

The Effects of migratory seasonal farmwork on psychomotor development and growth among children ages 0-5 years in Southeastern Anatolia

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Abstract

Objective:The aim of this cross-sectional survey is to investigate the role of migratory farmworker on childhood growth and psychomotor development. **Method:** We studied 174 children ages 0-5 years raised in migratory farmworker families (n=174), and compared them to a sample of non-farm workers' children (n=174) selected by probability sampling method. Data were collected using a structured questionnaire and anthropometric measurements, and Ankara Developmental Screening Inventory. **Results:** Stunting was found in 43.1% of the farmworker's children; 21.3% were in non-farmworker's children. Farmworker mothers reported that none of their children had been monitored by healthcare professionals. Being from a migratory farmwork family (OR 2.6; 95% CI 1.4-4.7; p=0.001) and maternal education (OR 0.88; 95% CI = 0.78-0.99; p=0.040) were found to be factors associated with stunted growth after controlling for confounding factors such as economic situation, number of children, household size and maternal age. **Conclusion:** Children of migratory farmworkers represent a vulnerable population that deserves special attention in terms of healthcare rights and primary healthcare services.

Key Words: Migratory farmwork, children, growth, development

Güneydoğu Anadolu Bölgesi'nde 0-5 yaşları arasındaki çocukların büyüme ve psikomotor gelişimine mevsimlik tarım işçiliğinin etkisi

Özet

Amaç: Kesitsel tipteki bu araştırmanın amacı, mevsimlik tarım işçiliğinin çocukların büyüme ve psikomotor gelişimine etkisini araştırmaktır. **Yöntem:** Olasılıklı örnekleme yöntemiyle seçilen 174 göçebe tarım işçisi ailenin çocuğu ve 174 tarım işçisi olmayan ailenin çocuğu büyüme ve gelişme açısından karşılaştırılmıştır. Veri toplamada soru formu, antropometrik ölçümler ve Ankara Gelişim Tarama Envanteri kullanılmıştır. **Bulgular:** Bodurluk tarım işçisi ailelerin çocuklarında %43.1, tarım işçisi olmayan ailelerin çocuklarında %21.3'dür. Mevsimlik tarım işçisi anneler çocuklarının büyüme ve gelişme izlemlerinin yapılmadığını bildirmişlerdir. Ekonomik durum, çocuk sayısı, hanehalkı büyüklüğü ve annenin yaşı kontrol edildiğinde, mevsimlik tarım işçisi ailenin çocuğu olma (OR 2.6; %95 GA 1.4-4.7; p=0.001) ve annenin öğrenim düzeyi (OR 0.88; 95% CI = 0.78-0.99; p=0.040) bodurluk için ilişkili faktörler olarak saptanmıştır. **Sonuç:** Hassas bir grup olan mevsimlik tarım işçisi ailelerin çocuklarının temel sağlık hizmetlerine ve sağlık haklarına erişimlerinin sağlanması için çaba harcanmalıdır.

Anahtar Kelimeler: Göçebe tarım işi, çocuklar, büyüme, gelişme

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Introduction

Child health has long been known to be dependent on physical, sociocultural, economic and environmental factors¹. Although there is great potential in childhood for health promotion and disease prevention, some important problems still continue. Globally, malnutrition is the most important risk factor for morbidity and mortality, contributing to more than half of childhood deaths worldwide. The World Health Organization estimates that by the year 2015, the prevalence of malnutrition will have decreased to 17.6% globally. Despite marked improvements in the prevalence of malnutrition, rates of undernutrition and stunting have continued to rise in some risk groups.^{2,3} Throughout the world, migratory farm workers remain marginalized, and are among the most socially, economically, and medically vulnerable populations at risk for malnutrition.

Agriculture is a major industrial sector in Turkey and relies heavily on migrant and seasonal farm labor. The total population of farm workers in Turkey (≥ 12 years old) has been estimated to be 12.5 million, according to the Census of Agricultural Households Survey.⁴ However, this statistic does not differentiate between migrant and non-migrant farm workers, and more recent estimates indicate that as many as 2 million migratory farm workers live and work in Turkey.

Farm workers perform strenuous tasks and are exposed to a wide variety of occupational risks and hazards. Internationally, studies on the health status of migratory seasonal farm workers' children include findings of: late immunization, respiratory diseases, Hepatitis A infection, a high prevalence of psychiatric disorders, parasitic infections, child abuse and neglect, iron deficiency, untreated dental caries, and pesticide exposure⁵⁻¹⁴. These children face numerous barriers to medical care, including lack of transportation, insurance and sick leave; the threat or fear of wage or job loss; language

barriers between farm workers and health care providers; and limited healthcare services.¹⁵⁻¹⁷

There are few population-based growth and development data on migratory farm workers' children. This study was carried out to investigate the role of migratory farm work on the growth and psychomotor development of the children ages 0-5 years and to demonstrate the effects of malnutrition on farm worker families' children compared to non-farm workers' children of similar ages.

Method

This cross sectional survey was carried out within the catchment areas of two primary healthcare centers (PHCs) in the Sanliurfa district of Southeastern Anatolia. The majority of families (70%) lived within the Ertugrulgazi PHC's catchment area and was migratory farm workers. The comparison group which is non-farm workers lived within the catchment area of a PHC named "Primary Healthcare Center Number Four." This study was conducted from January-March, 2008. Since records of Ertugrulgazi PHC were unreliable or incomplete because of family and health professional mobility, first all household records filled out by students of Health School of Harran University. 174 children between 6 months to 5 years of age were randomly selected from household records in each catchment area. Based on sample-size determinations, our sample was estimated to provide a malnutrition prevalence of 25%; $d = 0.05$; and confidence level of 95%¹⁸. Selection criteria included absence of chronic or acute illness and disability, term births, and normal birth weight. In home visits, after explaining the aim of the study, informed consent was obtained by the children's parents. Thereafter, physical and psychomotor development examinations were performed on each child. The response rates for survey completion were 98.9% for migratory farm workers and 96.4% for non-farm workers.

Children identified as being malnourished, along with those found to have other medical conditions, were given written referrals to the PHCs. Families found to be living below the national poverty line were referred to the local Department of Social Services for assistance.

Data collection

To measure the developmental status of children, we utilized the Ankara Child Development Screening Inventory (AGTE), a culturally-relevant tool developed by Savasir, Sezgin and Erol¹⁹⁻²¹. It is a 154-item inventory designed to evaluate children ages 0-6 years, based upon maternal/caregiver answers coded as “yes,” “no,” or “I don’t know.” Each “yes” response is assigned one point. The child is assigned a “general development” score, which is the sum of four inventory subscales: (1) language/cognitive skills; (2) fine motor skills; (3) gross motor skills; (4) social/activities of daily-living (ADL) skills.

In order to assess growth, we obtained weight and height information for all children. Weight was measured using a calibrated spring scale (0.5 kg scale), and height was measured using a supine measuring board (0.1 cm scale). Weight-for-age (WAZ), height-for-age (HAZ), and weight-for-height (WHZ) measurement were calculated using the EPINUT program of Epi-info, version 6. Children whose weight-for-height, height-for-age, and weight-for-age fell below -2 SDs were classified, respectively, with acute malnutrition (wasting), chronic malnutrition (stunting), or global malnutrition²²⁻²³. In addition, a structured questionnaire with open- and closed- ended questions, which was developed by researchers, was used to collect socioeconomic, environmental and demographical data. Education data were collected as years of schooling, and economic situation was classified as a ‘poor’ or ‘good’ according to the mother’s opinion (*Question: How is your economic situation?*).

Data analysis was carried out using the SPSS statistical package. The

psychosocial development score for each child was computed by scoring test item responses as either 1 or 0. At each age level (monthly intervals), children having scores in the lowest quartile were categorized as having developmental delay and those in the uppermost quartile were labeled as having accelerated development. The associations between independent variables and psychomotor development and growth were tested using chi-squared. Mann-Whitney U test was used to compare migratory farm workers and non-farm workers in view of social and demographic characteristics in univariate analysis. A logistic regression model was created to determine the independent effects of demographic, social and environmental factors on growth, because of essential indicator of child health.

Results

The farm worker group consisted of 87 boys (50.0%) and 87 girls (50.0%), while the non-farm worker sample consisted of 93 boys (53.4%) and 81 girls (46.6%). The mean age was 31.3±17.1 months in the farm worker group, and 29.3±16.2 in the comparison sample. There were no significant differences in the mean age and gender distribution of the groups ($p>0.05$). As seen in Table 1, maternal and paternal education, number of living children, household size and economic situation between farm worker families and non-farm worker families differed significantly ($p<0.05$). Migratory farm worker families had lower parental education, greater household size, higher number of children, and greater poverty.

A majority of the families (96.8%) reported that housing for migrant farm workers has been characterized as deplorable, and that lack of access to water often leads to the use of unsanitary and potentially polluted drainage systems for both bathing and drinking. All barracks lack privacy, even those with basic toilet facilities.

Nearly 65% of the migratory farm worker mothers in our study reported that

they lived in different agricultural regions of a single city in a given year, while 26.7% of them reported that they lived in at least two cities and worked in several regions. As many as 7.9 % of the mothers reported that they lived in more than 3 cities in a given year. 29.6% of the families reported working in Sanliurfa's agricultural regions, and 71.1% usually return to the same regions for work. 99.1% of these families stated that they move with all family members. When they get sick, 41.6% of them go to the hospital while 33.8% go to a primary healthcare center. The rest

reported that when they get sick, they either go to a pharmacy, or ask for drugs from their neighbors, or wait until they feel better. None of the farm worker mothers reported having had their children's growth rate and development followed by a health professional because of high mobility, and unawareness of mothers. 26.8% of non-farm worker mothers stated that nurses or midwives monitored their children health regularly. Only 3.4% of farm worker mothers reported that they follow their children's immunizations schedules, while this rate was 74.8% in non-farm workers.

Table 1. Characteristics of migratory farm worker and non- farm worker families

Variables	Migratory Farm workers n=174	Non- farm workers n=174	Significance z; p
	Median (25 th -75 th percentile)	Median (25 th -75 th percentile)	
Maternal education (year)	0.0 (0.0-1.0)	2.0 (0.0-5.0)	-5.774;0.001
Paternal education (year)	3.5 (0.0-5.0)	5.0 (3.0-8.0)	-3.870;0.001
Number of children	5.0 (3.0-6.0)	3.0 (2.0-4.0)	-7.791;0.001
Household size	8.0 (7.0-10.0)	5.0 (4.0-7.0)	-9.217;0.001
Economic situation	% n	% n	X², p
Poor	69.1 (85)	30.9 (38)	27.77; 0.0001
Good	39.6 (89)	60.4 (136)	OR=1.7 (95% CI=1.4-2.1)

Table 2 presents the association between physical and psychomotor development and migratory farm worker situation. Children from migratory farm worker families had higher rates of stunting (43.1% migratory farm workers vs 21.3% non-farm workers), underweight (27.6% migratory farm workers vs. 13.2% non-farm workers), and wasting (8.0% migratory farm workers vs. 4.3% non-farm workers) ($p < 0.05$ for all). As shown in Table, nearly 32% of children in the migratory farm worker sample had language-cognitive delay; 48.8% had fine motor development delay; 15.1% had gross motor development delay; and 19.2% had social skills/ self care developmental delay. This contrasts with non-farm worker families' children, who had respective developmental delay rates

of: 10.9%, 27%, 9.8% and 3.4 %. In preliminary analyses, two PHC's data were combined (a variable created named farm worker situation was coded as farm worker and non-farm worker), and the influence of background variables was tested. Maternal education, economic situation and farm worker situation were significantly related to stunting ($p < .05$). No significant relationship was found between stunting and paternal education, maternal/ paternal age, and number of children or household size ($p > .05$). In logistic regression analysis with forced entry of all variables, those variables that showed significant relationships in our univariate analyses were examined.

Table 2. Association between child growth / psychomotor development and migratory farm worker status

		Growth		
Migratory farmworker status		Height for age ≤ -2SD % (n)	Weight for age ≤ -2SD % (n)	Weight for height ≤ -2SD % (n)
Yes		43.1 (75)	27.6 (48)	8.0 (14)
No		21.3 (37)	13.2 (23)	4.3 (6)
χ^2 p	OR	19.012; 0.001	11.059; 0.001;	9.256; 0.001
	(CI 95%)	2.8 (1.8-4.5)	2.5 (1.4-4.3)	2.3 (1.2-4.1)

Delay in psychomotor development (AGTE Inventory)

Migratory farm worker status	Linguistic-cognitive % (n)	Fine Motor % (n)	Gross Motor % (n)	Social Skills/ Self-Care % (n)	General Development % (n)
Yes	32.6 (56)	48.8 (84)	15.1 (26)	19.2 (33)	22.1 (38)
No	10.9 (19)	27.0 (47)	9.8 (17)	3.4 (6)	14.9 (26)
χ^2 p	23.9; 0.001	17.5; 0.001	2.27; 0.001	21.4 ; 0.001	2.9; 0.001
OR (CI 95%)	3.9 (2.2-6.9)	2.5 (1.6- 4.0)	1.6 (1.2-3.1)	6.6 (2.7-16.3)	1.6 (1.1-2.8)

Table 3 displays the results of our logistic regression models for stunting. In this multivariate model, maternal education (OR

0.88; 95% CI = 0.78-0.99; p=0.040) and farm worker status (OR=2.36, 95% CI=1.42-3.90) significantly predicted stunting.

Table 3. Factors associated with the risk for stunting (Logistic regression analysis)

	B	P	OR	%95 CI	
Gender (male vs female)	0.234	0.328	1.26	0.79	2.02
Maternal education (year)	-0.125	0.040	0.88	0.78	0.99
Children of farm workers (y vs n)	0.856	0.001	2.36	1.42	3.90
Poor economic situation (y vs n)	0.112	0.660	1.11	0.68	1.83

Discussion

Anthropometric indices such as weight and height are used as important criteria in growth and nutritional assessment of children. Particularly for children under five years of age, adequate nutrition is a critical

developmental factor. Nearly 43% of farm workers' children who were included in this study were stunted. İnandı and Akbaba (1996) reported that the prevalence of stunting was 45.3% in this group.²⁴ Stunting was about 2.4 times higher among children

in farm worker families, and maternal education was determined as another significant variable on growth. The results of this study should be viewed in the light of a number of limitations. Because of cross-sectional nature of this study, it is difficult for us to draw conclusions about any causal relationship between child growth-development, and migratory farmworks and maternal education. However, additional research is needed to replicate these findings and to investigate the potential underlying mechanisms that explain the differentials association of child growth and farmwork' risk factors such as duration of work, exposures and maternal health indicators. Therefore, despite the limitations of the cross-sectional design, our sampling frame in both the migratory farm workers and non-farm workers samples generated empirical knowledge to describe the growth and psychomotor development of children in this vulnerable population.

According to data from the 2003 Population and Health Survey in Turkey, 22.1% of children below 5 years of age living in Eastern Anatolia were found to be stunted (Turkey 12.1%).²⁵ Stunting is directly related to chronic malnutrition, along with infectious diseases and genetic factors.¹²⁻¹³ However, low height for age in developing countries is also considered an issue of environmental adaptation by some experts.²⁶ Poor housing, limited sanitation facilities, inadequate diets, substandard health care, and overcrowded and unsanitary conditions are major causes of general poor health among migratory farm workers' children.¹⁵⁻¹⁶

Most agricultural workers in the world have low educational level. In view of maternal education, researchers have incorporated a causal role for education in theoretical health production and health demand models in two ways. A number of researchers have posited that more educated mothers might produce better health because they combine health inputs more efficiently. For example, more educated mothers may use the optimal amount of preventative care by visiting doctors at a rate that more effectively

prevents serious illnesses, or take preventive measures like immunization. This causal pathway has been given the label "allocative efficiency." Other researchers have posited that education directly affects the amount of health a woman can produce with a given set of inputs. A more educated woman might produce more health from a given set of inputs if, for example, her education taught her what combinations of food yield the most nutrients. Similarly, more educated women might produce more health from given inputs because their education makes it more likely that they carefully follow the treatment plan that doctors prescribe. This causal pathway has been given the label "productive efficiency".²⁷⁻³²

On the other hand, education level effects beliefs, and life style. One general belief among Latino agricultural workers is that the locus of health or illness is outside the control of the individual, whether due to supernatural causes or to God's will. This belief limits farm workers' usage of preventive measures³³⁻³⁴. Thus, building the capacity of mothers through basic education is a key long-term strategy to improve child health in developing-countries communities. More work is needed to develop shorter-term maternal educational strategies targeted toward improving child health outcomes for migratory farm workers. The seasonality of agricultural production and the resulting intensive periods of labor are overarching characteristics of the industry that affect the ability to attending the school. Finally, agricultural workers have limited access to health care, and education services.³⁵

It was found that approximately 32% of the children in our farmworker sample had poor linguistic-cognitive skills, 48.8% had poor fine motor development, 15.1% had poor gross motor development, and 19.2% had poor social skills and self-care. In recent years, there have been increasingly sophisticated attempts to combine environmental, social and personal components that are known to contribute to psychomotor development.³⁶

Due to the complexity of farm workers' problems, primary healthcare services should be organized for his underserved children. As is known, primary health care services were defined in 1978, when representatives from 134 countries gathered in Alma-Ata declared that primary health care, "based on practical, scientifically sound and socially acceptable methods and technology made universally accessible through people's full participation", was key to delivering cost effective health interventions for all by the year 2000. The Declaration of Alma-Ata articulated primary health care as a set of guiding values for health development, a set of principles for the organization of health services, and a range of approaches for addressing priority health needs and the fundamental determinants of health. Recent years have seen a renewed interest in primary healthcare, particularly in low-income and middle-income countries. Reasons for this renewed interest include profound inequities in health; inadequate progress towards the Millennium Development Goals, especially in developing countries.³⁷

The prevention of disease and health promotion is a major goal of public health programs. Primary health care systems should play a key role in physical, psychosocial and motor development in partnership with social services and other health-related organizations. To prevent psychomotor problems, primary healthcare workers must possess the knowledge and skills to assess factors relevant to child psychosocial and motor development, while providing families with preventive approaches that build upon existing strengths. Additionally, awareness of migratory farm workers and community-based monitoring programs can be launched to teach parents/ caregivers to provide beneficial physical and psychomotor development tools to their children.

Efforts have been made to improve the rights of children with regard to health and social care, but migrant workers' children remain marginalized. This

disadvantaged group needs targeted preventive measures, including regular monitoring of growth and development in the fields and primary care activities provided by mobile clinics, including nutritional support, safe water and sanitation services. It is our hope that the findings of this study will be of help in future planning and create a stronger public health infrastructure to meet the needs of children of migratory farm workers. Moreover, we hope that it will inspire integrative and interdisciplinary efforts to conduct comprehensive needs assessments for the overall health and strength of farm worker children.

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