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Dr. Öğr. Üyesi Burcu İmren Güzel
https://orcid.org/0000-0002-1682-9265
Niğde Ömer Halisdemir Üniversitesi, Mimarlık Fakültesi, Niğde / TÜRKİYE
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Spatial Patterns and Socioeconomic Correlates of Preschool Participation Across Türkiye's Provinces: Evidence from 2024

Türkiye İllerinde Okul Öncesi Eğitime Katılımın Mekânsal Örüntüleri ve Sosyoekonomik Göstergelerle İlişkisi: 2024 Yılı Bulguları

ABSTRACT

Preschool education plays a critical role in supporting children's development, improving school readiness, and reducing inequalities before compulsory education. This study examines the spatial distribution of preschool participation rates among children aged 3–5 and their associations with selected socioeconomic indicators across Türkiye's 81 provinces. A quantitative cross-sectional research design was employed, combining thematic mapping, descriptive statistics, normality assessment, and bivariate correlation analysis. Across the 81 provinces, participation rates averaged 52.27% and ranged from 36.90% to 67.50%. Although the spatial distribution revealed a broad east–west differentiation, this pattern was not uniform. Several provinces in eastern Türkiye recorded comparatively high participation rates, while some populous metropolitan and coastal provinces were not among those with the highest rates. The correlation results indicated that preschool participation was positively associated with average years of schooling, the employment rate, and gross domestic product per capita, whereas it was negatively associated with the unemployment rate. Overall, the findings suggest that provincial variations in preschool participation reflect multiple and place-specific dynamics rather than geography or metropolitan status alone. Accordingly, these dynamics should be assessed within their local contexts, and policy and planning decisions should be tailored to the distinct conditions and needs of each province.
Keywords: Early Childhood Education, Spatial Disparities, Socioeconomic Correlates, Educational Access, Türkiye.

ÖZET

Okul öncesi eğitim, çocukların gelişimini desteklemede, okula hazır oluşlarını artırmada ve zorunlu eğitim öncesindeki eşitsizlikleri azaltmada kritik bir rol oynar. Bu çalışma, Türkiye'nin 81 ilinde 3–5 yaş arası çocukların okul öncesi eğitime katılım oranlarının mekânsal dağılımını ve bu oranların seçilmiş sosyoekonomik göstergelerle ilişkilerini incelemektedir. Tematik haritalama, betimsel istatistikler, normallik değerlendirmesi ve iki değişkenli korelasyon analizini birleştiren nicel, kesitsel bir araştırma deseni kullanılmıştır. Katılım oranları 81 il genelinde ortalama %52,27 olup %36,90 ile %67,50 arasında değişmiştir. Mekânsal dağılım genel bir doğu–batı farklılaşması ortaya koysa da bu örüntü tüm illerde aynı değildir. Türkiye'nin doğusundaki bazı illerde görece yüksek katılım oranları kaydedilirken, nüfusu yüksek bazı büyükşehir ve kıyı illeri en yüksek oranlara sahip iller arasında yer almamıştır. Korelasyon sonuçları, okul öncesi eğitime katılımın ortalama eğitim süresi, istihdam oranı ve kişi başına düşen gayrisafi yurt içi hasıla ile pozitif; işsizlik oranı ile negatif ilişkili olduğunu göstermiştir. Genel olarak bulgular, okul öncesi eğitime katılımda iller arasındaki farklılıkların yalnızca coğrafi konumu veya büyükşehir statüsünü değil, birden fazla yere özgü dinamiği yansıttığını düşündürmektedir. Buna göre, bu dinamikler yerel bağlamları içinde değerlendirilmeli ve politika ile planlama kararları her ilin kendine özgü koşul ve ihtiyaçlarına göre şekillendirilmelidir.
Anahtar Kelimeler: Erken Çocukluk Eğitimi, Mekânsal Eşitsizlikler, Sosyoekonomik İlişkiler, Eğitime Erişim, Türkiye.

1. INTRODUCTION

Early childhood is a critical stage of life during which the foundations of cognitive, social, and emotional development are established. Quality education provided during this period supports children's overall development and school readiness, enabling them to make a strong start in their subsequent educational and life trajectories. Preschool education also helps parents reconcile care responsibilities with employment and facilitates women's participation in the labor force. It should therefore be regarded not merely as an educational service for children but as a multidimensional social investment that promotes individual well-being, social equity, and human capital development.

Nevertheless, children's opportunities to access quality preschool education vary according to socioeconomic, demographic, and spatial conditions. Inequalities emerging during the early years of life may widen over time and develop into disparities that are difficult to overcome at later stages of education. Ensuring that children enter the education system early and under equitable conditions is important not only for supporting their current development but also for reducing potential educational, social, and economic problems in the future. Particularly in countries characterized by regional development disparities, broader and more equitable participation in preschool education may therefore contribute to mitigating existing local and regional inequalities.

Although the effects of preschool education on children and families and the socioeconomic factors associated with participation have been widely examined, its spatial dimension has received relatively limited attention. Existing spatial studies have primarily focused on the geographical distribution of educational institutions, the planning of school locations, local access policies, or differences in service provision between rural and urban areas. By contrast, studies examining the spatial patterns of preschool participation and their relationships with socioeconomic indicators within the same analytical framework remain limited. In Türkiye, there is therefore a need to identify how participation varies geographically, where relatively low and high participation levels are concentrated, and which factors are associated with these differences.

This study aims to examine the spatial distribution of preschool participation in Türkiye and assess the associations between provincial participation rates and selected socioeconomic indicators. Accordingly, it seeks not only to compare participation levels across provinces but also to identify geographically differentiated patterns and explore their socioeconomic correlates. Identifying these differences may contribute to a more context-sensitive understanding of inequalities in preschool participation. The findings may also provide an evidence base for place-sensitive planning and the development of preschool education policies that take differing provincial conditions and needs into account.

2. LITERATURE REVIEW

This section reviews the literature through four interrelated dimensions: the individual and societal importance of preschool education, inequalities in access, the factors and barriers shaping participation, and the spatial and institutional organization of preschool services and related education policies.

2.1. The Individual and Societal Importance of Preschool Education

Educational opportunities begin at birth, and learning during the early years provides the foundation for lifelong learning. Child development is a cumulative process in which skills acquired at an early age support subsequent development and learning, and it is shaped by the interaction between children's biological characteristics and their surrounding environment (Hahn & Barnett, 2023). The first years of life constitute a critical period during which brain architecture and health-related biological systems develop and the foundations of cognitive, social, and emotional development are established (K. Magnuson & Duncan, 2016). Physical, psychomotor, social, emotional, cognitive, and linguistic development progresses rapidly during the preschool years, while personal characteristics with lifelong implications are shaped by children's environments and the quality of education they receive (Ulus & Çetin, 2022). The relative ease of learning during this period, together with the contribution of adequate nutrition and cognitive stimulation to long-term skill development, further underscores the importance of early childhood experiences (Berlinski et al., 2009).

Children acquire linguistic, cognitive, social, emotional, and self-regulation skills that influence their subsequent development during the early years of life, and high-quality early learning environments support the development of these skills (Bakken et al., 2017). Responsive and cognitively stimulating care environments also contribute to children's linguistic and cognitive development by shaping their school

readiness (Magnuson et al., 2004). By contrast, insufficient stimulation may result in missed opportunities for mental, emotional, and motor development, and these deficiencies may be difficult to overcome in later years (Deutsch, 1998). Although attending a high-quality preschool can provide children with developmental advantages, the family environment may exert a stronger influence on their development than early childhood education institutions (Betz, 2012).

In addition to being part of the education system that supports children's development and prepares them for primary school, early childhood education and care (ECEC) is regarded as an important social investment (Välimäki et al., 2024). Research indicates that high-quality ECEC contributes to children's overall development (Ishimine & Tayler, 2014) and improves their school readiness and academic achievement (Pei, 2025; Švecová & Tolmáči, 2025). The positive outcomes of participation extend beyond achievement in primary school to long-term literacy and mathematics skills, as well as non-cognitive skills such as self-regulation, discipline, and social adjustment (Sumayku & Sumanti, 2026). Social and emotional competencies—including sharing, emotional regulation, peer acceptance, and self-control—are also among the benefits associated with preschool education (Küçükturan & Altun, 2017). Giddings et al. (2007) reported that children participating in a publicly provided preschool program in Bolivia demonstrated more favorable outcomes in health, cognitive development, and psychosocial development.

The function of preschool education is not limited to childcare and supervision. By improving children's developmental outcomes, preschool institutions can contribute to human capital formation, labor productivity, and economic growth (Giddings et al., 2007). Investments made during the early years support subsequent learning, increase the effectiveness of educational investments later in life, and contribute to long-term academic achievement (Berlinski et al., 2009). Even when the short-term academic gains associated with high-quality preschool education diminish over time, its positive effects on educational attainment and income may persist (Magnuson & Duncan, 2016). Children who receive support at an early age may achieve more favorable outcomes in education, employment, income, and health later in life (Ghosh, 2019), while longitudinal studies indicate that these benefits may continue throughout the life course (Press et al., 2021).

Preschool education also functions as a childcare and supervision service that helps parents reconcile care responsibilities with employment and facilitates women's participation in the labor force (Giddings et al., 2007). Rather than children's temporary separation from their mothers, it is the quality of the environment in which they spend this time that is particularly important; a high-quality preschool environment can positively influence children's development (Berlinski et al., 2009). By providing an alternative to full-time maternal care at home, ECEC has the potential to reduce gender inequalities, while public financing and service provision are associated with stronger labor market attachment among mothers of young children (Meyers & Gornick, 2003).

2.2. Access to Preschool Education and Equality of Opportunity

Early childhood education is regarded as a social investment that safeguards children's right to education and promotes equality of opportunity regardless of their socioeconomic, cultural, or linguistic backgrounds (Välimäki et al., 2024). Nevertheless, inequalities in access to early childhood education and care (ECEC) remain a major challenge for education systems seeking to include all children (Lecusay et al., 2026). Although access has improved in many European countries, universal coverage has not yet been achieved, and participation continues to vary at the national, regional, and local levels (Theiss, 2021). In low- and lower-middle-income countries, participation is particularly limited among children from low-income families, ethnic minorities, immigrant backgrounds, and children with disabilities or special needs (Ghosh, 2019). Financial constraints and differences in household resources further restrict the participation of children living in economically disadvantaged households (Sumayku & Sumanti, 2026).

Such inequalities are not confined to developing countries. In the United States, participation in early childhood education programs has increased over time but has remained comparatively low among children from low-income families and those whose parents have lower levels of education (Magnuson et al., 2004). Research conducted in Western countries similarly indicates lower participation among children from families with lower educational attainment and immigrant backgrounds (Välimäki et al., 2024). Inequalities also emerge across localities, as both preschool participation and the provision of private early childhood education services tend to be lower in districts characterized by higher poverty rates (Pelletier et al., 2025).

These differences in participation coincide with inequalities in the developmental resources available to children before they enter formal education. Children from low-income and minority backgrounds may face adverse educational trajectories and limited life opportunities because their households and neighborhoods lack sufficient resources to support learning and development (Hahn & Barnett, 2023). More limited access to educational materials, role models, and learning experiences outside school may adversely affect their school readiness (Bakken et al., 2017). Consequently, these children may enter school with less developed academic skills and experience a "double disadvantage," as they are less likely both to receive stimulating care at home and to participate in education-oriented care outside the home (Magnuson et al., 2004).

Preschool education may partly compensate for these early disadvantages, and its benefits may be particularly pronounced among children with fewer socioeconomic resources. In France, the positive relationship between participation in publicly supported preschool education and first-grade achievement was stronger among children from disadvantaged families (Giddings et al., 2007). Access to early childhood education among children who are socially disadvantaged, have disabilities, or are at developmental risk may also improve their likelihood of succeeding at school and achieving a better quality of life (Švecová & Tolmáči, 2025). Similarly, the long-term benefits of early childhood education have been reported to be stronger among socioeconomically disadvantaged children (Ghosh, 2019; Pei, 2025). The concentration of these benefits among disadvantaged groups suggests that expanding participation may promote not only human capital development, efficiency, and economic growth but also greater equity (Giddings et al., 2007).

More broadly, early childhood education has the potential to reduce developmental inequalities among groups at risk (Küçükturan & Altun, 2017) and narrow socioeconomic gaps in academic achievement to some extent (Köse et al., 2021). Addressing inequalities in initial conditions through early childhood education may be more effective than attempting to compensate for unequal outcomes later in life (Berlinski et al., 2009). By preventing disadvantages from accumulating over time (Press et al., 2021), early childhood interventions may improve children's life opportunities and reduce inequalities in human capital (Magnuson & Duncan, 2016), while also helping to alleviate the developmental challenges and multidimensional poverty experienced by marginalized groups (Ang et al., 2025).

In Türkiye, access to high-quality preschool education is similarly important for reducing disadvantage and promoting equality of opportunity. Children who lack supportive developmental environments and quality education during the preschool years may be unable to realize their developmental potential fully. Providing children at risk and those from disadvantaged backgrounds with equitable opportunities for care and education may therefore help them begin school and life on more equal terms (Ulus & Çetin, 2022). In this context, expanding high-quality preschool institutions and increasing families' awareness of their benefits may support children growing up under disadvantaged conditions in entering primary school on more equal terms with their peers (Oktay, 1983).

2.3. Factors Shaping Participation in Preschool Education and Barriers to Access

Understanding the conditions that influence households' decisions regarding preschool participation is important because entering school without adequate preparation may have lasting consequences for later education and working life, while low achievement among disadvantaged children during the early years of primary education may increase their risk of dropping out (Giddings et al., 2007). These decisions do not depend solely on families' individual preferences but constitute a multidimensional process shaped by economic, sociocultural, institutional, and spatial conditions (Köse et al., 2021; Küçükturan & Altun, 2017; Sumayku & Sumanti, 2026).

Evidence from Turkish cities with low preschool participation illustrates this complexity. Factors encouraging participation included school readiness, the development of regular attendance habits and social behaviors, outreach by teachers and public institutions, maternal employment, and childcare needs. By contrast, financial constraints, perceptions that children were too young, concerns about institutional practices and transportation, beliefs regarding the maternal role, and limited awareness of the benefits of preschool education emerged as barriers (Küçükturan & Altun, 2017).

Economic and sociocultural factors are closely intertwined in shaping these decisions. Where early childhood education institutions depend heavily on parental fees and financial support is limited, participation becomes more dependent on households' disposable income and short-term financial capacity. During periods of economic pressure, preschool expenditure may consequently be treated as less essential than basic consumption needs. Evidence from Indonesia accordingly indicates a positive association between household income and participation in early childhood education programs (Sumayku & Sumanti, 2026).

Income alone, however, does not determine participation. Parents' education and awareness, maternal employment, household structure, and local social norms also influence decisions. Parents with lower educational attainment may have less information about the benefits of early education, whereas more highly educated parents tend to have greater knowledge of available options and higher educational expectations for their children (Berlinski et al., 2009; Ghosh, 2019). Participation may also vary according to social class and the importance families attribute to preschool education (Betz, 2012). Because women generally assume primary responsibility for childcare, mothers' socioeconomic characteristics are particularly relevant to these decisions (Välimäki et al., 2024).

Participation also depends on physical and institutional accessibility. The availability, cost, quality, and geographical distribution of services affect families' ability to use them. The location of institutions and the travel required to reach them may influence program choices (Köse et al., 2021), while an insufficient supply of services and high fees may further restrict access (Välimäki et al., 2024). These constraints may be particularly pronounced in rural areas, where lower incomes, lower maternal employment, and limited economies of scale can weaken both the supply of and demand for early childhood education services (Pelletier et al., 2025).

Overall, preschool participation emerges from the interaction between household circumstances and the local provision of services rather than from any single factor. Policies seeking to increase participation may therefore need to address financial affordability and physical accessibility alongside public awareness, with measures adapted to differing local conditions (Ghosh, 2019; Köse et al., 2021; Välimäki et al., 2024).

2.4. Institutional and Spatial Dimensions of Preschool Education Policy

International organizations such as the World Bank, the OECD, and the United Nations, as well as national governments, increasingly recognize the potential returns of investments in the early years for the development of human capabilities (Murray, 2017). Accordingly, the universal provision of early childhood education has become part of the global policy agenda (Press et al., 2021), while Sustainable Development Goal Target 4.2 seeks to ensure that all children have access to quality early childhood education and care and are adequately prepared for primary education (Pei, 2025).

The institutional organization and financing of early childhood education vary across countries. In most countries, preschool education is provided through an institutional structure separate from the general education system (Sommer et al., 2013), while models of service provision and financing differ even among countries with similar levels of economic development. Policy priorities also vary: gender equality is particularly prominent in Nordic countries, family and population policies in Continental Europe, and support for disadvantaged children and maternal employment in English-speaking countries (Meyers & Gornick, 2003). In many countries, inadequate public financing and institutional support have contributed to the expansion of private preschool education providers (Haslip & Gullo, 2018).

Alongside institutional arrangements, the spatial distribution of services is also crucial for equitable access. A study examining the development of preschool institutions in Slovakia identified considerable differences in their temporal and spatial distribution. Examining the geographical distribution of institutions contributes to identifying inequalities in access, allocating resources effectively, and planning services in accordance with community needs (Švecová & Tolmáči, 2025). Decisions regarding school locations should therefore consider both the current and projected size of the school-age population and its geographical distribution (Köse et al., 2021). While the influence of local policies varies according to the organizational autonomy of local governments (Theiss, 2021), the more limited provision of services by private programs and nonprofit organizations in rural areas increases the importance of publicly provided programs (Pelletier et al., 2025).

Expanding preschool education requires not only increasing coverage but also improving service quality and institutional capacity. Investment in universal preschool education is regarded as a strategy for enhancing educational quality (Berlinski et al., 2009). It is therefore important to develop and continuously evaluate programs that respond to families' needs, are culturally sensitive, and have demonstrated effectiveness (Jalongo et al., 2004). Raising public awareness and meeting existing demand can also support the expansion of preschool services (Küçükturan & Altun, 2017).

The institutional development of preschool education in Türkiye began during the late Ottoman period. The initial initiatives emerged as women increasingly entered employment and the number of children requiring care grew because of successive wars; preschool education was subsequently incorporated into the responsibilities of the Ministry of National Education in 1914–1915. Wars, economic constraints, and the prioritization of primary education during the early years of the Republic slowed the development of the

field. Preschool education was reconsidered at the National Education Councils of 1949 and 1953 and was incorporated into national development plans from the 1960s onward (Oktay, 1983). Today, the provision of services through different institutions and programs under various regulatory frameworks has resulted in a fragmented institutional structure. Recommendations for strengthening this structure include allocating adequate resources, making at least one year of preschool education compulsory, free, and high-quality, employing sufficient numbers of teachers, and establishing effective monitoring mechanisms (Ulus & Çetin, 2022).

3. METHODS

This study employed a quantitative cross-sectional research design to examine the spatial distribution of preschool participation and its bivariate associations with selected socioeconomic indicators across Türkiye's 81 provinces. The province constituted the unit of analysis, and all variables referred to 2024. All data were obtained from official statistics published by the Turkish Statistical Institute (TurkStat). The focal variable was the provincial preschool participation rate among children aged 3–5, expressed as a percentage. The selected socioeconomic indicators included average years of schooling, gross domestic product per capita at current prices (TRY), the unemployment rate, and the employment rate. The employment and unemployment indicators referred to the population aged 15 years and older.

To visualize provincial differences in preschool participation, a choropleth map was produced in Microsoft Excel. The provinces were classified into seven intervals of approximately five percentage points based on their participation rates. The map was examined descriptively to identify broad geographical patterns and provinces whose participation levels differed visibly from those of surrounding provinces.

Descriptive statistics—including the mean, standard deviation, minimum, and maximum values—were calculated to summarize the provincial distribution of the study variables. Before conducting the correlation analysis, the normality of each variable was assessed using the Shapiro–Wilk test. Pearson's product–moment correlation coefficient was used when both variables involved in a correlation met the normality assumption; otherwise, Spearman's rank correlation coefficient was employed. Statistical significance was evaluated at the $p < 0.05$ level. Because the study was based on aggregate provincial data, a cross-sectional design, and bivariate correlations, the findings were interpreted as associations rather than causal relationships.

4. RESULTS

This section first examines the spatial distribution of preschool participation rates among children aged 3–5 across Türkiye's 81 provinces. It then presents descriptive statistics and normality test results for the study variables, followed by bivariate correlations between preschool participation and the selected socioeconomic indicators.

4.1. Spatial Distribution of Preschool Participation Rates

Figure 1 presents the spatial distribution of preschool participation rates among children aged 3–5 across Türkiye's 81 provinces in 2024.

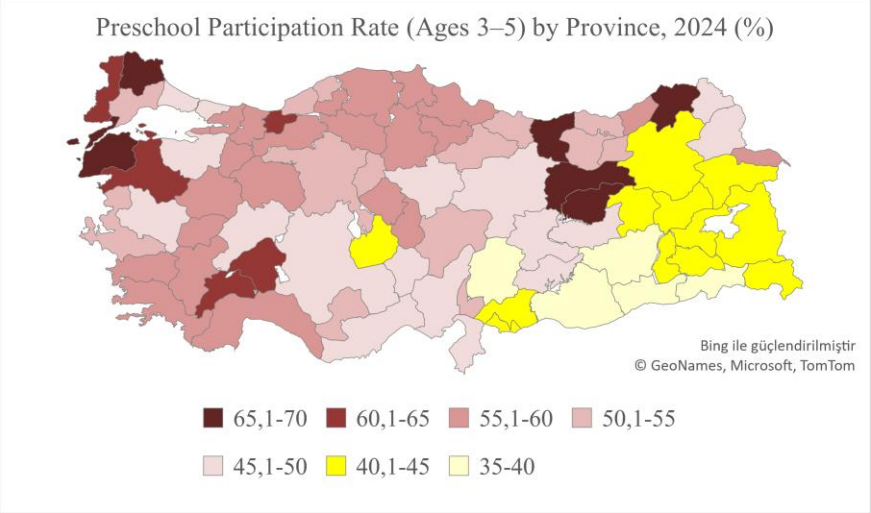

Figure 1. Provincial Distribution of Preschool Participation Rates Among Children Aged 3–5 in Türkiye, 2024 (Source: TurkStat (2024); map prepared by the author)

As shown in Figure 1, preschool participation rates exhibit a broad east–west differentiation, although this pattern is not uniform across the country. The lowest rates are observed in Şanlıurfa (36.9%), Mardin (37.2%), Diyarbakır (38.6%), Şırnak (38.8%), and Kahramanmaraş (39.8%). By contrast, Erzincan (67.5%), Tunceli (66.7%), Artvin (66.7%), and Giresun (65.8%) stand out from their neighboring provinces and rank among those with the highest participation rates in Türkiye. Similarly high rates are recorded in Kırklareli (65.9%) and Çanakkale (65.1%) in western Türkiye. Notably, several populous metropolitan provinces—including İstanbul, Ankara, İzmir, Bursa, Adana, and Mersin—as well as some coastal provinces do not fall within the highest participation category. Overall, the distribution does not follow a simple east–west pattern and does not correspond consistently to metropolitan status or coastal location. The marked contrasts between certain provinces and their surrounding areas point to place-specific variation and warrant closer examination of the local conditions associated with preschool participation.

4.2. Descriptive Statistics, Normality Assessment, and Correlation Analysis

This section presents the descriptive statistics and normality test results for the study variables across Türkiye's 81 provinces and examines the bivariate associations between preschool participation rates and the selected socioeconomic indicators.

Table 1. Descriptive Statistics for the Study Variables Across Türkiye's 81 Provinces

Variable	Mean	SD	Min	Max
Preschool Net Enrollment Rate (Ages 3–5, %)	52.27	7.75	36.90	67.50
Average Years of Schooling (Years)	9.01	0.57	7.50	10.80
Gross Domestic Product per Capita (TRY)	387,262	122,054	188,144	802,669
Unemployment Rate (Age 15+, %)	8.41	2.67	4.00	18.30
Employment Rate (Age 15+, %)	48.21	4.91	35.30	60.60

Table 1 presents the descriptive statistics for the variables included in the analysis. Across Türkiye's 81 provinces, preschool participation rates among children aged 3–5 averaged 52.27% (SD = 7.75) and ranged from 36.90% to 67.50%. Average years of schooling was 9.01 years, while the mean unemployment and employment rates were 8.41% and 48.21%, respectively. GDP per capita ranged from TRY 188,144 to TRY 802,669, indicating substantial differences in economic conditions across provinces.

Table 2. Shapiro–Wilk Normality Test Results for the Study Variables

Variable	Shapiro–Wilk (p)	Distribution
Preschool Net Enrollment Rate (Ages 3–5, %)	$p = 0.191$	Normally distributed
Average Years of Schooling (Years)	$p = 0.489$	Normally distributed
Gross Domestic Product per Capita (TRY)	$p < 0.001$	Not normally distributed
Unemployment Rate (Age 15+, %)	$p < 0.001$	Not normally distributed
Employment Rate (Age 15+, %)	$p = 0.404$	Normally distributed

Before conducting the correlation analysis, the normality of the study variables was assessed using the Shapiro–Wilk test (Table 2). The preschool participation rate, average years of schooling, and employment rate showed no significant departure from a normal distribution ($p > 0.05$). In contrast, GDP per capita and the unemployment rate deviated significantly from normality ($p < 0.05$). Accordingly, Pearson's product–moment correlation coefficient was used to examine the associations of preschool participation with average years of schooling and the employment rate, whereas Spearman's rank correlation coefficient was used for its associations with GDP per capita and the unemployment rate.

Table 3. Bivariate Correlations Between Preschool Participation Rates and Selected Socioeconomic Indicators

Variable	Correlation coefficient	*p*
Average Years of Schooling (Years)	Pearson $r = 0.383$	<0.001
Employment Rate (Age 15+, %)	Pearson $r = 0.551$	<0.001
Gross Domestic Product per Capita (TRY)	Spearman $\rho = 0.583$	<0.001
Unemployment Rate (Age 15+, %)	Spearman $\rho = -0.491$	<0.001

Note: Pearson's product–moment correlation coefficient (r) was used to assess the associations of preschool participation with average years of schooling and the employment rate, whereas Spearman's rank correlation coefficient (ρ) was used for its associations with GDP per capita and the unemployment rate.

Table 3 presents the bivariate associations between preschool participation rates and the selected socioeconomic indicators. Preschool participation was positively associated with average years of schooling ($r = 0.383$, $p < 0.001$), the employment rate ($r = 0.551$, $p < 0.001$), and GDP per capita ($\rho = 0.583$, $p < 0.001$). In contrast, it was negatively associated with the unemployment rate ($\rho = -0.491$, $p < 0.001$). Overall, provinces with higher preschool participation rates tended to have higher average levels of schooling, GDP per capita, and employment, together with lower unemployment.

5. DISCUSSION AND CONCLUSION

This study examined the spatial distribution of preschool participation rates and their bivariate associations with selected socioeconomic indicators across Türkiye's 81 provinces. The spatial distribution revealed a broad east–west differentiation, although this pattern was not uniform or reducible to a simple regional divide. Several provinces in southeastern Türkiye, together with Kahramanmaraş, recorded the lowest participation rates. By contrast, Erzincan, Tunceli, Artvin, and Giresun exhibited considerably higher rates than many neighboring provinces and ranked among the highest nationally, alongside Kırklareli and Çanakkale in western Türkiye. Moreover, several populous metropolitan and coastal provinces did not fall within the highest participation category. These findings indicate that broad regional differences coexist with marked province-specific patterns.

The correlation analysis showed that preschool participation was positively associated with average years of schooling, GDP per capita, and the employment rate, while it was negatively associated with the unemployment rate. At the provincial level, these results indicate that higher participation tends to coincide with stronger educational, economic, and labor-market conditions. However, because the analysis is based on aggregate data, these associations should be interpreted at the provincial level and do not establish equivalent household- or individual-level relationships.

The spatial contrasts also point to place-specific dynamics that extend beyond broad geographical classifications. Local institutional capacity, the availability and geographical distribution of preschool services, transportation conditions, affordability, and parental attitudes may be relevant to the observed patterns. Because these factors were not directly measured, they should be regarded as possible areas for further investigation rather than as explanations established by the present study. A closer examination of provinces that differ markedly from their surrounding areas may help clarify the local conditions associated with relatively high or low participation.

From a policy perspective, the findings support a place-sensitive approach rather than reliance on broad regional classifications alone. Provincial participation patterns can help identify locations whose needs should be examined more closely, although they do not by themselves determine the type or scale of investment required. In provinces with lower participation, local assessments of institutional capacity, service distribution, transportation, affordability, and family needs could inform more appropriate policy and planning decisions. Similarly, examining provinces that achieve relatively high participation despite their broader regional context may provide useful comparative insights. Such an approach could support more equitable opportunities for children to benefit from quality preschool education.

The findings should be considered in light of several limitations. The study was based on aggregate provincial data from a single year; therefore, the observed correlations do not establish causal or household-level relationships. The spatial component was limited to descriptive mapping, and no inferential spatial statistics or spatial autocorrelation tests were performed. Consequently, the visible geographical patterns should not be interpreted as statistically significant spatial clusters. The study was also limited to four socioeconomic indicators and did not directly measure institutional capacity, service quality, transportation, costs, or parental preferences. Future research could examine these factors using longitudinal, multilevel, and inferential spatial approaches. Despite these limitations, the study documents substantial provincial variation in preschool participation and identifies significant bivariate associations with educational, economic, and labor-market conditions. The findings underscore the value of province-level and place-sensitive assessments in efforts to promote more equitable participation in preschool education.

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