Prevalence and predictors of mental health among farmworkers in Southeastern Anatolia of Turkey

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Abstract—

Background: Mental health problems represent a major component of the global burden of disease. The primary objective of this study was to assess the prevalence and predictors of psychological wellbeing among farmworkers and to evaluate their mental health services need for in rural primary health care settings.

Methods: The study sample comprised 1855 farmworkers (918 women, and 937 men) who were selected using probability cluster sampling method at 95% confidence interval (87.6 % response rate). The 12-item General Health Questionnaire (GHQ-12) and socio-demographic information form were used to data collection.

Results: The overall prevalence of mental health problems was 31.5%; the prevalence among women was 1.4 times that of men (35%, females; 28.2%, males). Logistic regression analyses revealed that poor general health, as well as presence of chronic diseases and exposure to traumatic life events predicted mental ill health among both sex. Poor economic situation, being seasonal migrant farmworker, and pesticide exposure history affected male mental health problems; while type of settlement, history of having disabled child at birth, and not having a family physician were significant predictors of female mental ill health (P < 0.05).

Conclusions: These findings highlight the need for systematic development of community-based mental health services in conjunction with rural primary health care center and an integrated approach to health care of farmworkers. These include screening, early identification and treatment of mental health problems, development of non-communicable disease (NCD) control program, maternal health services and urgent measures to improve farmworkers' work safety and pesticide applications.

Key words: Farmworkers, Psychological health, Predictors, General Health Questionnaire -12.

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I. INTRODUCTION

Untreated mental disorders are widely recognized as a major contributor (13%) to the global burden of disease worldwide.[1,2] According to the World Health Organization (WHO) estimates nearly 25% of individuals develop one or more mental or behavioral disorders at some stage in their life, and one-third of all years lived with disability worldwide can be attributed to neuropsychiatric conditions.[3] The determinants of mental health are now recognized to include not only individual attributes, but social, cultural, economic, political and environmental factors such as living standards, working conditions, and social protection.[1]

The International Labor Organization (ILO) states that agriculture is the second largest employment field in the world, with a total employment rate of about 32%, and the regional distribution of this rate is as follows: Sub-Saharan Africa 59%, South Asia 53.5%, Southeast Asia and Pacific 44.3%, East Asia 36.9%, North Africa 27.8%, Southeast Europe 20.2%, Latin America 16.3%, and developed economies and the European Union 3.7%.[4] It is known that Turkey is in a similar situation

with the rest of the world, where according to the 2013 data of the Turkish Statistics Institution (TurkStat), agriculture ranks second in terms of employment, and approximately 24.7% of workers are employed in agriculture.[5]

Turkey's Southestern Anatolia Region (SAR) including the nine administrative provinces of Adiyaman, Batman, Diyarbakir, Gaziantep, Kilis, Mardin, Siirt, Sanliurfa and Sirnak covers the lower Euphrates and Tigris river system also kown as upper Masopotamia. While the surface area of the region is 9.7% of Turkey, the irrigable land in Southeastern Anatolia constitutes 20% of the total region. Agriculture has the biggest share in public investments comprising 54.2%; it is expected that this expenditure will increase the employment rate by 58% in agriculture.[6]

Agriculture preserves its importance in the world in terms of meeting food needs, providing input to industries, exports, and employment opportunities. The agricultural sector demonstrates differences compared to other sectors due to health issues and their causes arising from factors such as family members working together, work in the open field, an individual conducting more than one job at a time, dependence upon working times and periods based on seasonal or climatic conditions, and agricultural fields being located outside of urban areas. Depending upon the working environment and method of work, agricultural families frequently encounter health issues in terms of injuries, diseases, and premature mortality.[7-9] Along with physical health issues, there are also high mental and behavioral disorders, and child neglect/abuse, growth deficiency and congenital anomalies due to pesticides in agriculture have been reported.[7,10-16]

In the limited amount of research that has been conducted, it has been found that 1 in five farmworkers have a history of major psychiatric disorder.[17] Research from the Midwesttern United States suggests that 20%-40% of farmworkers have elevated symptoms of poor mental health. Stressors that cause these mental health issues include: separation from family; work demands; housing issues; income; language; and isolation, among others.[15] The overall objective of the WHO Mental Health Action Plan is to promote mental well being, prevent mental disorders, provide care, enhance recovery, and reduce morbidity and mortality among persons with mental health problems.[1] In pursuit of these goals, evidence-based research on risk and protective factors, and vulnerable populations ought to be done in every culture and community. The aims of the present study were: (i) to describe the prevalence of mental health problems in farmworkers in Southeastern Anatolia, (ii) to examine the risk factors and (iii) to determine their mental health needs.

II.   METHODS

In this cross sectional study, mental health outcomes from the representative multipurpose cross-sectional research data of the Southeastern Anatolian Project (Guneydogu Anadolu Projesi) GAP Agricultural Health Survey (2013), conducted by the authors in collaboration with the Harran University Scientific Research Council and the GAP Regional Development Administration, were analyzed. This survey was approved by the ethics committee of the Faculty of Medicine at Harran University. The Turkish Statistics Institution (TurkStat) data was used to calculate the optimum sample size using a 95% confidence level, and the selected households were chosen using the probability proportional to size method. The cluster size was identified as 10 households working in agriculture. If there was more than one women and men in a household, one of them was randomly enrolled in the study using the Kish person selection method. Working in agriculture and animal husbandry was determined in 1071 eligible homes. The study was successfully conducted in 1071 households; the response rate was 87%.

During home visits, the aim of the study was explained to the participants and informed consent was obtained from each participant by trained Turkish, Kurdish and Arabic field staff. Data were collected during a face-to-face interview using a structured questionnaire that included sociodemographic information, and the 12-item General Health Questionnaire (GHQ-12). After the study period all patients diagnosed with any mental disorders were directed to Harran University Faculty of Medicine Department of Psychiatry or their family physcian for their treatment and follow-up.

III. MEASURES

3.1 Dependent Variable

The 12-item General Health Questionnaire (GHQ-12) is a self-report measure intended to detect mental disorders in community and non-psychiatric settings. It has been shown to be a valid and reliable instrument across cultures and widely used in population surveys. It is a well recognized as a screening inventory for assessment of non-psychotic mental disorders that include anxiety and depression spectrum. The GHQ-12 items include questions on mood, emotions, self-worth and worries during the previous four weeks. The response alternatives are: "Better than usual", "Same as usual", "Worse than usual" and "Much worse than usual". The most common scoring method is bi-modal (0-0-1-1) with responses summed up following a standard procedure. The total score ranges from 0–12. Validation studies recommend a cut-off point score 2 indicating common mental disorders. The GHQ inventory has shown to have high reliability and predictive validity against standardised clinical interviews. The 12-item version of the questionnaire among Turkish primary care attenders, focusing mainly on the factor structures was found to be reliable and validity in Turkey.19,20

3.2 Independent Variables

Demographic variables considered in this study were sex, age, size of household, educational attainment (illiterate/less than primary; primary, and secondary or higher), dominant language (Turkish, Kurdish and Arabic), type of work (seasonal migratory worker and works own farm), years in agriculture, pesticide applicator, type of settlement (city center, rural areas such as small town or village), having chronic diseases. General health status, and economic situation were constructed as dichotomous variables based on whether the farmworker described his/her health/economic situation as fair or poor compared with those who reported as good or excellent. We asked about trauma experiences (e.g., accident, losses, economic difficulties), and suicidal intent in the 12 month period prior to the interview. Two questions were related with reproduction such as delivered baby with birth defects, and loss of pregnancy. On the other hand, two questions were paused to male farmworkers to determine pesticide exposure including 'Have you ever applied pesticides? Have you got any health complaints after application'. All independent variables were treated as categorical data, and therefore entered in the analysis as sets of dummy variables.

IV. DATA ANALYSIS

Data were analysed using the SPSS statistical package. Bivariate analyses were used to begin to examine relationships between risk factors and mental health outcomes. The statistical differences between percentages were examined with the chi-square test. Predictive factors were included in the subsequent models if they were significantly associated at the $P < 0.05$ level with any outcome variable in the bivariate analysis. Logistic regression model of outcome were estimated to determine independent associations of these risk factors with the mental health problems and for controlling confounders. Statistical significance is defined as a P-value of 0.05 or lower; logistic regression models present 95% confidence intervals.

V. RESULTS

5.1 Characteristics of sample

A total of 918 reproductive-aged female and 937 males farmworkers aged between 18 and 55 were enrolled in this study (total 1855 persons). The mean age of participants was 36.5 ± 9.7 years and the average number of household members was 8.12 ± 0.12. Descriptive information about the variables among women is presented in the first column of Table 1. Most women farmworkers had no or little formal education; 30% reported having 5 years of education or higher. Among all farmworkers studied, 74% reported that they were experienced about 7 or more years working in agriculture. The majority (72.1%) reported Kurdish as their dominant language, and most (78.6%) were from Southeast Anatolian Region (SAR) underdeveloped provinces. About 32% were seasonal migratory farmworkers, and 39% of participants reported that they had a fair or poor economic condition. Half of them rated their health as poor or fair, about 20% reported that didn't know their family physician, 39% reported having a chronic illness, and more than 1 in 10 reported having a disabled child at birth. Previous trauma events experienced by 53.6% of the women included loss of a family member, having illness or injury with children or a family member, illness of animals, and agricultural products sold cheaply.

TABLE 1
DISTRIBUTION OF INDEPENDENT VARIABLES AND BIVARIATE ASSOCIATIONS WITH MENTAL HEALTH OUTCOMES AMONG FARMWORKER WOMEN OF REPRODUCTIVE AGE (N=918): GAP REGION AGRICULTURAL HEALTH SURVEY, 2013

	% (No)	GHQ%	χ^2 P value
Age group			
Less than 24	13.1 (133)	42.0	3.143
25-34	32.4 (299)	32.5	0.208
35 years and older	54.4 (465)	35.1	
Type of settlement			
Large city	12.2 (112)	51.8	18.762
Town	36.3 (333)	36.0	**0.001**
Village	51.5 (473)	30.2	
Educational attainment			
Illiterate or less than primary	70.0 (643)	36.1	1.170
Primary or higher	30.0 (275)	32.4	0.279
Economic situation			
Farmworkers describe as fair/poor	38.8 (356)	39.0	4.252
Farmworkers describe as good	61.2 (562)	32.4	**0.039**
Development of province			
Developed	21.4 (196)	31.6	1.219
Underdeveloped	78.6 (722)	35.9	0.270
Household size			
Less than 7 person	49.1 (451)	34.1	0.263
8 or more	50.9 (467)	35.8	0.608
Dominant language			
Turkish	16.3 (149)	32.2	1.527
Arabic	11.6 (106)	31.1	0.466
Kurdish	72.1 (660)	36.1	
Working type			
Family worker in own farm	68.2 (626)	34.5	0.185
Seasonal migratory worker	31.8 (292)	36.0	0.667
Years in agriculture			
Less than 6 years	25.7 (236)	35.6	0.055
7 or more years	74.3 (682)	34.8	0.815
General health perception			
Farmworkers describe as poor	22.1 (201)	44.3	
Farmworkers describe as fair	27.9 (254)	36.3	13.169
Farmworkers describe as good	47.3 (430)	30.0	**0.004**
Farmworkers describe as excellent	2.7 (25	28.0	
Disabled childbirth			
Yes	12.7 (117)	46.2	7.379
No	87.3 (801)	33.1	**0.007**
Abortion			
Yes	38.5 (353)	38.5	3.596
No	61.5 (565)	32.7	**0.047**
History of trauma in the last year			
Yes	53.6 (492)	43.9	37.222
No	46.4 (426)	24.6	**0.001**
Being a family physician			
Yes	80.4 (738)	33.1	6.001
No	19.6 (180)	24.0	**0.014**
Having a chronic illness in the last year			
No	61.3 (563)	31.5	8.551
Having chronic illness	38.7 (355)	40.6	**0.014**

* OR was calculated if P <0.05

As shown in Table 2 among male farmworkers, rate of seasonal agricultural worker, having a family physician, having a chronic illness, years of work in agriculture, dominant language, and economic situation were similar with female farmworkers. In terms of education level, 33.4% of male farmworkers were illiterate or had no primary education, and had

17% had secondary or higher education. About 34% rated their health as a poor or fair, and 36.1% reported exposed pesticides.

TABLE 2
DISTRIBUTION OF INDEPENDENT VARIABLES AND BIVARIATE ASSOCIATIONS WITH MENTAL HEALTH OUTCOMES AMONG FARMWORKER MEN (N=937): GAP REGION AGRICULTURAL HEALTH SURVEY,2013

	% (No)	GHQ %	χ^2 P value
Age group			
Less than 24	22.0 (206)	28.2	
25-34	30.1 (282)	26.2	0.853
35 years and older	47.9 (449)	29.4	0.653
Type of settlement			
Large city	10.8 (101)	28.7	
Town	36.2 (339)	29.2	0.353
Village	53.0 (497)	27.4	0.838
Educational attainment			
İlliterate or less than primary	34.6 (323)	33.4	
Primary	65.4 (448)	25.4	7.829
Secondary or more	17.4 (162)	22.2	**0.020**
Economic situation			
Farmworkers describe as fair/poor	38.7 (358)	34.9	13.490
Farmworkers describe as good	61.3 (567)	23.8	**0.001**
Development of province			
Developed	23.2 (217)	16.6	18.730
Underdeveloped	34.7 (720)	31.7	**0.001**
Household size			
Less than 7 person	51.5 (483)	29.4	0.739
8 or more	48.5 (454)	26.9	0.390
Dominant language			
Turkish	18.0 (167)	18.1	
Arabic	11.1 (103)	28.9	11.875
Kurdish	71.0 (660)	35.9	**0.003**
Working type			
Family worker in own farm	67.7 (618)	26.4	3.999
Seasonal migratory worker	32.3 (319)	32.1	**0.04**
Years in agriculture			
Less than 6 years	17.4 (163)	34.4	3.725
7 or more years	82.6 (774)	26.9	**0.035**
General health perception			
Farmworkers describe as poor	11.5 (106)	50.0	
Farmworkers describe as fair	22.0 (203)	31.0	33.997
Farmworkers describe as good	60.6 (558)	23.7	**0.001**
Farmworkers describe as excellent	5.9 (54)	18.5	
Being a family physician			
Yes	81.0 (759)	28.6	3.518
No	19.0 (178)	26.4	0.318
Pesticide exposure			
Exposed	36.1 (206)	31.6	5.600
Unexposed	63.9 (364)	22.5	**0.018**
Having a chronic illness in the last			
No	44.9 (421)	19.6	22.178
Having chronic illness	37.7 (353)	36.8	**0.001**

* OR was calculated if P <0.05

5.2 Bivariate Anayses

In this sample the prevalance of mental health problem was 31.5% (men=28.2%, women=35%); the difference was significant (OR, 95% CI=1.4 (1.1-1.7). Bivariate anaysis are presented according to sex in Tables 1 and 2. The frequency of mental health problems among women was significantly different according to the type of residence/settlement, economic situation, having a family physician, perception of general health, presence of chronic illness, and having a disabled child at

birth, loss of pregnancy, and history of previous trauma. The frequency of mental problems among men were significantly different by educational attainment, economic situation, living an underdeveloped provinces, dominant language, working type, years worked in agriculture, perception of general health, having chronic illness and pesticide exposure (P < 0.05). There were no significant differences according to age and household size in both sexes (P > 0.05). The prevalence of any suicidal ideation in the last year was 3.4% among women and 1.7% among men.

5.3   Multivarate analyses

In a logistic regression analysis with forced entry of all variables, those variables that showed significant relations in bivaritae analyses were further examined. Results of logistic regression analyses are depicted in Table 3.

TABLE 3
RESULTS FROM MULTIVARIATE LOGISTIC REGRESSION OF MENTAL HEALTH

Independent Variables	Men				Women			
	Coefficient	Standard Error	P value	Odds Ratio (95% CI)	Coefficient	Standard Error	P value	Odds Ratio (95% CI)
Intercept	-2.74	0.49	<0.0001		-1.81	0.360	<0.0001	
Educational attainment								
İlliterate or less than primary vs primary or more	0.12	0.310	0.708	1.1 (0.6-2.1)			NA	
Economic situation								
Farmworkers describe economic situation as fair/poor vs good	0.54	0.16	0.001	**1.7 (1.2-2.4)**	0.14	0.152	0.351	1.2 (0.8-1.6)
Development of province								
Underdeveloped vs developed provinces for men City center vs village or small town for women	0.21	0.44	0.638	1.2 (0.5-2.9)	0.71	0.214	0.001	**2.0 (1.3-3.1)**
Dominant language								
Kurdish and Arabic vs Turkish	-0.19	0.47	0.686	0.8 (0.3-2.1)				
Working type								
Seasonal migratory worker vs family worker in own farm	0.34	0.17	0.043	**1.4 (1.1-1.9)**			NA	
Years in agriculture								
Less than 6 years vs 7 or more	0.52	0.46	0.263	1.6 (0.6-4.1)			NA	
Pesticide exposure								
Unexposed vs exposed	0.62	0.29	0.019	**1.8 (1.1-3.2)**			NA	
General health perception								
Farmworkers describe as poor/fair vs good or excellent	0.73	0.28	0.010	**2.1 (1.2-3.7)**	0.32	0.17	0.71	**1.4 (1.1-1.9)**
Chronic illness								
Having chronic illness vs not	1.08	0.33	0.003	**2.9 (1.4-6.0)**	0.28	0.154	0.046	**1.3 (1.1-1.8)**
History of trauma in the last year								
Having a traumatic event vs not	0.48	0.120	0.001	**1.7 (1.2-2.3)**	0.78	0.150	0.001	**2.1 (1.6-2.9)**
Loss of pregnancy								
Abortion vs normal pregnancy			NA		0.14	0.150	0.342	1.1 (0.8-1.5)
Disabled childbirth								
Disabled chilbirth vs healthy baby			NA		0.67	0.211	0.001	**1.9 (1.3-3.0)**
Being a family physician								
Not being family physcian vs have			NA		0.41	0.177	0.021	**1.5 (1.1-2.1)**

In multivariate analyses, men and women farmworkers who experienced previous trauma, chronic illness, or perceived their general health as poor or fair were more likely to suffer from mental health problems than those who did not, with odds ratios of 1.7, 2.9, 2.1 in men, and 2.1, 1.3, and 1.4 in women, respectively. The odds of poor mental health among male farmworkers with fair or poor economic situation was 1.7 times higher compared to those with good economic situation. Seasonal migratory male farmworker had a higher mental health problems than family farmworkers (OR=1.4; 95%CI=1.1-1.9). The odds of poor mental health were almost 2 times higher for male farmworkers who were exposed to or applied pesticides compared to thise who were unexposed. Women who reported living city center residence had 2 times higher poor mental health compared to those resideding in small town or village settlements. Having a disabled child at birth increased the likelihood of mental health problems (OR=1.9; 95%CI=1.3-3.0). Female farmworkers who reported not having a family physician had 1.5 times higher mental health problems than those who reported having a family physician. Educational level, dominant language at home, years of work in agriculture, and pregnancy miscarriage were not significant in the regression analyses.

VI. DISCUSSION

The results of this large scale community-based study of an ethnically diverse agricultural population contribute to the literature in several ways. First, the prevalence of mental health problems among female farmworkers was 1.4 times more common than among male farmworkers. This finding is consistent with a universal picture of gender disparity in mental health that shows that women are more likely than men to be adversely affected by mental disorders: female to male sex ratio ranging from 1.6 to 2.6.21-25 Since gender is a measure of both biological/genetic as well as social/cultural differences, it is likely that the health inequalities between men and women reflect both sets of factors as well as an interplay between them.25-27 This is not surprising, given that social and economic disadvantages experienced by many women in both high income as well as low and middle income countries with higher rates of high anxiety and depression than that reported among men.27 The study results need to be interpreted in the context of the Southwestern Anatolia Region (SAR) today, where there is still a feudal ideology that assigns the central role to the male. Therefore gender inquality is paramount, blood ties are highly valued, and a tribal system is often the operant power hierarchy. Consanguineous marriages (50%-63.6%) and adolescent marriages (45%-98.5%) are still common.28

Second, the finding of suicidal ideation in the last year being 2.0 times more common in women than men is highly disturbing. This observation supports previous research results that women ought to be considered to be a priority risk group for suicide attempt.29-30 The promotion of gender inequality needs therefore to be taken into consideration when designing preventive strategies. In the age group of 15-49 years, attention to mental illness and evaluations of previous histories of suicide attempts ought to become a regular part of women's health screening and counselling services, which are primarily the responsibility of family physicians.

Third, in this study a significant predictor was pesticide exposure. Research to date has shown that long-term pesticide exposure may indeed cause permanent neurological deficits such as peripheral neuropathy or deficits in motor skills, memory, and depression.31-33 In addition, prolonged standing and bending, overexertion, dehydration, poor nutrition, and pesticide or chemical exposures contribute to an increased risk of spontaneous abortion, premature delivery, fetal malformations, and as well as intrauterine growth retardation. In this study, having a disabled child at birth compounded the mental health problems among women approximately 1.9 times.34,35 Indeed, the infant mortality rate among agricultural families has been estimated to be twice the regional average, and 17.6% of women delivered children with intellectual disabilities/intellectual developmental disorders.36

Fourth, migrant seasonal agricultural workers face numerous sources of stress, including job uncertainty, poverty, social and geographic isolation, intense time pressures, poor housing conditions, intergenerational conflicts, separation from family, lack of recreation, and health and safety concerns. Like other studies, high rates of mental health problems in seasonal migrant men worker were determined compared with non-migrant.37,38

Finally, another risk factor for women was living in an urban area. Urban residents have been considered as more vulnerable to mental problems than rural ones.38,39 There are other data suggesting that socio-demographic factors are better predictors than location of residence. Therefore the integration of mental health services into the general health services provided in urban and rural areas based on the socio-demographic characteristics of population is a matter of great importance. Similarly, numerous studies show that people exposed to traumatic life events, poverty and having a chronic illness are at greater risk of psychological distress and psychiatric disorders.39,40

The results of the present study should be interpreted in the light of a number of limitations. First, as this study involved a cross-sectional household interview survey, it may be impossible to draw conclusions about the nature of the putative causal relationship between mental health problems and noted physical, chemical and psychosocial variables. Second, the GHQ-12 involves a dimensional assessment of anxiety-depression related items. Despite the limitation in the design of this study however, the results of this study has immediate practical implications for improvement of the assessment and intervention conditions for farmworkers who have experienced a range of deprivation experiences. The identification of risk and protective factors regarding the mental health in community settings can directly assist health professionals in identifying essential interventions and setting priorities. Secondly, additional analytic epidemiological research is needed to replicate these findings and to investigate the potential underlying mechanisms that explain the differential association of poor mental health and predictive variables.

In conclusion, despite methodological problems, this study showed that there is an urgent need to develop some intervention programs, reducing risk factors and strengthening protective factors, to control adverse mental health problems in the SAR region. These include: i-surveillance system enhancement to gather and analyse data to define and monitor high risk groups; ii- mental health promotion activities for strengthening health systems by improving undergraduate and in-service training programmes for primary healthcare and emergency department staff to enhance detection and management of mental disorders, and to integrate mental health screening into the primary healthcare services monitoring program such as 15-49 years monitoring program, antenatal care, and chronical illnes monitoring program; iii- community empowerment programmes by increasing mental health education of people using new strategy such as peer education, mental health leadership; iv-improving intersectoral actions with social services to control family social problems, and to improve pesticide control program for reduce mental disorders.

KEY POINTS

- Mental health is an initiative primarily for underserved populations based on their specific needs.

- This study shows that the prevalence of mental health problems was higher in seasonal farmworkers, pesticide applicators, and those with disabled children among farmworkers.

- This study shows that comprehensive community-based rural mental health services integrated to the primary healthcare services including control of chronic diseases, reproductive health services and pesticide control program could reduce mental health problems.

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