FACTOR ANALYSIS OF QUALITY OF LIFE INDICATORS AMONG OLDER INTERNALLY DISPLACED PERSONS WITHIN THE FRAMEWORK OF HEALTH-ENHANCING RECREATIONAL PHYSICAL ACTIVITY

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Summary

The ongoing military conflict and forced displacement have significantly impacted the quality of life (QoL) of older individuals. This study aims to analyze the internal structure of QoL indicators among older internally displaced persons (IDPs) and substantiate the role of physical activity in their rehabilitation.

Methods. A sample of 152 older IDPs (aged 60+) was assessed using the SF-36 Health Survey. Statistical analysis included exploratory factor analysis (Principal Component Analysis with Varimax rotation), with preliminary validation via KMO (0.727) and Bartlett's tests ($p < 0.001$).

Results. The study identified moderate QoL levels (45.6–46.3 points), with the lowest scores in Role-Physical (41.1) and Role-Emotional (42.3) domains. A two-factor model was established, explaining 33.9% of the total variance. Factor 1 ("Role and Physical Limitations") revealed a strong coupling between physical pain and emotional functioning. Factor 2 ("Socio-Emotional Resource") demonstrated that vitality is inextricably linked to social integration. Notably, Mental Health (0.971) and Physical Functioning (0.890) exhibited exceptionally high uniqueness, suggesting a "resource conservation mode" and functional decoupling under chronic stress.

Conclusions. The findings confirm that war and displacement impose a "double burden" on older IDPs, simplifying their QoL structure to basic survival dimensions. Improving QoL requires comprehensive health-improving recreational physical activity (HRPA) programs. An effective strategy must integrate moderate aerobic exercise (e.g., Nordic walking) with "mental fitness" modalities (yoga, Pilates) to simultaneously address physical limitations and bolster psycho-emotional resilience through group-based socialization.

Key words: SF-36 health survey, physical and mental health components, active aging, social integration, host communities.

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1. Introduction

The hostilities in Ukraine have driven a substantial increase in the number of internally displaced persons (IDPs), with older adults emerging as a particularly vulnerable cohort. As of January 2026, approximately 3.7 million IDPs are registered in Ukraine, with individuals aged 60 and over accounting for more than 50% of this population *(IOM, 2026)*. Older IDPs represent one of the most at-risk demographics within the context of contemporary armed conflict. Forced displacement, the severance of social ties, and the loss of a familiar living environment exert a multifaceted negative impact on their psychophysical well-being *(Hakman et al., 2025)*. This underscores the urgent need for effective integration and socialization strategies, where health-enhancing and recreational physical activity serves as a primary intervention.

The WHO defines Quality of Life as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" *(WHO, 1998: 11)*.

In their research, N. Bielikova, S. Indyka, A. Tsos, and L. Vashchuk conceptualize the quality of life among conflict-affected populations as a complex, multidimensional construct encompassing physical health, psycho-emotional state, and social well-being. Their findings underscore the profound impact of hostilities on declining living standards and emphasize the critical role of an individual's subjective self-assessment *(Bielikova et al., 2022)*.

In later life, quality of life is defined as a comprehensive attribute rooted in the fulfillment of physical, mental, and social potential within the "active aging" paradigm. The pivotal factors are subjective life satisfaction and health-enhancing recreational physical activity, which aim to preserve autonomy and bolster the psycho-emotional state *(Andrieieva et al., 2021)*.

Recent psychometric evaluations of the SF-36 in geriatric groups have challenged the traditional two-component model. While some studies in general populations support the two-factor structure *(Souza et al., 2018)*, research specifically focused on older adults often identifies more complex structures. A recent study on older adults found that a three-factor model provided a significantly better fit than the traditional two-factor version *(Román-Quirós et al., 2024)*. Similarly, research on Mexican older adults confirmed a four-factor structure through Confirmatory Factor Analysis, suggesting that the instrument's dimensions are more nuanced in late life *(Aguirre et al., 2022)*.

A 2024 meta-analysis specifically examining the use of SF-36 among refugees and displaced persons – a group highly comparable to elderly IDPs – concludes that the instrument remains a robust measure for assessing health-related quality of life in conflict-affected contexts *(Essex et al., 2024)*.

Factor analysis using Principal Component Analysis with varimax rotation in geriatric samples has sometimes yielded an 8-factor solution, accounting for over 76% of the observed variance in quality-of-life indicators *(Harith et al., 2020)*. This supports the structural validity of the eight individual scales rather than just the two aggregate scores *(Bartsch et al., 2011)*.

Research indicates that the SF-36 effectively discriminates between health states in the elderly, with physical functioning scores typically declining linearly with age, whereas mental health scores may remain more stable *(Bartsch et al., 2011)*. Furthermore, women in these populations consistently report lower quality-of-life scores across both physical and mental domains than men *(El Osta et al., 2019)*. The consensus among recent researchers is that while the SF-36 is a valid and reliable instrument for monitoring the quality of life in elderly populations *(El Osta et al., 2019)*, the use of factor analysis is essential to confirm which specific dimensions-such as physical functioning or social traits-are most impacted by the unique stressors faced by internally displaced persons *(Aguirre et al., 2022)*.

Therefore, it is essential not only to assess quality-of-life indicators among older IDPs using the SF-36 survey but also to perform a factor analysis of the results. This approach enables the identification of critical factors requiring intervention and provides a scientific rationale for HERPA's efficacy in mitigating stress-related impacts and enhancing functional health status.

The study aims to identify the structure and interrelationships among quality-of-life indicators among older IDPs (assessed via the SF-36 Health Survey) using factor analysis. This approach seeks to provide a scientific rationale for the potential impact of health-enhancing recreational physical activity on their psychophysical well-being.

2. Materials and Methods

Participants.

The study sample comprised 152 internally displaced persons (IDPs) residing in Chernivtsi, Ukraine, during the assessment period. The distinct patterns informed the decision to maintain gender homogeneity in quality-of-life perception and HERPA engagement, characteristic of older adults. Participants were categorized as older adults according to the WHO classification. The mean age of the respondents was M = 68 years (SD = 4.2).

Organization of research.

Data collection was carried out at the "Turbota" Municipal Social Service Center in Chernivtsi. In accordance with ethical standards, all participants were briefed on the study objectives and provided voluntary informed consent for the processing of their personal information. To ensure respondent confidentiality, all surveys were conducted anonymously.

Methods.

The primary assessment tool was the non-specific Short Form Health Survey (SF-36). This methodology allows for a comprehensive assessment of respondents across eight scales: Physical Functioning (PF) – reflects the extent to which physical health limits physical activities (self-care, walking, climbing stairs, carrying loads, etc.); Role-Physical (RP) – the impact of physical health on daily role activities (work, daily chores); Bodily Pain (BP) – pain and its impact on the ability to perform daily activities, including housework and outside work; General Health (GH) – a general self-assessment of health status; Vitality (VT) – implies feeling full of energy and vigor or, conversely, exhausted; Social Functioning (SF) – determined by the extent to which physical or emotional state limits social activities (communication); Role-Emotional (RE) – involves assessing the extent to which emotional state interferes with work or other daily activities (including increased time spent, reduced workload, decreased quality, etc.); Mental Health (MH) – characterizes mood, presence of depression, anxiety, and a general indicator of positive emotions. The eight scales listed above are classified into two categories, forming integral indicators of Physical Component Summary (PF, RP, BP, GH) and Mental Component Summary (VT, SF, RE, MH) *(Krutsevych et al., 2019; Ware et al., 1992)*.

Data management and initial processing were conducted in Microsoft Excel 2016, with subsequent statistical analysis performed in JASP (Version 0.95.4). Descriptive statistics included the calculation of means (M) and standard deviations (SD). Factor analysis was executed using Principal Component Analysis (PCA). To achieve a more interpretable factor structure, Promax oblique rotation was employed, accounting for potential inter-factor correlations inherent in health-related data. Sampling adequacy for factor analysis was assessed using the Kaiser-Meyer-Olkin (KMO) measure (threshold> 0.7) and Bartlett's test of sphericity ($p < 0.05$), indicating the presence of significant patterned relationships among the variables.

3. Results

The analysis of the study findings revealed moderate levels of quality of life across the majority of the surveyed domains (Table 1).

Table 1

Mean Scores for Individual SF-36 Domains of Physical and Mental Health Components Among Older IDPs (N=152)

Quality of Life Components	Domain / Subscale	Mean Score	SD (%)
Physical Component Summary	Physical Functioning (PF)	50,2	17,68
	Role-Physical (RP)	41,1	36,89
	Bodily Pain (BP)	48,0	20,48
	General Health (GH)	43,2	14,20
Mental Component Summary	Vitality (VT)	46,3	14,71
	Social Functioning (SF)	49,2	19,07
	Role-Emotional (RE)	42,3	38,36
	Mental Health (MH)	46,3	6,03

Data analysis using the SF-36 questionnaire revealed that the composite scores for both the PCS and MCS are moderate (approximately 45–46 points out of 100). These findings suggest moderate functional limitations among the studied demographic.

Table 2

Summary Quality of Life Scores for Older IDPs based on the SF-36 Health Survey (N=152)

Quality of Life Components	Mean Score	SD (%)
Physical Component Summary	45,6	15,6
Mental Component Summary	46,3	13,3

PCS (comprising PF, RP, BP, and GH) yielded a mean score of 45.6. The most significant impairments were identified in the RP domain (mean = 41.1), characterized by high variability among respondents. BP and GH scores were moderate, potentially acting as limiting factors for physical activity. Specifically, the lower GH score (43.2) aligns with age-related morbidities exacerbated by the current national crisis.

MCS (comprising VT, SF, RE, and MH) averaged 46.3. While SF showed relative stability (±49), RE domain remains a critical area of concern (±42), highlighting substantial challenges in maintaining social and professional roles.

To elucidate the latent structure of quality-of-life indicators among older IDPs, an exploratory factor analysis was performed using PCA with Varimax rotation. Preliminary diagnostics confirmed the sampling adequacy: the KMO measure was 0.727, exceeding the threshold for adequacy, while Bartlett's test of sphericity reached statistical significance ($\chi^2 = 223{,}531$; $p < 0{,}001$), validating the presence of robust correlations between the scales. The analysis yielded a two-factor model that accounted for 33.9% of the total variance in quality-of-life scores (Table 3).

Table 3

Factor Loadings of SF-36 Domains for Older IDPs (N=152)

Quality of Life Components	Factor 1 "Role and Physical Limitations"	Factor 2 "Social-Emotional Resource"	Uniqueness
Role-Emotional (RE)	0,753		0,502
Role-Physical (RP)	0,737		0,526
General Health (GH)	0,552		0,677
Bodily Pain (BP)	0,492		0,498
Social Functioning (SF)		0,651	0,686
Vitality (VT)		0,562	0,539
Mental Health (MH)			0,971
Physical Functioning (PF)			0,890

The first factor aggregates indicators reflecting the immediate impact of health status on respondents' daily functioning. The structure is anchored by the RE (0.753) and RP (0.737) domains. Given these predominant loadings, the factor was labeled "Role and Physical Limitations." This indicates that for older IDPs, the primary determinant of quality of life is the capacity to fulfill customary duties and social roles, irrespective of psycho-emotional or physical challenges. The inclusion of GH (0.552) and BP (0.492) reinforces the conclusion that physical discomfort is a direct correlate of social and role maladaptation.

The second factor, identified as the "Socio-Emotional Resource", characterizes the individual's adaptive potential and encompasses SF (0.651) and VT (0.562). The clustering of these domains underscores that energy levels and subjective vigor in older IDPs are inextricably linked to the quality of their social integration and the presence of communal support in their displacement settings. This underscores the critical need for group-based interventions and active social engagement to bolster their psychological and emotional resilience.

The domains of PF and MH warrant particular scrutiny, as they exhibited remarkably high uniqueness indices (0.890 and 0.971, respectively). These findings suggest that among IDPs aged 60 and older, the capacity for self-care and levels of anxiety or depression operate with relative autonomy from the broader quality of life framework. Specifically, mental health emerges as a standalone dimension. This phenomenon may be driven by prolonged chronic stress resulting from the military conflict, where an individual's internal psychological state undergoes a functional decoupling from physical comfort and social engagement.

4. Discussion

Our findings delineate a distinct QoL profile for older IDPs, which diverges significantly from both the general population and younger IDP cohorts. The identified moderate scores for the Physical Component Summary (45.6) and Mental Component Summary (46.0) are broadly consistent with the data reported by Bielikova et al. (2024), who observed comparable trends (49.0 and 37.0, respectively). Notably, the mental health component in our sample is higher than previously reported; this discrepancy may be attributed to the specific psychological adaptation mechanisms inherent to older adults, potentially reflecting greater emotional resilience or life experience.

The low scores within the domains RP (41.12) and RE (42.32) are particularly alarming. When contrasting these findings with the pre-war data of Krutsevich et al. (2021), who studied women aged 50+ in peacetime (reporting RP = 46 and RE = 53), a marked decline is evident. This disparity reinforces the hypothesis that war and forced relocation impose a "double burden" on elderly IDPs. Their capacity to maintain daily roles is compromised not merely by age-related physical wear and tear but is further exacerbated by profound psycho-emotional distress.

The identified two-factor model – "Role and Physical Limitations" and "Socio-Emotional Resource" – illustrates a distinct QoL architecture shaped by the chronic stress of forced relocation, separation from social networks, and pervasive future uncertainty. The clustering of the RE domain with physical indices (RP, GH, BP) demonstrates a profound interdependence: for older IDPs, psychological equilibrium is inextricably bound to physical well-being. Consequently, their emotional backdrop is contingent upon physical comfort and pain levels; any experience of physical malaise triggers an almost instantaneous decline in emotional health.

It is noteworthy that while Mexican researchers *(Aguirre et al., 2022)* identified a four-factor SF-36 structure as typical for the elderly, our findings reveal a consolidation into only two factors. This structural narrowing suggests that under the pressure of constant stress and anxiety, the physiological and psychological systems of older IDPs have shifted into a "resource conservation mode." Rather than a multifaceted quality-of-life framework, the structure has collapsed into two fundamental pillars: the physical capacity to withstand strain and the availability of social scaffolding. This reflects a typical clinical picture of individuals whose internal reserves have been depleted by protracted adversity.

The exceptionally high uniqueness index of the Physical Functioning (PF = 0.890) underscores its operational autonomy within the factor structure. This finding aligns with the consensus that targeted, health-improving recreational physical activity is the most potent catalyst for enhancing QoL. Specifically, the data from Zaloilo et al. (2024) demonstrate that systematic Pilates training yielded a 1.3-fold increase in physical health scores and a 1.8-fold increase in mental health scores. Such evidence suggests that physical activity is not merely a motor task but a fundamental bridge to restoring the multifaceted quality of life for vulnerable populations.

Furthermore, the emergence of the second factor, "Socio-Emotional Resource," which bridges social activity and vitality, underscores the critical importance of group-based health-improving and recreational physical activity. As highlighted by Hakman et al. (2024), the synergy of physical recreation, novel experiences, and social interaction significantly enhances self-perception and emotional well-being in older adults. This reinforces the need for structured group activities as a primary tool for psychosocial rehabilitation among displaced elderly populations.

The observed autonomy of the Mental Health (MH) indicator suggests that conventional health programs may be inadequate for addressing the psychological needs of older IDPs. We propose the integration of "Mental Fitness" modalities (such as yoga, Pilates, and breathwork) that emphasize the mind-body connection – an approach validated by recent research *(Zaloilo et al., 2024)*. Such interventions are uniquely positioned to simultaneously mitigate pain and physical constraints (Factor 1) while bolstering the socio-emotional resources (Factor 2) essential for this population.

Consistent engagement in HRPA enhances strength, endurance, and flexibility, thereby alleviating limitations in daily functioning and reducing fatigue *(Krutsevych et al., 2019)*. Beyond biomechanical benefits, such activity stimulates circulation and muscle plasticity, improving pain modulation in chronic conditions and reducing cardiovascular risks *(Geneen et al., 2017)*. Crucially, physical activity facilitates a reduction in stress, anxiety, and depressive symptoms via neurochemical pathways involving endorphins and serotonin *(Eime et al., 2013)*.

Group-based sessions foster socialization, mitigate social isolation, and enhance both mood and self-regulatory capacity *(Andrieieva et al., 2021)*.

Based on our findings, health-improving recreational physical activity is a robust intervention for improving quality of life in this population. The systematic integration of self-regulation techniques (including mental fitness, yoga, Pilates, breathwork, Tai Chi, Qigong, and relaxation methods), combined with moderate aerobic exercise (e.g., Nordic walking) and resistance training at least twice weekly, is expected to optimize the vital QoL domains. Specifically, these interventions target the two-factor structure identified in our study: "Role and Physical Constraints" (RE, RP, GH, BP) and the "Socio-Emotional Resource" (SF, VT).

5. Conclusions

The study established that Quality of Life scores among older IDPs remain at a moderate level (45.6–46.3), reflecting substantial limitations in daily functioning. The Role-Physical (41.1) and Role-Emotional (42.3) domains were identified as the most critical impairments, stemming from the cumulative impact of health decline and psychological stress.

Factor analysis yielded a two-factor model accounting for 33.9% of the total variance. The first factor, "Role and Physical Limitations," confirms that emotional well-being is not autonomous but is highly contingent upon physical comfort and pain management. The second factor, "Socio-Emotional Resource," highlights that vitality and vigor are inextricably linked to successful social integration within the host community.

A high degree of uniqueness was observed for Mental Health (0.971) and Physical Functioning (0.890). This suggests that under chronic war-related stress, psychological states may undergo functional decoupling from physical health, necessitating specialized interventions.

Scientific evidence indicates that improving QoL in this cohort requires comprehensive Health-improving and Recreational Physical Activity (HRPA) programs. An optimal strategy should integrate moderate aerobic exercise (e.g., Nordic walking) to address physical decline with "mental fitness" modalities (yoga, Pilates, breathwork) to bolster psycho-emotional resilience and foster group socialization.

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