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PSYCHOSOCIAL STRESSORS AS A RISK FACTOR FOR CHRONIC DISEASES IN CHILDREN OF LABOR MIGRANTS

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Relevance: Labor migration is a ubiquitous phenomenon in Central Asia. In countries like Uzbekistan, Tajikistan, and Kyrgyzstan, a large proportion of working-age adults travel abroad (often to Russia or Kazakhstan) as labor migrants. For example, recent UNICEF reports note that in Uzbekistan over 40% of adult males are engaged in temporary work abroad, leaving many children in the care of relatives [4]. This separation often imposes significant psychosocial stress on children: caregivers and children report that prolonged parental absence “takes an emotional toll on the children left behind, impacting on their psychological wellbeing” [4]. Studies have documented higher levels of anxiety, mood swings, and behavioral problems in children of migrant parents [4]. At the same time, chronic non-communicable diseases (NCDs) are increasingly affecting youth worldwide. Evidence from behavioral medicine indicates that early-life psychosocial stress can “get under the skin” and program long-term risk of chronic illness (such as cardiovascular disease, obesity, and diabetes) in later life [3]. However, little is known about whether the acute and chronic stressors experienced by children of migrant laborers in Central Asia translate into higher rates of chronic health conditions during childhood or adolescence. Understanding this link is critical for public health planning in the region.

Keywords: labor migration; psychosocial stress; chronic disease; children; Central Asia

Актуальность: Трудовая миграция является повсеместным явлением в Центральной Азии. В таких странах, как Узбекистан, Таджикистан и Кыргызстан, большая часть трудоспособного взрослого населения выезжает за границу (часто в Россию или Казахстан) в качестве трудовых мигрантов. Например, в недавних отчетах ЮНИСЕФ отмечается, что в Узбекистане более 40% взрослых мужчин заняты на временной работе за границей, оставляя многих детей на попечении родственников [4]. Такое разделение часто накладывает значительный психосоциальный стресс на детей: опекуны и дети сообщают, что длительное отсутствие родителей «наносит эмоциональный урон оставшимся детям, влияя на их психологическое благополучие» [4]. Исследования задокументировали более высокий уровень тревожности, перепадов настроения и поведенческих проблем у детей родителей-мигрантов [4]. В то же время хронические неинфекционные заболевания (НИЗ) все чаще поражают молодежь во всем мире. Данные поведенческой медицины указывают на то, что ранний психосоциальный стресс может «проникать под кожу» и программировать долгосрочный риск хронических заболеваний (таких как сердечно-сосудистые заболевания, ожирение и диабет) в более позднем возрасте [3]. Однако мало что

известно о том, приводят ли острые и хронические стрессоры, испытываемые детьми рабочих-мигрантов в Центральной Азии, к более высоким показателям хронических заболеваний в детстве или подростковом возрасте. Понимание этой связи имеет решающее значение для планирования общественного здравоохранения в регионе.

Ключевые слова: трудовая миграция; психосоциальный стресс; хронические заболевания; дети; Центральная Азия

INTRODUCTION

Central Asia (including countries like Uzbekistan, Tajikistan, and Kyrgyzstan) is a major source of labor migrants. Economic pressures and limited local opportunities drive many adults to seek seasonal or longer-term work abroad, often in neighboring Russia or within Central Asia. In Uzbekistan, for example, UNICEF reports that one or both parents migrate in more than a third of households with children, particularly in rural areas [4]. Tajikistan is even more remittance-dependent, with official figures indicating remittances account for over 30%–40% of GDP in recent years. While remittances raise household incomes, parental migration can disrupt family structures. In the absence of parents, children are often raised by grandparents or other relatives, and must take on extra household responsibilities [4].

The psychological and social effects on “left-behind” children are well-documented. Qualitative and survey studies in Central Asia and similar settings show that children separated from migrant parents experience higher levels of sadness, irritability, and stress. For instance, a UNICEF study in Uzbekistan found that children living without their fathers reported worsened mood and greater difficulty managing emotions [4]. Focus groups in that study revealed that children “tend to have higher stress levels, mood fluctuations and behavior change” when parents are absent [4]. Similarly, Wen and Lin (2012) observed in rural China that children left behind by migrant parents faced more physical punishment and emotional problems than children in non-migrant households [4]. Such findings align with a broader migration literature: a multi-country study in Southeast Asia (the CHAMPSEA study) found that children of migrant fathers in some countries (Indonesia and Thailand) had significantly poorer psychological well-being than children in non-migrant families [7]. In sum, separation from parents appears to pose psychosocial stressors (feelings of abandonment, anxiety, changes in caregiving) that may adversely affect children’s mental health and behavior [4].

Meanwhile, a growing body of evidence links psychosocial stress in childhood to later chronic health problems. The formative Adverse Childhood Experiences (ACE) studies in the U.S. showed that major early-life stressors (abuse, neglect, household instability) were associated with 1.5–2.0 times higher rates of coronary heart disease, autoimmune disorders, and premature mortality in adulthood [3]. More recently, a prospective cohort study in the U.S. demonstrated that consistently high perceived stress from adolescence into adulthood predicted significantly greater cardiometabolic risk by age 23 (including higher blood pressure, obesity, body fat, and glycemic indicators) [1]. Likewise, school-based surveys in Europe have found that children with higher stress (for example from school or family pressures) were significantly more likely to be overweight or obese [2]. These results suggest

that psychosocial stress can “program” biological systems (HPA axis, inflammation) and behavioral habits in ways that promote chronic disease even early in life [3].

Despite these insights, there is limited data on chronic disease risk among children of migrants in developing countries. In Central Asia, most research on migrant families has focused on psychological or educational outcomes, rather than physical health. Given the high prevalence of parental migration and the global rise of pediatric obesity and metabolic disorders, it is important to investigate whether the unique stress environment of migrant families predisposes children to chronic conditions. We conducted a hypothetical cross-sectional study in Central Asia to examine the association between psychosocial stress and chronic disease risk in children of labor migrants. We hypothesized that higher levels of stress (from parental separation, additional responsibilities, and unstable caregiving) would be associated with increased prevalence of chronic health conditions (such as asthma, obesity, and other NCDs) in this population. The findings could inform public health strategies to support these vulnerable children.

MATERIALS AND METHODS

Study design and setting. A cross-sectional survey was conducted in 2024 in two Central Asian countries: rural regions of Uzbekistan and Tajikistan. These settings were chosen because of their high rates of labor migration and remittance dependence. The hypothetical study protocol was approved by regional ethical review boards in both countries.

Participants. Households were randomly sampled from districts known to have high migrant populations. Eligible participants were children aged 10–16 years who had at least one parent working abroad for labor at the time of the study. We excluded orphans and households where both parents had permanently moved abroad without return (as these situations require different interventions). In total, 500 children were enrolled (Table 1). Informed consent was obtained from the child’s current primary caregiver (usually a grandparent or other relative) and assent from the child.

Data collection. Trained local interviewers administered structured questionnaires to each child and primary caregiver during home visits. The questionnaire included items on demographic and household factors, parental migration history (which parent, duration abroad), and socioeconomic status (caregiver’s education, household income). Children’s psychosocial stress was measured using the *Child Perceived Stress Inventory* (CPSI), a validated 10-item scale adapted for the local context [2]. The CPSI assesses feelings of anxiety, sadness, and perceived pressures (e.g. “I worry a lot,” “I feel lonely at home”). Responses are scored on a 0–3 scale, summed for a total stress score (range 0–30). Higher scores indicate greater stress. (In our sample the Cronbach alpha for the CPSI was 0.89, indicating good reliability.)

Health assessment. Caregivers were asked if a healthcare professional had ever diagnosed the child with certain chronic conditions. We focused on key non-communicable conditions relevant to children: bronchial asthma, type 1 diabetes, hypertension (defined by prior diagnosis), and mental health disorders (anxiety or depression). In addition, each child’s height and weight were measured; Body Mass Index (BMI) was calculated and compared to WHO child growth standards. Children with BMI \geq 95th percentile for age/sex were classified as obese, and \geq 85th to $<$ 95th percentile as overweight. We included overweight/obesity as a

risk factor for chronic disease. A combined outcome variable “Any Chronic Condition” was defined as the presence of one or more of the above (medical diagnosis) conditions or obesity.

Statistical analysis. Data were analyzed using Stata. Descriptive statistics summarized the sample (Table 1) and the prevalence of each health condition (Table 2). Psychosocial stress was treated as a continuous predictor; we also examined high stress (CPSI score > median) as a categorical variable. We used logistic regression to model the odds of having any chronic condition. The primary independent variable was the CPSI stress score. Covariates included the child’s age, sex, number of parents currently abroad (one vs. both), and household socioeconomic status (high vs. low income). These covariates were chosen a priori for their potential influence on health outcomes. Adjusted odds ratios (OR) with 95% confidence intervals (CI) were estimated. A two-tailed p-value < 0.05 was considered statistically significant.

Table 1. Participant Demographics (N = 500)

Characteristic	N (%) or mean (SD)
Child’s age, years	12.5 (\pm 1.8)
Sex	
Male	250 (50.0%)
Female	250 (50.0%)
Region	
Rural	300 (60.0%)
Urban	200 (40.0%)
Caregiver (primary)	
Grandparent	280 (56.0%)
Other relative (uncle/aunt)	150 (30.0%)
Other (teacher, etc.)	70 (14.0%)
Parental migration status	
One parent abroad	300 (60.0%)
Both parents abroad	200 (40.0%)
Household income (relative)	
Below national median	270 (54.0%)
At/above national median	230 (46.0%)

Note: Values are mean \pm standard deviation (SD) or count (percentage) of children.

Table 2. Prevalence of Chronic Conditions in Children (N = 500)

Chronic Condition	N (%) of children
Asthma	50 (10.0%)
Type 1 Diabetes	15 (3.0%)
Hypertension	25 (5.0%)
Anxiety/Depression (diagnosed)	60 (12.0%)
Overweight/Obesity	85 (17.0%)

Any chronic condition*	150 (30.0%)
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Note: “Any chronic condition” indicates at least one of the above diagnoses or overweight/obesity ($BMI \geq 85$ th percentile).

ANALYSIS AND RESULTS

The final sample included 500 children of labor migrants (mean age 12.5 years, 50% male). Table 1 summarizes participant characteristics. About 60% of children lived in rural districts. Sixty percent of children had one parent currently abroad and 40% had both parents abroad. Over half of households reported income below the national median. The mean psychosocial stress score was 16.2 (SD 5.4) on the 0–30 scale, with 45% of children classified as having high stress (CPSI > median).

As shown in Table 2, 30% of children had at least one chronic health condition. Asthma was present in 10% of the sample, type 1 diabetes in 3%, hypertension in 5%, and diagnosed anxiety/depression in 12%. Notably, 17% of children were classified as overweight or obese. Among those with any chronic condition ($n=150$), obesity was the most common, followed by asthma and anxiety/depression.

In unadjusted analyses, children with chronic conditions had significantly higher mean stress scores (18.3 vs. 15.6, $p<0.001$) and were more likely to have both parents abroad (47% vs. 37%, $p=0.02$) than children without chronic conditions. Age and sex distributions were similar between groups.

Logistic regression (Table 3) examined predictors of having any chronic condition. Higher psychosocial stress was a strong predictor: each one-point increase in the CPSI stress score was associated with 1.45 times higher odds of chronic disease (OR = 1.45; 95% CI: 1.30–1.62; $p<0.001$). In other words, children in the highest stress quartile had roughly double the odds of chronic illness compared to those in the lowest quartile. Having both parents abroad (vs. one parent) was also significantly associated with chronic conditions (OR = 1.50; 95% CI: 1.12–2.02; $p=0.008$). Greater age showed a modest effect (OR per year = 1.10; 95% CI: 1.01–1.20; $p=0.035$), reflecting higher NCD risk in older children. Female sex was not a significant predictor after adjustment (OR = 0.85; $p=0.35$). Household income (low vs. high) did not retain significance once stress was accounted for (OR = 1.25; 95% CI: 0.95–1.65; $p=0.10$), suggesting that psychosocial factors were more predictive than economic status in this sample.

Table 3. Logistic Regression Predicting Chronic Disease (Any Condition)

Predictor	OR	95% CI	p-value
Psychosocial stress (score)	1.45	1.30 – 1.62	<.001
Child’s age (per year)	1.10	1.01 – 1.20	.035
Female sex (vs. male)	0.85	0.60 – 1.21	.35
Both parents abroad	1.50	1.12 – 2.02	.008
Low household income	1.25	0.95 – 1.65	.10
(Intercept)	0.05	0.01 – 0.20	<.001

Note: OR = odds ratio from logistic regression. CI = confidence interval.

In summary, the hypothetical data indicate that psychosocial stress is independently and strongly associated with chronic disease risk in children of migrants. Even after adjusting for demographic factors, each incremental increase in stress score raised disease odds by ~45%. The effect of parental migration per se (both parents away) also contributed, but stress was the dominant predictor.

DISCUSSION

This study highlights a potentially important link between early-life psychosocial stress and chronic health conditions among children of labor migrants. The findings are consistent with the developmental origins framework: stressors in the family environment may program physiological systems and behaviors that increase susceptibility to disease [7]. In our sample, children experiencing higher levels of worry, sadness, or social pressure (as measured by the CPSI) had substantially higher odds of obesity, asthma, hypertension or mental health diagnoses. Notably, stress remained a key predictor even after accounting for age and socioeconomic status. This suggests that the emotional and behavioral burden of parental absence – rather than poverty alone – may be a critical pathway.

These results align with prior research. Miller et al. (2011) reviewed evidence that childhood adversity (including family separation) elevates long-term risk for cardiovascular and metabolic diseases [7]. They emphasize biological mechanisms such as chronic inflammation and HPA-axis dysregulation as consequences of early stress. In the present context, children of migrants may experience chronic activation of stress hormones due to disrupted attachment and caregiver changes, which could accelerate the development of obesity or insulin resistance. Indeed, our pattern of findings (stress linking to obesity and even early hypertension) mirrors large-scale cohort data showing that adolescent stress predicts higher blood pressure and obesity in young adulthood [1].

The psychosocial literature on left-behind children also provides context. The increased responsibilities and insecurity faced by these children likely elevate chronic stress. Our result that “both parents away” increases disease odds supports the idea that greater parental absence intensifies stress (as UNICEF and other studies suggest [4]). For example, in Uzbekistan children with an absent father reported more frequent mood disturbances and elevated stress levels [4]. Wen and Lin (2012) found that Chinese children left behind by either parent exhibited more depression and low self-esteem [4]. These psychosocial symptoms are in turn linked to health behaviors (e.g. comfort eating) and physiological strain, plausibly explaining the higher rates of obesity and other conditions we observed.

Importantly, our findings indicate that psychosocial interventions may be needed alongside traditional health programs. In Central Asia, public health efforts have focused on infectious diseases and more recently on obesity, but seldom on the mental/emotional aspects of child health in migrant contexts. The data suggest that screening for stress or mood problems in pediatric clinics could identify children at risk of NCDs. Schools and community centers in migrant-sending areas might implement counseling or peer-support for left-behind youth. At the policy level, strengthening social protection (e.g. formal guardianship of left-behind children, educational support, and counseling) could mitigate stress. UNICEF’s recommendations for Uzbekistan already emphasize formalizing care and psychosocial

support for these children [4]. Our results reinforce that ensuring emotional well-being is not only a child protection issue but also a preventive health measure.

Limitations. This analysis was based on a hypothetical cross-sectional design and self-reported health diagnoses, so causality cannot be confirmed. In reality, validating medical conditions and stress scales would be needed. Also, unmeasured factors (e.g. child's nutrition, physical activity, or genetic predisposition) could influence chronic disease prevalence. Nevertheless, the strong association between stress and disease in our model is notable. Future longitudinal research in Central Asian populations should track health over time to establish temporal relationships.

CONCLUSIONS AND RECOMMENDATIONS

Children left behind by migrant parents in Central Asia face multiple stressors that may predispose them to chronic health problems. The present analysis suggests that psychosocial stress – stemming from parental absence, increased responsibilities, and unstable care – is a significant risk factor for childhood chronic conditions such as obesity, asthma, and hypertension. These findings have several implications:

For Policymakers: Recognize the hidden health costs of labor migration. Develop national strategies to support left-behind children (for example, formal guardianship arrangements and caregiver training). Allocate resources for school- and community-based psychosocial programs in high-migration regions.

For Public Health Authorities: Integrate mental health screening into child and adolescent health services. Train primary care providers to ask about family migration and stress, and to provide referrals or counseling. Include questions on parental migration and stress in child health surveillance.

For Educators and NGOs: Provide psychosocial support in schools. Establish mentoring or peer-support networks where children can share experiences of parental absence. Offer stress management workshops and emotional literacy programs tailored for migrant families.

For Families: Encourage regular communication between migrating parents and children (via phone or video). Maintain stable caregiving arrangements and minimize changes in residence. Educate caregivers (grandparents, aunts/uncles) about the importance of emotional support for these children.

In conclusion, addressing psychosocial stress in children of labor migrants should be a priority alongside traditional health initiatives. By mitigating stress and strengthening support systems, Central Asian countries can protect the health of this vulnerable population and prevent the downstream burden of chronic diseases.

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