

Fertility Patterns and Determinants in Aswedduma Grama Niladhari Division, Sri Lanka: A Micro-Level Population Study

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Abstract:

This study investigates fertility patterns and determinants in Aswedduma Grama Niladhari Division (GND), providing a micro level perspective on Sri Lanka's demographic transition. Drawing from structured questionnaires with 35 ever married women aged 15 - 49, the research explores fertility outcomes, socio economic influences, and cultural attitudinal factors. Descriptive and bivariate analyses were conducted using Python, with interpretation guided by the Demographic Transition Model, Caldwell's Wealth Flows Theory, Becker's New Home Economics, and Diffusion of Innovations. Findings reveal that Aswedduma is experiencing a shift toward smaller family sizes, with the two-child norm emerging as dominant and the average fertility rate measured at 1.83. Delayed marriage and childbearing, alongside mixed birth spacing practices, highlight the coexistence of modern reproductive behavior and traditional norms. Education, income, occupation, and migration significantly shape fertility, higher education and professional employment correlate with lower fertility, whereas agriculture-based households maintain higher childbearing levels. Migration emerges as a key determinant, reducing fertility through delayed nuptiality and the diffusion of urban reproductive norms into rural contexts. Cultural and attitudinal factors remain influential. While most families align desired and actual fertility, couples with fewer children report greater social pressure, reflecting persistence of traditional ideals such as valuing children as "wealth" and family as "treasure." These findings underscore the tension between modernization and cultural continuity in shaping reproductive choices. The study contributes to population geography by demonstrating how localized fertility behaviors both mirror and diverge from national trends. It underscores the importance of cultural sensitivity in family planning interventions, as well as policies that integrate education, economic empowerment, and reproductive health services. Community awareness programs and targeted support for migrant families can further ease the transition toward sustainable fertility outcomes. Future research is recommended to compare rural and urban settings and to investigate intergenerational fertility preferences for deeper insights into evolving demographic behavior in Sri Lanka.

Keywords — Fertility, Population Geography, Demographic Transition, Socio-economic Determinants

I. INTRODUCTION

Population geography, a subfield of human geography, examines the spatial dimensions of demographic processes such as fertility, mortality, and migration, focusing on how people and spaces interact and how

these patterns vary across regions (Withers, n.d.). At the global level, fertility transitions have historically followed the logic of the Demographic Transition Model, first conceptualized in the mid-20th century, which describes the shift from high fertility and mortality to lower levels as modernization, healthcare,

and education expand (Perera, 2017). Yet, fertility decline has not been uniform while many developed and developing countries have experienced rapid declines, cultural, economic, and spatial differences mean that sub-Saharan Africa, South Asia, and parts of Latin America continue to show diverse fertility outcomes. Within South Asia, fertility transitions have been uneven. Sri Lanka and India began their fertility decline earlier than Nepal or Pakistan due to greater access to literacy, healthcare, and family planning programs, but rural, urban disparities persist, with rural areas typically retaining traditional reproductive norms for longer (Perera, 2017). In Sri Lanka, fertility fell rapidly, with the country achieving replacement level fertility by the early 1990s a decline driven by high female literacy, improved maternal and infant healthcare, and widespread contraceptive use (Wijesekere & Arunachalam, 2015). Data from Demographic and Health Surveys show that Sri Lanka's total fertility rate (TFR) dropped to 1.9 in 2000, rose slightly to 2.3 in 2006 -2007, and was reported at 2.42 in the 2011 census, confirming both the country's demographic transition and the persistence of localized fluctuations (UNFPA, n.d.). Importantly, socio, economic and spatial factors generate variation across the island in 2011, TFR was 2.1 in urban areas, 2.5 in rural areas, and 3.0 in estate sectors, underscoring the influence of education, income, and cultural norms (UNFPA, n.d.). Despite widespread adoption of the two-child norm, cultural ideals such as "*punchi pawla raththaran*" and "*daruwo sampathak*" illustrate the coexistence of modern and traditional fertility values in rural settings. Migration further complicates fertility behavior, as it acts as a vector for transferring urban reproductive norms to rural communities, accelerating demographic transitions and reshaping fertility ideals (UNFPA, 2005). Against this backdrop, micro-level studies are essential, since communities such as Aswedduma Grama Niladhari Division reveal how national demographic trends interact with local socio, economic structures, cultural traditions, and spatial contexts, providing insights into how small rural populations negotiate between tradition and modernity in the ongoing demographic transition of Sri Lanka.

II. LITERATURE REVIEW

Population geography conceptualizes fertility as a context dependent phenomenon shaped by space specific social, economic, and cultural dynamics. The Demographic Transition Model (Delventhal, 2021) remains foundational for explaining broad shifts from high fertility and mortality to low fertility as modernization, improved health infrastructure, and expanded educational opportunities spread. Micro level economic theories further clarify mechanisms behind this transformation: Caldwell's Wealth-Flows Theory posits that in traditional societies, children contribute net economic value to parents, whereas in modern societies they become net dependent, prompting families to choose to have fewer children (Kaplan, 2015). Becker's New Home Economics frames fertility as a cost benefit decision, where rising opportunity costs particularly those associated with female education and labor market participation encourage lower fertility (Becker, 1981). Diffusion theory (Rogers, 1962) explains the uneven spatial uptake of small family norms and contraceptive use, as innovations disseminate through social networks with variable reach. Bongaarts' proximate determinants framework operationalizes how fertility-influencing behaviors such as timing of marriage, contraceptive use, birth intervals, and breastfeeding directly regulate fertility outcomes (Bongaarts, 1978). At the regional scale, demographic transition in South Asia has been heterogeneous. Sri Lanka and parts of India experienced earlier fertility decline, driven by early investments in female education, maternal and child health, and accessible family planning services (Perera, 2017). Yet, subnational variation remains rural and estate areas continue to report higher fertility compared to urban zones, illustrating how socio economic disparities and cultural norms at the local level shape family formation (UNFPA Sri Lanka, n.d.). Moreover, migration plays a critical role in this spatial dynamic by facilitating the transmission of urban reproductive values and behaviors back into sending communities, it accelerates local fertility transitions in areas otherwise resistant to change (UNFPA, 2005). These literatures collectively underscore that fertility decline is neither automatic nor homogeneous, it emerges from the interplay of macro level development, meso level diffusion,

institutional contexts, and micro level calculations mosaic best understood through localized, population geography sensitive investigations.

III. METHODOLOGY

A cross-sectional study was conducted in Aswedduma GND to examine fertility patterns and determinants. The target population included ever married women of reproductive age (15–49 years) residing in the GND. A household-based sampling approach was used, selecting 35 respondents from 35 households. This approach aligns with micro level population studies, where the focus is on in-depth understanding of localized reproductive behavior rather than generalization to larger populations (Creswell, 2014). Data were collected through a structured questionnaire covering fertility outcomes (number of children, age at first marriage and birth, birth spacing), socio-economic factors (education, occupation, income, migration), and cultural or attitudinal influences (social pressure, desired family size). Data proceeded using Python. Descriptive statistics and bivariate analyses (correlations, group comparisons) were used to explore relationships between fertility and socio-economic, demographic, and cultural factors. Analyses were theory informed, interpreted considering the Demographic Transition Model, Caldwell's wealth flows, Becker's New Home Economics, Easterlin's demand supply cost, Bongaarts' proximate determinants, and Diffusion of Innovations.

IV. RESULTS AND DISCUSSION

A. Objective 1: To analyze fertility patterns in Aswedduma GND

Fertility outcomes in Aswedduma GND reflect a transition towards smaller family sizes while retaining some traditional reproductive behaviors. This aligns with Sri Lanka's broader demographic transition, where fertility has gradually declined since the 1970s due to improvements in education, healthcare, and family planning services (Perera, 2017).

Average Family Size

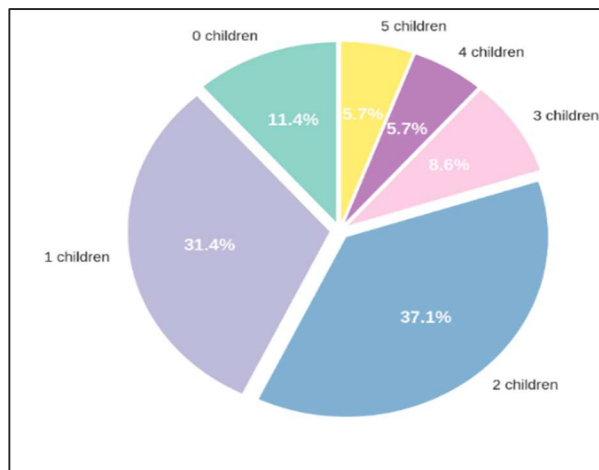


Fig. 1 Family size distribution

Source: Create by author based on survey data, 2024.

The most common family size is two children (37.1%), followed by one child (31.4%). Families with 4–5 children are rare (5.7% each), indicating a movement toward the two-child norm, consistent with Caldwell's theory of fertility decline, which links modernization and education to reduced fertility preferences. Earlier studies on Sri Lanka also highlighted this trend, suggesting that increasing female education and household aspirations drive couples to prefer fewer children (Perera, 2017). The findings in Aswedduma reflect this national shift at the micro level.

Fertility Rate

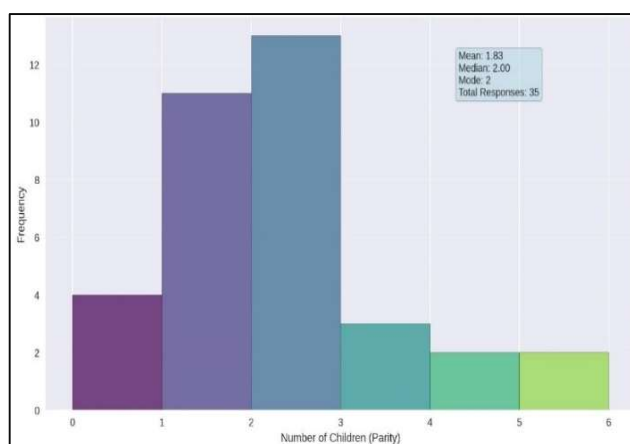


Fig. 2 Fertility Rate Distribution

Source: Create by author based on survey data, 2024.

The average fertility rate is 1.83 children per woman, with two children as the mode. Most women fall into the low fertility range, though a minority (with 4–6 children) still maintain residual high fertility behavior. This dual pattern can be understood through the Demographic Transition Model, Aswedduma appears to be in the late Stage III or early Stage IV, where fertility levels are low, but pockets of traditional norms persist. Similar micro level findings were reported by Perera (2017), who showed that rural Sri Lankan communities often retain higher fertility clusters despite overall national decline.

Timing of Fertility (Age at Marriage & First Birth)

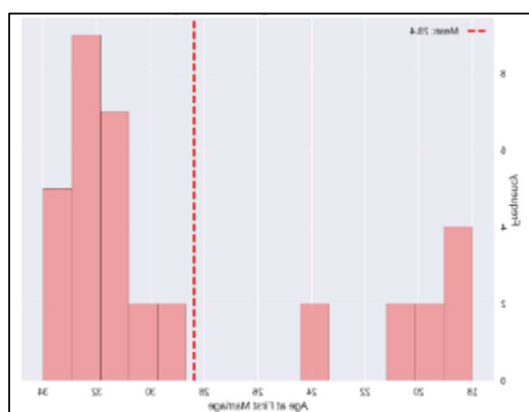


Fig. 3 Distribution of Age at First Marriage

Source: Create by author based on survey data, 2024.

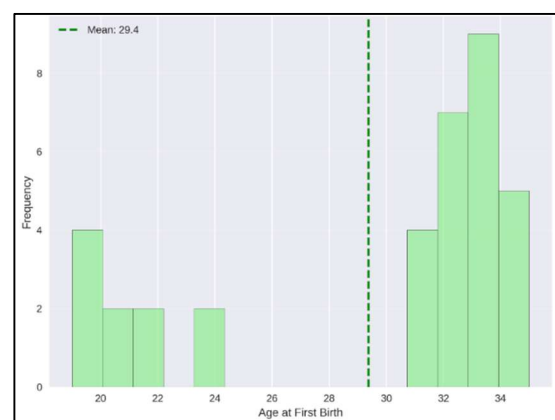


Fig. 4. Distribution of Age at First Birth

Source: Create by author based on survey data, 2024.

- Mean age at marriage: 28.4 years

- Mean age at first birth: 29.4 years

Most marriages and births cluster between 30–34 years, showing a clear trend of delayed childbearing compared to earlier generations. This postponement reflects both socio economic changes (higher education, career engagement, migration) and the increasing availability of contraceptive methods. According to Easterlin's Relative Cohort Size Hypothesis, fertility timing is often influenced by economic opportunities and competition for resources. In Aswedduma, later marriage and childbearing appear to be linked to aspirations for stability before family formation, echoing findings from Perera (2017) on changing reproductive behavior in semi urban Sri Lanka.

Birth Spacing

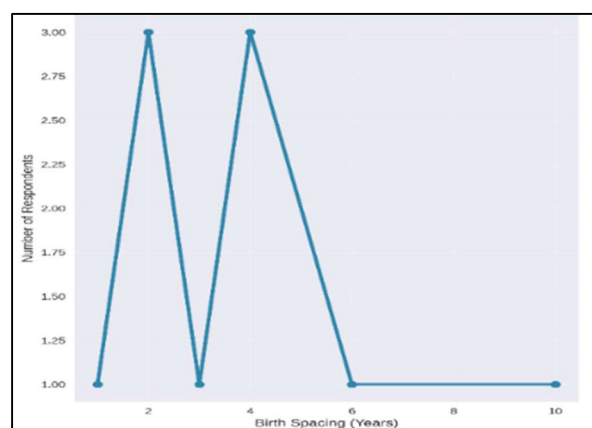


Fig. 5 Birth Spacing Distribution

Source: Create by author based on survey data, 2024.

Birth spacing reveals two dominant strategies ,shorter intervals (2 years), typical traditional practices, and longer planned intervals (4 years), reflecting greater family planning awareness. This duality shows that while modern contraceptive practices are influencing decisions, some families still rely on traditional norms. The Theory of Diffusion of Innovations (Rogers, 1962) helps explain this pattern. Family planning has diffused into the community, but adoption remains uneven.

Overall, fertility patterns in Aswedduma GND mirror Sri Lanka's demographic transition. The dominance of the two-child families, reduced fertility rate, delayed marriage and childbearing, and mixed birth spacing strategies indicate a community in transition.

Yet, residual high fertility behaviors and traditional practices continue, suggesting a coexistence of modern and cultural determinants.

B. Objective 2: To examine socio-economic and demographic determinants of fertility

Fertility patterns in Aswedduma GND show strong variation according to education, occupation, income, and migration. These socio economic and demographic factors are consistent with the determinants of fertility in the Demographic Transition Model and with Easterlin's demand supply cost framework, where fertility is shaped by preferences, constraints, and opportunities.

Education and Fertility

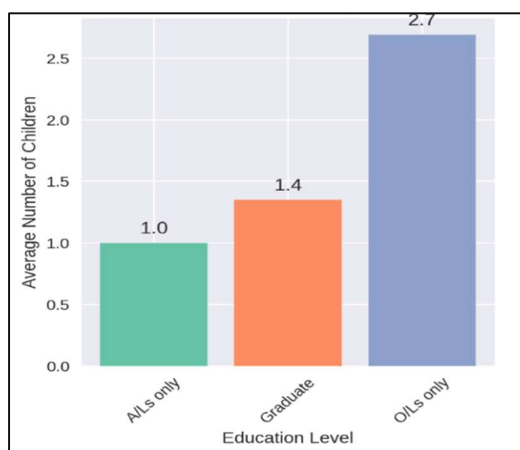


Fig.6. Average Number of Children by Education Level

Source: Create by author based on survey data, 2024.

A clear inverse relationship is evident, women with O/L education average 2.7 children, while graduates average only 1.4 children. This supports extensive Sri Lankan research showing education as the strongest fertility reducing factor (De Silva, 1997; Abeykoon, 2003). From a theoretical perspective, Caldwell's Wealth Flows Theory (1982) explains this pattern as education expands, the flow of wealth shifts from children to parents, reducing the economic utility of

large families (Schultz, T. Paul, 1983). Education also empowers women to delay marriage and control fertility, a finding consistent with Jayawardena (1986) on female autonomy in Sri Lanka.

Employment and Fertility

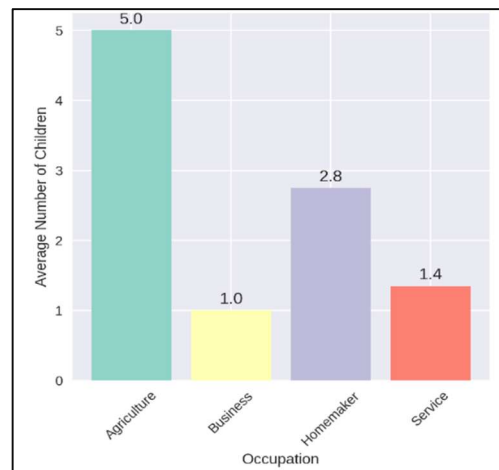


Fig. 7. Average Number of Children by Occupation

Source: Create by author based on survey data, 2024.

Fertility varies significantly by occupation, showing a clear gradient across different household types. Agriculture-based households report the highest fertility rate, with an average of about five children, reflecting the strong agrarian demand for labor noted in rural fertility studies (Cleland & Wilson, 1987). In these contexts, children are often considered economic assets, consistent with traditional demographic economic theories. In contrast, business and service sector households demonstrate the lowest fertility, averaging only about 1 to 1.4 children, as raising children in such contexts represents a higher opportunity cost. This pattern aligns with Becker's (1960) New Home Economics Model, which emphasizes how increased female employment and career engagement can discourage high fertility. Homemakers, meanwhile, fall in between these two extremes, with an average fertility rate of about 2.8 children, reflecting a balance between household responsibilities and family size preferences.

Source: (Create by author based on survey data, 2024.)

Income and Fertility

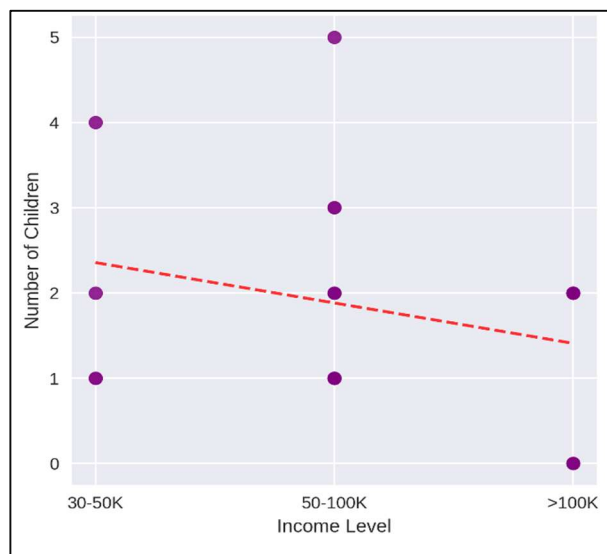


Fig.8. Income Level Vs Number of Children

Source: Create by author based on survey data, 2024.

Higher income levels correlate with lower fertility, households earning >100,000 Rs average fewer children. This paradox where economic security leads to reduced fertility is well documented in Sri Lanka's fertility transition (Perera, 2017). From the Demographic Transition perspective, rising income promotes investment in child quality rather than quantity, while Becker's model explains the substitution effect, where resources are concentrated on fewer children to maximize their opportunities.

Migration and Fertility

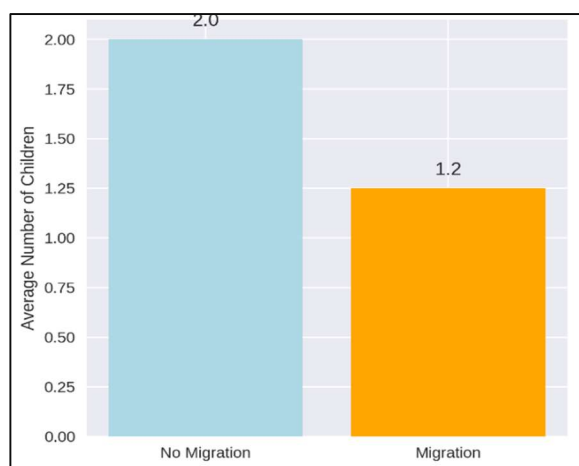


Fig.9. Average Children: Migration Vs No Migration

Migrant families average 1.2 children, compared to 2.0 among non-migrants. Migration delays marriage and childbearing while also exposing families to new socio-economic contexts and norms (Desiderio, 2020). From a population geography lens, migration acts as a vector of demographic change by transferring urban or modern fertility norms into rural areas. This echoes findings from Sri Lankan studies on international migration, where exposure to Middle Eastern and Western fertility ideals lowered reproductive aspirations (Desiderio, 2020).

Education, occupation, income, and migration clearly shape fertility in Aswedduma. These findings confirm classical fertility theories (Caldwell, 1982; Becker, 1981) and illustrate how place based socio-economic contexts intersect with demographic models in explaining local fertility patterns.

Objective 3: To explore cultural and attitudinal influences on fertility

While socio economic factors explain much of the fertility transition, cultural and attitudinal factors remain highly influential in Aswedduma. These factors highlight the role of population geography, where demographic behavior is shaped by cultural norms embedded in specific places.

Social Pressure and Fertility

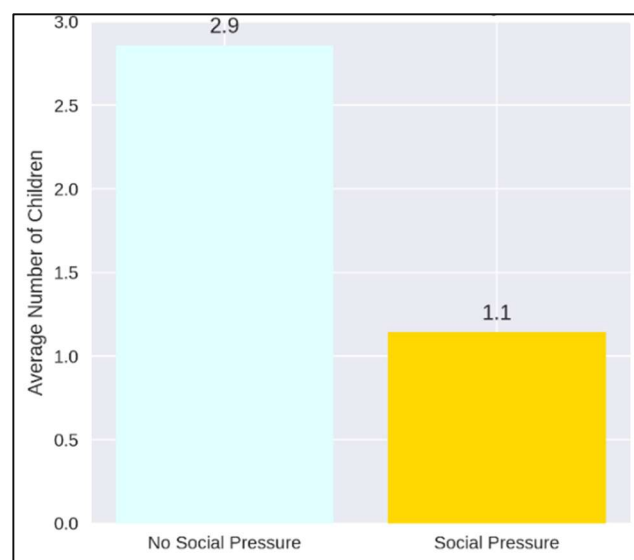


Fig. 10. Social Pressure Effect on Family Size

Source: (Create by author based on survey data, 2024.)

A clearer interpretation is that families with more children (2.9) report no social pressure, while those with fewer children (1.1) experience greater pressure. This suggests that in Aswedduma, social expectations continue to value moderate to large families, and couples with fewer children are pressured to have more.

This aligns with Caldwell's Wealth Flows Theory (1982), where children are still perceived as contributors to household well-being, especially in rural contexts. While Sri Lanka nationally has embraced the two-child norm (De Silva, 1997), in localized communities like Aswedduma, cultural norms may lag, reinforcing expectations of at least two or more children.

From a Diffusion of Innovations perspective (Rogers, 1962), family planning ideals are spreading, but resistance is visible, couples practicing low fertility face social scrutiny, showing that modern norms and traditional pressures coexist.

Correlation Matrix Findings

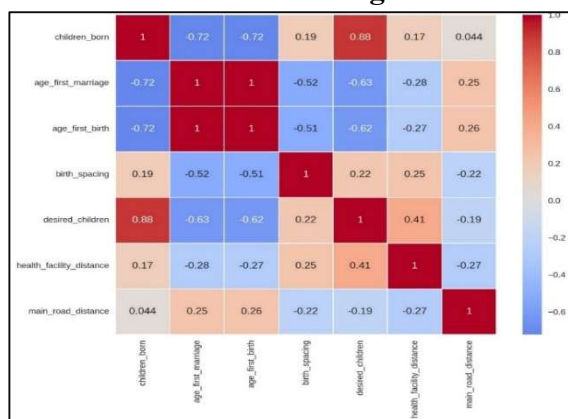


Fig.11. Correlation Matrix – Fertility and Related Variables

Source: (Create by author based on survey data, 2024.)

Strong positive correlation (0.88) between children born and desired children shows alignment between actual and ideal family size, reflecting successful fertility control. Negative correlation (-0.72) between age at marriage/first birth and children confirms that delayed nuptiality reduces fertility, consistent with Sri Lanka's demographic transition (Gunasekara, 2012). Minimal influence of distance to facilities/roads suggests fertility is more tied to social and cultural structures than pure physical geography, reflecting

Hagerstrand's (1967) view that demographic diffusion is socially mediated rather than spatially uniform.

Marriage Age and Family Size

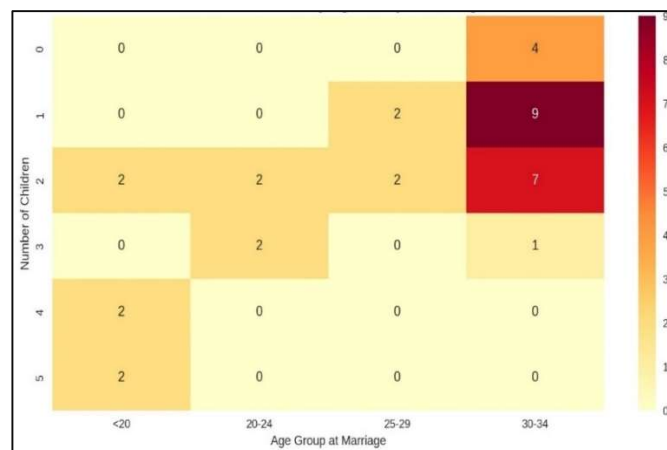


Fig 12. Number of Children by Age Group at Marriage

Source: (Create by author based on survey data, 2024.)

- Early marriages (<20) → larger families (4–5 children)
- Later marriages (30–34) → smaller families (1–2 children)

This reinforces the proximate determinants framework (Bongaarts, 1978), which identifies age at marriage as a key fertility regulator. Similar findings in Sri Lanka highlight the role of delayed marriage in sustaining the country's below-replacement fertility levels (Perera, 2016). Cultural and attitudinal influences particularly social pressure, marriage norms, and fertility ideals remain central in shaping reproductive behavior. Aswedduma reflects a localized cultural adaptation of global demographic transitions, where traditional norms coexist with modern small-family ideals.

IV. CONCLUSIONS

Fertility patterns in Aswedduma GND show a clear transition toward smaller families, with the two-child norm dominating and the average fertility rate at 1.83. Marriage and childbearing are delayed, and birth spacing reflects both traditional and modern practices. While education, income, occupation, and migration strongly influence fertility, cultural factors such as

social pressure and family ideals still play an important role.

The study achieved its objectives by analyzing fertility patterns, identifying socio-economic determinants, and highlighting cultural influences. It provides micro-level evidence of Sri Lanka's demographic transition, showing how modern influences and traditional norms coexist.

Recommendations include expanding access to family planning and reproductive health education, reducing social pressure on small families through awareness, and creating more opportunities for women's employment. Community dialogues can help balance cultural expectations with modern reproductive goals, while migrant families would benefit from targeted support. Future research should compare rural and urban settings, explore cultural attitudes in depth, and study intergenerational fertility preferences.

In conclusion, Aswedduma reflects Sri Lanka's national fertility transition but retains distinct local features. Sustainable fertility management requires combining education, economic empowerment, and cultural sensitivity to ensure reproductive rights and family well-being

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