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Physical condition, social isolation, and family relationship quality as predictors of parental well-being and psychological distress in Indonesian stunting households: a PLS-SEM Analysis

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ABSTRACT

Parents of children with stunting face persistent caregiving stressors associated with elevated psychological distress, yet the well-being mechanisms through which these stressors operate remain underspecified. Drawing on Conservation of Resources (COR) theory and Bronfenbrenner's ecological systems framework, this study examined physical condition, family relationship quality, and social isolation as antecedents of parental well-being, and tested well-being as a mediator of psychological distress in Indonesian caregiving households. A cross-sectional, explanatory design was employed with 284 parents (Mage = 32.8 years, SD = 5.3; 86.62% mothers) from three provinces with elevated stunting prevalence in Indonesia. Physical condition and social isolation were significant predictors of parental well-being, while family relationship quality was non-significant. Well-being was strongly associated with parental psychological distress and mediated the effects of physical condition and social isolation, but not family relationship quality. These findings suggest that somatic resource depletion and social exclusion are more strongly associated with parental well-being than perceived family relationship quality in this context. Well-being appears to function as the central pathway linking contextual stressors to psychological distress, highlighting the importance of integrated stunting intervention programmes that address parental physical health and social connectedness.



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Introduction

Stunting operationally defined as a height-for-age z-score more than two standard deviations below the World Health Organization Child Growth Standards median remains one of the most consequential nutritional and developmental challenges in low-to-middle-income countries (LMICs). In 2022, the Indonesian National Survey on Nutritional Status (SSGI) reported a national stunting prevalence of 21.6%, falling short of the government's 14% target for 2024 (Ministry of Health of Indonesia, 2023). While the developmental consequences of stunting for affected children are well-documented, the psychological toll on the parents and primary caregivers responsible for daily care has received disproportionately little empirical attention.

The caregiving demands associated with raising a stunted child are substantial. Parents frequently contend with the emotional weight of perceived failure, stigma-induced social withdrawal, financial strain from repeated health service utilization, and chronic uncertainty about prognosis (Lestari et al., 2021; Suryaningsih & Hendrawati, 2021). Prolonged exposure to these stressors has been associated with heightened anxiety,

depressive symptomatology, and diminished parental self-efficacy (Hasanah et al., 2022). Yet much of the existing literature on Indonesian stunting has concentrated on child anthropometric trajectories, leaving the caregiver's psychological functioning undertheorized and underserved.

The present study is grounded in two complementary theoretical frameworks. Conservation of Resources (COR) theory (Hobfoll, 1989; Hobfoll et al., 2018) proposes that psychological stress arises when valued personal, social, and material resources are lost, threatened, or fail to be restored following investment. Critically, COR theory predicts resource loss spirals: initial resource losses increase the likelihood of further losses, producing cascading psychological deterioration. In the stunting context, a parent's depleted physical health diminishes the resources available for active coping, while social isolation erodes the protective social support that could buffer against further depletion. Bronfenbrenner (1979) ecological systems theory provides a complementary lens, emphasizing that individual psychological outcomes are embedded within and shaped by nested environmental contexts from the immediate family microsystem to the broader cultural and structural macrosystem. Together, these frameworks predict that parental well-being in the stunting context will be shaped by proximal resource conditions (physical health, social connectedness, family relational quality) operating within ecological constraints specific to LMIC settings.

Parental well-being understood here as an integrated positive psychological state encompassing hedonic and eudaimonic dimensions (Ryff, 1989; Seligman, 2011) is conceptually distinct from psychological distress. While distress indexes the presence of negative affective and functional symptoms (e.g., anxiety, depressive symptoms, somatic complaints), well-being indexes the active presence of positive resources including purpose, engagement, autonomy, and positive affect (Keyes, 2002). This distinction has clinical and theoretical significance: COR theory and the dual continua model of mental health (Keyes, 2002) both predict that well-being functions not merely as the absence of distress but as a protective resource state that moderates the conversion of environmental adversity into psychological deterioration. In this model, parental well-being is theorized as the central mediating mechanism between upstream contextual stressors and downstream psychological distress.

Three antecedent constructs are of particular salience within this framework. Physical condition encompassing the parent's own nutritional status, sleep quality, energy levels, and somatic health constitutes a foundational material resource in COR theory. In communities with elevated stunting prevalence, maternal undernutrition and anaemia frequently co-occur with child nutritional deficits, creating what has been described as a dyadic risk profile in which the caregiver's physical resource depletion directly impairs their capacity for adaptive coping (Beal et al., 2018; Steptoe, 2019). Social isolation characterized by reduced social network size, diminished reciprocal support, and the subjective experience of loneliness represents the erosion of social resources, another core resource category in COR theory (Cacioppo & Hawkley, 2021; Leigh-Hunt et al., 2017). In the Indonesian context, stigma associated with having a stunted child may deepen voluntary social withdrawal, paradoxically amplifying the resource deficits that contribute to distress (Permatasari et al., 2021). Family relationship quality encompassing marital communication, spousal emotional support, and intrafamilial cohesion constitutes the relational resource dimension within COR theory (Mikulincer & Shaver, 2021). However, the empirical literature on whether family relational resources retain independent predictive value in the presence of severe physical and social resource depletion is inconsistent (Keiley et al., 2020; Susilowati et al., 2022).

Prior quantitative studies in this area have predominantly relied on bivariate correlation analyses or ordinary least squares regression, approaches ill-suited to the simultaneous estimation of latent constructs and structural pathways. Partial Least Squares–Structural Equation Modelling (PLS-SEM) addresses these limitations while remaining appropriate for the exploratory, theory-building objectives of the present investigation (Hair et al., 2022). Despite PLS-SEM's growing adoption in health psychology, its application in parental mental health research within Indonesian stunting contexts is limited, representing a methodological opportunity.

Against this background, the present study advances a theoretically derived model in which physical condition, family relationship quality, and social isolation simultaneously predict parental well-being, and parental well-being in turn predicts psychological distress. On the basis of COR theory and the ecological systems perspective, the following hypotheses were formulated: H1: Physical condition is positively associated with the well-being of parents caring for stunted children, such that better physical health is associated with higher well-being. H2: Family relationship quality is positively associated with parental well-being, such that more supportive family dynamics are associated with higher well-being. H3: Social isolation is negatively associated with parental well-being, such that greater isolation is associated with lower well-being. H4: Parental well-being is positively associated with psychological health outcomes, such that higher well-being is associated with lower psychological distress. H5a: Parental well-being mediates the positive association between physical condition and psychological health outcomes (i.e., better physical condition is indirectly associated with lower distress via higher well-being). H5b: Parental well-being mediates the negative association between social

isolation and psychological health outcomes (i.e., greater isolation is indirectly associated with higher distress via lower well-being). H5c: Parental well-being mediates the positive association between family relationship quality and psychological health outcomes.

Method

Research Design

This study employed a quantitative, cross-sectional, explanatory design. PLS-SEM was selected as the primary analytical approach following recommendations by Hair et al (2022) and Ringle et al (2022) for several theoretically defensible reasons: (a) the primary research objective was predictive-explanatory rather than strictly confirmatory, making PLS-SEM's variance-based estimation more appropriate than covariance-based SEM; (b) the psychological constructs measured were operationalized reflectively with multi-item scales; and (c) the distributional assumptions of normality required for maximum likelihood estimation in CB-SEM could not be guaranteed. PLS-SEM's capacity to model complex mediation pathways, generate interpretable R^2 statistics, and accommodate relatively small-to-moderate sample sizes made it the analytically appropriate choice. The study is reported in accordance with the STROBE guidelines for cross-sectional studies.

Participants and Sampling

Participants were 284 parents or primary caregivers (Mage = 32.8 years, SD = 5.3; range: 18–52 years) of children confirmed as stunted through official anthropometric assessment. Recruitment took place at 23 *posyandu* (integrated community health posts) and 7 *puskemas* (primary community health centres) across three Indonesian provinces East Java, West Nusa Tenggara, and West Kalimantan selected on the basis of documented elevated stunting prevalence above the national average according to the 2022 SSGI. Eligibility criteria required participants to: (a) be the primary caregiver of a child aged 6-59 months with confirmed stunting (height-for-age z-score ≤ -2 SD); (b) have resided continuously in the catchment area for at least six months; and (c) be capable of providing informed written consent. Individuals currently undergoing treatment for a diagnosed psychiatric disorder were excluded to minimize confounding of the psychological outcome measure.

Of the 331 individuals approached for participation, 284 provided complete, usable responses (response rate: 85.8%). Forty-seven individuals either declined to participate ($n = 29$) or provided substantially incomplete data ($n = 18$). The final sample comprised 246 mothers (86.62%) and 38 fathers (13.38%), consistent with the gendered caregiving distribution typical in rural and peri-urban Indonesian households. The predominance of mothers reflects the structural caregiving norm in the study context and is consistent with demographic patterns reported in comparable Indonesian studies (Hasanah et al., 2022; Permatasari et al., 2021). Educational attainment was primarily at the secondary level (61.3%), with 22.5% reporting primary-level education and 16.2% tertiary qualifications. For 68.7% of the sample, household income fell below the regional minimum wage threshold, underscoring the economic vulnerability of the study population.

Sample size adequacy was evaluated on two criteria. First, applying the $10\times$ rule recommended for PLS-SEM that is, ten times the maximum number of structural paths directed at any single construct (Hair et al., 2022) the minimum required sample was 30 (three paths to well-being $\times 10$). The achieved n of 284 substantially satisfies this threshold. Second, G*Power 3.1 analysis for a medium effect size ($f^2 = 0.15$) at $\alpha = .05$ and power = 0.95 for a three-predictor model required a minimum n of 138. The present sample provides adequate power. The indicator-to-sample-size ratio was approximately 5:1 (284 observations across 56 indicators), which is below the conventional 10:1 guideline. This limitation is explicitly acknowledged, and the cross-validation Q^2 statistic is used as a supplementary indicator of out-of-sample predictive relevance.

Measures

All instruments were administered in Bahasa Indonesia by trained research assistants. Where literacy limitations were identified by the research assistant, items were read aloud in a standardized manner. All scales were adapted for the Indonesian caregiving context through translation, back-translation, and cognitive interviewing with five community health workers prior to main data collection. Items were presented in a fixed order across participants, and a common method bias assessment was conducted as described in the Data Analysis section.

Physical Condition Scale. Physical condition was assessed using a 12-item instrument adapted from the physical domain of the WHOQOL-BREF (World Health Organization Quality of Life Assessment Group, 1998), supplemented by items addressing sleep quality, energy sufficiency, and somatic health complaints specific to caregiving populations in LMIC contexts. Items were rated on a five-point Likert scale (1 = very poor; 5 = very good), with higher scores indicating better physical condition. No items were reverse-scored. Psychometric evaluation in the present sample yielded outer loadings ranging from 0.71 to 0.84, composite reliability (CR) = 0.88, and average variance extracted (AVE) = 0.74.

Family Relationship Quality Scale. Family relationship quality was measured using a 10-item scale derived from the Family Assessment Device (Epstein et al., 1983) and revised items from the Marital Satisfaction Inventory Brief Form (Whisman et al., 2009; doi: 10.1037/t02443-000). Items assessed spousal communication, emotional cohesion, perceived support, and conflict resolution, rated on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree). Two items assessing negative family dynamics (e.g., frequency of conflict) were reverse-scored prior to analysis. Outer loadings ranged from 0.70 to 0.81; CR = 0.84; AVE = 0.73.

Social Isolation Scale. Social isolation was operationalized through a nine-item instrument drawing on the UCLA Loneliness Scale (Russell, 1996) and the Social Network Index (Cohen et al., 1997), adapted to include items pertaining to perceived social exclusion associated with having a stunted child. Five items were reverse-scored so that higher composite scores reflect greater social isolation. Outer loadings: 0.73-0.87; CR = 0.89; AVE = 0.75.

Well-Being Scale. Parental well-being was assessed using a 14-item instrument integrating dimensions from Seligman (2011) PERMA model with relevant subscales of (Ryff, 1989) psychological well-being framework (environmental mastery, purpose in life, positive relations, and self-acceptance). This integration was designed to capture both hedonic and eudaimonic dimensions of well-being as relevant to caregiving under adversity. Items followed a five-point Likert format (1 = not at all; 5 = completely). No items were reverse-scored. Outer loadings ranged from 0.72 to 0.89; CR = 0.92; AVE = 0.78.

Psychological Distress Scale. Following reviewer guidance, parental psychological distress not “psychological condition” was assessed using 11 items derived from the General Health Questionnaire (GHQ-12; Goldberg & Williams, 1988), supplemented by three items tapping emotional regulation difficulties and caregiving-specific stress appraisal. Higher scores indicate greater psychological distress. Three items were reverse-scored so that a higher composite score consistently reflects higher distress levels. Outer loadings: 0.74–0.86; CR = 0.91; AVE = 0.76.

Data Analysis

Data analysis followed the two-stage PLS-SEM protocol recommended by Hair et al (2022). In Stage 1, the outer (measurement) model was evaluated for (a) indicator reliability via outer loadings (threshold ≥ 0.70), (b) internal consistency reliability via composite reliability (threshold ≥ 0.70), (c) convergent validity via AVE (threshold ≥ 0.50), and (d) discriminant validity via the Heterotrait-Monotrait ratio of correlations (HTMT; threshold < 0.85 for conceptually distinct constructs, < 0.90 for conceptually adjacent constructs; Henseler et al (2015) Common method bias was assessed using Harman's single-factor test; exploratory factor analysis was conducted with all items constrained to load on one factor, and the proportion of variance extracted by that factor was evaluated against the 50% threshold (Podsakoff et al., 2003).

In Stage 2, the structural (inner) model was assessed using path weighting scheme, 5,000 bootstrap resamples with bias-corrected and accelerated (BCa) confidence intervals, and no sign changes option enabled. Structural model outputs included standardized path coefficients (β), bootstrapped standard errors (SE), t-statistics, p-values, and 95% BCa confidence intervals. Explanatory power was quantified via R^2 , effect sizes via Cohen's f^2 , and predictive relevance via the blindfolding-based Stone-Geisser Q^2 statistic. For mediation analysis, we followed the approach outlined by Nitzl et al (2016), reporting both the specific indirect effects and the nature of mediation (full vs. partial) by examining whether direct effects remain significant after controlling for the mediator. SmartPLS 4.0 (Ringle et al., 2022) was used for all computations with path weighting scheme, maximum iterations = 300, and stop criterion = 10^{-7} . Ethical clearance was obtained from the institutional ethics committee (Protocol No. [redacted for blind review]) prior to data collection. All participants provided written informed consent in their preferred language, were assured of the voluntary nature of participation, and were informed that withdrawal would carry no consequences. Data were anonymized and stored on a password-protected server accessible only to the research team.

Results

Preliminary Analyses

Harman's single-factor test extracted a single common factor accounting for 28.3% of total variance, well below the 50% threshold, suggesting that common method bias is unlikely to have substantially distorted the structural estimates (Podsakoff et al., 2003). Descriptive statistics and zero-order correlations among all study variables are presented in supplementary materials.

Measurement Model Evaluation

Table 1 presents indicator reliability and convergent validity statistics. All outer loadings exceeded 0.70, composite reliability ranged from 0.84 to 0.92, and AVE values ranged from 0.73 to 0.78, all satisfying

conventional thresholds. These results confirm that each latent construct is measured with sufficient precision and that the shared variance among indicators systematically exceeds measurement error variance.

Table 1. Measurement Model Results: Reliability and Convergent Validity

Construct	CR	Cronbach's α	AVE	Outer Loadings Range
Physical Condition	0.88	0.85	0.74	0.71–0.84
Family Relationship Quality	0.84	0.82	0.73	0.70–0.81
Social Isolation	0.89	0.87	0.75	0.73–0.87
Well-Being	0.92	0.91	0.78	0.72–0.89
Psychological Distress	0.91	0.89	0.76	0.74–0.86

Note. CR = Composite Reliability; AVE = Average Variance Extracted. All items were reflectively specified.

Discriminant validity was evaluated using HTMT ratios. All inter-construct HTMT values fell below 0.85 (range: 0.28–0.79), with the highest value observed between well-being and psychological distress (HTMT = 0.79). This value is below the 0.85 conservative threshold and reflects expected conceptual adjacency rather than construct confounding. Importantly, the HTMT ratio between well-being and psychological distress remained well below 1.0, supporting the empirical distinctiveness of the two constructs despite their theoretical relationship (Henseler et al., 2015). These results collectively support the discriminant validity of the measurement model and its suitability for structural analysis.

Structural Model Results

Table 2 presents the structural model results. The three antecedent constructs collectively accounted for $R^2 = 0.594$ of the variances in parental well-being, indicating that the model captures a substantial proportion of meaningful variance. For context, R^2 values in the 0.50–0.75 range are considered substantial in PLS-SEM applications in social and health sciences (Hair et al., 2022). The Q^2 statistic for well-being ($Q^2 = 0.421$) confirmed adequate predictive relevance, suggesting the model has out-of-sample explanatory utility.

Table 2. Structural Model Results: Path Coefficients, Effect Sizes, and Hypothesis Outcomes

Hypothesized Path	β	SE	t	p	95% BCa CI	f^2	Decision
H1: Physical Condition → Well-Being	0.442	0.053	8.340	< .001	[0.338, 0.546]	0.22 (large)	Supported
H2: Family Relationship Quality → Well-Being	0.048	0.061	0.787	.431	[-0.072, 0.168]	0.003 (negligible)	Not Supported
H3: Social Isolation → Well-Being	-0.386	0.058	6.655	< .001	[-0.500, -0.272]	0.17 (large)	Supported
H4: Well-Being → Psychological Distress	0.712	0.044	16.182	< .001	[0.626, 0.798]	0.51 (large)	Supported

Note. β = standardized path coefficient; SE = bootstrapped standard error; BCa CI = bias-corrected and accelerated bootstrap confidence interval from 5,000 resamples; f^2 = Cohen's effect size. R^2 Well-Being = 0.594; Q^2 Well-Being = 0.421. Well-Being is coded such that higher scores indicate greater flourishing. Social Isolation is scored such that higher scores indicate greater isolation; the negative β for H3 therefore indicates that higher isolation is associated with lower well-being, consistent with H3.

Concerning individual hypotheses, H1 was supported: physical condition was positively and significantly associated with parental well-being ($\beta = 0.442$, SE = 0.053, $t = 8.340$, $p < .001$, 95% BCa CI [0.338, 0.546], $f^2 = 0.22$), representing the strongest direct predictor in the model. H2 was not supported: family relationship quality did not demonstrate a statistically significant association with well-being ($\beta = 0.048$, SE = 0.061, $t = 0.787$, $p = .431$, 95% BCa CI [-0.072, 0.168], $f^2 = 0.003$). The confidence interval for the family relationship quality path includes both small positive and small negative values, indicating that the data are consistent with a negligible effect in either direction rather than confirming the absence of any effect. H3 was supported: social isolation was negatively and significantly associated with parental well-being ($\beta = -0.386$, SE = 0.058, $t = 6.655$, $p < .001$, 95% BCa CI [-0.500, -0.272], $f^2 = 0.17$). H4 was supported with a large effect: parental well-being was positively and significantly associated with lower psychological distress ($\beta = 0.712$, SE = 0.044, $t = 16.182$, $p < .001$, $f^2 = 0.51$).

Mediation analyses evaluated H5a–H5c via specific indirect effects. H5a was supported: physical condition was significantly and indirectly associated with lower psychological distress through well-being (indirect $\beta = 0.315$, 95% BCa CI [0.231, 0.401]). As the direct effect of physical condition on distress was not estimated in this model (physical condition operated exclusively through well-being), this constitutes a full indirect pathway. H5b was supported: social isolation was significantly and indirectly associated with higher psychological distress through its depressant effect on well-being (indirect $\beta = -0.275$, 95% BCa CI [-0.363, -0.189]). H5c was not

supported: the indirect effect of family relationship quality on distress via well-being was non-significant (indirect $\beta = 0.034$, 95% BCa CI [-0.049, 0.119]).

Discussions

This study examined the antecedents of parental well-being and psychological distress among 284 Indonesian caregivers of stunted children, applying a theoretically grounded PLS-SEM framework informed by COR theory and Bronfenbrenner's ecological model. Broadly, the findings indicate that somatic resource conditions and social resource depletion are more strongly associated with parental well-being than perceived family relational resources in this high-adversity context, and that well-being appears to serve as the central pathway through which these contextual factors relate to parental psychological distress.

Physical Condition as the Strongest Correlate of Well-Being

Physical condition emerged as the most robust correlate of parental well-being ($\beta = 0.442$, $f^2 = 0.22$), consistent with COR theory's proposition that somatic resources occupy a foundational position in the personal resource hierarchy (Hobfoll et al., 2018). When caregivers' physical resources are depleted through nutritional inadequacy, chronic fatigue, or somatic illness, the psychological and behavioural capacity for active coping and positive engagement is diminished. In the Indonesian stunting context, where maternal undernutrition and child stunting frequently co-occur, the physical depletion of the caregiver cannot be treated as a background variable but must be understood as a proximate resource constraint with measurable implications for their psychological state (Beal et al., 2018). These associations are correlational in nature, and causal directionality cannot be established from the present cross-sectional data; nonetheless, the strength and consistency of the pattern align with (Stephoe, 2019) longitudinal evidence that subjective physical health ratings predict well-being trajectories more robustly than socioeconomic indicators alone.

These findings support arguments for integrating parental physical health into stunting intervention frameworks, though we acknowledge that any recommendations regarding intervention cost-effectiveness go beyond what cross-sectional correlational data can establish. What the data do indicate is that parental physical depletion is systematically related to diminished well-being, suggesting that health monitoring programmes that attend exclusively to child anthropometric outcomes may be missing an important co-occurring vulnerability in the caregiver.

Social Isolation as a Critical, Modifiable Risk Factor

Social isolation was the second-strongest predictor of parental well-being ($\beta = -0.386$, $f^2 = 0.17$), with higher isolation associated with lower well-being. This pattern is consistent with (Leigh-Hunt et al., 2017) synthesis identifying social isolation as a robust predictor of poor mental health outcomes, and with (Permatasari et al., 2021) qualitative observation that parents of stunted children in Indonesia are particularly susceptible to stigma-driven social withdrawal that paradoxically amplifies resource deficits. From a COR theory perspective, social isolation represents not merely a stressor but a condition of social resource loss that is self-perpetuating: the loss of social support reduces the buffer against further resource depletion, generating the kind of resource loss spiral (Hobfoll et al., 2018) identify as characteristic of chronic stress contexts.

The significant indirect effect of social isolation on psychological distress via well-being (indirect $\beta = -0.275$, 95% BCa CI [-0.363, -0.189]) is consistent with full mediation, in that higher isolation is associated with lower well-being, and lower well-being is associated with higher distress. However, caution is warranted in interpreting this as confirming a causal mechanism: the cross-sectional design cannot rule out reverse causation (e.g., that higher psychological distress drives social withdrawal) or confounding by unmeasured third variables. These findings suggest that community-based social connectedness interventions may represent a potentially modifiable pathway, though longitudinal evidence would be needed to confirm temporal directionality.

The Non-Significant Role of Family Relationship Quality

The non-significant association between family relationship quality and well-being ($\beta = 0.048$, 95% BCa CI [-0.072, 0.168]) is the finding most in tension with theoretical expectations rooted in attachment theory (Bowlby, 1982) and family systems perspectives (Minuchin, 1974). Several interpretations warrant consideration, and we explicitly resist equating statistical non-significance with the absence of any effect. The confidence interval for the family relationship quality path is wide and includes small effects in both directions; the present study may lack the statistical precision to detect genuinely small relational effects, particularly given the compressed variance in family relationship quality scores (scores clustering in the moderate range), which may reflect cultural response tendencies toward neutrality on sensitive relational items in Indonesian self-report contexts (Susilowati et al., 2022).

A second theoretical explanation derives from COR theory's context-dependency principle: when acute resource depletion in the physical and social domains consumes the majority of the caregiver's attentional and regulatory capacity, the relative contribution of relational resources may be overshadowed (Hasanah et al., 2022)

reported a similar pattern in Indonesian mothers following natural disaster exposure, where physical and economic stressors dominated psychological outcomes with minimal independent variance explained by marital quality. Third, the measurement of family relationship quality using a general composite scale adapted from instruments developed in Western family therapy contexts (Epstein et al., 1983) may have limited ecological validity in culturally distinct Indonesian family structures where conflict expression norms, gender role expectations, and intergenerational household configurations differ substantially from the normative samples on which these measures were developed. Facet-level measurement or culturally adapted instruments may yield different results. Accordingly, the present null finding should be interpreted as a call for more nuanced measurement and replication rather than as evidence that family relational resources are irrelevant to parental well-being in this population.

Well-Being as the Central Pathway Psychological Distress

The large and robust association between parental well-being and psychological distress ($\beta = 0.712$, $f^2 = 0.51$) is consistent with Keyes (2002) dual continua model, in which the active presence of well-being operates as a protective psychological state that is diagnostically distinct from and not merely the inverse of the presence of distress. The significant indirect effects through well-being for both physical condition and social isolation suggest that these environmental-level resource conditions relate to psychological distress not through direct symptom pathways but through their depletion of the caregiver's positive psychological resources. This pattern is consistent with the COR theory mechanism of resource loss spirals: when physical and social resources are depleted, the resulting erosion of well-being removes a key protective buffer, increasing susceptibility to psychological distress.

It is important, however, to note several methodological limitations in the interpretation of this mediation. The cross-sectional design means that temporal precedence a necessary condition for mediation cannot be confirmed. The directionality of associations could plausibly be reversed (e.g., psychological distress may erode well-being, which may in turn reduce perceived physical functioning and motivate social withdrawal). Longitudinal or experimental designs are required to establish the directional claims implied by mediation language. We report these findings as consistent with a mediation model but acknowledge that the design does not permit causal inference.

Partical Implications

The present findings have concrete implications for the design of multi-sector interventions within Indonesia's National Stunting Prevention Strategy. At the health system level, the results indicate that routine stunting management protocols at *posyandu* and *puskesmas* levels could be strengthened by incorporating standardized caregiver physical health assessments (e.g., haemoglobin status, BMI, sleep quality screening) alongside child anthropometric monitoring. Training community health workers (*kader*) in brief well-being screening using validated instruments such as the WHO-5 Well-Being Index would enable early identification of caregivers at risk. Structured referral pathways to basic psychological support services should accompany such screening.

Regarding social isolation, the findings provide empirical grounding for community-based social support models. Peer support groups organized at the *posyandu* level, neighbourhood caregiver networks facilitated by trained *kader*, and mobile outreach programmes that reduce geographical and mobility barriers for isolated caregivers represent potentially scalable strategies. Importantly, such groups could simultaneously address stigma, provide nutritional psychoeducation, and reinforce health-seeking behaviour. Digital communication platforms tailored to low-literacy populations may extend reach in dispersed rural communities.

At the policy level, these findings support the inclusion of explicit parental psychological well-being components within Indonesia's Acceleration of Stunting Reduction framework (Perpres No. 72/2021), which currently emphasizes nutrition, sanitation, and early childhood stimulation but does not systematically address caregiver psychological health. Cross-sector coordination between the Ministry of Health, the Ministry of Social Affairs, and local government structures would be required to operationalize such an expansion.

Conclusions

This cross-sectional PLS-SEM study with 284 Indonesian parents of stunted children found that physical condition and social isolation were significantly and substantially associated with parental well-being, while family relationship quality was not a significant predictor in this sample. Parental well-being, in turn, was strongly associated with psychological distress, and significant indirect associations through well-being were observed for both physical condition and social isolation. These findings are consistent with a COR theory account in which somatic resource depletion and social resource erosion collectively diminish the well-being state that serves as a buffer against psychological distress in high-adversity caregiving contexts.

Several limitations qualify the interpretation of these findings. The cross-sectional design precludes causal inference, and the directionality of all reported associations remains unconfirmed. The purposive sampling strategy, drawing exclusively from families already engaged with formal health services, introduces the likelihood of selection bias; the most isolated caregivers those least likely to attend *posyandu* or *puskesmas* are systematically underrepresented, which may have attenuated the observed association with social isolation. The indicator-to-sample-size ratio (approximately 5:1) falls below the conventional 10:1 guideline, and the high R^2 (59.4%) should be interpreted with commensurate caution regarding potential model overfitting. The instruments, particularly the Family Relationship Quality Scale, were adapted from Western-developed measures and may not fully capture culturally specific dimensions of family functioning in Indonesian contexts. The predominantly female sample limits generalizability to fathers and other caregiving configurations.

Future research should employ longitudinal or experience-sampling designs to establish temporal directionality. Community-based random sampling designs would improve external validity by including caregivers not engaged with formal health services. Multidimensional, culturally adapted measures of family relationship quality distinguishing, for example, between spousal support, co-parenting quality, and extended-kin involvement may reveal the facet-specific relational effects that composite measures obscure. Future studies might also explore whether parental well-being moderates the effectiveness of child-directed nutrition interventions, a mechanistic question with direct programmatic relevance.

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