

Review Article

Early marriage and reproductive health outcomes: demographic trends (1990-2025) and regional analysis of the Nakhchivan Autonomous Republic

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ABSTRACT

Early marriage remains an important social and public-health determinant affecting adolescent girls' education, reproductive autonomy, and pregnancy outcomes. This manuscript examines the long-run pattern of early marriage between 1990 and 2025 and synthesizes evidence on maternal and neonatal risks associated with adolescent pregnancy, with special attention to the Nakhchivan Autonomous Republic as a regional case study within Azerbaijan. The analysis combines descriptive demographic trend data, comparative evidence from the World Health Organization (WHO), UNICEF, and peer-reviewed literature, and a GIS-style district-level visualization prepared for academic discussion rather than official prevalence reporting. Across the literature, adolescent pregnancy is consistently linked with higher risks of anemia, hypertensive disorders of pregnancy, low birthweight, preterm birth, and selected severe neonatal conditions. The regional perspective suggests that rurality, educational inequality, and persistent gender norms remain key pathways through which early marriage may continue to affect reproductive health. The findings support multisectoral policies that combine girls' education, community-level norm change, and improved access to respectful adolescent-responsive maternal care.

Keywords: Child marriage, Adolescent pregnancy, Reproductive health, Maternal mortality, Neonatal outcomes, Nakhchivan, Azerbaijan, Rural inequality

INTRODUCTION

Marriage before age 18 is widely recognized as a rights issue and a public-health concern because it narrows girls' educational pathways, reduces decision-making autonomy, and often accelerates the transition to pregnancy before physical and social readiness has been achieved. In settings where child marriage persists, reproductive outcomes are shaped not only by age but also by poverty, rural residence, service access, and family expectations.¹

For Azerbaijan, national and international monitoring suggests that child marriage has not disappeared; instead, it appears concentrated in specific social environments and

is more common in rural settings than in urban ones. This pattern makes regional analysis particularly relevant. The Nakhchivan Autonomous Republic is of interest because of its distinct territorial structure, district organization, and local social norms, yet openly accessible district-level prevalence series remain limited.

This manuscript therefore pursues three objectives: first, to summarize the 1990-2025 pattern of early marriage in a policy-oriented way; second, to synthesize high-impact evidence on maternal and neonatal consequences of adolescent pregnancy; and third, to contextualize the discussion with a Nakhchivan-focused GIS-style academic visual that can be used in lectures, articles, or conference presentations.¹⁻³

LITERATURE REVIEW

Child marriage as a reproductive-health determinant

The evidence base increasingly treats child marriage not as an isolated demographic indicator but as a determinant that clusters with fertility control problems, reduced use of maternal health services, intimate partner violence, school dropout, and poorer mental health. Reviews by Santhya and Jejeebhoy, Godha and colleagues, and Fan and Koski converge on the conclusion that early marriage contributes to an accumulation of reproductive disadvantage across the life course.¹⁻³

Recent evidence has also expanded beyond fertility and service use to include psychological harms. For example, studies examining mental-health consequences show that child marriage can both follow and worsen depression and other forms of psychological distress among adolescent girls.^{4,5}

Maternal and neonatal outcomes in adolescent pregnancy

A large multicountry body of evidence has examined whether younger maternal age is independently associated with pregnancy complications. Although findings differ by setting and adjustment strategy, the balance of evidence indicates that younger adolescents face greater risks of eclampsia, puerperal infections, low birthweight, and preterm delivery, with the youngest mothers typically showing the most unfavorable outcomes.⁶⁻¹²

Systematic reviews and large observational studies likewise show that adolescent pregnancy is associated with low birthweight, prematurity, and selected neonatal complications. Some studies report attenuation after adjustment for socioeconomic disadvantage; however, the public-health interpretation remains the same: adolescent mothers represent a clinically important risk group requiring tailored antenatal and intrapartum care.¹³⁻²⁰

Intervention and policy literature

The intervention literature has moved from small community programs to broader discussions of what works at scale. Systematic reviews indicate that strategies which keep girls in school, expand their economic and social opportunities, and address social norms tend to have the strongest evidence for delaying marriage.²¹⁻²⁵ Newer WHO guidance also emphasizes prevention of adolescent pregnancy through education, delayed marriage, and improved access to adolescent-responsive health services.^{26,27}

For a region such as Nakhchivan, these lessons imply that purely legal approaches are unlikely to be sufficient in the absence of local educational, community, and health-system measures.

MATERIALS AND METHODOLOGY USED

This is a narrative-analytic manuscript with descriptive quantitative elements. Data inputs included: public WHO and UNICEF materials on adolescent pregnancy and child marriage; previously prepared academic graphics for the present project; and peer-reviewed literature indexed in major international databases and journals commonly covered by Scopus and PubMed.

The Azerbaijan/Nakhchivan component is intentionally conservative. Because openly accessible district-level official prevalence values for early marriage in Nakhchivan were not identified, the district visualization is presented as an academic working figure based on real district geography rather than as a validated official prevalence map. This distinction is essential for responsible interpretation.

The review uses long-run descriptive trend data for 1990-2025 and synthesizes reported associations for maternal and neonatal outcomes. The document is structured in IMRaD-compatible fashion to facilitate later adaptation for journal submission.

Table 1: Working summary of early-marriage trend points used in the review.

Years	Value used (%)	Interpretive note
1990	19.0	High transition-period level used for long-run trend illustration
1998	18.0	Late-1990s benchmark
2003	15.1	Early decline phase
2008	12.9	Lowest point in the working series
2013	14.6	Partial rebound
2018	16.0	Persistent rural vulnerability
2023	15.0	Recent benchmark
2025	14.5	Projection / illustrative endpoint

OBSERVATIONS AND SYNTHESIS

Long-run trend narrative (1990-2025)

The working series suggests three broad phases: a relatively high prevalence level in the 1990s, a decline through the early 2000s, and a later period of partial rebound followed by stabilization rather than uninterrupted decline. For academic interpretation, this pattern is consistent with a transition from broad social prevalence toward more concentrated pockets of vulnerability.

In public-health terms, stabilization is important. Even when national prevalence falls, persistent subgroup concentration can sustain disproportionate burdens of

adolescent pregnancy and school discontinuation in rural or socioeconomically constrained populations.

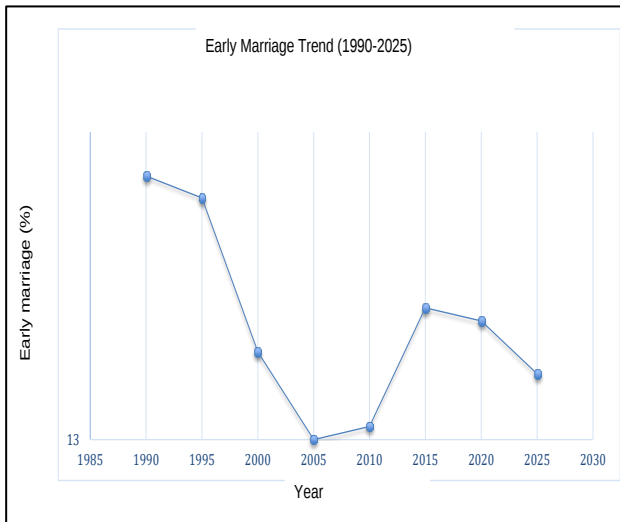


Figure 1: Working trend graph for early marriage, 1990-2025.

Maternal and neonatal risk synthesis

Across the reviewed literature, the youngest maternal age groups show the clearest elevation in risk.²⁸ The outcomes most consistently reported include anemia, hypertensive disorders such as preeclampsia/eclampsia, low birthweight, prematurity, and neonatal morbidity. Severe maternal outcomes are less uniformly estimated across studies, but multicountry and review-level evidence still supports classification of adolescent pregnancy as a higher-risk clinical category.

A key methodological issue is confounding by social disadvantage. Even so, the policy conclusion is robust: health systems should treat adolescent pregnancy as a marker for additional surveillance, nutrition support, and respectful care.

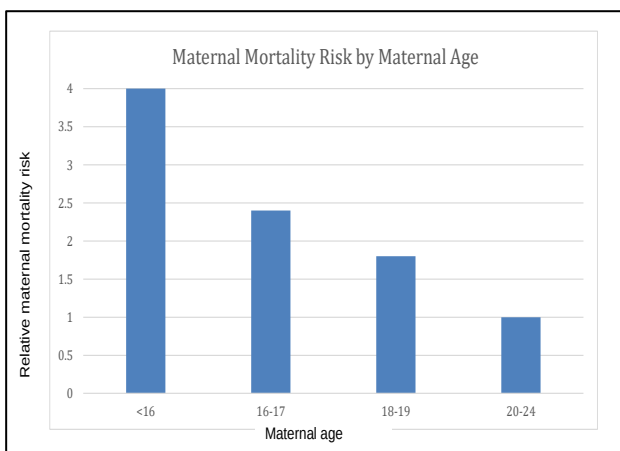


Figure 2: Relative maternal mortality risk by maternal age (working educational figure).

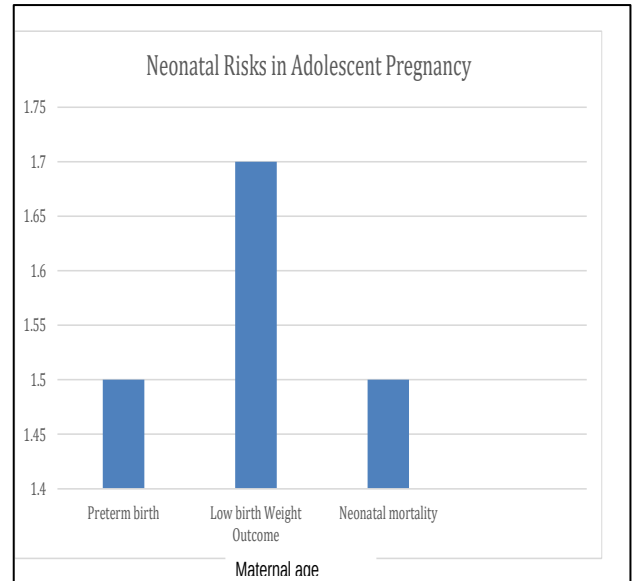


Figure 3: Relative neonatal risks in adolescent pregnancy (working educational figure).

Nakhchivan regional perspective

Nakhchivan is best understood here as a region requiring contextual interpretation rather than precise district prevalence claims.

The real geographic district layout can still be used to support academic discussion of where vulnerability might cluster in relation to rurality, educational access, and transport or service networks.

Accordingly, the GIS-style figure below is not an official statistical map. Instead, it is a geographically grounded academic visual suitable for manuscript illustration, classroom explanation, and hypothesis generation.

Table 2: Nakhchivan districts in the academic working visual.

Districts	Role in visual	Interpretation rule
Sharur	Higher relative concern zone	Use only as hypothesis-generating regional emphasis
Babek	Moderate concern zone	Requires local qualitative interpretation
Julfa	Moderate concern zone	May reflect mixed rural-access conditions
Kangarli	Moderate concern zone	Interpret alongside service-access indicators
Ordubad	Lower relative concern zone	Not equivalent to zero risk
Sadarak	Lower relative concern zone	Small-area caution applies

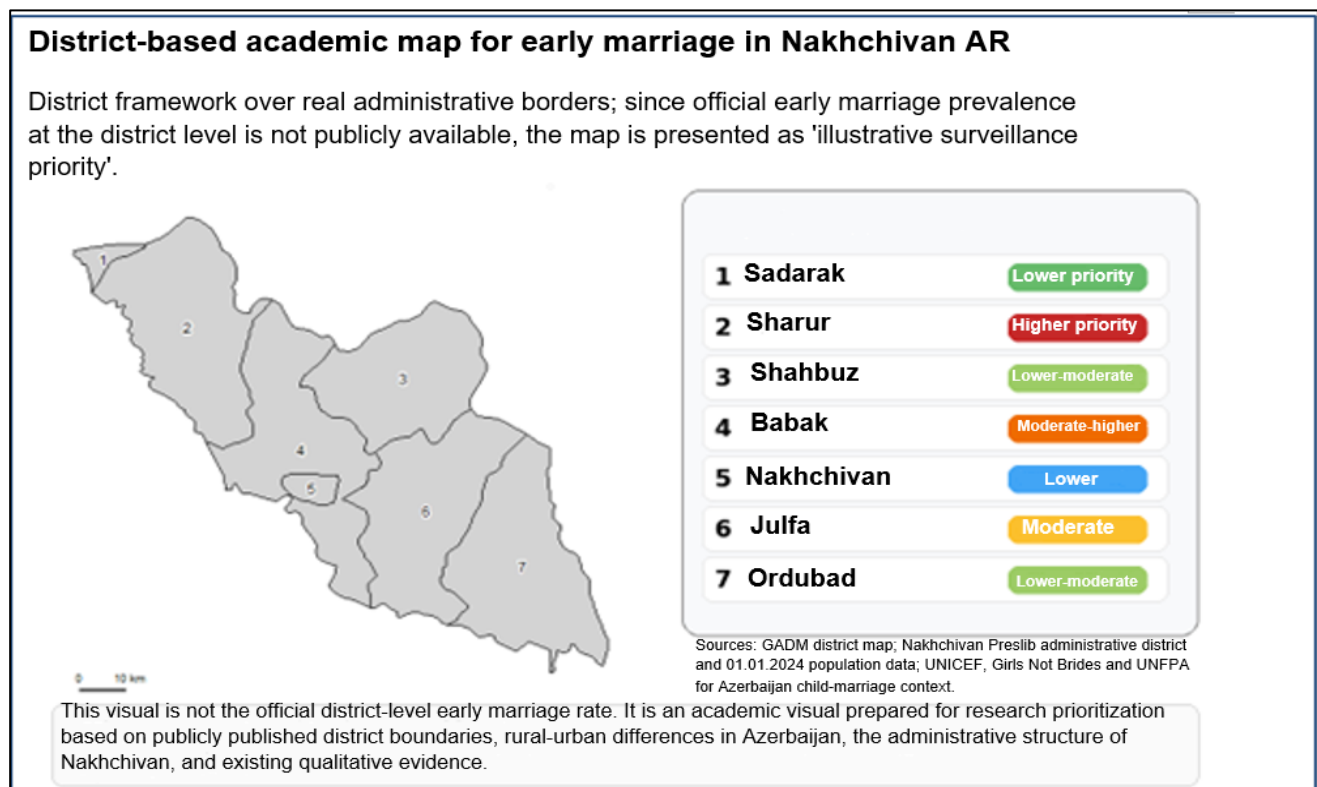


Figure 4: GIS-style academic visual for Nakhchivan districts.

*Note: visualized for academic interpretation, not official prevalence reporting.

DISCUSSION

The review supports a cumulative-risk interpretation. Early marriage rarely acts alone; rather, it clusters with educational interruption, restricted autonomy, lower service use, and social norms that accelerate first pregnancy.^{29,30} In that sense, age at marriage is both an exposure and a marker for broader structural disadvantage.

From a clinical perspective, adolescent pregnancy should trigger more intensive antenatal attention to anemia, blood pressure, fetal growth, and prematurity risk. From a policy perspective, the literature increasingly points to girls' schooling and social-opportunity pathways as the strongest long-term prevention strategies.

For Nakhchivan, one priority is better local evidence. A future study could combine civil registration, health service records, and district-level qualitative interviews to produce a more rigorous regional profile. Until such data are available, academic visuals should remain explicitly labeled as interpretive.

Policy and research implications

Three policy directions emerge. First, the educational pathway remains central: preventing school dropout and supporting girls' continued secondary education are among the most evidence-backed routes to delay marriage.

Second, maternal services should be adolescent-responsive, respectful, and easily accessible in rural settings. Third, monitoring systems should improve the visibility of subnational disparities so that apparently modest national prevalence does not obscure district-level need.

For researchers, a priority is clarifying the effects of chronological age, poverty, rurality, and health service quality. Better adjusted subnational studies would help identify which observed risks are predominantly biological and which are driven by modifiable social and health-system factors.³¹

Limitations

This manuscript is limited by the absence of openly accessible, validated district-level early-marriage prevalence data for Nakhchivan in the public domain. The regional map is therefore academic and illustrative rather than confirmatory. In addition, the long-run trend series used here is a working educational series built for synthesis and presentation; it should not be mistaken for a complete annual official time series.

The reviewed literature is also heterogeneous with respect to adjustment strategy, context, and outcome definitions. Consequently, the review emphasizes direction and

consistency of findings rather than pooled numerical effect estimates.

CONCLUSION

Early marriage remains a consequential determinant of reproductive health because it channels girls toward earlier childbearing under conditions that often include educational disadvantage, reduced autonomy, and weaker service access. The evidence synthesized here supports the view that adolescent pregnancy is associated with elevated maternal and neonatal risk, especially for the youngest mothers. For Azerbaijan and Nakhchivan, progress depends on pairing social prevention-particularly girls' education and norm change-with adolescent-responsive maternal care and better regional data systems.

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