Replicating Evidence in a New Context: A Cross-Sectional Study of Multidomain Quality of Life in Serbian Prisons

Abstract

This cross-sectional study assessed Quality of Life (QOL) using the WHOQOL-BREF among 600 prisoners (14% female, 71% in closed regimes) across five large Serbian facilities, aiming to replicate and extend international findings. Four QOL domains and their correlates, gender differences, and the contributions of each domain to overall QOL were examined. Mean scores ranged from 55.48 (environmental) to 67.02 (psychological), with overall QOL averaging below 60. Regression analysis revealed that physical health was the strongest predictor of overall QOL (β = .35), followed by environmental QOL (β = .32), diverging from U.S. data, and that males reported significantly higher QOL than females. While partially replicating earlier data, these findings provide the first detailed QOL profile of Serbian prisoners and reveal context-specific differences in correlates and demographic patterns. These findings fill a major geographical gap, confirm that QOL is profoundly compromised, and underscore the need for environment- and health-oriented prison reforms in Serbia.

Keywords: quality of life, WHOQOL-BREF, prisoners, Serbia, prison environment, gender

Introduction

Importance of QOL in Prisons

Quality of life (QoL) in correctional settings is generally defined as a multidimensional and subjective assessment of well-being and functioning within the prison environment (Prost et al., 2020; Skowroński & Talik, 2021, 2023b). As a broad concept, QOL includes physical, psychological, social, and existential domains, capturing how prisoners evaluate their living conditions, sense of purpose, ability to function, and capacity for agency while incarcerated (Muller, 2020; Prost et al., 2020). Over time, it has emerged as one of the central constructs in prison research, relevant to prisoner well-being, rehabilitation, and the effectiveness of institutional interventions (Combalbert et al., 2019; Muller, 2020; Seifu et al., 2023).

Several studies have further demonstrated that QOL is important for understanding prisoner adjustment and predicting long-term outcomes such as recidivism (Prost et al., 2022; Rogers et al., 2024). Evidence across diverse prison systems indicates that poorer QOL is associated with deteriorating physical and psychological health, heightened stress, and reduced coping capacity (Combalbert et al., 2019; Seifu et al., 2023). Lower QOL is consistently predicted by psychological distress, depression and anxiety, and associated with disengagement from rehabilitative programs and higher recidivism risk. Conversely, social support and family contact are among the strongest protective factors, and higher QOL is linked to better engagement in rehabilitative programs and more positive post-release adjustment (De Claire & Dixon, 2017; Ghazanfari et al., 2023).

The literature recognises QOL as a sensitive and valid indicator of the overall health burden of incarceration, evidenced by prisoners' compromised physical and psychological QOL compared to the general population, often reflecting chronic illness, anxiety, and the worsening of health during custody (Combalbert et al., 2019; Désesquelles, 2012; Muller, 2020; Prost et al., 2020; Seifu et al., 2023; Zwemstra et al., 2009). Furthermore, QOL is

closely tied to rehabilitative success. Numerous studies demonstrate that factors associated with improved well-being, including family visits, perceived social support, positive staff relations, and access to education or income-generating work, contribute to post-release preparedness and broader social support (De Claire & Dixon, 2017; Ghazanfari et al., 2023; Ilijić et al., 2024; Kosilov et al., 2019; Prost & Novisky, 2022). Thus, QOL provides an integrative framework that bridges health research and correctional policy as it reflects both individual adaptation to imprisonment and the institutional capacity to safeguard well-being and influence behavioural outcomes. In general, the growing use of QOL in both criminology and correctional policy reflects a transition from purely disciplinary and recidivism-based metrics toward a more holistic understanding of prisoners' well-being (Ahmed et al., 2025; Hussin et al., 2025).

Prior Research on QOL in Correctional Settings

Previous studies, particularly in the U.S. and Western Europe, have shown that QOL is multidimensional, encompassing physical, psychological, social, and environmental domains, and that these domains are linked to overall well-being and behaviour in prison. Prost et al. (2020) examined QOL in a large U.S. jail, providing one of the most systematic studies of prisoner QOL. The results showed that psychological QOL was the strongest predictor of overall life quality, and female prisoners reported significantly lower QOL than males. Large-sample and population comparisons consistently show that prisoner and detained groups have lower QOL than general or non-detained populations. In France and Ireland, all aspects of QOL (physical health, psychological health, social relationships, and environment) were rated as poorer when compared with population norms (Combalbert et al., 2019; Mooney et al., 2002), with a severe disadvantage in physical health (Désesquelles, 2012). A similar pattern of compromised QOL was observed in other studies. Prisoners in Thailand

reported lower overall personal well-being and higher economic stress compared to other cohort members (Yiengprugsawan et al., 2012).

Similarly, a study in the Netherlands found that prisoners with mental disorders reported poorer QOL than both the general population and prisoners without psychopathology. However, their QOL in the physical, psychological, and environmental domains was still higher than that of psychiatric outpatients (Zwemstra et al., 2009). Furthermore, a systematic review concluded that detained offending populations report lower QOL than general population samples, with the worst scores among those with untreated mental illness; social factors (e.g., relationships) were the most consistent longitudinal predictors of QOL (Muller, 2020). Finally, there is a high prevalence of poor self-reported QOL among male prisoners in Italy, with health worsened during custody (Nobile et al., 2011), whereas prisoners' well-being in Serbian prisons is influenced by factors such as living conditions, contact with family, and the professional behaviour of prison staff (Ilijić et al., 2024). As for personal characteristics, older age and higher education are linked to better QOL, whereas longer incarceration and prior offences predict lower QOL ratings (De Smet et al., 2017; Novisky et al., 2025; Putri et al., 2020).

Rationale, Context and the Aim of the Present Study

Despite these advances, the literature remains geographically imbalanced, with little evidence from non-Western or post-socialist prison systems, particularly those of Serbia and the broader Southeast European region (Milićević, 2024; Nivette, 2025). Serbia's penal system is characterised by a strong reliance on custodial sentencing and its post-socialist legacy (Feješ, 2007; Hacin et al., 2022; Radosavljević, 2020; Tripković, 2016), which is reflected in consistently high incarceration rates relative to the European averages (Aebi & Cocco, 2025). In early 2024, Serbia recorded 177.1 prisoners per 100,000 inhabitants, substantially

exceeding the European average (121.7) and median (104.8) (Aebi & Cocco, 2025). At the same time, the average length of imprisonment is comparatively short (6.7 months vs. 11.3 months in Europe), and the prison density is close to the European median (97.9 per 100 places vs. 93.6). Serbia also has a relatively small proportion of female (4.1%) and foreign prisoners (6.3%), and a gradually ageing prison population (Aebi & Cocco, 2025). However, staffing capacity is markedly lower, with 2.7 prisoners per staff member compared with a European average of 1.6, indicating substantial operational strain (Aebi & Cocco, 2025). Furthermore, data indicate very high admission and release rates (316.5 and 301.6 per 100,000 inhabitants, respectively, compared with European averages of 163.4 and 143.3), producing a high-turnover prison system (63.3 vs. a European average of 52.3). Prisoner treatment combines individual and group-based interventions, work engagement, education, leisure activities, and structured rehabilitation planning (Bobić et al., 2022).

Overall, prisons are facing significant resource strain and financial costs, largely caused by elevated incarceration rates (Babin et al., 2020; Reljanović & Knežević Bojović, 2014). This pressure is accompanied by a long-term expansion of the prison population: between 2005 and 2024, Serbia recorded a 70% increase in incarceration rates, in sharp contrast to the slight decline observed at the European level (Aebi & Cocco, 2025). Although Serbia cannot be classified as overcrowded in terms of official prison density (Aebi & Cocco, 2025), the combination of very high incarceration and turnover rates and a markedly elevated prisoner-to-staff ratio suggests a system operating under sustained operational pressure (Bobić et al., 2022; Ilijić et al., 2024; Milićević & Hacin, 2025). These structural features are likely to translate into more restrictive daily regimes, reduced staff availability, and limited access to services, rehabilitative activities, and meaningful out-of-cell time (Coyle, 2002; Nyvoll, 2025). Given these characteristics, alongside traditional security-oriented regimes, limited

rehabilitative services, and ongoing reforms (Tripković, 2016; Vujičić & Karić, 2020), the Serbian prison system is a valuable setting for testing the transferability of QOL research. To address this gap, our study applies the methodology of Prost et al. (2020) to the Serbian prison system. Using the same WHOQOL-BREF instrument allows us to assess the generalisability of international findings and to establish the first systematic baseline of QOL in Serbian prisons, enabling future longitudinal and intervention research in the region. On the other hand, different outcomes would be equally informative, as they could help us identify the unique pressures and systemic challenges specific to the Serbian context.

The aim of this cross-sectional research is, therefore, to replicate and extend the findings of Prost et al. (2020) using a sample of prisoners in Serbian prisons. Specifically, the aim was to: (1) describe the QOL of prisoners in Serbia across the four main WHOQOL-BREF domains (physical health, psychological health, social relationships, and environment); (2) examine the relationships of age and gender with QOL domains and overall QOL; and (3) explore how each domain contributes to overall QOL. By providing the first detailed assessment of QOL among prisoners in Serbia, this study fills a major geographical gap in the literature and provides the first step in identifying specific QOL aspects that require attention, particularly those related to the female population.

Method

Procedure

The present study uses data from a larger, cross-sectional survey of QOL and prison climate among adult prisoners in the Serbian prison system (the PrisonLIFE project: https://prisonlife.rs/en/). All data were collected by the authors and project team members, who administered the questionnaires directly to participants. Ethical approval was granted by the Institute of Criminological and Sociological Research, Belgrade, Serbia, and formal authorisation was

obtained from the Administration for the Enforcement of Penal Sanctions. Between May 2022 and January 2023, participants were recruited from five of the country's largest prisons, including one women's facility (Sremska Mitrovica, Niš, Požarevac, Zabela, and Beograd). Eligibility criteria included: being legally sentenced to imprisonment, having served at least 30 days of the sentence, having functional literacy in Serbian, and voluntarily participating with signed informed consent. Individuals held in disciplinary segregation or in acute medical or psychiatric care were not approached. All individuals were fully informed about the study's goals, assured of anonymity, and reminded of their right to withdraw at any time. Questionnaires were personally administered by the research team during a single paper-and-pencil session, usually held in the prison's common dining area. Researchers were present to assist with questions. Completed forms were sealed in envelopes and returned directly to the research team.

Measures

As part of the primary data collection, the research team administered the World Health Organisation Quality of Life – Brief Version (WHOQOL-BREF). This is a self-reported instrument designed to assess perceived QOL within an individual's personal, social and cultural context, as defined by the WHO (WHOQOL Group, 1998). The instrument's cross-cultural validity and psychometric properties have been tested across diverse populations and institutional contexts (Archuleta et al., 2023; Ilijić et al., 2024; Međedović et al., 2024; Putri et al., 2020; Seifu et al., 2023). The WHOQOL-BREF is a key component of the WHO Prison Health Framework and is also widely used to evaluate the QOL of both prisoners and prison staff (Alves Da Costa et al., 2022; De Smet et al., 2017; Kalonji et al., 2017; Muller, 2020). Although a formal validation of the WHOQOL-BREF in a Serbian prison population is not yet available, previous analyses using the same dataset have demonstrated acceptable

psychometric performance in terms of internal consistency, distributional properties, and the absence of floor and ceiling effects (Ilijić et al., 2024).

The WHOQOL-BREF consists of 24 items grouped into four domains (physical health, psychological, social relationships, and environment), two introductory health questions, and two additional items on general QOL and health satisfaction (WHOQOL Group, 1998). Physical health domain covers areas such as daily functioning, energy, mobility, pain, sleep, and dependence on medication (7 items, e.g., *How satisfied are you with your sleep?*). Psychological domain evaluates mood, self-esteem, body image, spirituality, and cognitive functions, such as memory and concentration (6 items, e.g., *How much do you enjoy life?*). The social relationships domain evaluates personal relationships, social support, and sexual activity (3 items, e.g., *How satisfied are you with the support you get from your friends?*). Finally, the environmental domain explores various environmental factors, such as financial resources, safety, healthcare access, living conditions, and opportunities for learning, recreation, and leisure (8 items, e.g., *How healthy is your physical environment?*).

Items are rated on a five-point Likert scale, ranging from 'never' to 'always', 'not at all' to 'extremely/completely', 'very poor' to 'very good', or 'very dissatisfied' to 'very satisfied', depending on the item. Raw domain scores were transformed into a 0–100 scale to be comparable with the WHOQOL-100, where higher scores indicate better QOL. The overall QOL score was computed by obtaining the sum of two additional items measuring general QOL (*How would you rate your quality of life?*) and health perception (*How satisfied are you with your health?*). The introductory health questions include a dichotomous item (*Are you currently ill?*) and an open-ended follow-up (*If something is wrong with your health, what do you think it is?*), both of which were included in the analyses.

The psychometric evaluation of the WHOQOL-BREF on the sample confirmed acceptable to good reliability (Table 1), with Cronbach's alpha coefficients ranging from .53 (social

relationships) to .84 (physical health). In a previous analysis using the same dataset (Ilijić et al., 2024), all domains showed a balanced distribution of scores, as none exhibited floor or ceiling effects (less than 15% of responses at the extreme limits). Although Kolmogorov-Smirnov tests indicated statistically significant deviations from normality, the skewness and kurtosis values were within acceptable limits (less than 2), suggesting the variables were reasonably normally distributed for the study's purposes.

The Social Relationships domain showed lower internal consistency ($\alpha = .53$), which is consistent with prior WHOQOL-BREF findings and likely due to the small number of items (Kalfoss et al., 2021; Međedović et al., 2024). However, the mean inter-item correlation was .30, which falls within the recommended optimal range (.20–.40) for short scales (Piedmont, 2023), supporting acceptable internal coherence (Sitarenios, 2022). Results for this domain should nevertheless be interpreted with caution. The domain was retained to ensure comparability with previous international studies using the WHOQOL-BREF and because social relationships represent a theoretically important component of QOL in custodial settings (e.g., Greberman et al., 2025; Zwemstra et al., 2009).

In addition to the WHOQOL-BREF scores, other demographic and health data were collected, including self-reports (age, time served, and a binary question regarding current illness) and information retrieved from correctional records (gender, education, prison ward, sentence length).

Participants

Table 1 shows the demographic, criminological, and health-related characteristics of the prisoner sample ($n = 600$). The average age of the sample was 39.8 years (median: 39 years, IQR: 32–45), with the first arrest usually happening in the late twenties ($M = 28.4$ years). The typical sentence length was nearly 8 years, ranging from 2 months to 40 years. Most

participants were men (86%), ethnically Serb (83%), and had at least some high school education (69%). Female prisoners (14%) were only recruited from Požarevac, which is the only women's facility. The majority of participants were serving their sentences in closed regimes (71.2%), with fewer in semi-open or open conditions (24.9%). More than half of the prisoners had been incarcerated for over two years at the time of data collection (53%), and 45.8% were recidivists, indicating a high rate of reoffending among the sample. Mean QOL scores ranged from 55.48 (*SD* = 22.04) for environmental QOL to 67.02 (*SD* = 20.31) for psychological health (Table 1). On average, overall QOL score was below 60 (*M* = 56.80, *SD* = 24.77). Internal consistency for the WHOQOL-BREF was adequate (α > .70). The domain of social relationships, however, had a lower α coefficient, likely because that scale is operationalised with only three items.

Self-reported illness was relatively common (40.2%). Among the 221 respondents who provided an open-ended description of their health problem (91.7% of those reporting current illness), approximately two-thirds (65–70%) reported chronic somatic conditions, most commonly cardiovascular, respiratory, metabolic, infectious, and neurological diseases. Musculoskeletal problems, injuries and chronic pain were reported by roughly 40% of respondents. Mental health problems were mentioned in about 15–20% of responses, and substance dependence in approximately 10%. Acute or minor ailments (e.g., colds, flu-like symptoms) accounted for 10% of responses.

<Table 1 About Here>

Data analysis

Descriptive statistics (*M*, *SD*, proportion) were used to characterise the sample and scores. Pearson's product–moment correlation coefficient was applied to examine associations between age, gender, and QOL scores. Independent-samples *t*-tests were conducted to test

gender differences in the overall QOL and its domains (physical health, psychological, social relationships, and environmental). To account for the unequal group sizes between men and women, Hedges' *g* was calculated as a measure of effect size, providing a weighted estimate that corrects for sample imbalance, where values around 0.2, 0.5, and 0.8 represent small, medium, and large effects, respectively. Finally, multiple linear regression (with listwise deletion) was used to evaluate the relative contributions of each QOL domain to overall QOL after controlling for age and gender.

Participants were selected based on the WHOQOL-BREF completion criteria, requiring a minimum of 21 out of 26 items answered. The final sample (n = 600) exceeded minimum statistical requirements (Tabachnick & Fidell, 2019), and preliminary analyses confirmed the assumptions of linearity, homoscedasticity, normality, and independence of residuals, with multicollinearity and outliers ruled out. Standardised regression coefficients (β) were presented, while unstandardised coefficients (B) were used to interpret their individual effect. Population-based WHOQOL-BREF norms reported by Hawthorne et al. (2006), derived from pooled random community samples in Australia, were used as a reference benchmark for interpreting domain scores. Open-ended responses to the WHOQOL-BREF follow-up question (*If something is wrong with your health, what do you think it is?*) were grouped into broad, overlapping categories (e.g., chronic somatic conditions, musculoskeletal problems and injuries, mental health problems, substance dependence, acute/minor conditions), and then descriptively analysed. Although many prisoners reported multiple conditions, their responses helped us contextualise the self-reported prevalence of current illness.

Results

Bivariate analyses (Table 2) revealed positive correlation between all scores and the overall QOL (r = .40–.70; p < .01), with the strongest association between overall QOL and physical

health. Age was negatively associated with most QOL measures, but only its positive association with the environmental QOL was statistically significant (r = .12, p < .01). Concerning gender, all QOL scores and overall QOL were positively and significantly related to being male (r = .12–.22; p < .01), except for the social relationships domain.

<Table 2 About Here>

Findings from the independent t-tests (Table 3) confirm that male prisoners in the current sample reported significantly higher QOL scores than their female counterparts on most domains, as indicated in bivariate analyses. The largest difference was found in overall QOL, where male prisoners reported significantly higher scores than female prisoners (t = -5.58, g = 0.66), followed by the environmental QOL (t = -4.68, g = 0.55). Conversely, the smallest and non-significant difference between genders was found in the social relationships QOL (t = -0.85, g = 0.10).

<Table 3 About Here>

The measure of variance (R^2) indicates that the second model provides a better fit between the model and the data than the first model (Table 4). This suggests that aspects of QOL influence overall QOL more than age and gender alone. Physical, psychological, and environmental QOL all made significant contributions to overall ratings. Among these, physical health contributed the most to overall QOL (β = .35), followed by environmental (β = .32) and psychological (β = .22) domains (all p < .01). A 1-point improvement in physical health, environmental, and psychological scores is associated with an increase of 0.39, 0.36 and 0.27 in the global WHOQOL-BREF score, respectively.

<Table 4 About Here>

Discussion

This study replicated the research of Prost et al. (2020) with a sample of prisoners in Serbia. The aims were to describe QOL across four domains, examine gender differences and QOL correlates, and assess how each domain contributes to overall QOL. Participants reported QOL scores in the mid-range on the 0–100 WHOQOL-BREF scale. The environmental domain received the lowest ratings. This reflects widespread dissatisfaction with physical conditions, safety, and resources. In contrast, the physical and social domains received comparatively higher scores, likely reflecting health concerns, fatigue, sleep problems, dependence on medical care, and support from close relationships. The psychological domain, capturing mood, self-esteem, enjoyment of life, and concentration, received the highest score. Overall, our findings partially replicate those of Prost et al. (2020) by confirming domain-specific variations and consistently low environmental QOL. Serbian prisoners had higher mean scores across domains, especially in social relationships, but their overall QOL was slightly lower than of the U.S. sample. As in Prost et al. (2020), all domains correlated significantly with overall QOL; however, in Serbia, physical health was the strongest predictor, whereas psychological QOL was the strongest predictor in the U.S. sample. Only a small positive association was found between age and environmental QOL in Serbia, differing from the negative associations reported by Prost et al. (2020). Gender disparities were confirmed, with men reporting higher QOL. Whereas Prost et al. (2020) found significant gender differences in just two domains (physical and psychological), our results revealed differences in four scores (all but social relationships), confirming the urgent need for gender-responsive policies and practices (Batrićević et al., 2023; Milićević & Hacin, 2025).

Taken together, these findings suggest that overall QOL for prisoners in Serbia is determined mainly by physical health and material–institutional conditions, whereas psychological and social QOL contribute less significantly to overall life quality. Furthermore, women and older prisoners may be particularly vulnerable, especially regarding environmental constraints (e.g.,

safety, privacy, material conditions, and access to health care and meaningful activities). Consequently, these results point to specific areas for reform, including healthcare continuity, safety, and improved living conditions.

Prisoner QOL Across WHOQOL-BREF Domains

Our first aim was to describe domain-specific QOL in Serbian prisons and to situate these patterns in relation to existing international evidence. Compared with population-based WHOQOL-BREF norms derived from pooled random Australian community samples (Hawthorne et al., 2006), QOL in the five Serbian prisons is considerably lower across all domains (55.5–67.0 vs. 70.6–75.1). The largest absolute deficits are concentrated in the environmental (−19.62), physical (−7.84), and social (−7.39) domains, indicating pronounced disadvantage in material–institutional and health-related dimensions of imprisonment. Hawthorne et al. (2006) found that scores in the low-to-mid 70s reflect typical perceived functioning and well-being, whereas substantially lower scores appear among individuals reporting poorer health status. Furthermore, respondents in poor health scored up to 50% lower than those in excellent health, highlighting the clinical and public health relevance of these norms. Against this reference point, the gap observed in the Serbian prison sample reflects a marked disadvantage across all QOL dimensions, with particularly acute impairment in domains most directly shaped by institutional living conditions.

International research shows that while absolute QOL scores vary between countries, the relative importance of specific domains and the general impact of imprisonment on well-being remains largely consistent. Physical health is typically rated in the mid-range of the WHOQOL-BREF scale, often reflecting chronic illness, ageing, pain, limitations in everyday activities, and unfavourable prison conditions (Mommaerts et al., 2025; Seifu et al., 2023). The psychological and social relationships domains are often rated as low to moderate,

reflecting reduced enjoyment of life, more frequent negative emotions, difficulties with concentration, and dissatisfaction with perceived support from close relationships. Studies attribute these lower scores mainly to mental health problems, limited coping resources and social support, and restricted family contact (Prost et al., 2020; Seifu et al., 2023). Environmental QOL, covering safety, living conditions, access to health and social care, and opportunities for learning and recreation, is generally described as low and found to depend on regime type, overcrowding, institutional order, length of incarceration, and staff professionalism (Archuleta et al., 2023; Ilijić et al., 2024; Kalonji et al., 2017; Međedović et al., 2024; Seifu et al., 2023).

It is important to note that WHOQOL-BREF findings are not directly comparable at the institutional or national prison system level. Instead, they are most helpful in identify recurring patterns in how incarcerated populations experience different domains of QOL. These findings can also show the extent to which certain deprivations appear structural rather than context-specific. From a classic penological perspective, some of these deficits represent the structural 'pains of imprisonment', inherent in the deprivation of liberty and unlikely to be eliminated (Sykes, 2007). Others, by contrast, vary according to institutional design, regime quality, and resource availability and adequacy (De Smet et al., 2017). Persistent dissatisfaction in autonomy and environmental control may therefore represent structural features of incarceration rather than solely remediable institutional shortcomings. Nevertheless, consistently low environmental and physical scores indicate that, despite these structural limits, material conditions, safety, healthcare access, and daily living conditions remain critical leverage points for institutional improvement.

Empirical evidence across diverse prison systems illustrates these recurring patterns. For example, research in Ethiopia reports a mid-range to moderate overall QOL, with very low levels of physical and psychological health (Seifu et al., 2023). Similarly, studies from

Thailand and the Netherlands show that prisoners consistently report lower well-being than non-incarcerated peers, with psychopathology explaining much of this differences; in some cases, prisoners even report higher QOL than psychiatric outpatients, suggesting structured detention could have stabilising effects (Yiengprugsawan et al., 2012; Zwemstra et al., 2009). In the U.S, similar patterns appear, with psychological and social QOL tending to be lowest (Prost et al., 2020).

Meanwhile, recent Serbian studies report relatively better evaluations of living conditions and family contact, but prisoners remained dissatisfied with autonomy, staff professionalism, and opportunities for personal development (Ilijić et al., 2024; Međedović et al., 2024). Taken together, these findings indicate that the same domains continue to emerge as sources of vulnerability despite cross-national variation in absolute QOL levels, underscoring environmental and physical conditions as priority targets for reform-oriented interventions.

Demographic Correlates of Prisoner QOL and Vulnerable Groups

Age Differences in Prisoner QOL

Our second aim was to examine age and gender differences in QOL. Age was not significantly associated with most QOL domains, suggesting broadly similar ratings across physical, psychological, and social domains. Only the environmental QOL (e.g., safety, privacy, material conditions, access to health care and meaningful activities) showed a small positive association, indicating that older prisoners may perceive prison conditions more favourably, possibly reflecting greater adaptation to institutional routines and reduced expectations regarding material and social resources (Avieli, 2022; Solares et al., 2020). However, in the regression model, age was negatively associated with overall QOL. This suggests that, despite slightly more positive evaluation of environmental aspects, older prisoners experience lower overall life quality, consistent with the cumulative health and

psychological burdens of ageing (Kalonji et al., 2017; Kosilov et al., 2019; Solares et al., 2020). This pattern aligns with findings from a large U.S. jail study, in which older prisoners reported lower physical QOL, partly explained by reduced visitation and social contact, both of which are known to reduce health decline and support well-being (Prost & Novisky, 2022). Global literature similarly indicates that older prisoners tend to perceive their physical and mental health more negatively due to higher rates of chronic illness and functional decline (Di Lorito et al., 2018; Mommaerts et al., 2025; Novisky et al., 2025; Prost et al., 2021; Solares et al., 2020). Studies from France and Indonesia suggest that older prisoners often develop better environmental adaptation. In these contexts, age is associated with improved coping, emotional regulation, social relationships, and problem-solving skills. This suggest a complex relationship between ageing and QOL, which could help explain our findings (Combalbert et al., 2019; Putri et al., 2020).

Taken together, these findings suggest that older prisoners in Serbia may constitute a vulnerable group whose lower overall QOL may not be fully captured by domain-specific ratings, confirming to the need for age-sensitive health care, mobility support, and psychosocial services in custody (Archuleta et al., 2023; Combalbert et al., 2019; Putri et al., 2020).

Gender Differences in Prisoner QOL

Consistent with U.S. findings (Prost et al., 2020), Serbian female prisoners reported lower mean scores across all WHOQOL-BREF domains than males. However, the effect sizes were more pronounced in our sample, with the largest differences in the overall and environmental QOL. In contrast, Prost et al. (2020) reported significant gender differences only in the psychological and physical QOL domains. For instance, the gender gap in the environmental domain was moderate in the Serbian sample (Hedges' $g = 0.55$), but small and non-significant

in a U.S. study (Hedges' $g \approx 0.19$). Because this domain captures perceived financial resources, safety, access to health and social care, living conditions, and opportunities for learning and recreation, the observed difference may reflect context-specific environmental constraints faced by women in Serbian prisons. However, as these factors were not directly measured, this interpretation should be treated cautiously, and future research should integrate objective institutional indicators with prisoners' subjective assessments to examine their combined impact on QOL.

Gender disparities may also reflect gendered economic vulnerability in custody, as women may enter prison with greater economic precarity, fewer financial resources, and weaker external economic support networks (Harner et al., 2017). A U.S. county jail study similarly found that male prisoners experienced significantly better physical health-related QOL and lower financial anxiety, with gender differences in physical QOL explained mainly by disparities in financial well-being (Panisch et al., 2019). Conversely, the minimal and non-significant difference found in the social domain suggests that both male and female prisoners may maintain this aspect of QOL relatively equally despite restrictive conditions (Schaefer et al., 2017).

Gender differences in our sample may also parallel Belgian findings showing that more vulnerable groups often face barriers to communicating their needs, leading to under-recognised psychological distress (De Smet et al., 2017). Related evidence indicates that higher QOL is associated with better treatment engagement, whereas low satisfaction, particularly in social relationships, is linked to poorer engagement (Van Damme, Hoeve, et al., 2015). It is also important to note that older and female prisoners frequently have fewer opportunities for social support, work, and recreation, which in low-resource prison environments directly influence psychological and environmental QOL (Seifu et al., 2023).

Histories of trauma and psychiatric disorders are also highly prevalent among female prisoners, and have an adverse effect on their QOL (Prost et al., 2022; Van Damme, Colins, et al., 2015). These vulnerabilities may partly explain the lower scores observed among women in our study, particularly in physical health and environmental QOL, reflecting chronic health and sleep problems, fatigue, dependence on medical care, restricted autonomy, limited access to resources, and constrained physical surroundings. Environments perceived as unsafe or threatening are likely to reproduce feelings of vulnerability and loss of control among women with trauma histories, further exacerbating poor health perceptions and distress, and thereby lowering overall QOL (Prost et al., 2022). However, the absence of gender difference in the social relationships domain aligns with findings that detained females may maintain relatively high satisfaction with interpersonal relationships despite severe psychiatric difficulties and socioeconomic disadvantage (Van Damme, Colins, et al., 2015). This domain may therefore remain comparatively preserved even in highly vulnerable female populations, which may help explain the lack of gender differences in our sample.

Taken together, these findings indicate that while lower QOL among female prisoners is consistent across jurisdictions, the magnitude of gender disparities varies by institutional contexts, resources, and policy frameworks. In Serbia, these differences likely reflect broader socioeconomic inequalities, limited institutional support, and insufficient gender-responsive policy frameworks, consistent with prior national evidence (Batrićević et al., 2023; Ćopić et al., 2012; Ćopić & Šaćiri, 2012; Milićević, 2025; Nikolić-Ristanović & Ćopić, 2015; Savić & Knežić, 2019). However, the limited predictive role of age and gender corresponds with the conclusion of Zwemstra et al. (2009) that structural and contextual factors, rather than individual characteristics, account for most QOL variance. Our results extend these findings by suggesting that QOL may serve as a sensitive indicator of institutional well-being even in the absence of clinical data.

Domain Contributions to Overall QOL: Which Domains Matter Most for Overall QOL?

General Findings and Relative Contributions of QOL Domains

Our third aim was to assess the relative contribution of each QOL domain to overall QOL. Regression analysis demonstrated that the domains jointly explained a significantly larger proportion of variance in overall QOL than demographic variables (gender and age) alone. Physical health, psychological QOL, and environmental QOL made significant independent contributions, whereas the social relationships domain did not, consistent with Prost et al. (2020). However, the hierarchy of influence differed across contexts. While psychological QOL was the strongest predictor in the U.S. study, physical health emerged as the most influential factor in Serbia, closely followed by environmental QOL.

Prisons in both the U.S. and Serbia face staffing pressures and high incarceration and turnover rates, but direct cross-national comparisons remain limited due to differences in system organisation, security levels, and measurement practices (Aebi & Cocco, 2025; Federal Bureau of Prisons, 2024; Mueller & Kluckow, 2025; Nivette, 2025). International research indicates that overcrowded and highly restrictive prison environments intensify both health problems and environmental deprivation (Aon et al., 2025; Baffour et al., 2024; Pearce et al., 2026). While official data show no overcrowding in Serbia by European standards (Aebi & Cocco, 2025), high turnover and limited staff may put pressures on daily routines, service continuity, and staff-prisoner interaction, comparable to those seen in European prisons (Nyvoll, 2025). This may help explain why physical and environmental QOL, capturing health functioning and material–institutional conditions, emerged as the strongest predictors of overall QOL in our sample.

This pattern may also partly reflect a sampling effect, as prisoners in disciplinary segregation and those receiving acute medical or psychiatric care were not included. These groups often

exhibit the strongest interactions between physical illness, psychological distress, and severely compromised QOL (Mommaerts et al., 2025; Mooney et al., 2002; Nobile et al., 2011; Novisky et al., 2025; Skowroński & Talik, 2023a, 2023b; Zwemstra et al., 2009). As a result, our findings reflect a relatively stable prison population and may underestimate the overall health-related burden and the strength of interdependencies among QOL domains. This should be considered when interpreting the strength and generalisability of the observed associations, particularly for the most vulnerable prisoner subgroups.

Physical Health and Environmental QOL are the Primary Determinants of Overall QOL

The dominant role of physical health in predicting overall QOL likely reflects the high prevalence of infectious and chronic disease observed in prison populations globally (Merten et al., 2012; Solares et al., 2020). More than 40% of our sample reported being current ill based on a self-reported WHOQOL-BREF item. Over 90% of these respondents described chronic somatic conditions (e.g., cardiovascular and respiratory diseases, diabetes, infectious diseases such as hepatitis and HIV, neurological conditions), musculoskeletal injuries and chronic pain, as well as mental health problems and substance dependence. Acute or minor ailments (e.g., colds or flu-like symptoms) were present but accounted for only a small proportion of responses. The strong influence between poor physical health and overall QOL may therefore reflect the burden of chronic and multimorbid conditions, consistent with patterns documented in Dutch and Thai cohorts (Yiengprugsawan et al., 2012; Zwemstra et al., 2009). Although the overall prevalence of self-reported illness in our sample is somewhat lower than in other European prison studies (e.g., Combalbert et al., 2019), this difference may reflect underreporting, variations in health perceptions, or differences in access to and continuity of healthcare across facilities.

Environmental QOL emerged as a second, nearly equally strong predictor of overall QOL, underscoring the role of material and institutional conditions in shaping prisoners' well-being. This domain captures perceived safety, material resources, access to healthcare, and living conditions, consistent with evidence showing that better-designed, newer, or more rehabilitative facilities yield more positive prisoner evaluations (Alves et al., 2024; Ilijić et al., 2024). Regime type, staff–prisoner relationships, financial resources, access to services, and opportunities for work or education are systematically associated with higher QOL (Harner et al., 2017; Ilijić et al., 2024; Milićević & Glomazić, 2025; Seifu et al., 2023). For example, prisoners who moved into a newer Italian facility reported higher evaluations of light, safety, sociability, concentration, and overall satisfaction than those in an older prison (Alves et al., 2024). In Serbia, prisoner safety has been identified as one of the strongest predictors of the overall quality of prison life (Milićević & Glomazić, 2025), while dissatisfaction with educational provision highlights gaps between prisoner needs and institutional resources (Malčić et al., 2024). Evidence from Sweden and the U.S. further indicates that restricted autonomy, safety, and access to services (Puthoopparambil et al., 2015), and financial strain (Harner et al., 2017), significantly reduce prisoner well-being.

The relatively strong predictive power of both physical health and environmental QOL may also partly reflect the educational profile of our sample: 69% had at least secondary education, compared with predominantly low-educated prison populations in some prior studies (e.g., Combalbert et al., 2019). Higher education may heighten awareness of health risks and sensitivity to environmental quality, which, in turn, may influence overall QOL (Combalbert et al., 2019; Sheehan, 2019).

Taken together, these findings suggest that constraints in safety, privacy, material conditions, healthcare access, and meaningful activities, such as education, skill development and recreation, remain central determinants of prisoners' overall QOL. Accordingly, institutional

reforms that strengthen safety, service provision, and financial stability (e.g., paid work and reintegration funds), and access to education, may plausibly support improvements in perceived QOL, even within the structural constraints of custodial environments.

The Contribution of Psychological QOL in the Correctional Settings

Psychological QOL, while not the strongest predictor, as observed in the U.S. study (Prost et al., 2020), remains a significant contributor to overall life quality in our model. International studies consistently highlight its role in prisoner well-being, as this domain is particularly sensitive to trauma, social disadvantage, low trust, and economic stress. For example, lower trust, higher economic stress, and lower personal well-being were reported among prisoners in Thailand (Yiengprugsawan et al., 2012). A large study in Ethiopia found that moderate overall health-related QOL but very poor physical and psychological health, which were negatively affected by age, medical conditions, and depression (Seifu et al., 2023). In the Dutch study, psychological health accounted for most of the QOL variance among prisoners with mental disorders, complementing our finding by highlighting the influence of high rates of mental illness within prison populations (Zwemstra et al., 2009).

Psychological QOL, which captures enjoyment of life, emotional well-being, self-esteem, and cognitive functioning, is particularly sensitive to psychosocial adversity, with research documenting that it is strongly affected by trauma and social disadvantage among detained young females in Belgium (Van Damme, Colins, et al., 2015). Studies on immigrant detainees in Sweden further highlight the role of staff support for psychological, but also for physical QOL (Puthoopparambil et al., 2015). These global comparisons confirm that while needs related to physical health and environmental conditions may be more immediately pressing in Serbia (Milićević & Hacin, 2025), psychological well-being remains a critical and context-dependent component of overall QOL.

Taken together, these findings suggest that although physical health and environmental QOL have the strongest influence on overall QOL in Serbia, psychological well-being remains an important and potentially modifiable domain. Efforts to increase access to mental health care, trauma-informed support, meaningful activities, and positive staff-prisoner relationships could further improve well-being, especially for vulnerable subgroups.

Demographic Predictors and Social QOL as Non-Significant Domain

As in Prost et al. (2020), the social relationships domain did not significantly contribute to overall QOL. In strictly controlled prison environments, restricted social interactions may limit the influence of relational factors (e.g., perceived social support, quality of personal relationships, and intimate life) relative to health and material conditions. However, several lines of evidence suggest that overall QOL is not determined by the physical health and material conditions, but also by prisoners' internal psychological capital and social resources (Greberman et al., 2025; Harner et al., 2017; Mommaerts et al., 2025; Panisch et al., 2019; Prost & Novisky, 2022; Rogers et al., 2024).

For example, a study from Spain found that social loneliness and sexual satisfaction are significant predictors of prisoners' QOL, particularly among those without a partner, with lower loneliness and higher sexual satisfaction associated with better psychological, environmental, and overall QOL (Carcedo et al., 2012). Moreover, male and female prisoners with a heterosexual romantic partner in the same facility were found to report higher global, psychological, and environmental QOL, along with greater sexual satisfaction and lower romantic loneliness (Carcedo et al., 2011), which could help contextualise the protective role of intimacy and companionship in otherwise deprived environments. Recent evidence from Indonesia demonstrated that prison-based social rehabilitation programs can improve QOL across all domains within six months (Andriany & Anggiri, 2025). In Poland, social support

emerged as a significant positive correlate of prisoners' QOL, supporting its role as a protective factor in rehabilitation and well-being (Skowroński & Talik, 2023b). Accordingly, the lower social QOL scores observed in both our study and Prost et al. (2020) likely reflect restricted opportunities for meaningful interaction, intimacy, and autonomy in custodial settings, rather than any intrinsic irrelevance of social relationships for prisoner well-being.

In contrast to the U.S. study (Prost et al., 2020), demographic variables in our sample showed independent predictive power. Gender remained a significant predictor of overall QOL even when accounting for all four WHOQOL-BREF scores, reinforcing earlier findings that males experience a baseline advantage in QOL not fully explained by the domains alone. Finally, age was a small yet statistically significant negative predictor of overall QOL, indicating that the ageing process within the Serbian correctional settings independently contributes to a marginal decline in overall QOL.

Taken together, these findings suggest that, while relational interventions remain valuable, structural conditions of imprisonment, including healthcare access and the material living conditions, may exert a particularly strong influence on the QOL of women and older prisoners. This conclusion aligns with structural challenges faced by both groups. It parallels financial- and health-based gender and age disparities documented in earlier studies and underscores the value of targeted, rather than uniform, reform strategies (Combalbert et al., 2019; De Smet et al., 2017; Panisch et al., 2019; Putri et al., 2020; Solares et al., 2020).

Implications

Our findings suggest that improving targeting physical health and material–institutional conditions are likely to yield the most immediate and substantial increases in prisoner well-being in Serbia. Priority areas include continuity of healthcare for chronic and multimorbid

conditions, timely access to medical services, improvements in safety and basic living conditions, and the availability of meaningful daily activities.

The strong predictive role of the environmental domain further implies that institutional measures aimed at strengthening service provision, financial stability (e.g., paid prison work, reintegration funds), and access to education and vocational training could contribute to measurable improvements in overall QOL, even within the structural constraints of prison environments. While the social relationships domain did not independently predict overall QOL, international research suggests that social support and rehabilitative programming remain important for longer-term well-being and reintegration outcomes, and that social interventions should complement, rather than replace, material and health-focused reforms. Furthermore, given the observed gender and age disparities, future policy should address the structural disadvantages faced by women and older prisoners to ensure equitable QOL outcomes, with particular attention to gender-responsive healthcare, privacy and safety measures, age-appropriate healthcare and accessibility adaptations. Finally, the differences found in the hierarchy of QOL predictors compared to Western studies confirm the value of extending such comparative research to non-Western contexts to develop more culturally and structurally relevant correctional policies.

Strengths, Limitations and Future Directions

This study offers novel empirical data on QOL in a previously neglected correctional context. However, several limitations should be noted. First, the cross-sectional design limits conclusions about the directionality of relationships between QOL domains and overall QOL. Second, reliance on self-report data and convenience sampling may have biased outcomes toward prisoners with higher literacy. Third, the exclusion of individuals in disciplinary segregation or those receiving acute medical or psychiatric care during data collection may

have skewed the sample toward a more stable prison population, potentially underestimating the overall burden of health-related problems and their impact on QOL.

Furthermore, environmental conditions were not assessed using objective institutional indicators. Health status was assessed using a single self-reported WHOQOL-BREF item, supplemented with open-ended descriptions and descriptively categorised for contextual purposes. These data reflect participants' perceptions and do not include clinically verified diagnoses. Finally, cross-national comparisons should be interpreted with caution due to differences in sampling frames, prison regimes, and measurement practices, which limit direct comparability.

Future work should address these methodological limitations through longitudinal studies to track changes in QOL over time, intervention-based designs to test policy efficacy of specific policies, and broader comparative research across regional jurisdictions. Replicating this study with larger, representative samples and integrating objective institutional and health measures along subjective assessments is recommended.

Conclusion

This study provides the first systematic evidence on prisoner QOL in Serbia, revealing both parallels with Western findings and clear context-specific patterns. It can be concluded that overall well-being is determined not only by physical health and environmental conditions but also by the psychological resources prisoners bring to the carceral setting. Taken together, these findings offer an essential empirical foundation for evidence-based institutional reforms in Serbia and contribute valuable comparative insights to the international QOL literature.

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Table 1. Sample characteristics

Variable		*M* (*SD*)	Observed range
Age (years)		39.79 (10.15)	20–73
Age of first arrest (years)		28.35 (10.67)	14–69
Sentence length (years, months)		7 y 11 mo (8 y 4 mo)	2 mo–40 y
Quality of life[a]			
	Overall quality of life[b]	56.80 (24.77)	0.00–100.00
	Physical health (α = .84)	65.66 (22.37)	7.14–100.00
	Psychological (α = .79)	67.02 (20.31)	0.00–100.00
	Social relationships (α = .53)	64.11 (22.07)	0.00–100.00
	Environmental (α = .82)	55.48 (22.04)	0.00–100.00
		n	%
Gender	Male	516	86.0
	Female	84	14.0
Ethnicity	Serb	498	83.0
	Roma	20	3.3
	Hungarian	8	1.3
	Others	20	3.4
	Did not declare	54	9.0
Education	Elementary school or lower	169	28.2
	High school or higher education	413	68.9
Prison	Požarevac (women)	84	14.0
	Sremska Mitrovica	189	31.5
	Niš	179	29.8
	Zabela	119	19.8
	Beograd	29	4.8
Regime	Closed[c]	427	71.2
	Semi-open and open	149	24.9
Length of current incarceration[d]	≤ 6 months	74	12.3
	6 months to 1 year	93	15.5
	1 year to 2 years	115	19.2
	> 2 years	318	53.0
Recidivism (yes)		275	45.8
Presence of illness (yes)[e]		241	40.2

Note. *n* = 600. Observed range was given in Min–Max format.

[a] Transformed WHOQOL-BREF scores; theoretical range: 0–100. Population norms reported by Hawthorne et al. (2006): physical 73.5 (*SD* = 18.1); psychological 70.6 (14.0); social 71.5 (18.2); environmental 75.1 (13.0). [b] Combined score of two items: 'How would you rate your quality of life?' and 'How satisfied are you with your health?'. [c] Closed regime includes prisoners in maximum-security units. [d] At the time of data collection. [e] Self-reported, based on the WHOQOL-BREF item: 'Are you currently ill?'.

Table 2. Relationships among age, gender, and quality of life in prisoners in Serbia

Variables	1	2	3	4	5	6
1. Age						
2. Gender	.03					
3. Overall QOL	-.04	.22**				
4. Physical health	-.06	.17**	.70**			
5. Psychological	-.04	.12**	.66**	.68**		
6. Social relationships	-.07	.03	.40**	.43**	.50**	
7. Environmental	.12**	.19**	.67**	.60**	.64**	.48**

Note. n = 600. Gender: 0 = female, 1 = male. QOL = quality of life. ** $p < .01$.

Table 3. Disparities in the quality of life between male and female prisoners in Serbia

WHOQOL-BREF Scores	Females	Males	t (df)	Hedges' g
Overall quality of life	43.07 (24.56)	59.02 (24.10)	-5.58 (594)**	0.66
Physical health	56.08 (23.68)	67.22 (21.78)	-4.27 (593)**	0.51
Psychological	61.03 (22.66)	68.00 (19.74)	-2.93 (596)**	0.35
Social relationships	62.20 (21.29)	64.42 (22.20)	-0.85 (596)	0.10
Environmental	45.22 (24.33)	57.16 (21.20)	-4.68 (594)**	0.55

Note. n = 598. Values are M (SD). ** $p < .01$.

Table 4. Variation in the quality of life of prisoners in Serbia

	Overall quality of life				
	Model 1		Model 2		
Variable	B (SE)	β	B (SE)	β	95% CI
Constant	48.96 (4.74)**		-5.50 (3.88)		[-13.13, 2.13]
Gender	15.76 (2.90)**	.22	6.16 (1.87)**	.09	[2.49, 9.83]
Age	-0.14 (0.10)	-.05	-0.15 (0.06)*	-.06	[-0.28, -0.02]
Physical health			0.39 (0.04)**	.35	[0.31, 0.47]
Psychological			0.27 (0.05)**	.22	[0.17, 0.36]
Social relationships			-0.01 (0.03)	-.01	[-0.07, 0.06]
Environmental			0.36 (0.04)**	.32	[0.28, 0.44]
R^2	.05		.63		
F	15.52**		159.71**		
ΔR^2			0.57		
ΔF			220.04**		

Note. n = 581. CI = confidence interval for B in Model 2 [lower limit, upper limit]. Gender: 0 = female, 1 = male. * $p < .05$. ** $p < .01$.

Plain Language Summary Title:
What Life Is Like in Serbian Prisons: A Study of Health, Safety, and Daily Living Conditions for Men and Women

Plain Language Summary:
People in prison often live under challenging conditions that can affect their physical and mental wellbeing. However, very little is known about what everyday life feels like for prisoners in Serbia. This study set out to understand how prisoners in Serbia rate their quality of life, and whether men and women have different experiences.
We worked with 600 adults held in five major prisons across the country. We asked them about four main areas of their lives: their physical health, their emotional well-being, their relationships with others, and the quality of their living environment. This type of study, conducted at a single point in time, helps show what conditions look like right now.
Overall, prisoners rated their quality of life as low. The weakest area was the living environment. Many people described problems with safety, noise, overcrowding, and access to resources. The strongest area was emotional well-being, although scores were still low compared with those of people living in the community.
When we looked at what mattered most for overall well-being, physical health played the most significant role. People who felt healthier also reported better overall quality of life. The living environment was the next most important factor. We also found that men, on average, reported a better quality of life than women, suggesting that women in prison may require additional support. These results are significant because they offer the first detailed picture of daily life for prisoners in Serbia. They show that improving health care, safety, and living conditions should be major priorities. They also highlight the need for gender-sensitive services, as women's experiences and needs may differ from men's. The findings can help guide future reforms to create safer, healthier, and more humane prison environments.