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Sustaining family life: Social-ecological resilience among single mothers in rural East Java

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Abstract:

Single mothers in rural areas face simultaneous economic and caregiving responsibilities, social expectations regarding gender roles, and limited access to support, which may affect their ability to sustain family life. This study aims to analyze how single mothers in rural Jombang Regency sustain family life through personal agency, social support, religious meaning-making, and adaptation to gender norms. This qualitative case study involved six purposively selected single mothers as primary informants and 12 supporting informants. Data from interviews, four weeks of participant observation, and documentation were analyzed using Braun and Clarke's reflexive thematic analysis, informed by Ungar's social-ecological perspective. The findings reveal three main patterns. First, multidimensional maternal agency is manifested through commitment to children, material and emotional support from kinship networks, and reciprocal community practices. Second, religious-spiritual resilience emerges through religious study gatherings (*pengajian*) as spaces for support and togetherness, alongside the interpretation of caregiving as a religious trust and an act of worship. Third, agency within constraints is reflected in adaptations to gender roles, efforts to maintain social acceptance, the reinterpretation of family responsibilities, and unequal access to family and community support. The study concludes that single mothers' resilience is social-ecological in nature, shaped by personal actions, social relationships, and religious meaning-making, while also being influenced by gender norms and unequal access to support. The study recommends that the government strengthen community support and inclusive religious activities, expand access to social services, and develop economic empowerment initiatives that accommodate single mothers' caregiving responsibilities.

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INTRODUCTION

The phenomenon of single motherhood in rural Jombang Regency, East Java, reflects shifting family responsibilities within prevailing gender norms that continue to associate the primary breadwinner role with men. Women may become single mothers due to divorce, the death of a spouse, or other family circumstances that require them to assume economic and caregiving responsibilities (Hutasoit & Brahmana, 2021). These circumstances may generate psychological distress, particularly when caregiving responsibilities coincide with financial constraints and limited family support (Jasmita et al., 2024; Mishra et al., 2021; Karunanayake et al., 2021). Socioeconomically, the poverty rate in Jombang Regency reached 9.15% in 2023 (Pemerintah Kabupaten Jombang, 2023), while the national poverty rate stood at 9.36% in March 2023 (Kementerian Koordinator Bidang Pembangunan Manusia dan Kebudayaan, 2023). Although these figures do not specifically represent the circumstances of single mothers, economic vulnerability provides an important context for understanding the challenges of meeting family needs. Therefore, economic and caregiving responsibilities must be understood in relation to the availability of family support, community relationships, and access to social resources that enable single mothers to sustain family life.

Previous studies on single mothers' resilience can be classified into three main research streams. First, psychological-emotional resilience studies highlight caregiving pressures, mental health, coping strategies, and the role of social support in single mothers' ongoing adaptation to adversity (Caragata et al., 2021; Clark et al., 2024; Dharani & Balamurugan, 2024; Vo & Canty, 2023). Second, economic resilience studies emphasize employment demands, income constraints, access to resources, and the strategies single mothers employ to meet family needs (Affandy, 2023; Asrofi et al., 2025; Girisken, 2021; Munir et al., 2024). Third, socio-cultural and religious resilience studies examine family support, community solidarity, religious participation, and spiritual beliefs in helping single mothers cope with adversity (Dharani & Balamurugan, 2025; Ibrahim et al., 2024; Misriani et al., 2024; Zhou & Taylor, 2022). However, these studies have not sufficiently explained the interconnections among maternal commitment, kinship support, reciprocal community assistance, religious meaning-making, and adaptation to gender norms, particularly when access to support varies. The novelty of this study lies in its integrated analysis of these personal, social, spiritual, and structural dimensions, using Ungar's social-ecological resilience perspective, within the context of single motherhood in rural Jombang.

Building on this research gap, this study aims to analyze how single mothers in rural Jombang Regency sustain family life through individual actions, social support, religious meaning-making, and adaptation to gender norms. The study addresses three research questions: (1) How are maternal commitment and family and community resources associated with single mothers' resilience? (2) How do religious practices and values contribute to meaning-making and community togetherness? (3) How do single mothers adapt their family responsibilities to gender norms and constraints in accessing support resources? Theoretically, this study seeks to deepen the application of the social-ecological resilience perspective by examining the interconnections among maternal agency, spiritual meaning-making, social relationships, and structural conditions in rural settings. In practice, the study is expected to inform efforts to strengthen community support, economic empowerment, and social services that are more responsive to single mothers' needs and to their ability to sustain family life.

This study is grounded in the argument that single mothers' resilience is not merely an individual capacity to cope with economic and emotional pressures but a relational process involving commitment to caregiving, kinship support, reciprocal community relationships, and

religious meaning-making. Family and community support can strengthen mothers' ability to fulfill their economic and caregiving responsibilities, while religious practices may provide spaces for social togetherness and sources of spiritual meaning. However, such agency operates within gender norms that continue to place domestic responsibilities on women, even when they assume the role of primary breadwinner. Moreover, unequal access to family and community networks indicates that social resources are not always equally available. Ungar's (2011) social-ecological resilience perspective is employed to understand how maternal agency, social relationships, spiritual meaning-making, and structural constraints interact in sustaining family life. Accordingly, this study conceptualizes resilience as a process of negotiation among individual actions, socio-cultural expectations, and resource availability in the everyday lives of rural single mothers.

METHOD

Research Approach

This study employed a qualitative case study design to explore the resilience of single mothers in sustaining family life in rural Jombang Regency, East Java. This design enables an in-depth understanding of individual experiences within their sociocultural contexts (Priya, 2021) and the interrelationships among various factors in real-life settings (Crowe et al., 2011). The study focused on the interpretation of economic and caregiving responsibilities, kinship and community relationships, religious practices, and adaptation to gender norms and resource constraints. Jombang Regency was selected to examine resilience dynamics in a rural setting where social relationships and religious practices are embedded in everyday life. Ungar's social-ecological resilience perspective was employed to understand the relationship between personal capacities and the sociocultural environment, while themes were progressively developed through the interpretation of informants' empirical experiences.

Data Sources

Primary data were obtained through in-depth interviews with six single mothers, purposively selected as primary informants to provide relevant, detailed information aligned with the research objectives (Palinkas et al., 2015). The selection criteria included having at least one child under 18 years of age, having assumed primary caregiving responsibilities for at least three years without a male partner residing in the same household, being at least 25 years old, residing in rural Jombang Regency, and being willing to participate in interviews and observations. The six informants are identified as YP, RS, SM, SR, AP, and Rina. The study also involved 12 supporting informants, including family members, community members, and friends, to enrich understanding through diverse perspectives, consistent with the principles of source triangulation in qualitative research (Carter et al., 2014). Additional primary data were obtained through four weeks of participant observation, while secondary data included local government reports, records from religious institutions, community program documents, and relevant policy documents.

Data Collection

Data were collected through semi-structured in-depth interviews, participant observation, and document analysis. The interview guide was developed with reference to Ungar's (2008) social-ecological resilience framework to explore caregiving experiences, economic activities, family and community support, religious practices, and adaptation to gender norms. Open-ended questions allowed informants to describe their experiences and interpretations in depth. Interviews with 12 supporting informants were conducted to gather additional perspectives on social relationships and the support single mothers receive. Four

weeks of participant observation focused on everyday interactions and community activities, including religious gatherings, while document analysis was used to understand the social and institutional context. Data collection with the primary informants concluded after the sixth interview, when information relevant to the research questions began to recur, and no substantively new categories of experience emerged. This was considered an indicator of the adequacy of empirical data rather than definitive evidence that all possible interpretations had reached saturation.

Data Analysis

Data were analyzed using Braun and Clarke's (2019) reflexive thematic analysis through six phases: data familiarisation, coding, initial theme development, theme review, theme definition and naming, and report writing. Interview transcripts and observation notes were read repeatedly, followed by open, line-by-line coding that generated 127 initial codes, including motivation related to children, the burden of dual roles, kinship assistance, and religious study gatherings (*pengajian*) as sources of support. These codes were developed into nine candidate themes, which were subsequently reviewed based on patterns of meaning, resulting in three overarching themes comprising ten subthemes: multidimensional maternal agency (three subthemes), religious-spiritual resilience (three subthemes), and agency within constraints (four subthemes). The analysis proceeded iteratively, combining inductive engagement with informants' experiences and Ungar's social-ecological perspective as an interpretive framework. Consistent with Byrne (2022), themes were developed through the researcher's active interpretation of the data and informants' everyday circumstances rather than being predetermined by theoretical categories.

Trustworthiness

The trustworthiness of the study was enhanced through source and methodological triangulation, participant clarification (*member checking*), peer debriefing, reflexive journaling, and thick contextual description (Korstjens & Moser, 2018). Source triangulation involved comparing accounts from six single mothers and 12 supporting informants, while methodological triangulation integrated interviews, four weeks of participant observation, and documentation. Participant clarification focused on the accuracy of reported experiences and their interpretation, rather than treating participants' agreement as definitive validation of the researcher's thematic interpretations. Peer debriefing and reflexive journaling were employed to examine assumptions, coding decisions, and alternative interpretations. Detailed descriptions of single mothers' experiences and community contexts supported assessments of the transferability of the findings. Consistent with the principles of reflexive thematic analysis, interpretive quality was grounded in methodological coherence and researcher reflexivity rather than uniformity in coding outcomes (Braun & Clarke, 2021).

RESULTS AND DISCUSSION

Results

This section presents three main themes generated through reflexive thematic analysis: multidimensional maternal agency, reflected in commitment to children, kinship support, and reciprocal community assistance; religious-spiritual resilience, expressed through religious meaning-making, emotional support, and community togetherness; and agency within constraints, manifested through adaptation to gender norms, efforts to maintain social acceptance, reinterpretation of family responsibilities, and unequal access to support. Together, these themes demonstrate that single mothers' resilience is not merely an individual capacity but is shaped by dynamic relationships among personal commitment,

family support, community networks, religious meanings, gender expectations, and access to socio-ecological resources.

Multidimensional maternal agency: Commitment, kinship, and community support

The thematic analysis revealed that single mothers' resilience is associated with their commitment to their children and the support they receive through family and community relationships. Analysis of the interview narratives generated three subthemes: maternal commitment as the foundation of resilience, kinship networks as sources of economic and emotional support, and reciprocal community assistance as a mechanism of social support. These subthemes demonstrate that single mothers' efforts to sustain family life are driven not only by personal motivation but also by the involvement of family members and the surrounding community. Across informants' experiences, maternal agency is reflected in their efforts to continue working, meet their children's needs, draw upon family assistance, and participate in mutually supportive social relationships. The mapping of initial codes, subthemes, and thematic meanings is presented in Table 1.

Table 1
Thematic Mapping of Multidimensional Maternal Agency

Initial Codes	Subthemes	Thematic Meanings
Children as a reason to persevere; caregiving responsibilities; working for children's future; uncertain income; work-related exhaustion; efforts to meet children's educational needs.	Maternal Commitment as the Foundation of Resilience	Commitment to children's needs and future motivates mothers to continue working, fulfil caregiving responsibilities, and persevere despite economic difficulties.
Childcare assistance from parents; rice and food assistance; financial support for school expenses from siblings; emotional support; family as a source of comfort during difficulties.	Kinship Networks as Sources of Economic and Emotional Support	Extended family members help mothers meet material needs, maintain employment outside the home, and obtain emotional support in fulfilling their responsibilities as single parents.
Participation in *arisan*; use of *arisan* funds for family needs; sharing personal experiences; *gotong royong*; assistance from neighbours; voluntary house repairs; reciprocal assistance.	Reciprocal Community Assistance as a Mechanism of Social Support	Community relationships provide access to material and emotional assistance while enabling mothers to participate in mutual support practices.

Source: Compiled by the authors based on thematic analysis, 2026.

As shown in Table 1, the three subthemes illustrate interconnected forms of support and agency in single mothers' experiences. Maternal commitment represents the personal motivation that encourages them to continue meeting family needs. Kinship networks demonstrate how assistance from family members supports the fulfillment of economic and caregiving responsibilities. Meanwhile, reciprocal community assistance highlights the role of social relationships beyond the family in providing practical and emotional support. These patterns are further illustrated through the informants' experiences below.

Maternal commitment as the foundation of resilience

The first subtheme indicates that commitment to their children motivates single mothers to maintain their economic and caregiving responsibilities despite various constraints. Their hopes for their children's future encourage them to continue working despite physical exhaustion and income uncertainty. YP (38), a single mother who sells bread, stated:

> "I wake up very early to prepare the bread I sell. After returning home, I still have to do the housework and support my children's education. Sometimes I feel extremely tired, but I always remind myself that my children depend entirely on me, so I must keep striving." (Interview, 12 May 2025)

Commitment to children's education was also reflected in the experience of RS (42), who worked as a laborer. She explained, "As a laborer, my income is uncertain, but I always try to set aside money so that my children can continue their education. I do not want them to experience the same difficulties I have faced" (Interview, 14 May 2025).

Meanwhile, SM (45) emphasized the importance of her children's future as a source of motivation in facing work demands. She stated, "Working as a day laborer is exhausting, but whenever I feel like giving up, I always think about my children's future. Their dreams give me the strength to keep working despite the difficulties" (Interview, 16 May 2025).

These three experiences demonstrate that maternal commitment is reflected in efforts to maintain employment, fulfill caregiving responsibilities, and secure children's education. YP faces the demands of employment and caregiving simultaneously; RS attempts to allocate part of her income to her children's education, while SM draws motivation from her hopes for her children's future, persevering despite exhaustion. These findings indicate that maternal commitment is not merely an emotional motivation but is also expressed through concrete actions to meet children's needs and support their future amid economic pressures.

Kinship Networks as Sources of Economic and Emotional Support

The second subtheme demonstrates that kinship networks provide support for single mothers in fulfilling their economic and caregiving responsibilities. Such support includes assistance with daily necessities, educational expenses, childcare, and emotional encouragement from family members. SR (45) explained, "Without my mother, I might have given up. She often looks after my children while I work as a day laborer. Sometimes she also gives us rice or other necessities when my income is insufficient" (Interview, 16 May 2025).

Family assistance in meeting children's educational needs was also described by AP (37). She stated, "My older sister sometimes helps pay my children's school fees. Her financial situation is not very good either, but she always tries to help whenever she can. Her support makes me feel that I am not struggling alone" (Interview, 18 May 2025).

Beyond material assistance, family relationships also provide emotional encouragement. YP (38) revealed, "I am grateful that my family is always there for me. Although they cannot always provide financial help, they encourage me, listen to my problems, and help however they can. Their presence gives me the strength to keep going" (Interview, 12 May 2025).

These experiences illustrate that kinship networks provide support through different functions. SR receives childcare assistance and food provisions that enable her to continue working; AP obtains educational assistance from her sister despite the family's financial limitations; and YP emphasizes the importance of emotional support from family members. These differences indicate that kinship support extends beyond material assistance to include care and encouragement that reduce feelings of being alone in facing difficulties. Thus, kinship networks help single mothers maintain economic activities and fulfill caregiving responsibilities while navigating everyday pressures.

Reciprocal community assistance as a mechanism of social support

The third subtheme shows that community relationships provide economic, emotional, and practical support for single mothers through *arisan* (rotating savings groups), *gotong royong* (collective mutual assistance), and neighborly support. Participation in these activities

offers opportunities to meet family needs while developing mutually supportive relationships. AP (37) explained:

> "I regularly take part in an arisan with my neighbors. When it is my turn to receive the money, I use it to buy school supplies for my children or household necessities. More importantly, we trust and support one another because we all understand that life is not always easy." (Interview, 18 May 2025)

Beyond its economic benefits, *arisan* also provides a space to share experiences and receive emotional support. SM (45) stated:

> "I enjoy taking part in arisan not only because of the financial benefit but also because it gives us a chance to gather, share stories, and encourage one another. Talking with the other women makes me feel less alone in dealing with different problems." (Interview, 16 May 2025)

Another form of community support is evident in the practice of *gotong royong*. YP (38) described her experience of receiving assistance from neighbors to repair her house:

> "When part of my house needed repairs, several neighbors came voluntarily to help. I did not have enough money to pay a builder, but they worked together without expecting payment. Later, when they needed help, I also tried to help in whatever way I could." (Interview, 12 May 2025)

These three experiences demonstrate that community support operates through social practices that serve complementary functions. AP uses *arisan* funds to meet family needs, SM receives emotional support through interactions with other members, while YP benefits from practical assistance through *gotong royong*. YP's willingness to reciprocate her neighbors' assistance also indicates that single mothers are not merely recipients of support but have opportunities to contribute to reciprocal social relationships. Thus, community activities help single mothers navigate economic constraints while maintaining their participation in community life.

Overall, the three subthemes demonstrate that single mothers' resilience is associated with commitment to their children, support from kinship networks, and participation in community activities. Maternal commitment motivates efforts to meet family needs, while family and community assistance provides resources that support economic activities and caregiving responsibilities. These interconnected patterns indicate that maternal agency is expressed through both personal actions and participation in mutually supportive social relationships.

Religious-spiritual resilience in meaning-making and community togetherness

The thematic analysis revealed that single mothers' resilience is supported not only by material resources but also by spiritual meaning-making and participation in religious activities. The findings generated three subthemes: religious communities as sources of emotional support, community togetherness through religious values, and faith as a source of meaning and personal strength. These subthemes illustrate how religious practices and beliefs help single mothers cope with life's pressures, obtain social support, and interpret their caregiving responsibilities. The thematic mapping is presented in Table 2.

Table 2
Thematic Mapping of Religious-Spiritual Resilience

Initial Codes	Subthemes	Thematic Meanings
Participation in *pengajian*; inner peace at the mosque; sharing personal problems; mutual encouragement.	Religious Communities as Sources of Emotional Support	Religious activities provide spaces for sharing experiences and receiving emotional support in coping with difficulties.

Pengajian as a second family; mutual understanding; feeling valued; shared religious values.	Community Togetherness through Religious Values	Relationships within religious communities strengthen a sense of belonging, social acceptance, and togetherness.
Caregiving as a religious trust (*amanah*); trials from Allah; patience; faith; spiritual struggle; caregiving as an act of worship.	Faith as a Source of Meaning and Personal Strength	Religious beliefs help mothers interpret difficulties and caregiving responsibilities as part of a religious trust and an act of worship.

Source: Compiled by the authors based on thematic analysis, 2026.

As shown in Table 2, religious-spiritual resilience is reflected in emotional support through religious activities, togetherness among community members, and the interpretation of caregiving responsibilities in light of religious beliefs. These three patterns are illustrated in the following experiences of the informants.

Religious communities as sources of emotional support

The first subtheme indicates that *pengajian* (Islamic religious study gatherings) and mosque-based activities provide emotional support for single mothers. These activities offer opportunities to share experiences, attain inner peace, and encourage one another in coping with difficulties. AP (37) stated, “When I attend pengajian, I realize that I am not the only one facing difficulties. Many other mothers are also dealing with their own struggles, and we encourage one another to remain patient and strong” (Interview, 18 May 2025).

Emotional reassurance through religious activities was also experienced by RS (42). She explained, “I regularly attend pengajian at the mosque because it brings me inner peace. I can talk with other women who understand my situation, and we remind one another to remain grateful and keep striving for our families” (Interview, 14 May 2025).

These experiences demonstrate that *pengajian* serves as a space for emotional support beyond religious worship. AP emphasized the importance of mutual encouragement through shared experiences, while RS found reassurance through opportunities to discuss her difficulties. These findings indicate that interactions within religious activities help single mothers cope with emotional pressures through support from fellow community members.

Community togetherness through religious values

The second subtheme shows that participation in religious activities strengthens single mothers’ sense of belonging and social acceptance. Relationships developed through *pengajian* enable them to receive attention, advice, and recognition from community members. YP (38) revealed:

> “Pengajian feels like a second family to me. Whenever I share my problems, the other participants listen attentively and offer advice based on Islamic teachings. This helps me view difficulties as trials from Allah that I must face with patience and faith.” (Interview, 12 May 2025)

A similar experience was shared by SM (45), who emphasized the importance of participating in mosque activities. She stated, “If I did not attend activities at the mosque, I think the pressure I experience would be much greater. Through pengajian, I can share experiences, receive encouragement, and feel valued by the community” (Interview, 16 May 2025).

The experiences of YP and SM demonstrate that religious communities not only provide emotional support but also foster feelings of acceptance and recognition. YP regards *pengajian* as a second family, while SM emphasizes the social recognition she receives through mosque activities. Observational data further revealed that weekly *pengajian* gatherings

included Qur'anic recitation, informal discussions of personal problems, and collective efforts to identify solutions based on Islamic teachings. These findings indicate that religious values form part of communal practices that strengthen social relationships among mothers within the community.

Faith as a Source of Meaning and Personal Strength

The third subtheme indicates that religious beliefs help single mothers interpret difficulties and caregiving responsibilities as forms of religious trust and worship. Patience, faith, and spiritual struggle serve as sources of strength in navigating life's constraints. YP (38) explained:

> "In Islam, mothers are highly honored. The Prophet taught us to respect mothers because paradise lies beneath a mother's feet. Although I am raising my children alone and facing many difficulties, I believe Allah has entrusted them to me. Caring for them is my responsibility and a trust placed in me." (Interview, 12 May 2025)

The interpretation of caregiving responsibilities as a spiritual struggle was also expressed by SM (45). She stated:

> "Being a single mother has taught me that I am stronger than I ever imagined. I see this situation as my jihad, that is, my spiritual struggle. Every effort I make to earn a living and care for my children is part of my worship and my responsibility before Allah." (Interview, 16 May 2025)

These narratives demonstrate that faith provides meaning to single mothers' experiences in fulfilling family responsibilities. YP understands caregiving as a trust entrusted by Allah, while SM interprets both employment and caregiving as spiritual struggles and acts of worship. The narratives of RS and AP also highlight the importance of patience, prayer, and faith in coping with difficulties. Thus, faith serves as a source of personal strength that helps these mothers maintain hope and fulfill their caregiving responsibilities.

Overall, the three subthemes demonstrate that single mothers' religious-spiritual resilience is associated with emotional support, community togetherness, and religious meaning-making. *Pengajian* provides opportunities to share experiences and develop social relationships, while religious beliefs help mothers interpret difficulties and maintain their commitment to their families. These findings indicate that religious practices serve as sources of both personal strength and social support in the lives of single mothers.

Agency within constraints: Strategic gender-norm adaptation and family meaning-making

The thematic analysis revealed that single mothers fulfill their economic and caregiving responsibilities by adapting to gender norms and the social conditions they encounter. The analysis generated four subthemes: strategic adaptation to gender roles, efforts to maintain social acceptance, reinterpretation of family responsibilities, and unequal access to sources of support. These subthemes illustrate how single mothers adjust their roles, maintain social respect, and strive to sustain family life amid resource constraints. The thematic mapping is presented in Table 3.

Table 3

Thematic Mapping of Agency Within Constraints

Initial Codes	Subthemes	Thematic Meanings
Women as primary breadwinners; economic and caregiving roles; domestic responsibilities; adaptation to gender roles.	Strategic Adaptation to Gender Roles	Single mothers assume breadwinning responsibilities while maintaining caregiving and domestic duties considered important in family life.

Maintaining politeness; working honestly; regulating behaviour; gaining respect; meeting social expectations of mothers.	Efforts to Maintain Social Acceptance	Single mothers seek to maintain social respect through behaviour and responsibilities aligned with prevailing community values.
Taking over husbands' economic roles; becoming family breadwinners; ensuring children's well-being; sustaining family life.	Reinterpretation of Family Responsibilities	Single mothers reinterpret family responsibilities by assuming economic roles while continuing to fulfil their children's caregiving needs.
Transportation constraints; distance to *pengajian*; family members living far away; limited childcare assistance; access to mosques and community networks.	Unequal Access to Sources of Support	Differences in access to family and community networks influence single mothers' opportunities to obtain assistance in coping with difficulties.

Source: Compiled by the authors based on thematic analysis, 2026.

As shown in Table 3, single mothers' agency is reflected in their adaptation to gender roles, efforts to maintain social acceptance, reinterpretation of family responsibilities, and unequal access to support. These four patterns are illustrated through the informants' experiences below.

Strategic adaptation to gender roles

The first subtheme demonstrates that single mothers adapt to gender roles by assuming breadwinning responsibilities while continuing to fulfill caregiving and domestic duties. These adjustments occur within social contexts where the role of primary breadwinner is still commonly associated with men. YP (38) stated:

> "Some people in my neighborhood may think it is unusual for a woman to be the main breadwinner for her family. Nevertheless, I always make sure that my children are well cared for, the house is kept clean, and our daily needs are met. I want others to see that although I work, I still fulfill my responsibilities as a mother." (Interview, 12 May 2025)

YP's experience illustrates that breadwinning responsibilities are undertaken alongside efforts to maintain caregiving and domestic roles. She not only strives to meet her family's economic needs but also demonstrates that her employment does not diminish her responsibilities as a mother. This finding indicates that adaptation to gender roles involves expanding economic responsibilities while continuing to consider social expectations surrounding motherhood.

Efforts to maintain social acceptance

The second subtheme shows that single mothers seek to maintain social acceptance while engaging in economic activities. These efforts are reflected in their emphasis on politeness, honesty, and the fulfillment of family responsibilities. AP (37) explained:

> "I work every day to support my family, but I also try to be polite and behave appropriately. I always make time to prepare meals for my children and keep the house tidy. I want my children and neighbors to see that I can earn a living without neglecting my responsibilities at home." (Interview, 18 May 2025)

The importance of maintaining appropriate workplace behavior was also emphasized by RS (42). She stated: "As a laborer, I often work with many people, including men. I always try to be polite and work honestly because I want others to respect me as a mother who works hard to support my family properly." (Interview, 14 May 2025)

These experiences demonstrate that social acceptance is an important consideration for single mothers when engaging in economic activities. AP emphasizes balancing employment

with domestic responsibilities, while RS prioritizes politeness and honesty in the workplace. These findings illustrate how single mothers seek to gain social respect through behavior that aligns with values they consider important.

Reinterpretation of family responsibilities

The third subtheme indicates that changes in economic roles following single motherhood also influence how women interpret their family responsibilities. Meeting economic needs, previously undertaken by their husbands, becomes part of their responsibilities without diminishing their caregiving roles. SM (45) explained:

> "After becoming a single mother, I had to take over the work my husband had previously done. Although I am now the family breadwinner, I still see myself primarily as a mother responsible for ensuring my children are cared for and that our family can continue to survive." (Interview, 16 May 2025)

SM's experience demonstrates that changes in family structure are accompanied by adjustments in economic and caregiving responsibilities. Although she has assumed the economic role previously performed by her husband, SM continues to regard childcare as a central aspect of her maternal identity. This finding indicates that family responsibilities are reinterpreted through mothers' efforts to meet economic needs while maintaining childcare and sustaining family life.

Unequal access to sources of support

The fourth subtheme reveals that single mothers experience different circumstances in accessing family and community support. Geographical distance, transportation costs, and the availability of social networks influence their opportunities to obtain assistance. These circumstances are reflected in Rina's experience, as she faces limited access to religious activities and family support. She explained:

> "The nearest pengajian is five kilometres away, and I do not have money for transport to attend it regularly. My family also lives in another regency, so I cannot rely on them to help care for my children. When my children are ill or when I face problems, there is no one I can contact. I feel very alone." (Interview, 12 May 2025)

In contrast to Rina's experience, YP (38) described having access to support through her religious community. She stated:

> "Even when I feel tired and stressed, I know that tomorrow I can go to the mosque and talk to the other women. Just knowing that this opportunity is available already makes me feel better. I am never truly alone." (Interview, 12 May 2025)

The contrasting experiences of Rina and YP demonstrate that access to social support is not always equally available. Rina faces geographical and economic barriers that limit her participation in religious activities and access to family assistance, whereas YP finds reassurance in the availability of a supportive community she can turn to. These findings indicate that single mothers' ability to cope with difficulties is associated not only with personal motivation but also with the availability and accessibility of support within their social environments.

Overall, the four subthemes demonstrate that single mothers' agency is expressed through adaptations to gender roles, efforts to maintain social acceptance, and responsibilities for sustaining family life. However, the experiences of Rina and YP reveal that opportunities to obtain social support differ among individuals. Thus, single mothers' agency operates through the interplay among personal actions, social expectations, and structural conditions that shape their ability to navigate constraints in everyday life.

Overall synthesis of the three themes

Taken together, the three themes demonstrate that single mothers' resilience is shaped by the interconnections among maternal commitment, social support, religious meaning-making, and adaptation to gender norms. Commitment to their children's future motivates mothers to maintain economic and caregiving responsibilities, while kinship networks and community practices such as *arisan* and *gotong royong* provide material and emotional support. Religious participation also strengthens community togetherness and provides opportunities for mothers to interpret difficulties through spiritual values. At the same time, mothers adapt their roles as breadwinners to social expectations concerning maternal responsibilities. However, differences in informants' experiences, particularly those of Rina and YP, reveal that access to sources of support is not always equally available. Thus, single mothers' resilience is reflected not only in personal perseverance and actions but also in social relationships and environmental conditions that support or constrain their efforts to sustain family life.

Discussion

The findings reveal three interrelated patterns of resilience among single mothers in sustaining family life in rural East Java. First, multidimensional maternal agency is reflected in commitment to children, material and emotional support from kinship networks, and reciprocal community assistance in navigating socioeconomic pressures. Second, religious-spiritual resilience is shaped through participation in religious communities, shared spiritual values, and the interpretation of maternal responsibilities as a religious trust (*amanah*) and an act of worship. Third, agency within constraints is manifested through strategic adaptation to gender roles, efforts to maintain social acceptance, reinterpretation of family responsibilities, and differences in access to family and community support. Overall, these findings indicate that single mothers' resilience is shaped not only by personal commitment and actions but also by religious meaning-making, social relationships, and structural conditions that facilitate or constrain access to resources.

In rural Jombang Regency, the interconnections among maternal commitment, community support, and limited access to resources reflect a broader social concern: single mothers fulfill economic and caregiving responsibilities with limited resources. Research in South Sumatra indicates that informal assistance is important in addressing socioeconomic insecurity, although its continuity is not always guaranteed (Munir et al., 2024). At the national level, female-headed households face barriers to financial access and economic opportunities (Ekaputri et al., 2025). Within this context, *arisan* and *gotong royong* are not merely communal practices but also sources of assistance that help sustain family life. Religious study gatherings (*pengajian*) provide emotional support and religious meaning, consistent with the relationship between religious coping and family resilience (Prasetyo et al., 2024). Meanwhile, economic and caregiving responsibilities remain influenced by gender norms (Setyonaluri & Utomo, 2024), including the division of domestic labour within Indonesian Muslim families (Kiram, 2025). Differences in access among informants further demonstrate that community support is not always easily accessible.

Theoretically, these interconnections suggest that resilience cannot be adequately explained by individual strength alone but also involves the capacity to navigate and access resources that are genuinely available and valued within one's sociocultural environment (Ungar, 2011). Commitment to children provides direction for economic and caregiving activities; however, these efforts are strengthened by family assistance and reciprocal community practices. Participation in religious activities serves two functions simultaneously:

fostering relationships that support everyday life and providing moral meaning to maternal responsibilities. The perspective of relational agency helps explain that mothers' choices are situated within networks of support and social expectations (Mackenzie & Stoljar, 2000). Thus, adapting to the breadwinning role without a corresponding reduction in caregiving demands reflects agency exercised amid inequality rather than unrestricted freedom of choice. When access to family or community networks is constrained, personal capacities are also limited. This interpretation positions resilience as a process that enables families to sustain their lives but does not automatically eliminate structural inequalities (Mahdiani & Ungar, 2021).

A fundamental insight from these findings is that single mothers' perseverance does not eliminate the vulnerabilities they experience. Commitment to children provides direction for efforts to sustain family life, while kinship and community networks alleviate some of the responsibilities they bear. The importance of social ties to resilience is consistent with Agashe et al. (2021). In the spiritual domain, interpreting caregiving as a religious trust helps mothers maintain hope, while religious gatherings provide spaces to share difficulties, underscoring the relevance of religious coping to single mothers' experiences, as discussed by Dharani and Balamurugan (2024). Nevertheless, the ability to fulfill economic and caregiving responsibilities should not be treated as the sole indicator of well-being; unequal access to support continues to create social vulnerabilities, consistent with concerns regarding social relationships and psychological well-being (Silveira et al., 2022). Thus, understanding resilience requires recognizing mothers' agency and perseverance without normalizing gendered burdens or absolving their social environments of responsibility for providing support.

The contribution of this study can be understood through both similarities to and further elaboration of previous research. Djap et al. (2021) and Wahab and Jamil (2024) emphasize caregiving commitment and the dual responsibilities of single mothers; the Jombang study demonstrates how such commitment is sustained through family assistance and reciprocal community practices. These findings intersect with those of Munir et al. (2024) regarding both the benefits and limitations of informal support. In the spiritual dimension, Dewi (2024) discusses religious coping as a source of strength; the present study extends attention to the social function of *pengajian* as a space for sharing experiences and obtaining emotional support. Compared with Shawaqfeh (2024), who examines social support more broadly, this analysis distinguishes the roles of kinship networks and religious communities. The findings also align with those of Ayuni and Purnairawan (2025) on the negotiation of gender norms and highlight how differences in access shape mothers' opportunities to obtain support. The study's contribution lies in its integrated examination of maternal agency, religious meaning-making, gender norms, and resource constraints in the everyday lives of rural single mothers in East Java.

The practical implications highlight the need for support mechanisms that strengthen single mothers' efforts without increasing the burdens they already bear. First, village governments, together with *arisan* groups and community members, can establish voluntary emergency assistance and childcare support mechanisms. Second, organizers of *pengajian* and mosque activities can strengthen safe spaces for sharing experiences, maintain confidentiality, and connect mothers in need with available services. Third, local governments should identify barriers related to distance, transportation costs, and time constraints when designing more accessible social services. Fourth, economic empowerment initiatives should provide employment or business opportunities that accommodate caregiving schedules rather than merely increasing mothers' workloads. Fifth, religious and community leaders should promote social acceptance of single mothers and reduce judgment towards their

choices. Services should also reach mothers who do not participate in community activities, particularly those living in remote areas. Implementing these measures requires coordination among stakeholders to ensure that informal support does not become the sole means of sustaining family life.

CONCLUSION

This study demonstrates that single mothers' resilience in rural Jombang Regency is shaped by three interrelated patterns. First, multidimensional maternal agency is reflected in their commitment to meeting children's needs, which is supported by material and emotional assistance from family members and by reciprocal community practices. Second, religious-spiritual resilience is manifested through *pengajian* and other religious activities, which serve as spaces for community togetherness, alongside the interpretation of caregiving responsibilities as a religious trust (*amanah*) and an act of worship. Third, agency within constraints is evident as mothers adapt their breadwinning and caregiving roles to social expectations while seeking to maintain community acceptance. However, the support they need is not always equally accessible due to geographical distance, transportation costs, and limited social networks. Overall, resilience stems not only from personal perseverance but also from social relationships, religious meaning-making, and environmental conditions that may support or constrain mothers' efforts to sustain family life amid everyday socioeconomic pressures.

Theoretically, this study deepens the application of Ungar's social-ecological resilience framework by demonstrating that maternal agency operates through the interplay of personal capacities, community resources, religious meanings, and gender norms. *Pengajian* serves not only as a spiritual activity but also as a space for emotional support and community togetherness. These findings further demonstrate that mothers' ability to adapt does not automatically eliminate inequalities in caregiving responsibilities or barriers to accessing assistance. Practically, village governments and organizers of religious activities should strengthen inclusive and sustainable support networks, while local governments should improve access to social services and economic empowerment initiatives that accommodate caregiving responsibilities. Informal support is important, but it should not replace the responsibility of formal social protection systems.

This study is limited to the experiences of single mothers in rural Jombang Regency; therefore, its findings cannot be directly transferred to areas with different social, cultural, and service-access conditions. As a qualitative study, it emphasizes the interpretation of lived experiences and was not designed to measure resilience levels or the magnitude of the influence of individual sources of support. Future research could compare single mothers' experiences across regions, particularly those with differing access to transportation and community networks, to assess the transferability of the identified patterns. Longitudinal studies are needed to understand how coping strategies change over time as children's needs and economic circumstances evolve. Mixed-methods approaches could also examine resilience indicators that account for local values, access to resources, and the distribution of caregiving responsibilities.

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CONFLICT OF INTEREST STATEMENT

The authors declare that this study is free from any financial, professional, or personal conflicts of interest.

DECLARATION OF AI USE

No artificial intelligence (AI) tools were used in conducting the research or preparing the manuscript. The authors assume full responsibility for all research findings and interpretations.

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AUTHOR CONTRIBUTION STATEMENT

Eka Mariska Putri Imra: Conceptualization; Data Curation; Formal Analysis; Investigation; Methodology; Visualization; Writing Original Draft; Validation; Writing Review & Editing. **Febriandita Tedjomurti**: Conceptualization; Formal Analysis; Methodology; Supervision; Validation; Writing Review & Editing. **Muhammad Faruki**: Formal Analysis; Validation; Writing Review & Editing.

REFERENCES

Affandy, A. H. (2023). Single mothers: Financial challenges and experiences in Brunei-Muara district. *Southeast Asia: A Multidisciplinary Journal, 23(2)*, 83–94. https://doi.org/10.1108/SEAMJ-02-2023-0019

Agashe, S., Kumar, S., & Rai, R. (2021). Exploring the relationship between social ties and resilience from evolutionary framework. *Frontiers in Human Dynamics, 3*, Article 683755. https://doi.org/10.3389/fhumd.2021.683755

Asrofi, D. A. N., Pratomo, D. S., Syafitri, W., & Pangestuty, F. W. (2025). Mothers' empowerment: How employment shapes women's roles and enhances family welfare in Indonesia. In *Proceedings of the Asia Pacific Sociological Association Conference (APSA 2024)* (pp. 176–193). Atlantis Press. https://doi.org/10.2991/978-94-6463-680-2_15

Ayuni, A. Q., & Purnairawan, R. E. (2025). Religious coping strategies among divorced single mothers in Garut: Managing stigma and patriarchal challenges. *Saneskara: Journal of Social Studies, 2(1)*, 1–15. https://doi.org/10.62491/sjss.v2i1.2025.28

Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health, 11*(4), 589–597. https://doi.org/10.1080/2159676X.2019.1628806

Braun, V., & Clarke, V. (2021). One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative Research in Psychology, 18(3)*, 328–352. https://doi.org/10.1080/14780887.2020.1769238

Byrne, D. (2022). A worked example of Braun and Clarke's approach to reflexive thematic analysis. *Quality & Quantity, 56*, 1391–1412. https://doi.org/10.1007/s11135-021-01182-y

Caragata, L., Watters, E. C., & Cumming, S. (2021). Changing the game: The continuous adaptation of resilient single mothers. *International Journal of Social Work and Human Services Practice, 8*(1), 1–10. https://doi.org/10.13189/ijrh.2021.080101

Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J., & Neville, A. J. (2014). The use of triangulation in qualitative research. *Oncology Nursing Forum, 41(5)*, 545–547. https://doi.org/10.1188/14.ONF.545-547

Clark, S., Henderson, M., & Kabiru, C. (2024). Single motherhood and stress in a Kenyan slum: The importance of paternal and kin support. *Journal of Family Issues, 45*(1), 74–102. https://doi.org/10.1177/0192513X221150978

Crowe, S., Cresswell, K., Robertson, A., Huby, G., Avery, A., & Sheikh, A. (2011). The case study approach. *BMC Medical Research Methodology, 11*, Article 100. https://doi.org/10.1186/1471-2288-11-100

Dewi, K. S. (2024). Journey to happiness: A phenomenological study of single mothers' positive spiritual coping experiences as woman-headed household. *Jurnal Psikologi Ulayat, 11(1)*, 75–96. https://doi.org/10.24854/jpu730

Dharani, M. K., & Balamurugan, J. (2024). The psychosocial impact on single mothers' well-being: A literature review. *Journal of Education and Health Promotion, 13*, Article 148. https://doi.org/10.4103/jehp.jehp_1045_23

Dharani, M. K., & Balamurugan, J. (2025). Resilience amidst adversity: A qualitative analysis of social support for rural single mothers in India. *Journal of Human Behavior in the Social Environment*. Advance online publication. https://doi.org/10.1080/10911359.2025.2544789

Djap, W., Mustikasiwi, A., Hermawati, O., Irawan, D., & Santosa, E. (2021). The resilience of single mothers with special needs children in supporting their education and fulfilling their needs during the COVID-19 pandemic. *Indonesian Journal of Disability Studies, 8*(2), 425–439. https://doi.org/10.21776/ub.ijds.2021.008.02.10

Ekaputri, R. A., Sukiyono, K., Yefriza, Y., Febriani, R. E., & Nopiah, R. (2025). Gendered dimensions of poverty in Indonesia: A study of financial inclusion and the influence of female-headed households. *Economies, 13(8)*, Article 240. https://doi.org/10.3390/economies13080240

Girisken, A. (2021). Understanding work-life balance, resilience and emotional endurance of single working mothers in the workplace: A qualitative study. *PressAcademia Procedia, 8*(1), 64–75. https://doi.org/10.17261/pressacademia.2021.1387

Hutasoit, I. T. M. br., & Brahmana, K. M. B. (2021). Single mother role in the family. *Education and Social Sciences Review, 2*(1), 27–34. https://doi.org/10.29210/07essr208800

Ibrahim, N., Mustapha, R., Ibrahim, R. A., Ayob, M. N., Roslan, M. N. H., & Rahman, A. A. (2024). Resilience in the midst of difficulties: The challenges of single mothers receiving zakat assistance in Pahang. *Environment and Social Psychology, 9(9)*, Article 2950. https://doi.org/10.59429/esp.v9i9.2950

Jasmita, R., Juliawati, D., & Harmalis. (2024). Stress, family support, coping strategies in single mothers bereaved by spousal death. *Psyche 165 Journal, 17*(3), 248–254. https://doi.org/10.35134/jpsy165.v17i3.412

Karunanayake, D. D. K. S., Aysha, M. N., & Vimukthi, N. D. U. (2021). The psychological well-being of single mothers with school-age children: An exploratory study. *International Journal of Scientific Research in Science and Technology*, 16–37. https://doi.org/10.32628/ijsrst21812

Kementerian Koordinator Bidang Pembangunan Manusia dan Kebudayaan. (2023, 27 September). *Sesmenko PMK: Kampus punya peran besar untuk entaskan kemiskinan ekstrem*. https://www.kemenkopmk.go.id/sesmenko-pmk-kampus-punya-peran-besar-untuk-entaskan-kemiskinan-ekstrem

Kiram, M. Z. (2026). Gendered division of domestic labour: Indonesian Muslim men's perceptions, participation and experiences in housework and childcare. *Journal of Gender Studies, 35(1)*, 174–191. https://doi.org/10.1080/09589236.2025.2473923

Korstjens, I., & Moser, A. (2018). Series: Practical guidance to qualitative research. Part 4: Trustworthiness and publishing. *European Journal of General Practice, 24(1)*, 120–124. https://doi.org/10.1080/13814788.2017.1375092

Mackenzie, C., & Stoljar, N. (Eds.). (2000). *Relational autonomy: Feminist perspectives on autonomy, agency, and the social self*. Oxford University Press. https://doi.org/10.1093/oso/9780195123333.001.0001

Mahdiani, H., & Ungar, M. (2021). The dark side of resilience. *Adversity and Resilience Science, 2*(3), 147–155. https://doi.org/10.1007/s42844-021-00031-z

Mishra, P. S., Thamminaina, A., & Mishra, N. (2021). Single mothers: Strategies of family management and support systems in relation to health. *Journal of International Women's Studies, 22*(5), 393–406. https://vc.bridgew.edu/jiws/vol22/iss5/24

Misriani, Hasbi, & Raf, N. (2024). Social resilience in single-parent women's families (Case study of Dusun Tontonan). *Revista de Gestão Social e Ambiental, 18(1)*, Article e06161. https://doi.org/10.24857/rgsa.v18n1-106

Munir, M., Yuda, T. K., Kusumah, E. P., & Suwandi, M. A. (2024). An exploratory study on women single parents' experiences in coping with socioeconomic insecurity. *International Journal of Sociology and Social Policy, 44(7–8)*, 643–656. https://doi.org/10.1108/IJSSP-10-2023-0247

Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and Policy in Mental Health and Mental Health Services Research, 42(5)*, 533–544. https://doi.org/10.1007/s10488-013-0528-y

Pemerintah Kabupaten Jombang. (2023). *Tingkat kemiskinan*. Satu Data Jombang. https://sambang.jombangkab.go.id/front/data/602-tingkat-kemiskinan

Prasetyo, Y. B., Faridi, F., Masruroh, N. L., Melizza, N., Kurnia, A. D., Wardojo, S. S. I., Huriah, T., & Latif, R. A. B. (2024). Path analysis of the relationship between religious coping, spiritual well-being, and family resilience in dealing with the COVID-19 pandemic in Indonesia. *Asian Journal of Social Health and Behavior, 7(1)*, 1–10. https://doi.org/10.4103/shb.shb_375_23

Priya, A. (2021). Case study methodology of qualitative research: Key attributes and navigating the conundrums in its application. *Sociological Bulletin, 70(1)*, 94–110. https://doi.org/10.1177/0038022920970318

Setyonaluri, D., & Utomo, A. (2024). Negotiating work, family, and traffic: Articulations of married women's employment decisions in Greater Jakarta. *Gender, Work & Organization, 31(6)*, 2423–2445. https://doi.org/10.1111/gwao.13069

Shawaqfeh, B. (2024). The impact of perceived social support and social self-efficacy on resilience among single mothers. *F1000Research, 13*, Article 294. https://doi.org/10.12688/f1000research.146971.1

Silveira, S., Hecht, M., Adli, M., Voelkle, M. C., & Singer, T. (2022). Exploring the structure and interrelations of time-stable psychological resilience, psychological vulnerability, and social cohesion. *Frontiers in Psychiatry, 13*, Article 804763. https://doi.org/10.3389/fpsyt.2022.804763

Ungar, M. (2008). Resilience across cultures. *The British Journal of Social Work, 38(2)*, 218–235. https://doi.org/10.1093/bjsw/bcl343

Ungar, M. (2011). The social ecology of resilience: Addressing contextual and cultural ambiguity of a nascent construct. *American Journal of Orthopsychiatry, 81(1)*, 1–17. https://doi.org/10.1111/j.1939-0025.2010.01067.x

Vo, T., & Canty, L. (2023). Global mental health experiences of single mothers: A mixed methods research synthesis. *Journal of Advanced Nursing, 79(1)*, 68–82. https://doi.org/10.1111/jan.15461

Wahab, M. A. A. bin, & Jamil, Z. binti. (2024). Dwi-peranan ibu tunggal: Cabaran dalam pengurusan keluarga tunggal dan peranan sokongan sosial. *Jurnal Perspektif, 16*(2), 24–34. https://doi.org/10.37134/perspektif.vol16.2.3.2024

Zhou, X., & Taylor, Z. E. (2022). Differentiating the impact of family and friend social support for single mothers on parenting and internalizing symptoms. *Journal of Affective Disorders Reports, 8*, Article 100319. https://doi.org/10.1016/j.jadr.2022.100319