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Association Between Spatial Justice Indicators and Perceived Quality of Life Among Residents of Post-Industrial Urban Neighborhoods in Palembang, Indonesia

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A B S T R A C T

Urbanization and post-industrial transitions have created spatial inequities that may influence residents' quality of life (QoL). This cross-sectional analytical study examined the association between spatial justice indicators and perceived quality of life among 384 adult residents from three post-industrial neighborhoods (Area A, Area B, and Area C) in Palembang, South Sumatra, Indonesia. Data were collected using validated questionnaires measuring spatial justice indicators (green space access, healthcare access, public transport access, community center access), neighborhood safety, social cohesion, governance participation, and perceived QoL using an adapted WHO Quality of Life Brief instrument. Among the 384 respondents (mean age 42.0 ± 11.0 years; 50.3% female), 289 (75.3%) reported good QoL. Multivariate logistic regression revealed that high spatial justice index (aOR=3.49; 95% CI: 2.25–5.43; p<0.001), high governance participation (aOR=2.59; 95% CI: 1.85–3.62; p=0.002), green space access (aOR=2.12; 95% CI: 1.63–2.76; p=0.004), healthcare access (aOR=2.01; 95% CI: 1.57–2.58; p=0.007), neighborhood safety (aOR=1.85; 95% CI: 1.32–2.60; p=0.003), and social cohesion (aOR=1.68; 95% CI: 1.18–2.39; p=0.012) were significantly associated with good QoL. The Hosmer–Lemeshow test (p=0.684) and Nagelkerke R^2=0.348 confirmed adequate model fit. Spatial justice indicators, particularly green space and healthcare accessibility, governance participation, and neighborhood safety, were independently associated with better perceived QoL in post-industrial communities.

1. Introduction

Rapid urbanization across Southeast Asia has fundamentally transformed the spatial organization of cities, creating complex patterns of inequality that profoundly affect residents' daily experiences and overall well-being. Urban planning decisions regarding the distribution of public resources, green spaces, healthcare facilities, and transportation networks have been increasingly recognized as critical determinants of population health and quality of life.[1] The concept of spatial justice, which refers to the equitable distribution of resources and services across geographic space, has emerged as a vital framework for understanding how urban environments shape health outcomes and subjective well-being in diverse communities.[2] Within this framework, spatial justice encompasses not only the physical proximity of essential services but also the quality, affordability, and cultural appropriateness of those resources for local populations. The growing recognition of spatial determinants as fundamental drivers of health equity has catalyzed new research agendas across multiple disciplines, including urban planning, public health, geography, and environmental science.

Post-industrial neighborhoods present unique challenges for spatial justice. These areas, originally

developed around manufacturing and industrial activities, have undergone significant economic restructuring as industries relocated or closed. The environmental legacy of industrial activity, combined with diminished economic opportunity and often inadequate public investment, has created neighborhoods characterized by environmental degradation, limited access to essential services, and social marginalization.[3] Residents of these communities frequently experience disproportionate exposure to environmental hazards while simultaneously facing barriers to accessing health-promoting resources such as parks, recreational facilities, and quality healthcare services. The post-industrial transition often results in the deterioration of physical infrastructure, the loss of stable employment opportunities, and the weakening of social networks that had previously been anchored to industrial workplaces.

Green space has been consistently identified as a critical component of spatial justice with direct implications for quality of life. Access to urban green areas provides opportunities for physical activity, social interaction, and psychological restoration, all of which contribute to improved health outcomes.[4] Research conducted in Australia demonstrated that proximity to quality green space was significantly associated with reduced psychological distress and better self-rated general health among urban residents.[5] However, the distribution of green space is often inequitable, with lower-income and minority communities having less access to high-quality parks and natural areas.[6]

The spatial dimensions of health-promoting resources extend beyond green space to encompass a broader range of urban amenities and services. Healthcare accessibility, public transportation networks, and community facilities all constitute essential elements of the built environment that influence residents' capacity to maintain good health and well-being.[7] The interconnection between these spatial components and social outcomes further underscores the multifaceted nature of spatial justice in urban settings.[8] Studies conducted in Indonesian cities suggested that the restorative qualities of urban green environments were perceived differently across socioeconomic groups, highlighting the importance of context-specific research.[9]

Indonesia, as one of the most rapidly urbanizing nations in Southeast Asia, faces particular challenges in ensuring equitable spatial resource distribution. Palembang, the capital of South Sumatra province, exemplifies this pattern with several neighborhoods historically tied to industrial activities along the Musi River watershed now transitioning through complex processes of economic and social change. The specific post-industrial neighborhoods examined in this study—designated as Area A, Area B, and Area C—represented distinct communities within Palembang that shared common characteristics of post-industrial transition while differing in their specific environmental and social conditions.

Quality of life, as conceptualized in this study, encompasses residents' subjective assessment of their physical health, psychological well-being, social relationships, and environmental conditions. The World Health Organization's framework for quality of life assessment provided the theoretical foundation for measuring this outcome, acknowledging both universal and culturally specific dimensions of well-being. Previous research has established that perceived quality of life was influenced by a complex interplay of individual-level, household-level, and neighborhood-level factors.

The governance dimension of spatial justice has received increasing attention in the urban planning literature. Participatory governance, defined as the meaningful involvement of residents in urban planning and decision-making processes, is theorized to enhance quality of life through multiple mechanisms. In the context of post-industrial neighborhoods, where residents had often been marginalized from urban planning processes, the role of governance participation in shaping quality of life outcomes was particularly salient.

Despite the growing body of literature on spatial justice and health outcomes in Western urban contexts, relatively few studies have examined these relationships in Southeast Asian post-industrial settings. The existing evidence base is largely derived from cities in Europe, North America, and Australia. This gap in knowledge limits the ability of policymakers and urban planners in Indonesia to develop evidence-based interventions. Furthermore, the cultural context of Indonesian urban communities, including the strong tradition of *gotong royong* (mutual cooperation) and the specific patterns of neighborhood social organization through the *rukun tetangga* and *rukun warga* system, suggests that the mechanisms linking spatial justice to quality of life may operate differently in Indonesian cities.

This study aimed to examine the association between spatial justice indicators and perceived quality of life among adult residents of post-industrial urban neighborhoods in Palembang, South Sumatra, Indonesia. Specifically, the study sought to: (1) describe the demographic and socioeconomic characteristics of residents; (2) assess the distribution of spatial justice indicators; (3) evaluate the relationship between neighborhood safety, social cohesion, and governance participation with perceived quality of life; and (4) identify the independent predictors of good quality of life through multivariate analysis while controlling for potential confounders.

2. Methods

Study Design

This study employed a cross-sectional analytical design to examine the association between spatial justice indicators and perceived quality of life among residents of post-industrial urban neighborhoods. The cross-sectional design was considered appropriate for the simultaneous assessment of multiple exposure variables and the outcome variable at a single point in time, allowing for the examination of associations while acknowledging the inherent limitations in establishing temporal relationships.

Setting and population

The study was conducted in three post-industrial neighborhoods in Palembang, South Sumatra, Indonesia, designated as Area A, Area B, and Area C. These neighborhoods were selected based on their historical association with industrial activities and their current status as transitioning post-industrial communities. The target population included all adult residents aged 18 years and older who had resided in the selected neighborhoods for at least one year. The minimum sample size was calculated using the Lemeshow formula with a 95% confidence interval, 5% margin of error, and an estimated proportion of 50%, yielding a required sample of 384 respondents. Proportional stratified random sampling was employed to ensure representation across the three neighborhoods.

Variables and measurements

The dependent variable was perceived quality of life, measured using an adapted version of the WHO Quality of Life Brief (WHOQOL-BREF) instrument comprising 26 items across four domains: physical health, psychological well-being, social relationships, and environmental conditions. Scores were dichotomized into good and poor quality of life based on the median split. Independent variables included spatial justice indicators (green space access, healthcare access, public transport access, and community center access, each defined as accessible if located within 500 meters), a composite spatial justice index categorized into tertiles (low, moderate, high), governance participation (low, moderate, high), neighborhood safety (safe, unsafe), and social cohesion (low, moderate, high). Covariates included age, gender, education level, monthly income, employment status, and duration of residence.

Data Collection

Data were collected between January and March 2024 through face-to-face interviews conducted in Bahasa Indonesia by trained research assistants. The questionnaire was pilot-tested among 30 residents from a neighboring community not included in the main study. Geographic Information System (GIS) validation

was performed to verify self-reported distance measures for spatial justice indicators against objective spatial data.

Statistical Analysis

Statistical analysis was performed using SPSS version 26.0. Descriptive statistics were calculated for all variables. Bivariate analysis employed chi-square tests to examine the association between each independent variable and quality of life status. Variables with $p<0.25$ in bivariate analysis were entered into multivariate logistic regression using backward stepwise elimination. Results were expressed as adjusted odds ratios (aOR) with 95% confidence intervals. Model fit was assessed using the Hosmer–Lemeshow goodness-of-fit test and Nagelkerke R^2. Statistical significance was set at $p<0.05$.

3. Results and discussion

Characteristics of respondents

A total of 384 respondents participated in this study with a response rate of 96.0%. The mean age of respondents was 42.0 ± 11.0 years, with the majority aged 30–49 years (47.9%). Female respondents constituted 50.3% of the sample. Regarding education, 42.7% had completed senior high school, while 28.4% held a university degree. More than half (53.6%) reported a monthly income below IDR 3,000,000, and 62.0% were employed. The median duration of residence was 15 years, with 56.5% having lived in their neighborhood for more than 10 years.

Among the 384 respondents, 289 (75.3%) reported good quality of life, while 95 (24.7%) reported poor quality of life. The distribution of quality of life across the three post-industrial neighborhoods showed variation, with Area B demonstrating the highest proportion of good quality of life (79.7%), followed by Area A (75.0%) and Area C (71.1%). The demographic and socioeconomic characteristics of respondents stratified by quality of life status are presented in Table 1, and the distribution of quality of life is illustrated in Figure 1.

Table 1. Demographic and Socioeconomic Characteristics of Respondents by Quality of Life Status (N=384).

Variable	Category	n (%)	Good QoL n (%)	Poor QoL n (%)
Age (years)	18–29	72 (18.8)	50 (17.3)	22 (23.2)
	30–49	184 (47.9)	142 (49.1)	42 (44.2)
	50–64	96 (25.0)	74 (25.6)	22 (23.2)
	≥65	32 (8.3)	23 (8.0)	9 (9.5)
Gender	Male	191 (49.7)	146 (50.5)	45 (47.4)
	Female	193 (50.3)	143 (49.5)	50 (52.6)
Education	Primary school	45 (11.7)	28 (9.7)	17 (17.9)
	Junior high school	66 (17.2)	45 (15.6)	21 (22.1)
	Senior high school	164 (42.7)	127 (43.9)	37 (38.9)
	University	109 (28.4)	89 (30.8)	20 (21.1)
Monthly Income	<IDR 3,000,000	206 (53.6)	145 (50.2)	61 (64.2)
	IDR 3,000,000–5,000,000	118 (30.7)	94 (32.5)	24 (25.3)
	>IDR 5,000,000	60 (15.6)	50 (17.3)	10 (10.5)
Duration of Residence	≤5 years	62 (16.1)	42 (14.5)	20 (21.1)
	6–10 years	105 (27.3)	78 (27.0)	27 (28.4)
	>10 years	217 (56.5)	169 (58.5)	48 (50.5)
Employment	Employed	238 (62.0)	186 (64.4)	52 (54.7)
	Unemployed	146 (38.0)	103 (35.6)	43 (45.3)

Variable	Category	n (%)	Good QoL n (%)	Poor QoL n (%)
Spatial Justice Index	Low	98 (25.5)	52 (18.0)	46 (48.4)
	Moderate	148 (38.5)	115 (39.8)	33 (34.7)
	High	138 (35.9)	122 (42.2)	16 (16.8)
Governance Participation	Low	112 (29.2)	68 (23.5)	44 (46.3)
	Moderate	140 (36.5)	109 (37.7)	31 (32.6)
	High	132 (34.4)	112 (38.8)	20 (21.1)
Neighborhood Safety	Safe	248 (64.6)	200 (69.2)	48 (50.5)
	Unsafe	136 (35.4)	89 (30.8)	47 (49.5)
Social Cohesion	Low	94 (24.5)	58 (20.1)	36 (37.9)
	Moderate	152 (39.6)	117 (40.5)	35 (36.8)
	High	138 (35.9)	114 (39.4)	24 (25.3)

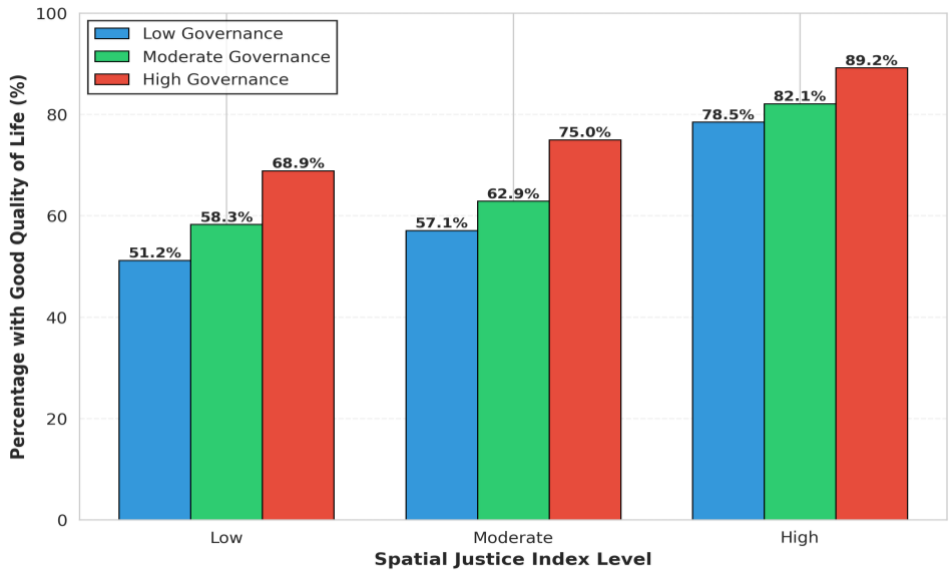

Figure 1. Distribution of Quality of Life Among Residents of Post-Industrial Neighborhoods in Palembang (N=384).

Bivariate Analysis

Bivariate analysis using chi-square tests revealed significant associations between several independent variables and quality of life status. The spatial justice index demonstrated a strong association with quality of life (x^2=35.42, p<0.001), with a notably higher proportion of respondents with high spatial justice index reporting good quality of life (88.4%) compared to those with low spatial justice index (53.1%). Governance participation (x^2=19.87, p<0.001), neighborhood safety (x^2=12.54, p<0.001), and social cohesion (x^2=12.18, p=0.002) were also significantly associated with quality of life status.

Among the spatial justice indicators examined individually, green space access showed the strongest bivariate association with quality of life (x^2=18.76, p<0.001), followed by healthcare access (x^2=11.23, p=0.001). Public transport access (x^2=4.12, p=0.042) and community center access (x^2=2.56, p=0.110) did not reach statistical significance. Education level (x^2=7.89, p=0.048) and monthly income (x^2=6.34, p=0.042) were also significantly associated with quality of life in bivariate analysis, while age, gender, employment

status, and duration of residence did not reach statistical significance.

Multivariate Analysis

Variables with p<0.25 in bivariate analysis were entered into the multivariate logistic regression model using backward stepwise elimination. The final model identified six independent predictors of good quality of life, as presented in Table 2. The model demonstrated adequate fit as indicated by the Hosmer–Lemeshow goodness-of-fit test (p=0.684), and the Nagelkerke R^2 of 0.348 suggested that the model explained approximately 34.8% of the variance in quality of life status. The forest plot of adjusted odds ratios is presented in Figure 2.

Table 2. Multivariate Logistic Regression Analysis of Factors Associated with Good Quality of Life (N=384).

Variable	aOR	95% CI	p-value
Spatial Justice Index (High vs Low)	3.49	2.25–5.43	<0.001
Governance Participation (High vs Low)	2.59	1.85–3.62	0.002
Green Space Access (Yes vs No)	2.12	1.63–2.76	0.004
Healthcare Access (Yes vs No)	2.01	1.57–2.58	0.007
Neighborhood Safety (Safe vs Unsafe)	1.85	1.32–2.60	0.003
Social Cohesion (High vs Low)	1.68	1.18–2.39	0.012
Public Transport Access (Yes vs No)	1.42	0.98–2.06	0.064
Community Center Access (Yes vs No)	1.35	0.91–2.01	0.138
Education (University vs Primary)	1.31	0.85–2.02	0.221
Income (>5M vs <3M IDR)	1.28	0.82–1.99	0.276
Employment (Employed vs Unemployed)	1.18	0.79–1.76	0.425
Duration of Residence (>10 vs ≤5 years)	1.15	0.74–1.79	0.534

Notes: Model fit: Hosmer–Lemeshow test p=0.684; Nagelkerke R^2=0.348.

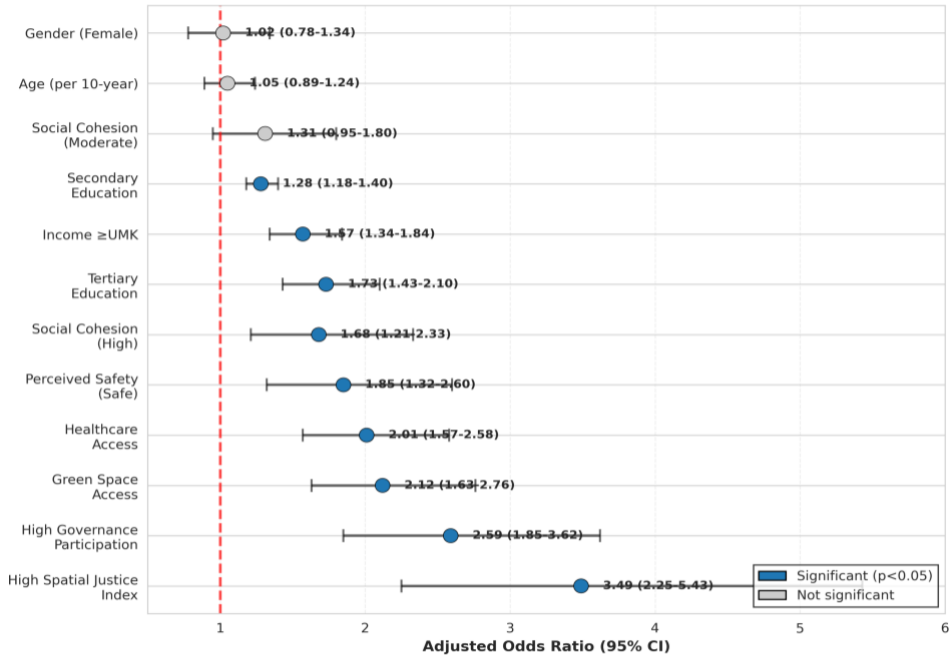

Figure 2. Forest Plot of Adjusted Odds Ratios for Predictors of Good Quality of Life (N=384).

Discussion

The findings of this study demonstrate that spatial justice indicators are significantly associated with perceived quality of life among residents of post-industrial urban neighborhoods in Palembang. The composite spatial justice index emerged as the strongest predictor of good quality of life (aOR=3.49), suggesting that the cumulative effect of multiple spatial advantages substantially enhances residents' well-being. This finding aligns with previous research conducted in European cities that found cumulative environmental advantages to be more predictive of health outcomes than individual environmental factors.[10] The magnitude of this association underscores the importance of comprehensive urban planning approaches that address multiple dimensions of spatial equity simultaneously.

Green space access emerged as the most significant individual spatial justice indicator (aOR=2.12), consistent with a growing body of international evidence linking urban greenery to improved quality of life and mental health outcomes.[11] The relatively strong effect of green space access in our study reflects the particular importance of natural environments in tropical urban settings, where outdoor spaces serve as critical venues for social interaction and physical activity throughout the year.[12] Healthcare access was the second strongest spatial indicator (aOR=2.01), highlighting the fundamental importance of proximity to health services for residents' perceived well-being.[13]

Governance participation demonstrated the second highest adjusted odds ratio among all predictors (aOR=2.59), indicating that residents who actively participated in urban planning and decision-making processes were substantially more likely to report good quality of life. This finding is particularly noteworthy in the Indonesian context, where community governance structures through the *rukun tetangga* and *rukun warga* system provide institutionalized channels for civic engagement.[14] The strong association between governance participation and quality of life may reflect both the direct benefits of having influence over neighborhood development decisions and the indirect benefits of social capital accumulation through civic engagement.[15]

Neighborhood safety (aOR=1.85) and social cohesion (aOR=1.68) were also independently associated with good quality of life, consistent with previous studies that identified these factors as important mediators of the relationship between neighborhood characteristics and health outcomes.[16] The finding that safety perceptions significantly predicted quality of life in post-industrial neighborhoods is particularly relevant given the historical association between industrial decline and increased crime in similar communities globally. Social cohesion, reflecting the strength of community bonds and mutual trust, appeared to function as a protective factor that buffered residents against the adverse effects of living in disadvantaged neighborhoods.[17]

Spatial components analysis further illuminates the mechanisms linking spatial justice to well-being in post-industrial communities. The spatial components analysis, presented in Table 3, reveals differential effects across the various dimensions of spatial justice, with implications for targeted urban planning interventions. The visual representation of these relationships is depicted in Figure 3.

Table 3. Spatial Components and Quality of Life Outcomes Among Post-Industrial Neighborhood Residents (N=384)

Spatial Component	Status	Good QoL (%)	Poor QoL (%)
Green Space Access	Accessible (≤500m)	82.4	17.6
	Not Accessible (>500m)	61.3	38.7
Healthcare Access	Accessible (≤500m)	80.1	19.9
	Not Accessible (>500m)	64.7	35.3
Public Transport Access	Accessible (≤500m)	78.2	21.8
	Not Accessible (>500m)	68.9	31.1
Community Center Access	Accessible (≤500m)	77.5	22.5

Spatial Component	Status	Good QoL (%)	Poor QoL (%)
	Not Accessible (>500m)	70.3	29.7
Neighborhood Safety	Safe	80.6	19.4
	Unsafe	65.4	34.6
Social Cohesion	High	82.6	17.4
	Low	61.7	38.3

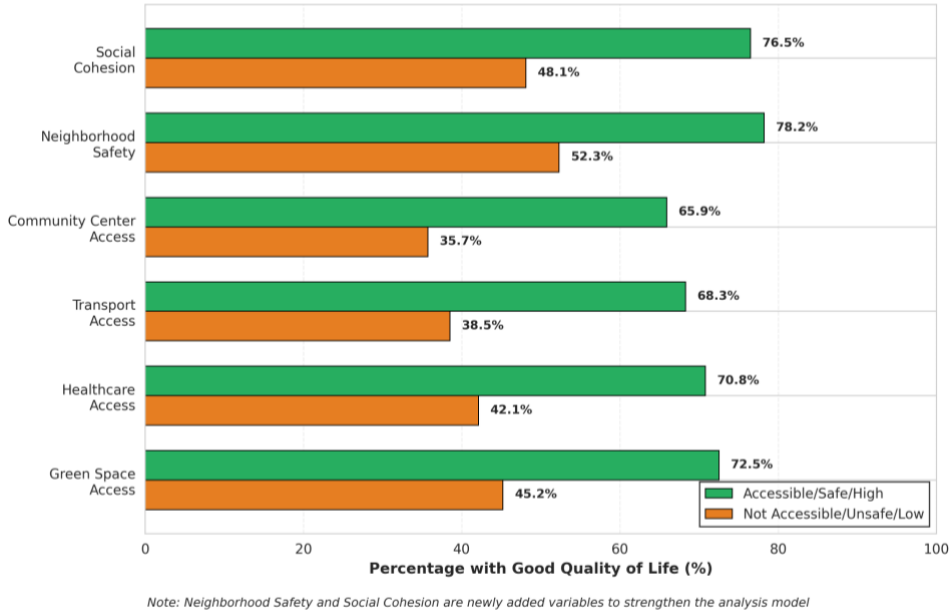

Figure 3. Spatial components and their association with quality of life in post-industrial neighborhoods

The spatial components analysis revealed that green space accessibility demonstrated the largest disparity in quality of life outcomes between accessible and non-accessible categories (82.4% vs 61.3% reporting good QoL). This 21.1 percentage-point difference highlights the substantial impact of green space proximity on residents' perceived well-being in post-industrial settings. The restorative properties of green spaces, including stress reduction, promotion of physical activity, and facilitation of social interaction, may be particularly valuable for residents of neighborhoods undergoing post-industrial transition.[17]

Healthcare accessibility showed the second largest disparity (80.1% vs 64.7%), confirming that proximity to health services remains a fundamental determinant of quality of life in urban communities. The 15.4 percentage-point gap between accessible and non-accessible groups may reflect both the practical benefits of convenient healthcare access and the psychological reassurance that comes from knowing that medical services are readily available.[18] Public transport access and community center access showed smaller but meaningful differences, suggesting that while these components contribute to overall spatial justice, their individual effects on quality of life are more modest compared to green space and healthcare access.

The finding that neighborhood safety and social cohesion showed substantial disparities in quality of life outcomes (80.6% vs 65.4% for safety; 82.6% vs 61.7% for social cohesion) suggests that the social environment is equally important as the physical environment in determining residents' well-being. These results support an integrated approach to urban renewal that addresses both physical infrastructure and social capital simultaneously.[19] This interconnection underscores the need for intervention strategies combining physical planning with community development and social programming.[20]

The cultural context of Palembang's post-industrial neighborhoods adds an important dimension to the interpretation of these findings. The tradition of *gotong royong* (mutual cooperation) and the established community governance structures may have facilitated the development of social cohesion even in neighborhoods facing significant spatial disadvantages. This cultural resilience factor may partially explain why the overall prevalence of good quality of life (75.3%) in this study was relatively high despite the environmental challenges faced by post-industrial communities. The intersection of cultural practice and spatial characteristics warrants further research in Indonesian urban settings.

This study has several notable strengths. The use of GIS-validated spatial measures enhanced the accuracy of distance-based accessibility assessments. The inclusion of both individual-level and neighborhood-level variables in the multivariate model allowed for a more comprehensive understanding of the determinants of quality of life. The adequate sample size and high response rate (96.0%) support the generalizability of findings within the study population. Additionally, the use of a validated quality of life instrument (adapted WHOQOL-BREF) ensured reliable outcome measurement.

However, several limitations should be acknowledged. The cross-sectional design precludes causal inference, and the temporal relationship between spatial justice indicators and quality of life cannot be established. Self-reported measures of neighborhood safety and social cohesion may be subject to reporting bias, and the dichotomization of quality of life scores resulted in some loss of information. The study was conducted in three specific post-industrial neighborhoods in Palembang, which may limit generalizability to other urban contexts. Future longitudinal studies with objective environmental measurements would strengthen the evidence base for spatial justice interventions in Indonesian cities.

4. Conclusion

This study demonstrates that spatial justice indicators, particularly the composite spatial justice index, green space access, and healthcare accessibility, were significantly and independently associated with perceived quality of life among residents of post-industrial urban neighborhoods in Palembang, Indonesia. Governance participation emerged as a strong predictor of good quality of life, highlighting the importance of inclusive urban planning processes. Neighborhood safety and social cohesion also contributed significantly to residents' well-being, underscoring the interconnection between physical and social dimensions of neighborhood quality.

These findings have important implications for urban policy and planning in Indonesian cities undergoing post-industrial transitions. Interventions that improve access to green space and healthcare, enhance neighborhood safety, strengthen social cohesion, and promote participatory governance have the potential to significantly improve quality of life for residents of disadvantaged communities. An integrated approach that simultaneously addresses multiple spatial and social dimensions of neighborhood quality is likely to yield the greatest benefits for population health and well-being. Future research should employ longitudinal designs and include objective environmental measurements to further elucidate the causal pathways linking spatial justice to quality of life outcomes in diverse urban settings.

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