information about health care and health in general, as well as it can lead to more active involvement in programs that strengthen their skills in the areas of interest (Haney 2012).

The present study has some limitations that need to be noted. First, the research focused on a specific population of convicted women in one women's prison in the Czech Republic, which may lead to limited generalizability of the results. Different demographic and social characteristics in other prisons in other states may affect the results of the study. Similarly, the use of the HLS-EU-Q47 questionnaire, which is not fully adapted to the specifics of the prison population, may be limiting and therefore contextual factories specific to the prison environment must be considered. The questionnaire is also self-assessing in nature. The dynamics of the prison environment itself may then influence the results of the study, especially the specificities of this environment, such as the restricted movement and social isolation of women prisoners.

Conclusion

The aim of the study was to investigate the level of health literacy of female inmates in a selected women's prison in the Czech Republic. To achieve this goal, the author focused on determining the level of health literacy using the HLS-EU-Q47 questionnaire and identifying demographic factors that influence it, as well as contextualizing health literacy within access to health care in the Czech prison system. The topic is important primarily as one of the significant stimuli for the development of desirable activities within the treatment programme for convicts to reinforce desirable behaviours, contribute to resocialisation and secondarily contribute to minimising recidivism of women after release.

It could be stated that there are statistically significant differences between the factor groups ($p < 0.001$). Healthcare Access Information was considered the most difficult by the respondents, followed by Health Promotion Apply Information and Health Promotion Access Information. Healthcare Understand Information was considered the easiest by respondents, followed by Disease

Prevention Understand Information and Healthcare Apply Information. In general, women inmates find it more challenging to obtain information about symptoms and illnesses and to assess the reliability of information about illnesses and health risks. Conversely, they do not have more difficulty understanding information about taking medication and instructions from doctors. These aspects are largely influenced by the limited access to information in the prison, the availability of only basic health care without choice and, in the case of non-acute problems, long waiting times before access to a doctor is provided. Available resources are limited in this respect in the prison environment.

Demographic factors such as age, and subjectively perceived social status play a significant role in the level of health literacy. Older female inmates demonstrate a better ability to handle health information, which can be attributed to their greater life experience and higher motivation to take care of their health. Subjectively perceived high social status was also found to contribute to better health literacy. Length of sentence also affects women's ability to manage health information, with women with longer sentences (5-10 years) showing slightly higher levels of understanding and application of this information.

These findings highlight the need to improve access to health information and increase health literacy among women inmates. Improving access to educational programs and increasing the availability of quality information in prisons could contribute to better health care and women's preparedness for life after release. This would not only improve their health literacy but could also reduce recidivism and promote successful reintegration into society.

The results of this study may be valuable for further research and for the development of policies and programs aimed at improving the health literacy and overall well-being of incarcerated women.

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