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Care Deficit Predictors Among Community-Dwelling Elderly in a Transnational Migration Area: A Cross-Sectional Analytical Study in a Coastal District of West Java, Indonesia

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A B S T R A C T

This cross-sectional analytical study examined predictors of care deficit among 412 community-dwelling elderly persons aged 60 years and older in a labor-exporting district in West Java, Indonesia, an area characterized by high rates of international labor migration. Care deficit, defined as inadequacy in instrumental and social care activities necessary for maintaining independence and well-being in daily living, was present in 189 respondents (45.9%). Data were collected using structured questionnaires assessing care deficit via an 18-item validated scale, intergenerational solidarity via the six-dimensional Bengtson framework adapted to Indonesian context, and social support using the Medical Outcomes Study Social Support Survey. Family migration status, health insurance coverage, government program participation, chronic disease status, living arrangement, and age were also documented. Bivariate analysis revealed significant associations between care deficit and seven variables: intergenerational solidarity (OR 2.42, 95%CI 1.64–3.58), social support (OR 2.38, 95%CI 1.60–3.53), family migration (OR 2.19, 95%CI 1.48–3.24), chronic disease (OR 1.94, 95%CI 1.28–2.93), living arrangement (OR 1.91, 95%CI 1.27–2.87), health insurance (OR 1.90, 95%CI 1.28–2.83), and government program participation (OR 1.83, 95%CI 1.24–2.71). Multiple logistic regression identified five independent predictors: intergenerational solidarity (AOR 2.04, 95%CI 1.33–3.13), social support (AOR 1.91, 95%CI 1.24–2.94), family migration (AOR 1.87, 95%CI 1.22–2.87), chronic disease (AOR 1.61, 95%CI 1.03–2.52), and health insurance (AOR 1.58, 95%CI 1.02–2.45). The model demonstrated adequate fit (Hosmer-Lemeshow p=0.368), explained 21.4% of variance (Nagelkerke R^2=0.214), achieved 69.2% classification accuracy, and yielded an AUC of 0.720. Findings highlight how transnational family structures reshape elderly care systems in resource-limited settings.

1. Introduction

Global population aging represents one of the most significant demographic transitions of the twenty-first century. According to the United Nations, the world's population aged 60 years and above is projected to reach 2.1 billion by 2050, representing approximately 22% of the global population. Indonesia, the fourth most populous nation globally with over 270 million inhabitants, faces a particularly acute challenge in this context. National statistics indicate that the absolute number of elderly persons (aged 60 years and above) exceeds 31 million, representing approximately

11.5% of the total population. Despite this substantial elderly population, formal care systems including institutional care facilities, professional home care services, and comprehensive social protection programs remain severely underdeveloped, leaving families as the primary and often sole source of care provision for aging members.

Transnational family migration—wherein adult children migrate to urban centers or overseas for employment while elderly parents remain in rural origin communities—has become a defining feature of Indonesian demography over the past three decades. Hugo documented that Indonesia has experienced sustained growth in international labor migration since the 1980s, with major destination countries including Malaysia, Saudi Arabia, the United Arab Emirates, Singapore, Taiwan, and Hong Kong.[2-4] Current estimates suggest that approximately 9.3 million Indonesians work overseas at any given timewith additional millions having migrated to major Indonesian cities such as Jakarta, Surabaya and Bandung.

The theoretical framework of intergenerational solidarity, developed and refined by Bengtson and colleagues over several decades of longitudinal research, provides an essential lens for understanding how transnational migration reshapes family relationships and consequently affects elderly care provision.[5] The Bengtson framework encompasses six distinct but interrelated dimensions: affectual solidarity, associational solidarity, consensual solidarity, normative solidarity, functional solidarity, and structural solidarity. Silverstein and colleagues extended this framework to demonstrate that intergenerational support flows are shaped by both normative expectations and practical constraints, with geographic proximity playing a particularly important moderating role.[6]

Beyond family-level factors, social support from broader community networks has been recognized as a critical determinant of health and well-being among elderly populations. Holt-Lunstad and colleagues demonstrated through meta-analytic evidence that social relationships have a substantial effect on mortality risk comparable to well-established risk factors such as smoking and physical inactivity.[7] Berkman and Glass articulated a comprehensive conceptual model linking social integration, social networks, and social support to health outcomes through multiple psychosocial and behavioral pathways.[8]

Care deficit—conceptualized as the insufficiency or inadequacy of instrumental and social care activities necessary for maintaining independence and well-being in daily living—has emerged as a critical public health concern in aging populations worldwide. Research on elderly populations in Southeast Asia has documented that care deficit is particularly pronounced among elderly left behind by migrant family members, with prevalence rates substantially exceeding those observed in non-migration populations.[9]

A coastal district in West Java known for high rates of international labor migration exemplifies these dynamics with particular clarity. As a labor-exporting district with limited industrial employment and a predominantly agricultural economy, this area has witnessed sustained out-migration since the early 1990s. Demographic data indicate that in some sub-districts, more than 60% of households contain at least one family member who has migrated for labor purposes.[3]

Despite the widespread acknowledgment of care deficit as a significant health and social concern, quantitative evidence on its predictors—particularly in transnational migration contexts—remains limited in Indonesia. This study aimed to identify independent predictors of care deficit among community-dwelling elderly persons in a labor-exporting district in West Java, Indonesia, with specific attention to transnational family migration and intergenerational solidarity.

2. Methods

Study design and setting

This was a cross-sectional analytical study conducted from August through November 2024 in a coastal district in West Java Province, Indonesia, known for high rates of international labor migration. The district comprises 32 sub-districts with a total population of approximately 1.76 million inhabitants. Within the district, four sub-districts were purposively selected to represent varying intensities of transnational migration: two sub-districts with documented high out-migration (>60% of households with a migrant member) and two with moderate migration (40–50% of households).

Population and sampling

The target population consisted of all community-dwelling elderly persons (aged ≥60 years) residing in the four selected sub-districts. The required sample size was calculated using the Lemeshow formula for cross-sectional studies.[10] With an estimated care deficit prevalence of 45% based on preliminary qualitative data, 95% confidence level, 5% margin of error, and design effect of 1.2, the calculated minimum sample size was 388 participants. To allow for anticipated 6% non-response, we enrolled 412 participants, all of whom completed the study (response rate 100%). Multi-stage cluster random sampling was employed. Inclusion criteria were: aged 60 years or older, resident in the selected sub-district for at least 12 consecutive months, mentally competent to provide informed consent, and willing to participate voluntarily. Exclusion criteria were: acute severe illness preventing interview completion, and sensory impairment preventing meaningful communication.

Measurements

Care deficit, the primary outcome variable, was measured using an 18-item instrument developed and validated in prior research on elderly populations in Indonesian settings. Items assessed both instrumental care and social care. A composite care deficit score was calculated by summing all item responses (possible range 18–72). A validated cut-off point of 50 was applied to dichotomize respondents as having care deficit (composite score ≥50; n=189) or adequate care (composite score <50; n=223). The instrument demonstrated adequate internal consistency in our sample (Cronbach's α=0.84).[11]

Intergenerational solidarity was measured using an adapted 12-item instrument based on the Bengtson multidimensional framework.[5] Items assessed all six theoretical dimensions. Composite solidarity scores ranged from 12 to 60, with scores dichotomized at the sample median (34) into low solidarity (<34) and high solidarity (≥34) categories. Internal consistency was adequate (Cronbach's α=0.79).

Social support was assessed using the 15-item Medical Outcomes Study Social Support Survey (MOS-SSS), a widely used instrument with established psychometric properties that has been previously adapted and validated in Indonesian populations.[12] Composite scores ranged from 15 to 75, with dichotomization at the sample median (48) into low support (<48) and adequate support (≥48) categories. Internal consistency was adequate (Cronbach's α=0.81).

Family migration status was documented as: (1) having at least one child residing outside the sub-district for 12 or more consecutive months for employment purposes, or (2) having no children meeting this migration criterion. Health insurance coverage was dichotomized as insured versus uninsured. Government elderly program participation was dichotomized as participant versus non-participant. Chronic disease status was recorded dichotomously as presence of any physician-diagnosed chronic condition versus absence. Living arrangement was categorized as living with spouse and/or adult children versus living alone or with non-family members.

Statistical analysis

Descriptive statistics including frequencies, percentages, means, and standard deviations were calculated for all study variables. Bivariate associations between each potential predictor and the dichotomous care deficit outcome were assessed using chi-square tests of independence. Crude odds ratios with corresponding 95% confidence intervals were calculated for each predictor variable. Variables demonstrating p-values less than 0.10 in bivariate analysis were retained as candidates for multivariate modeling.[10]

Multiple logistic regression was performed using the simultaneous entry method. Prior to model estimation, variance inflation factors (VIF) were calculated for all predictors; all VIF values were less than 2.5. The interaction term between family migration and intergenerational solidarity was tested and found non-significant (p=0.089) and was not retained in the final model. Model adequacy was evaluated using the Hosmer-Lemeshow goodness-of-fit test, classification accuracy, area under the ROC curve, and Nagelkerke R^2. All statistical analyses were performed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA) with a significance threshold of $p<0.05$.

Ethical considerations

All participants provided written informed consent prior to participation. Confidentiality was maintained throughout the study through assignment of numeric identifiers and secure storage of all research materials. Participation was entirely voluntary with an explicit right to withdraw at any point without consequence. The author declares no conflicts of interest. This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

3. Results and Discussion

Sociodemographic characteristics

The sociodemographic characteristics of the 412 respondents enrolled in this study are detailed in Table 1. The mean age of the sample was 70.2 years (SD=8.1). The sample was predominantly female (231 respondents, 56.1%). More than half (246 respondents, 59.7%) were currently married. Education levels reflected historical patterns characteristic of rural Indonesia, with 89 respondents (21.6%) having no formal education, 178 (43.2%) having completed primary school, and 145 (35.2%) having attained secondary education or higher.

Two-thirds of respondents (274, or 66.5%) lived with a spouse and/or adult children, while 138 (33.5%) lived alone or with non-family members. Family migration patterns were notably prevalent: 237 respondents (57.5%) had at least one migrant child, while 175 (42.5%) had no migrant children. Furthermore, 268 respondents (65.0%) reported at least one physician-diagnosed chronic disease, with hypertension, diabetes mellitus, and osteoarthritis being the most commonly reported conditions. Care deficit was present in 189 respondents (45.9%), indicating that nearly half the elderly population in this transnational migration context experienced inadequate instrumental or social care.[14]

The demographic profile of our sample reflects the broader sociodemographic landscape of elderly populations in labor-exporting regions of Indonesia.[22] The high proportion of respondents with no formal education or only primary education reflects the educational opportunities available to this cohort during their formative years in the 1950s through 1970s. The finding that 57.5% of respondents had at least one migrant child underscores the pervasiveness of transnational family structures in this setting. The combination of high chronic disease burden (65.0%) and high family migration rates creates a particularly challenging care environment.[3]

Table 1. Sociodemographic characteristics of study respondents (N=412).

Characteristic	Category	n	%
Age (years)			
	60–64	124	30.1
	65–69	118	28.6
	70–74	97	23.5
	75+	73	17.7
Gender			
	Male	181	43.9
	Female	231	56.1
Education			
	No formal	89	21.6
	Primary	178	43.2
	Secondary+	145	35.2
Marital status			
	Married	246	59.7
	Widowed/Divorced	166	40.3
Living arrangement			
	With spouse/children	274	66.5
	Alone/non-family	138	33.5
Family migration			
	Has migrant child	237	57.5
	No migrant children	175	42.5
Chronic disease			
	Yes (≥1)	268	65.0
	None	144	35.0

Bivariate analysis

Bivariate analysis results, as summarized in Table 2, revealed statistically significant associations between care deficit and seven of the eight examined variables. The strongest bivariate association was observed for intergenerational solidarity: respondents with low intergenerational solidarity had 2.42 times the odds of experiencing care deficit compared to those with high solidarity (OR 2.42, 95%CI 1.64–3.58, p=0.001).[5,6] Social support demonstrated the second-strongest bivariate association (OR 2.38, 95%CI 1.60–3.53, p=0.001).[7,8] Family migration status showed a strong association with care deficit (OR 2.19, 95%CI 1.48–3.24, p=0.001), with 128 of 237 (54.0%) respondents with migrant children experiencing care deficit compared to only 61 of 175 (34.9%) without migrant children.

Table 2. Bivariate analysis of factors associated with care deficit (N=412).

Variable	Care Deficit n(%)	No Deficit n(%)	OR (95%CI)	p-value
Family migration (Has vs No)	128 (54.0)	109 (46.0)	2.19 (1.48–3.24)	0.001
Intergenerational solidarity (Low vs High)	114 (57.0)	86 (43.0)	2.42 (1.64–3.58)	0.001
Social support (Low vs Adequate)	107 (57.5)	79 (42.5)	2.38 (1.60–3.53)	0.001
Health insurance (Uninsured vs Insured)	86 (55.8)	68 (44.2)	1.90 (1.28–2.83)	0.002
Govt program (Non-part vs Part)	121 (52.4)	110 (47.6)	1.83 (1.24–2.71)	0.003
Living arrangement (Alone vs With family)	78 (56.5)	60 (43.5)	1.91 (1.27–2.87)	0.002
Chronic disease (Present vs Absent)	138 (51.5)	130 (48.5)	1.94 (1.28–2.93)	0.002
Age (75+ vs 60–74)	41 (56.2)	32 (43.8)	1.65 (0.99–2.76)	0.056

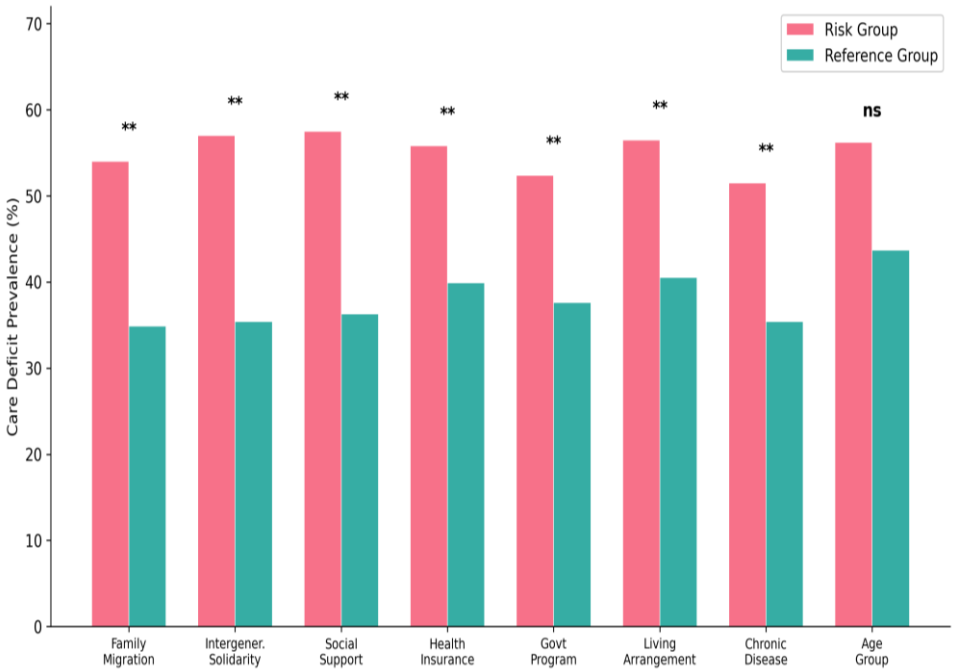

Figure 1. Prevalence of Care Deficit by Key Variables. The grouped bar chart displays care deficit prevalence stratified by family migration status, intergenerational solidarity level, social support adequacy, and living arrangement, illustrating how each factor independently associates with care deficit risk among community-dwelling elderly.

The bivariate findings merit discussion in the context of existing literature on elderly care in migration-affected settings. The strong association between low intergenerational solidarity and care deficit (OR 2.42) is notably larger than solidarity-care associations reported in non-migration elderly populations, where odds ratios typically range from 1.4 to 1.8. This amplification of the solidarity effect in a migration context supports the hypothesis that geographic separation magnifies the importance of psychological and normative dimensions of family relationships.

Multivariate analysis and model performance

The multivariate logistic regression results presented in Table 3 identified five statistically significant independent predictors of care deficit after simultaneous adjustment for all candidate variables. Intergenerational solidarity remained the strongest independent predictor (AOR 2.04, 95%CI 1.33–3.13, p=0.001). Social support was the second strongest predictor (AOR 1.91, 95%CI 1.24–2.94, p=0.003), followed by family migration status (AOR 1.87, 95%CI 1.22–2.87, p=0.004). Chronic disease (AOR 1.61, 95%CI 1.03–2.52, p=0.037) and health insurance status (AOR 1.58, 95%CI 1.02–2.45, p=0.041) were also independently significant predictors.

Three variables that were significant in bivariate analysis did not retain independent significance in the multivariate model: government program participation (AOR 1.52, 95%CI 0.99–2.34, p=0.057), living arrangement (AOR 1.48, 95%CI 0.94–2.33, p=0.092), and age group (AOR 1.39, 95%CI 0.81–2.38, p=0.231). The final model demonstrated adequate statistical fit. The Hosmer-Lemeshow goodness-of-fit test yielded a non-significant chi-square statistic (p=0.368). The model explained 21.4% of variance in care deficit (Nagelkerke R^2=0.214) and correctly classified 69.2% of all respondents.

Table 3. Multiple logistic regression: independent predictors of care deficit (N=412).

Variable	AOR	95%CI	p-value
Intergenerational Solidarity (Low vs High)	2.04	1.33–3.13	0.001
Social Support (Low vs Adequate)	1.91	1.24–2.94	0.003
Family Migration (Has vs No)	1.87	1.22–2.87	0.004
Chronic Disease (Present vs Absent)	1.61	1.03–2.52	0.037
Health Insurance (Uninsured vs Insured)	1.58	1.02–2.45	0.041
Govt Program (Non-part vs Part)	1.52	0.99–2.34	0.057
Living Arrangement (Alone vs With family)	1.48	0.94–2.33	0.092
Age (75+ vs 60–74)	1.39	0.81–2.38	0.231

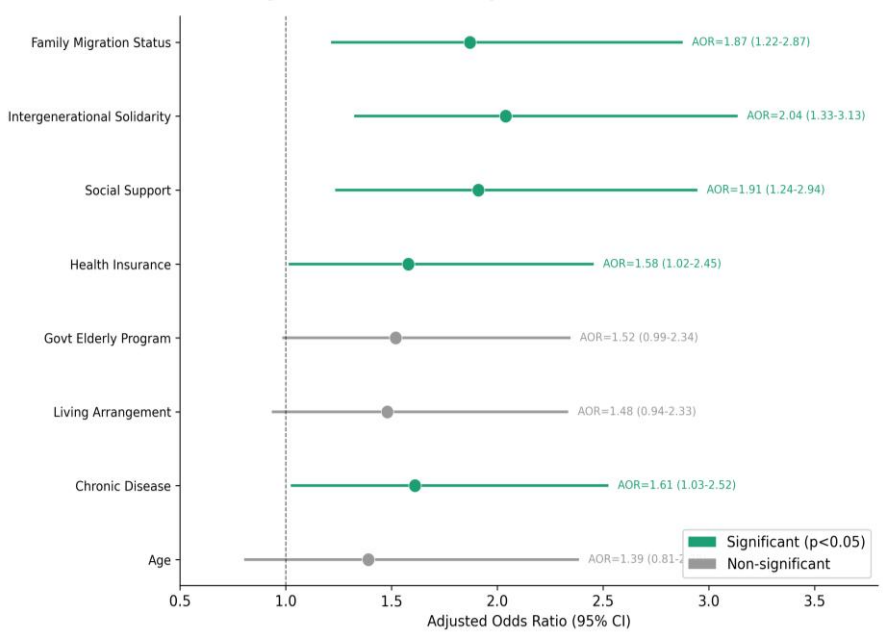

Figure 2. Forest Plot of Multivariate Model Estimates. The forest plot displays adjusted odds ratios and 95% confidence intervals for each predictor variable in the final multiple logistic regression model, with diamond markers indicating point estimates and horizontal lines denoting confidence intervals. Variables crossing the null value of 1.0 did not achieve statistical significance.

Model discrimination and predictive utility

Model discriminative ability, depicted in Figure 3, yielded an AUC of 0.720 (95%CI 0.675–0.765), indicating fair discrimination capacity of the multivariate prediction model.[10] An AUC of 0.720 indicates that the model correctly ranks a randomly selected respondent with care deficit as having higher predicted probability of deficit than a randomly selected respondent without deficit 72% of the time.

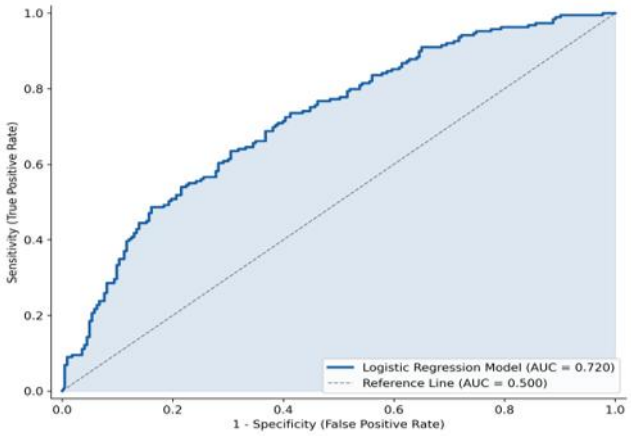

Figure 3. Receiver Operating Characteristic (ROC) Curve. The ROC curve plots sensitivity (true positive rate) against 1-specificity (false positive rate) across all possible probability thresholds, with the area under the curve (AUC=0.720) indicating fair discriminative accuracy of the multivariate logistic regression model for identifying elderly persons with care deficit.

Intergenerational solidarity in the transnational migration context

The prominent role of intergenerational solidarity as the strongest independent predictor of care deficit (AOR 2.04) warrants detailed discussion. The Bengtson framework posits that family relationships depend not merely on geographic proximity (structural solidarity) but equally on psychological closeness (affectual solidarity), shared values (consensual solidarity), normative commitment (normative solidarity), patterns of interaction (associational solidarity), and mutual exchange of help (functional solidarity).[5] Our findings suggest that in the context of transnational migration, these multiple dimensions interact in complex and consequential ways. Respondents with high intergenerational solidarity maintained psychological closeness, value alignment, and a strong sense of mutual obligation despite geographic separation from their migrant children.[6,19]

Social support and community-based networks

Social support emerged as the second-strongest independent predictor of care deficit (AOR 1.91, p=0.003), highlighting the critical importance of community-based social networks for elderly well-being in migration-affected settings. The MOS-SSS captures both tangible and emotional/informational support.[12] In communities affected by transnational migration where family-based support is structurally reduced, elderly persons with adequate social support appear to have developed effective compensatory community networks.[7,20]

Family migration as structural transformation

Family migration retained significant independent effects on care deficit risk (AOR 1.87, p=0.004) even after adjustment for all other covariates. This finding suggests that the structural reality of having a migrant child independently increases care deficit risk through mechanisms not fully captured by the other variables. Migration disrupts the daily routines, face-to-face interactions, and spontaneous mutual assistance patterns through which family members traditionally communicated needs and provided responsive care.[4,17]

Chronic disease and healthcare access

The independent significance of chronic disease (AOR 1.61, p=0.037) reflects the increased and often complex care demands inherent in managing multiple chronic health conditions during later life. The chronic disease burden in our sample (65.0% prevalence) is consistent with epidemiological data on elderly populations in Indonesia.[2,21,22] The independent

significance of health insurance (AOR 1.58, p=0.041) suggests that insurance coverage facilitates access to formal healthcare services. In Indonesia's evolving universal health coverage system (Jaminan Kesehatan Nasional, JKN), insurance coverage enables access to primary care, specialist referrals, medication, and hospitalization.[23]

Policy implications and intervention targets

The study findings generate multiple actionable implications for policy and practice in regions affected by transnational labor migration. First, intergenerational family strengthening programs should specifically target elderly persons in migration-affected households who demonstrate low psychological closeness and weakened value alignment with their migrant children. Second, elderly persons with limited social support require priority enrollment in community-based group programs and social activities. Priority interventions include expansion of integrated health post programs for the elderly (posyandu lansia), development of elderly cooperative groups, and establishment of structured befriending programs.[7,8,24]

Third, government elderly assistance programs should be substantially expanded and redesigned in high-migration districts. Fourth, health insurance enrollment campaigns deserve particular emphasis in labor-exporting districts given the independent effect of insurance on care deficit risk (AOR 1.58). Fifth, development of formal community-based elderly care worker programs would provide an alternative or complement to family-based instrumental care.[21,23] Sixth, enhanced chronic disease management programs in community settings would address the independent effect of chronic disease on care deficit (AOR 1.61).

Comparison with non-migration contexts

Comparative data from studies of elderly care in non-migration contexts provides valuable perspective. In urban settings where adult children co-reside with or live near elderly parents, care deficit prevalence typically ranges from 25% to 35% in developing country populations.[14,24,25] Our observed prevalence of 45.9% in a transnational migration context is substantially higher, representing a roughly 50% relative increase over baseline rates.

Strengths and limitations

This study presents several notable methodological strengths. The adequate sample size (N=412) with a 100% completion rate provided robust statistical power for logistic regression analysis with eight candidate predictor variables. Multidimensional measurement of intergenerational solidarity using a validated instrument based on the Bengtson framework provided more nuanced assessment than single-item or unidimensional measures.[5]

However, several limitations merit acknowledgment. First, the cross-sectional design inherently prevents causal inference. Second, care deficit was measured through self-report, which reflects perceived adequacy rather than objectively assessed need. Third, the dichotomization of continuous variables at their sample medians may have resulted in loss of information. Fourth, the relatively modest AUC of 0.720 indicates that substantial variance in care deficit remains unexplained by the identified predictors. Fifth, the study was conducted in a single district, limiting generalizability to other regions with different migration profiles, cultural contexts, or elderly care systems.

4. Conclusion

In this sample of 412 community-dwelling elderly persons in a labor-exporting coastal district of West Java, Indonesia, care deficit was documented in 189 respondents (45.9%), substantially exceeding prevalence rates reported in non-migration elderly populations. Multiple logistic regression identified five statistically significant independent predictors of care

deficit: intergenerational solidarity (AOR 2.04, 95%CI 1.33–3.13, p=0.001), social support (AOR 1.91, 95%CI 1.24–2.94, p=0.003), family migration status (AOR 1.87, 95%CI 1.22–2.87, p=0.004), chronic disease presence (AOR 1.61, 95%CI 1.03–2.52, p=0.037), and health insurance coverage (AOR 1.58, 95%CI 1.02–2.45, p=0.041). The final model demonstrated adequate fit (Hosmer-Lemeshow p=0.368), explained 21.4% of care deficit variance (Nagelkerke R2=0.214), achieved 69.2% classification accuracy, and yielded fair discriminative ability (AUC=0.720, 95%CI 0.675–0.765).

The prominence of intergenerational solidarity as the strongest independent predictor underscores the critical importance of family relationship quality in determining elderly care outcomes within transnational migration contexts. The independent significance of social support emphasizes that community-based relationships serve as essential buffers against family-based care deficits. The persistent independent effect of family migration itself demonstrates that the structural reality of geographic separation constrains care provision through mechanisms that psychological and social resources alone cannot fully compensate.

These findings provide evidence-based targets for strengthening elderly care systems in transnational migration contexts. Priority interventions include: intergenerational family strengthening programs; expansion of community-based social programs; redesign of government elderly assistance programs; health insurance expansion; development of formal community-based elderly care worker services; and enhanced chronic disease management programs. Longitudinal research is needed to establish causal pathways, and intervention trials should test the effectiveness and cost-effectiveness of these proposed approaches.

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