Title: A Spatial Analysis of Service Lag to Early Intensive Behavioral Intervention

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Introduction: Early intensive behavioral intervention (EIBI) is one of the most common evidence based early intervention approaches to increase adaptive behavior among children with autism spectrum disorder (ASD). Despite emphasis on intervening early following identification and diagnosis, significant barriers can interfere with timely service access. Among the most common barriers (e.g., waitlists, service provider shortages), geography has been relatively unexamined. More specifically, geographic location is a known but not widely investigated barrier to both receiving a timely diagnosis and starting or sustaining ASD treatment efforts. Previous research suggests that there is limited access to care for autism-related services in non-metropolitan/ rural areas (Mandell et al., 2005; Thomas, Ellis, McLaurin, Daniels, & Morrissey, 2007). The purpose of this study was to assess the relation between geographical distribution and starting EIBI services.

Method: A cohort of children ages 3-5 years old (n=667) with ASD residing in Minnesota between 2008 and 2010 were identified through Minnesota’s Medicaid Management Information System. We compared metro and non-metro residence using Kaplan-Meier product limit estimates of survival and Chi-square analyses. The distribution of service providers and the average time lag to EIBI was also assessed utilizing geographical information system (GIS). Geographic information systems (GIS) is a spatial analysis technique that can integrate data to analyze spatial relationships by electronically layering information such as a population within a specific region and other variables of interest.

Results: Approximately 70% of children in this study experienced a time lag to EIBI services, with an average lag of approximately 9 months (range= 0-45 months). Average time lag ranged from 0 months in 7 of the counties, which were all located outside the metro area, to 28 months. The average age to start EIBI services was 4.70 years (SD=1.24 years). In the metro area, the average start age was 4.79 years. In the non-metro area, children started EIBI at a younger age, 4.50 years, on average. Overall, speech language therapy was the most frequent supplemental intervention across both metro and non-metro areas, followed by occupational therapy, and physical therapy. A higher percentage of children residing in the metro area received supplemental services in comparison to the children residing in the non-metro areas. There was a statistically significant difference between residence and service receipt for speech language therapy and occupational therapy, but not for physical therapy. The Kaplan-Meier median time to starting EIBI per the survival functions for the whole sample was 5 months (standard error, 0.59, 95% CI: 4.43, 7.57). The children who resided in the metro area, median time lag was 6 months (standard error, 0.80; 95% CI: 4.43, 7.57) and for the children who resided in the non-metro areas, median time lag was 4 months (standard error, 0.88, 95% CI: 2.28, 5.72). At 12 months, the probability of ‘survival’ (i.e., starting EIBI) was approximately 18% for the non-metro children and 35% for the metro children. Overall, the survival curves showed that non-metro children experienced less time lag to starting EIBI over time.

Discussion: We examined the time lag to starting EIBI among a cohort of children with ASD in relation to residence characterized as metro or non-metro for the state of Minnesota.. Overall, sample sizes and number of service providers varied by county with most of the children residing in the metropolitan/urban areas. There was a statistically significant mean difference between metro and non-metro time lag to service estimates with the non-metro areas having overall shorter time lags. Our hypothesis that the metro area would have less service delay was not supported. The same number of service providers were located in the metro areas as the non-metro suggesting that the burden appears to be greater perhaps due to the higher demand for services in the metro areas within this cohort. The survival analysis conducted also showed that the non-metro areas experienced less time lag to starting EIBI and that the survival curves were statistically significantly different. Similar results were found by Yingling and colleagues (2018), who reported that urbanicity did not predict time lag between diagnosis and EIBI treatment onset in the state of South Carolina. Notably, we also found that the average age at start of EIBI was 5 years regardless of urban or rural residency. This represents a systematic time lag that runs counter to the theoretical basis of early intervention for ASD. With the increase in ASD prevalence, resources and service provision are critical for meeting the needs of children and families early on...
and throughout the lifespan. Research focusing on socio-cultural factors – including where one happens to live – has the potential to significantly inform both clinical practice and public health policy.

References:


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