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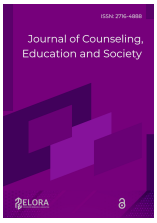

Fatherless in matrilineal societies: a quantitative profile from the Minangkabau context and its implications for culturally responsive counselling

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ABSTRACT

This cross-sectional quantitative study examined perceived fatherless among 488 adolescents in Padang, West Sumatra, within the Minangkabau matrilineal cultural context. Participants were recruited via convenience sampling from 169 school units and responded to a validated 20-item Fatherless Scale grounded in the tripartite model of father involvement (Cronbach's alpha = 0.788; Aiken's V = 0.67–0.92). Descriptive statistics and t-SNE dimensionality reduction with K-Means cluster analysis were used to map the distribution and latent structure of perceived paternal involvement. Results showed that 53.9% of respondents fell within the very low and low categories of perceived father involvement, despite 79.9% living with both parents and 90.0% having a living biological father. These categories were operationally defined using M ± SD boundaries; the categorical framework served as a descriptive reporting tool, while t-SNE and cluster analysis independently confirmed that the underlying response structure constitutes a gradient continuum rather than discrete groups. Adolescents living with both parents reported the lowest mean involvement (M = 40.59) compared to single-parent adolescents (M = 49.80), confirming that fatherless in this sample is predominantly a psychological and relational phenomenon rather than one of physical separation. Findings carry direct implications for culturally responsive counseling within Minangkabau family systems.

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Introduction

The scholarly study of father involvement has a history spanning five decades. Since Lamb (1975) first called attention to fathers as *"forgotten contributors"* to child development, a substantial body of research has accumulated demonstrating that paternal engagement is not interchangeable with maternal care but constitutes a qualitatively distinct developmental resource (Pleck, 1997; Cabrera, Tamis-LeMonda, Bradley, Hofferth, & Lamb, 2000). Across cognitive, emotional, and social developmental domains, the presence and quality of father involvement consistently predicts better outcomes for children (Diniz, Brandão, Monteiro, & Veríssimo, 2021; Puglisi, Rattaz, Favez, & Tissot, 2024). The contribution of fathers, in short, is not interchangeable with that of mothers; it is complementary and necessary in its own right (Islamiah, Breinholst, Walczak, & Esbjørn, 2023; Cho, Ryu, & Cho, 2024; Liu, Haslam, Dittman, Guo, & Morawska, 2022).

Yet reality, in many parts of the world, tells a different story. Millions of children grow up without meaningful paternal involvement, a condition widely referred to as fatherless, defined as a state in which a child is deprived of the father's role physically, psychologically, or both (Fajarrini & Umam, 2023; Wulandari & Shafarni, 2023). In the United States, approximately one in four children grows up without an actively involved father (TenEyck, Knox, & El Sayed, 2023). Indonesia faces an equally serious challenge: national data from the Susenas 2021 survey indicate that from 30.83 million early-childhood-aged children, approximately 2.99 million live without the daily presence of a father (Fajarrini & Umam, 2023), and Indonesia has been cited among countries with the highest global rates of fatherless (Ashari, 2018).

The consequences are real and far-reaching. Children who grow up without paternal involvement are more vulnerable to diminished self-esteem, social relational difficulties, anxiety, and depression (Nazari, Hosseini, & Haghani, 2024; Musembi, Muriithi, & Githuthu, 2022). Father-love absence significantly and negatively affects adolescents' subjective well-being (Peng, Hu, & Xiang, 2024), and these effects persist into emerging adulthood, shaping life satisfaction and emotional patterns well beyond the teenage years (Semešiová, Ráczová, & Babinčák, 2024; Diniz, Brandão, & Veríssimo, 2023).

What makes this problem theoretically complex is that prior Indonesian scholarship on fatherless (Fajarrini & Umam, 2023; Wulandari & Shafarni, 2023) has largely examined fatherless through conceptual and qualitative frameworks, and has not yet addressed a core theoretical puzzle: how does fatherless manifest in cultural systems where the nuclear father's role is structurally ambiguous by design? West Sumatra is home to the Minangkabau people, the world's largest matrilineal society, in which lineage, inheritance, and family obligations are organized around the maternal line (Natsir, Suryadi, Kamil, Sudiapermana, & Julia, 2021). A Minangkabau man simultaneously holds two competing roles: *ayah* to his own children and *mamak* (maternal uncle) to his clan's children (Herdianti, Hartati, & Mardianto, 2025). Traditionally, child welfare has been framed as the responsibility of the maternal kinship network, rendering the nuclear father's role structurally marginal (Hartati, Minza, & Yuniarti, 2021). Does this system protect children from the psychological consequences of paternal disengagement, or does it inadvertently legitimize the father's emotional withdrawal from his own children's lives? This theoretical tension remains unresolved in both the Indonesian and comparative matrilineal literature.

This study addresses that gap through a cross-sectional quantitative design employing a validated self-report instrument. Drawing on data from 488 adolescents across Padang, West Sumatra, with 81% of Minangkabau ethnicity, this research aims to (1) describe the overall profile of perceived fatherless using descriptive statistics and category boundaries derived from M ± SD criteria; (2) examine distributional variation in perceived father involvement by sex, living arrangement, and father's vital status; and (3) explore the latent response structure of the fatherless scale using t-SNE dimensionality reduction and K-Means cluster analysis. A quantitative descriptive design is appropriate for this purpose because no prior study has provided a large-scale empirical baseline of perceived fatherless in a matrilineal Indonesian setting, without which neither intervention design nor comparative scholarship can be meaningfully grounded (Creswell & Creswell, 2022; Yusuf, 2016).

Method

Research Design

This study employed a cross-sectional quantitative descriptive design. This approach is appropriate for the stated objectives because the primary aim is to map the distributional profile of perceived fatherless among a defined population and examine variation across demographic subgroups, without manipulating variables or testing directional hypotheses (Creswell & Creswell, 2022; Yusuf, 2016). This design directly addresses the research gap identified in the introduction: the absence of a large-scale empirical baseline of perceived paternal involvement in a matrilineal Indonesian context. Descriptive quantitative methods are the most suitable initial step for establishing such a baseline before more explanatory or experimental designs can be pursued.

Participants

A total of 488 adolescents participated in this study, recruited through convenience sampling from junior and senior high schools across Padang, West Sumatra. Convenience sampling was employed because no population register of adolescents with fatherless experiences exists in this context, making probability sampling impractical. Participants were reached via Google Form distributed through school networks across 169 school units. Inclusion criteria were: (1) currently enrolled as an active student in a junior or senior high school in Padang; (2) able to provide informed consent through parental or guardian approval obtained via the Google Form agreement page; and (3) willing to complete the survey independently. The sample size of 488 exceeds the commonly applied minimum ratio of 10 participants per instrument item (20 items × 10 = 200), providing

sufficient basis for stable descriptive statistics. Demographic characteristics of the sample are presented in Table 1.

Table 1. Demographic Characteristics of Participants (N = 488)

Characteristic	Category	n	%
Sex	Male	159	32.6
	Female	328	67.2
Ethnicity	Minangkabau	395	80.9
	Other	60	12.3
	Javanese	20	4.1
	Nias	8	1.6
	Sundanese	3	0.6
	Betawi	1	0.2
Living Arrangement	Both parents	390	79.9
	Single parent	65	13.3
	Guardian	32	6.6
Father's Status	Alive	439	90.0
	Deceased	48	9.8
Parental Income (IDR/month)	< 1,000,000	131	26.8
	1,000,000–1,999,999	121	24.8
	2,000,000–2,999,999	103	21.1
	3,000,000–3,999,999	49	10.0
	4,000,000–4,999,999	44	9.0
	5,000,000–9,999,999	28	5.7
	> 10,000,000	11	2.3

Note. Guardian includes grandparents, siblings, aunts/uncles, and other relatives. The demographic pattern in this table is central to the study's central argument: 79.9% of respondents live with both parents and 90.0% have a living biological father, yet more than half report very low or low perceived involvement. This structural disconnect between paternal presence and perceived engagement defines the fatherless condition examined in this study.

Instrument

The instrument used was the Fatherless Scale (*Skala Fatherless*), developed and validated by Zahri (2026) in her doctoral research at Universitas Negeri Padang. The scale is grounded theoretically in the tripartite model of father involvement proposed by Lamb, Pleck, Charnov, and Levine (1987), which remains the most widely applied framework for operationalizing paternal participation (Pleck, 1997; Diniz et al., 2021; Liu et al., 2022). The model identifies three core dimensions: (1) *engagement*, namely direct one-on-one interaction with the child; (2) *accessibility*, namely the father's physical and psychological availability; and (3) *responsibility*, namely management of the child's welfare including health, education, and family decisions (Lamb et al., 1987).

The scale consists of 20 items rated on a four-point Likert-type format, yielding total scores from 20 to 80. Higher scores indicate greater perceived father involvement; lower scores indicate more pronounced fatherless experience. Content validity was established through expert judgement by three certified Guidance and Counseling scholars using Aiken's V formula (Aiken, 1980):

$$V = \frac{\sum s}{n(c-1)}$$

s = rater's score minus the lowest possible score, n = number of raters, and c = number of rating categories. Items with $V \geq 0.60$ were retained (Aiken, 1980; Penfield & Giacobbi, 2004). All 20 retained items yielded Aiken's V coefficients ranging from 0.67 to 0.92, indicating adequate to high content validity. Table 2 presents the complete content validity results.

Table 2. Content Validity Coefficients (Aiken's V) of the Fatherless Scale

No.	Item Summary	Aiken's
1	Father asks mother to handle child's hygiene needs	0.92
2	Father feeds the child when mother is occupied	0.67
3	Father actively helps bathe the child	0.92
4	Father is present when child needs emotional support*	0.58
5	Father assists in toilet-training the child	0.83
6	Father carries or soothes the child when fussy	0.83
7	Father ignores child's crying at night (reverse scored)	0.83
8	Father makes time after work to play with child	0.83
9	Father takes child outdoors for play and exploration	0.83
10	Father chooses phone over playing with child (reverse scored)	0.92
11	Father creates creative play activities at home	0.83
12	Father delegates playground supervision to mother (reverse scored)	0.83
13	Father unavailable on weekends due to work (reverse scored)	0.83
14	Father gives child phone to avoid being disturbed (reverse scored)	0.75
15	Father avoids conflict with mother in front of child	0.75
16	Father avoids aggressive behavior affecting child's emotions	0.67
17	Father introduces child to extended family and community	0.83
18	Father modulates voice when correcting child's behavior	0.83
19	Father provides materials supporting child's creativity	0.83
20	Father motivates child to explore new experiences	0.67

Note. *Item 4 (V = 0.58) was retained after editorial revision following expert recommendation. Items marked (reverse scored) are negatively worded. V ≥ 0.80 = very high; V ≥ 0.60 = acceptable validity (Aiken, 1980).

Construct validity was confirmed through item-total correlation analysis, with all retained items exceeding *r*-critical = 0.266 (n = 55, α = 0.05). Internal consistency reliability was estimated using Cronbach's alpha (α = 0.788), reflecting adequate to good reliability for social science instruments (Taber, 2018). These psychometric properties provide sufficient measurement quality to support the descriptive inferences made in this study.

Scoring and Data Analysis

Scores were converted to percentages using the following formula:

$$\% \text{ Score} = \frac{\text{Obtained Score}}{80} \times 100$$

Classified into five categories based on $M \pm SD$boundaries (Yusuf, 2016), as shown in Table 3. These categories serve as descriptive reporting tools for communicating distributional patterns; they do not imply that fatherless is a discrete typological variable. Descriptive statistics were computed using the following formulas (Yusuf, 2016):

$$M = \frac{\sum f x_i}{n}$$

$$SD = \sqrt{\frac{n\sum f x_i^2 - (\ \ \sum f x_i)^2}{n(n-1)}}$$

$$P = \frac{f}{n} \times 100$$

Frequency distributions and cross tabulations were produced by sex, living arrangement, and father's vital status. To examine the latent structure of the response data independent of the categorical framework, a t-SNE dimensionality reduction analysis was conducted (perplexity = 35, learning rate = 200, maximum iterations = 1,500, random state = 42; van der Maaten & Hinton, 2008; Wattenberg, Viégas, & Johnson, 2016) alongside K-

Means cluster analysis ($k = 2$ to 10), using the elbow method and silhouette scores to identify the optimal cluster solution (Rousseeuw, 1987). All descriptive computations were performed in Microsoft Excel and cross verified manually.

Table 3. Fatherless Score Categorization Criteria

Category	Score Criteria	Score Range	n	%
Very High	≥ M + 1.5 SD	≥ 63	30	6.1
High	M + 0.5 SD to < M + 1.5 SD	50–62	78	16.0
Moderate	M − 0.5 SD to < M + 0.5 SD	35–49	117	24.0
Low	M − 1.5 SD to < M − 0.5 SD	21–34	120	24.6
Very Low	< M − 1.5 SD	≤ 20	143	29.3
Total			**488**	**100.0**

Note. M = 42.31; SD = 14.40. Score boundaries are computed from these sample statistics. Category labels follow the Bahasa Indonesia convention used in the original instrument (Zahri, 2026). These categories are operationally defined reporting tools; the t-SNE and cluster analyses in the Results section independently assess whether the underlying data structure supports discrete versus continuous interpretation.

Results and Discussions

Overall Profile of Perceived Fatherless

The descriptive analysis yielded a mean total score of M = 42.31 (SD = 14.40), with scores ranging from the minimum of 20 to the maximum of 80 (mean percentage score = 52.89%). The overall sample is situated in the lower half of the possible score range. This descriptive position becomes interpretively significant when placed against the theoretical expectation that a score of 52.89% out of 100 on a scale measuring father involvement indicates that, on average, these adolescents perceive their fathers as fulfilling roughly half of the engagement, accessibility, and responsibility dimensions described by Lamb et al. (1987). Applying the M ± SD categorization criteria, the Very Low and Low categories together accounted for 263 respondents (53.9% of the total sample), while 22.1% fell in the High or Very High categories and 24.0% in the Moderate category. Table 4 presents the full distribution by demographic subgroup.

Table 4. Perceived Father Involvement by Demographic Subgroup

Group	n	M	SD	Very Low %	Low %	High %	Very High %
Both parents	390	40.59	14.01	33.3	24.9	13.6	4.9
Single parent	65	49.80	12.47	12.3	20.0	29.2	9.2
Guardian	32	48.16	16.79	15.6	28.1	18.8	15.6
Father alive	439	41.64	14.28	31.0	24.6	15.5	5.5
Father deceased	48	48.56	14.24	14.6	22.9	20.8	12.5
Male	159	41.75	14.77	32.1	19.5	18.2	4.4
Female	328	42.59	14.25	28.0	26.8	14.9	7.0
Total	**488**	**42.31**	**14.40**	**29.3**	**24.6**	**16.0**	**6.1**

Note. M = mean total score (range 20–80). Very Low % and Low % = proportions within each subgroup in those two lowest categories. High % = High category; Very High % = Very High category. The demographic profile in Table 1 confirms that the high prevalence of low perceived involvement cannot be attributed to physical father absence, as 79.9% of respondents live with both parents and 90.0% report their biological father is alive.

Latent Response Structure: t-SNE Visualization

To examine whether the categorical reporting framework reflects naturally occurring groupings in the data, a t-SNE dimensionality reduction analysis was conducted on the 20 standardized item scores (van der Maaten & Hinton, 2008; Wattenberg et al., 2016). The analysis used perplexity = 35, learning rate = 200, maximum iterations = 1,500, and random seed = 42. The resulting KL divergence was 0.910, indicating an acceptable two-dimensional approximation of the 20-dimensional response space.

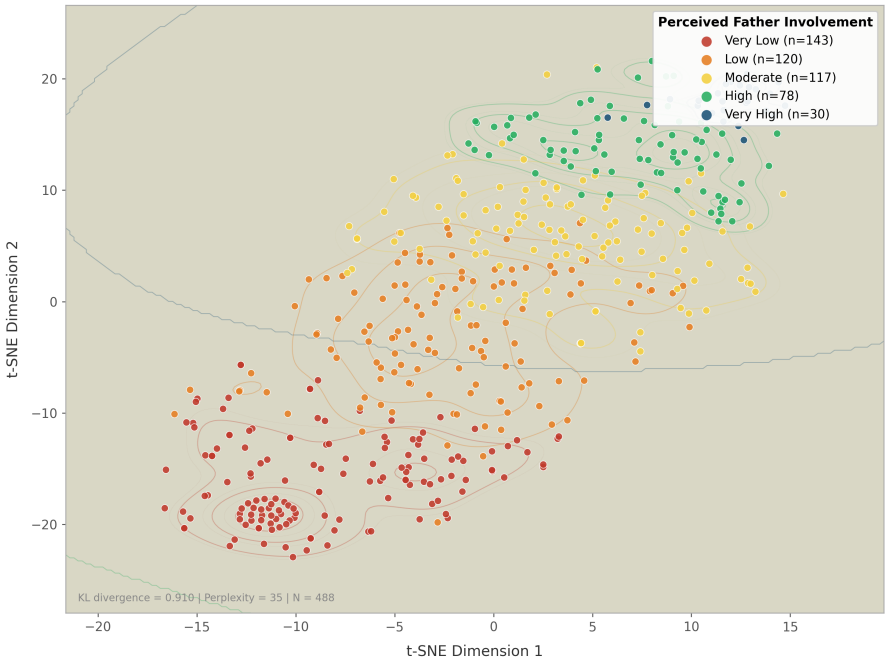

Figure 1. t-SNE Visualization of Fatherless Scale Response Patterns by Perceived Father Involvement Category (N = 488).

Colors represent the five category assignments derived from M ± SD criteria. Contour lines indicate kernel density estimates per category. KL divergence = 0.910; perplexity = 35; learning rate = 200; max_iter = 1,500; random_state = 42.

As shown in Figure 1, respondents in the Very Low and Low categories occupy substantially overlapping regions of the t-SNE space rather than forming clearly separated clusters. The Very High category (n = 30) forms a relatively concentrated subgroup in the upper periphery, while the middle categories (Low, Moderate, High) show considerable overlap. This spatial distribution pattern is inconsistent with a discrete typological structure and is more consistent with a gradient continuum, indicating that the category boundaries used for descriptive reporting do not correspond to natural discontinuities in the response data.

Optimal Cluster Structure: Elbow Method and Silhouette Analysis

To quantitatively corroborate the t-SNE findings, K-Means clustering was performed on the standardized 20-item scores for k = 2 through k = 10. Two convergent indicators were used: the elbow method (inertia) and the silhouette score (Rousseeuw, 1987).

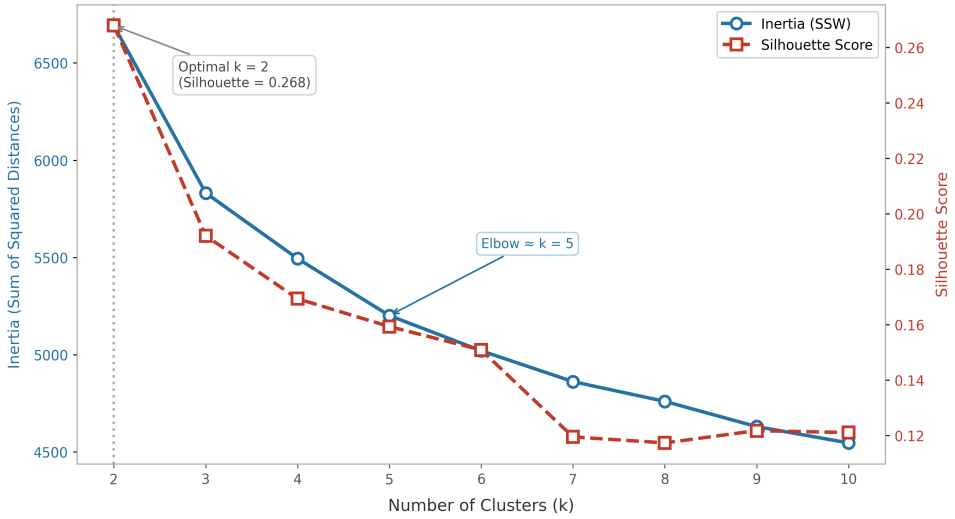

Figure 2. Elbow Method (Inertia) and Silhouette Score for Optimal Cluster Determination (k = 2–10).

Blue line (left axis) = inertia (sum of squared within-cluster distances); red dashed line (right axis) = silhouette score. The dotted vertical line marks the statistically optimal k. Best silhouette score at k = 2 (S = 0.268); subtle inflection in the inertia curve near k = 5.

The inertia curve declines gradually without a pronounced elbow, indicating that increasing cluster count yields diminishing reduction in within-cluster variance. The silhouette score peaks at k = 2 (S = 0.268), and all higher values of k yield lower silhouette scores, indicating that no solution with more than two clusters provides meaningfully better separation than two. A subtle inflection in the inertia curve near k = 5 is consistent with the five-category theoretical framework used for descriptive reporting, but the weak silhouette scores throughout confirm that these groupings are not sharply bounded in the data. Taken together, the t-SNE visualization and cluster analysis converge on the same conclusion: fatherless, as measured by this scale, exists as a gradient continuum. The categorical reporting framework in Table 3 and Table 4 should therefore be interpreted as a descriptive convenience, not as evidence of discrete subtypes.

Variation by Demographic Subgroup

Male (M = 41.75) and female (M = 42.59) respondents reported nearly identical mean scores. Male respondents were proportionally more concentrated in the Very Low category (32.1% vs. 28.0% for females), while females showed slightly higher representation in the Very High category (7.0% vs. 4.4%). These patterns are consistent with prior research documenting differential patterns of father-son and father-daughter interaction quality (Herbaut, Delès, & Diter, 2025; Cano, Perales, & Baxter, 2023).

The most interpretively significant findings concern living arrangement and father's vital status. Respondents living with both parents reported the lowest mean perceived involvement (M = 40.59), with 58.2% in the Very Low or Low categories. In contrast, respondents living with a single parent reported (M = 49.80), with only 32.3% in the lowest two categories. Adolescents whose fathers were deceased reported higher perceived involvement (M = 48.56) than those whose fathers were alive (M = 41.64). These patterns are presented in full in Table 4 and are discussed in detail in the following section.

The Paradox of the Present-but-Absent Father

The central finding of this study is a striking paradox: in a sample where 79.9% of adolescents live with both parents and 90.0% have a living biological father, more than half report very low or low perceived paternal involvement. This finding extends the theoretical distinction between physical and psychological father absence, which Cabrera et al. (2000) identified as one of the defining challenges for fatherlessness research entering the twenty-first century. A father who is physically resident but emotionally unavailable fails to fulfill the three dimensions of the tripartite model (Lamb et al., 1987; Pleck, 1997): he may be present but not engaged, accessible in body but not in responsiveness, and nominally responsible without exercising that responsibility in ways the child perceives (Osinga, van Bergen, van Brummen-Girigori, Kretschmer, & Timmerman, 2023; Peng, Hu, & Xiang, 2024; Musembi, Muriithi, & Githuthu, 2022). This form of absence is arguably more insidious than physical absence precisely because it is invisible to household-composition surveys and does not activate social support mechanisms designed for fatherless families (Nazari, Hosseini, & Haghani, 2024).

From an attachment theory perspective (Bowlby, 1982; Ainsworth, Blehar, Waters, & Wall, 1978), children's security depends not on physical proximity but on the caregiver's emotional responsiveness and attunement. A father who is distracted, withdrawn, or unresponsive fails to serve as a secure base, generating attachment dynamics functionally similar to those produced by actual absence (Islamiah et al., 2023; Puglisi et al., 2024). The data from Table 4 are consistent with this account: the group with the highest rate of low perceived involvement is the group with two parents present, not those with a single parent or a deceased father, which is the pattern predicted if attachment security is driven by relational quality rather than physical co-residence. From a social learning perspective (TenEyck, Knox, & El Sayed, 2023; Cano et al., 2023), adolescents who observe limited paternal engagement in the home internalize a model of fatherhood as peripheral and dispensable, shaping their future expectations of intimate and family roles in adulthood.

Economic factors provide a structural explanation for part of this pattern. Over 51.6% of respondents came from families earning below IDR 2,000,000 per month. Financial pressure is among the strongest structural predictors of low father involvement: economically precarious fathers are more likely to work long hours, hold multiple jobs, or migrate seasonally for employment, all of which reduce the quantity and quality of father-child interaction (Liu et al., 2022; Diniz, Brandão, & Veríssimo, 2023; Lei, Chen, & Hu, 2024). These structural drivers must be recognized by counselors who might otherwise locate the problem entirely within individual or relational dynamics.

The Minangkabau Cultural Factor

With 80.9% of respondents from Minangkabau backgrounds, the matrilineal social structure provides a crucial interpretive context. The theoretical puzzle identified in the introduction can now be addressed with empirical grounding. The Minangkabau man's dual obligation as *ayah* to his biological children and *mamak* to his clan's children creates a structural tension that may, in some family configurations, result in diminished engagement with his own children (Herdianti et al., 2025; Hartati et al., 2021). The high prevalence of low perceived

involvement in this predominantly Minangkabau sample is therefore partly interpretable as a structural outcome of matrilineal organization, not merely as individual paternal indifference.

However, this cultural explanation requires qualification. Natsir et al. (2021) demonstrated through structural equation modeling that matrilineal parenting in Padang retains positive associations with adolescent behavioral outcomes, suggesting the system has functional value. Hartati et al. (2021) documented a contemporary normative shift: the nuclear father's role is growing stronger amid urbanization and Islamic values that position the father as family head and economic provider. Herdianti et al. (2025) confirmed that even within this matrilineal setting, adolescents who perceive greater paternal involvement demonstrate better psychological development. The cultural frame, therefore, mitigates but does not eliminate the developmental significance of father involvement (Natsir, Melvina, Jusoh, & Lidya, 2026). This finding suggests that matrilineal structure creates vulnerability to fatherless, but does not render it developmentally irrelevant, resolving the theoretical puzzle posed in the introduction.

The Counterintuitive Pattern: Single-Parent and Bereaved Adolescents

Adolescents living with a single parent ($M = 49.80$) and those with a deceased father ($M = 48.56$) reported higher perceived involvement than those with a living, co-resident father ($M = 40.59$). For single-parent adolescents, episodic paternal contact (weekend visits, phone calls) may be experienced as more intentionally engaged than the diffuse and unremarkable presence of a co-resident father who provides limited emotional interaction (Diniz et al., 2023; Osinga et al., 2023). In collectivistic West Sumatran contexts, the *mamak* or other male relatives may additionally serve as partial substitutes for the biological father's role (Hartati et al., 2021; Sia & Aneesh, 2024). For bereaved adolescents, the elevated scores likely reflect *idealization* of the deceased father, a documented process in which memory of a lost parent is reconstructed in more positive terms than daily reality warranted (Worden, 2018). These interpretations cannot be confirmed with the present cross-sectional data and constitute hypotheses for longitudinal investigation.

Implications for Counseling Practice

Four implications for school counselors and family counselors in West Sumatra are highlighted. First, household composition is not a reliable indicator of paternal presence. Counseling intake assessments should include direct measures of perceived father-child relationship quality rather than relying on co-residence or father's vital status as proxies (Herdianti et al., 2025; Musembi et al., 2022).

Second, culturally responsive approaches must account for the structural role of the *mamak*. Counselors working with Minangkabau families need to assess whether the *mamak* functions as a compensatory paternal figure before concluding that the adolescent lacks male developmental support (Natsir et al., 2021; Hartati et al., 2021). Concretely, counselors can adapt existing father involvement assessment tools by including items that measure the engagement, accessibility, and responsibility of the *mamak* alongside the biological father, producing a culturally accurate map of the adolescent's paternal support ecology.

Third, interventions should address structural and economic drivers of paternal disengagement. Family counseling models that combine psychoeducation about the developmental importance of father involvement with practical coparenting agreements that distribute household and caregiving responsibilities are most likely to produce sustained engagement change (Zahri, 2026; Diniz et al., 2021; Puglisi et al., 2024). The family counseling model with symbolic modeling techniques validated in this cultural context (Zahri, 2026) represents one such framework, and its documented effectiveness should be disseminated among school counselors in Padang.

Fourth, the gradient continuum structure confirmed by t-SNE and cluster analysis suggests that intervention programs should be tiered rather than categorical. Adolescents in the Very Low category (29.3% of this sample) require intensive individual and family counseling aimed at structural change in the father-child relationship. Those in the Low and Moderate categories may benefit from group psychoeducational programs that raise adolescent awareness of the relational dimensions of paternal involvement and equip them with communication skills for improving the father-child relationship (Cho et al., 2024; Islamiah et al., 2023). A single universal program would under-serve the most at-risk group while over-resourcing those with milder fatherless experiences.

Limitations and Future Directions

Several limitations of this study must be acknowledged. First, the cross-sectional design precludes causal inference. The associations observed between demographic characteristics and perceived fatherless cannot establish that living arrangement, economic pressure, or cultural structure causally produces paternal disengagement. The finding that adolescents with both parents report lower perceived involvement than single-parent adolescents, for instance, is an empirical pattern that can be explained by multiple mechanisms, and distinguishing between them requires longitudinal data or experimental designs.

Second, the convenience sampling procedure limits generalizability. Participants were recruited through school networks in Padang, and the sample likely overrepresents adolescents with access to educational institutions and excludes school dropouts, who may experience more severe fatherless. The findings should be interpreted as descriptive of this sample rather than representative of all Minangkabau adolescents.

Third, the study relies exclusively on adolescent self-report. Perceived father involvement is theoretically meaningful as a construct in its own right (Herdianti et al., 2025), but it is not equivalent to observed paternal behavior, father-reported involvement, or dyadic interaction quality. Future research should employ multi-informant designs that triangulate adolescent perceptions with paternal self-reports and, where feasible, observational data (Liu et al., 2022; Diniz et al., 2021).

Fourth, the study did not assess whether the Fatherless Scale is invariant across ethnic subgroups within the sample. Comparative analyses between Minangkabau and non-Minangkabau respondents should await measurement equivalence testing. Future research should also examine whether the cultural construct of *mamak* involvement moderates the relationship between biological father absence and adolescent outcomes, as this would directly test the buffering hypothesis implied by the matrilineal structure.

Conclusions

This study provides the first large-scale quantitative profile of perceived fatherless among adolescents in Padang, West Sumatra, within the Minangkabau matrilineal context, offering an empirical foundation where previously only conceptual and qualitative accounts existed. The central finding is that fatherless in this setting is predominantly a condition of perceived psychological and relational absence rather than physical separation: 53.9% of 488 respondents reported very low or low perceived father involvement despite 79.9% living with both parents and 90.0% having a living biological father. t-SNE visualization and K-Means cluster analysis (optimal $k = 2$, silhouette score $S = 0.268$; inertia inflection near $k = 5$) confirmed that the underlying response structure is best characterized as a gradient continuum, validating the descriptive categories as reporting tools while ruling out discrete typological groupings. The counterintuitive finding that co-resident, living fathers are associated with the lowest perceived involvement ($M = 40.59$) compared to single-parent ($M = 49.80$) and bereaved adolescents ($M = 48.56$) demonstrates that demographic indicators of paternal presence are poor proxies for relational quality. These findings resolve a theoretical puzzle in the matrilineal fatherless literature by showing that Minangkabau structural arrangements do not eliminate the developmental significance of nuclear father involvement, even as they may partially mitigate its absence. Counselors working in this setting are called to assess relational quality directly, attend to the dual-role structural tensions of Minangkabau fatherhood, and deliver tiered interventions calibrated to the gradient nature of fatherless experiences.

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