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A Call to Action: Overcoming Health Inequality; Comparative Health Indicators and Service Needs of Seasonal Agricultural Migratory Families in Turkey

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Abstract

Background: In order to reduce regional health inequality, it is necessary to identify risk groups and develop need-appropriate services. The objective of this study was to develop evidence-based recommendations by calculating comparative health indicators in light of the Millennium Development Goals (MDGs) for seasonal agricultural migratory families (SAMFs) in Turkey.

Materials and methods: In this study, we conducted a cross-sectional survey using the probability cluster sampling method in 1021 selected households, and focus groups. The response rate was 85.2%. Fundamental socio-demographic and health indicators were calculated and compared with the national indicators using secondary data.

Results: While the median age for the SAMFs was 18 years, it was approximately 30 years for the general population of Turkey. Of the SAMFs, 72.1% of female seasonal agricultural workers aged 15–49 did not graduate from primary school phase one, while this ratio was 16.9% for Turkey in general; 58.2% of the SAMFs were under the absolute poverty threshold; and 32.9% had access to safe drinking water, while no hygienic toilets were available in the agricultural fields. Maternal-infant health and general mortality and morbidity rates were at least 3.5 times higher in SAMFs than in the general population of Turkey.

Conclusion: Our findings show that SAMFs are at high risk with respect to diseases and premature mortality, and it is necessary to develop sustainable public health programs in order to achieve the MDGs, enhance individual and community empowerment, and strengthen the health system.

Keywords: Seasonal agricultural migratory families, health inequality, health indicators

Background

A society's health level is determined by biological factors (*age, gender, genetics, and nutrition*); physical environmental factors (*air, water, housing conditions, exposure to chemicals, noise, public safety, and solid waste*); social and cultural determinants (*socioeconomic status, education, early childhood experiences, lifestyle, child raising norms, unemployment, social aid, social exclusion, and social control*); working environment; services including health, education, and social services; and by the existence of/access to their quality of public health services, food, and transportation policies [1,2]. In relation to the aforementioned factors, differences in health status arise between countries, regions, and within regions.

It is well known that working environments have a direct effect on

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lifestyle, and the relationship between lifestyle and premature mortality and morbidity. The International Labor Organization (ILO) states that agriculture is the second largest employment field in the world, with a total employment rate of 35%, and the regional distribution 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% [3]. When extreme poverty and hunger (Goal 1), infant mortality (Goal 4), improvement of maternal health (Goal 5), communicable diseases (Goal 6), and sustainable environments (Goal 8) are evaluated with respect to the Millennium Development Goals (MDGs), it is seen that these goals have not yet been achieved in regions where agricultural production is high, with Sub-Saharan Africa being the foremost. When evaluated in terms of fundamental sanitation, the literature states that a population of 2.5 billion does not have access to improved sanitation requirements, such as safe water and the sanitary dispatch of feces, and this is 5 times higher in rural areas [4].

It is known that Turkey is in a similar situation as the rest of the world, where according to the 2012 data of the Turkish Statistics Institution (TurkStat), agriculture ranks second in terms of employment, and approximately 24% of workers are employed in agriculture [5]. 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, working in open areas, individuals conducting more than one job at a time, dependence on working times and periods based on seasonal or climatic conditions, and agricultural fields being located outside of urban areas. Depending on the working environment and method of work, women, children, the elderly, and seasonal agricultural migratory families (SAMFs) are identified as special risk groups in terms of injuries, diseases, and premature mortality in agricultural societies [6–9]. Vaccine coverage is low, malnutrition is frequently high, developmental deficiencies are frequent, and parasitic diseases and anemia are high

in the children of these SAMFs. Along with physical health issues, there are also high are emotional and behavioral disorders, oral and dental health issues, and child neglect and abuse [10–19]. Within the limited amount of research conducted, we find that prenatal and postnatal care is insufficient, and involuntary miscarriage, stillbirth, and adolescent pregnancy frequencies are high. Additionally, infertility, menstrual irregularity, miscarriage, stillbirth, premature birth, low birth weight, maternal and neonatal tetanus, growth deficiency and congenital anomalies due to pesticides used in agriculture have been reported [17,20–22].

However, in the aforementioned research, there are no calculations of the health indicators compared with the nation, so the inequality size and dimensions are unknown. In order to reduce regional health inequalities, it is necessary to identify risk groups and their needs, and improve need-appropriate services. In this study, the aim was to shed light on how to improve the health of this group by identifying the features of seasonal agricultural labor migration, the needs of families, health services, and reproduction health issues in terms of the fundamental MDG indicators.

Methods

The Ethics Committee of the Faculty of Medicine at Harran University approved this study. In this research, we conducted research cross-sectionally through mixed-methods including quantitative and qualitative data collection. As the first step, a community-based household survey was conducted to calculate health indicators. The sample frame was created using the list of geographical districts where seasonal agricultural workers (SAMFs) lived by collaboration with Municipalities and other governmental agencies. The sample size was calculated as 1200 (95% confidence level, 4.4% confidence interval) households using the Probability Proportional to Size sampling method by TurkStat. A cluster size of 24 households in 50 different clusters was calculated. In every location, the address of 100 houses were given using the National Address-Based Population Registration System, and trained field workers visited all of the houses, and listed the seasonal agricultural worker families in the last 12 months, and who live in the provincial centers of Adiyaman and Şanlıurfa. The houses were numbered and 24 were randomly selected. If there was more than one woman or man

in a house, 1 women and 1 man were enrolled using the person selection method. Completion of the quantitative section included 1021 of the 1200 households, and information was collected on the 7165 individuals living in those households (response rate of 85.2%).

In order to determine the families' sociodemographic characteristics, migration data, problems encountered in places of work, fertility, mortality, access to services, and knowledge level on reproductive health, 3 separate questionnaires were prepared: Household Questionnaire, Women's Questionnaire, and Men's Questionnaire. When preparing the questionnaires, we utilized the Turkish Demographic and Health Survey, and Turkish Youth Sexual and Reproductive Health Survey questionnaires. The researchers also developed some questions, and conducted a pilot study for the test questions. The interviewers conducted face-to-face interviews to fill out the questionnaires, as the majority of the interviewees had no reading or writing skills. A selection of 40 interviewers who spoke Arabic or Kurdish were identified for data collection, and after receiving theoretical and applied training for 5 days, a field study was completed over 2 months, in 2011. We used the Statistical Package for Social Sciences version 11.5 for data entry and analysis.

We used secondary data for comparisons, including that of the TurkStat 2011 Address-Based Population Registration System Results, 2010 Mortality Statistics, Household Budget Survey, Family Structure Survey, 2008 Turkish Population and Health Survey, 2007 Turkish Sexual Health and Reproduction Health Survey, 2006 Turkey National Maternal Mortality Survey, and 2008 Global Tobacco Survey.

To obtain qualitative data for in-depth information and to understand and explain the meaning, beliefs, and cultures that influence the behaviors for strategy development for SAMFs, focus group meetings were held with 4 different groups. These groups were seasonal agricultural workers including women and men, aged above 15 years; agricultural envoys that legally regulated the relations between workers and employers; and primary health care workers. We developed a semi-structured interview to elicit perceptions about living conditions, reproductive health care experiences, and access to health care services and barriers. Recruited were 15 female and 15 male

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agricultural workers from different houses, 10 agricultural envoys, and 15 primary health care physicians. Interviews with the SAMFs were conducted in their native language at locations convenient for the study groups. Questions were asked in an interactive group setting where participants were free to talk with other group members. Each group interview lasted approximately 2–3 h, based on the complexity of the number of questions and characteristics of the participants. The interviews were tape-recorded and transcribed verbatim. We presented the results of the focus-group interviews in uncomplicated ways using lay terminology supported by quotation sentences often expressed by the participants, as suggested by Rabiee [23].

Results

Demographic and social characteristics of SAMFs

A total of 7165 SAMFs were enrolled in this study. Table 1 represents the general distribution of the sex, age groups, and education attainment with respect to public health services, where 49.7% of SAMFs were female, 53.4% of the population was illiterate, and 9.2% of the study population was under 4 years old.

Table 1 Sex, age, and education attainment of the SAMFs

Characteristics	N	%
Sex		
Female	3562	49.7
Male	3603	50.3
Age groups		
0–9	1576	22.0
10–19	2453	34.2
20–29	1133	15.8
30–39	586	8.2
40–49	684	9.5
50–59	451	6.3
60–69	184	2.5
70+	103	1.4
Total	**7165**	**100.0**
Education attainment*		
Illiterate	3381	53.4
Primary school (5 years)	1153	18.2
Secondary school (8 years)	1036	16.4
High school (12 years and above)	760	12.0
Total	**6330**	**100.0**

*Calculated above 6 years old.

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When compared to Turkey in general, as shown in Table 2, the median age of the SAMFs was 18 years, while the median age was 30 years for Turkey in general during the same period. SAMFs had a higher number of children than that in Turkey in general, while the older population was lower. Among the SAMFs, while there were 1.6 times more of those under the age of 15, there were 3.3 times fewer of the older population. While the mean household size was 6.8 persons in the SAMFs, it was 3.8 persons in Turkey in general. The net schooling rate for primary education for females and males was lower than that in Turkey. When examined with respect to social health indicators, 72.1% of reproductive-aged women

Table 2 Demographic and social indicators of the SAMFs compared to Turkey in general

	Turkey	SAMFs
Demographic and social indicators		
Population below age 14 (%)	25.2[1]	40.4
Population above age 65 (%)	7.3[1]	2.2
Median age	29.7[1]	18.0
Median household size	3.8[2]	6.8
Registered population below age 5 (%)	93.7[2]	78.8
Net schooling rate for primary education of females (%)	98.6[2]	74.0
Net schooling rate for primary education of males (%)	98.2[2]	78.0
Illiterate women aged 15–49 years (%)	16.9[2]	72.1

[1]TurkStat Population Indicators 2011, [2]Turkish Demographic and Health Survey 2008.

either never attended school or received education for 4 years or less; this rate was about 4.3 times higher than that in Turkey in general.

Migration data and environmental/daily living conditions

In this study, 1021 families were working in agriculture in 48 different provinces in the past year alone, and 1 out of every 2 SAMFs stated that they had been agricultural workers since birth. The working timeframe of those who stated that they had been agricultural workers since birth was, on average, 15 years, and then 6 years for the others. Approximately 70% of families had only been to a single province; however, they worked in

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different agricultural fields within the same province.

As seen in Table 3, about 55 out of every 100 families found their jobs via agricultural envoys, while 45.1% reported that they found their own working areas and generally worked in the same places. April to September was the most common period for agricultural work; however, agricultural work took place in every month of the year. One out of every 5 families reported traveling by track. As shown in Table 3, only 32.9% of the families had access to safe drinking water in the fields. Approximately half of the SAMFs utilized open fields while working, where most shared closed-pit toilets. The majority (80.8%) reported that they lived in unprotected tents. The most consumed products by the families on a daily basis were bread, tea, wheat, and legumes. All of the families reported irregular meals and eating habits, and that they ate out of shared bowls. When asked what kind of problems they encountered in their work places, the majority reported the long and tiring work hours (89.6%), lack of bathroom/toilet facilities (76.7%), problems in accessing health services (66.8%), unsafe water (63.8%), childcare problems (64.4%), thermal stress (62.9%), nutritional problems (62.2%), lack of electricity (55.3%), and children school problems (53.5%).

Table 3 Migration data and environmental conditions in agricultural areas of the SAMFs

Characteristics	N	%
Who find work in agricultural areas		
Agricultural envoy	561	54.9
Themselves	277	27.2
Relatives/friends	183	17.9
Working months		
January-March	56	5.5
April-June	296	29.0
July-September	567	55.5
October-December	102	10.0
Type of transportation		
Bus	816	79.9
Truck	205	20.1
Access to safe water in agricultural areas		
Yes	329	32.9
No	692	67.2
Disposal of human feces in agricultural areas		

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Shared and lack improved sanitation toilet	437	42.8
Open defecation	303	29.7
Public toilet	204	20.0
Other	65	6.3
Unknown	12	1.2
Shelter type in agricultural areas		
Unprotected tent	819	80.8
Protected tent	6	0.6
Potting shed	14	1.4
House	182	17.2
Total	**1021**	**100.0**
Commonly consumed food in agricultural areas*		
Bread-tea	804	78.7
Grains-pulses	783	76.7
Vegetables	127	12.4
Meat and meat products	118	11.6
Milk-diary	32	3.1
Difficulties encountered in agricultural areas*		
Long and tiring work hours	915	89.6
Lack of bathroom-toilet facilities	783	76.7
Problems in accessing health services	681	66.8
Unsafe water	651	63.8
Childcare problems	658	64.4
Thermal stress	639	62.9
Nutritional problems	635	62.2
Lack of electricity	563	55.3
Children school problems	546	53.5

*Chose more than one.

The most frequent statements heard in the focus group meetings were, *'We are forced to leave aside all our human rights, because we are already in a place where we are distanced from rights; in the end, we go there for money, so money becomes only our purpose; we don't care about any of the discomforts'*

Legally, agricultural envoys' responsibilities in Turkey include providing safe transportation, payment of workers' wages, and organizing healthy living conditions in collaboration with local authorities. In focus group meetings conducted with the agricultural envoys, none seemed aware of the regulations on their responsibilities related to environmental and health facilities.

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Comparative health indicators according to the MDGs

Table 4 provides indicators with respect to population and health, with relevance to the MDGs, for Turkey in general and the SAMFs. As can be observed, there are no groups with daily earnings under US$1 for Turkey in general, but 3 out of every 5 families are under the poverty threshold. During the timeframe of the research conducted in this study, compared to Turkey in general, the crude death rate was 4.5 times higher, the infant mortality rate was approximately 3.5 times higher, the crude maternal mortality was 5.4 times higher, and stillbirth was approximately 5 times higher in the SAMFs.

Table 4 Health indicators of SAMFs compared to Turkey in general by MDG indicators

	Turkey	SAMFs
MDG 1: Eradicate extreme poverty and hunger		
Percentage of poor families (%)	0.0[3]	58.2
MDGs 4–5: Reduce child mortality, improve maternal health		
Consanguineous marriage (%)	20.0[4]	50.8
Infant mortality rate (‰)	17.0[2]	59.0
Maternal mortality ratio (per 100,000 live births)	28.5[6]	153.0
Crude birth rate (‰)	18.6[2]	39.5
Mean living children number	3.3[2]	6.4
Pregnancy women (%)	3.9[2]	13.8
Total fertility rate (%)	2.2[2]	4.9
Teenage mothers (%)	3.9[2]	7.2
Expected number of children: women aged 15–49	2.5[2]	4.5
No antenatal care (%)	7.8[2]	25.6
Delivery by health professional (%)	90.0[2]	72.8
Contraceptive knowledge: female (%)	99.8[2]	93.8
Any contraceptive methods usage: female (%)	73.0[2]	46.3
Stillbirth rate (‰)	4.0[2]	19.9
Mean age at first marriage: female	23.2[1]	18.3
Mean age at first marriage: male	26.5[1]	21.8
Smoking prevalence: female (%)	15.0[7]	15.0
Smoking prevalence: male (%)	49.0[7]	49.1
MDG 6: Prevention of communicable diseases		
Access to safe drinking water in the fields (%)	99.9[2]	32.9
Crude death rate (‰)	5.0[5]	22.6
Condom users (%)	14.3[3]	13.5
MDG 8: Develop a global partnership for development		
Number of computers per 100 households	49.0[3]	9.6
Internet access per 100 households	32.8[3]	2.6

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[1]TurkStat Population Indicators 2011, [2]TDHS 2008, [3]TurkStat Household Budget Survey, [4]TurkStat Family Structure Survey 2006, [5]TurkStat Mortality Statistics 2010, [6]Turkey National Maternal Mortality Survey 2006, [7]Global Tobacco Survey 2008.

When examined in terms of access to antenatal care, 3.3 times fewer female SAMFs received care, and 27.2% of these women gave birth without the assistance of health staff. The total fertility rate for the SAMFs was 2.2 times higher than in Turkey in general. Along these lines, we see that contraceptive use was 73% in Turkey in general, whereas this rate was 46% in the SAMFs. Consanguineous marriages occurred in approximately 51% of the SAMFs, while this figure was 20% in Turkey in general. Where only 1 out of 5 SAMFs have heard about HIV/AIDS, this figure was 9 out of 10 in Turkey in general. The mean Internet access per 100 households was 2.6 in terms of access to information. The 6th MDG aims at the prevention of communicable diseases, with HIV/AIDS being the foremost MDG. The SAMFs are underserved in terms of health knowledge and access to information.

When examined with respect to goals pertaining to infant mortality, maternal mortality, communicable diseases, and access to information, it is seen that each health indicator differentiated negatively between 2 and 9 times. Smoking was the only health indicator that did not show a significant variation, and for both population groups, 15% of women and 49% of men smoke.

Utilization of health services

Of the participants, 32.7% of the women and 16% of the men assessed their health as ‘poor’, and 32.5% of the women and 11.9% of the men stated that they did not show the necessary care for their health. As provided under Table 5, approximately 1 out of 5 individuals stated that they did not see a doctor while working in the field. Their reasons for not applying for health services were provided as follows: 22.3% due to financial issues, 33.6% due to their work load in the field, 18.5% due to the use of medicine brought from somewhere else, 12.3% due to ‘waiting to heal’, and 6.3% due to not owning a vehicle. Table 4 shows that 20.2% did not know their family physician and the majority of family physicians did not visit or call the families for preventive

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health services such as vaccination, antenatal care, or screening.

Table 5 Utilization of health services of the SAMFs in the last 12 months

Access to health services	N	%
No access	176	17.2
State hospital	756	74.1
Family health center	43	4.2
Private hospital	30	2.9
Others	16	1.6
Know their family physician		
Yes	815	79.8
No	206	20.2
Visit/calling by family physician for preventive services		
Yes	180	14.7
No	853	83.5
Unknown	18	1.8
Total	**1021**	**100.0**

Listed below are some frequently reported statements from the focus group meetings:

"For example, if I have a headache or I fall sick, I cannot go, there is no one holding you back, but we cannot go. For example, we do not have a car, and Konya is 80–90 km away, so when there is no car we cannot go" **(Single male, below the age of 24)**.

"We don't usually go. We go to the doctor when there is illness or pain. They used to call us, we had monthly vaccinations, they used to come to our home to vaccinate, but other than that, we don't go to the doctor for vaccination" **(Married women, above the age of 25)**.

"Sir, the problem starts with us. We do not value ourselves, and so no one else values us" **(Single male, below the age of 24)**.

"We live in disgrace, we stay in tents, work in fields, cannot go to hospitals. If dispensaries were close we could have gone; transportation is difficult" **(Married women, above the age of 25)**.

'They could not register at family specialists in the provinces in which they worked; women usually gave birth in the field, and since a birth report is required for issuing identity cards, and they cannot procure this report, they take their children to private doctors when they become ill if they have the money" **(Agricultural envoy, 38 year old)**.

In the focus group meetings conducted with family physicians, we observed that the family physicians' awareness was insufficient towards health issues encountered by the

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families, difficulties dependent on life conditions were encountered in the system, and that it would be beneficial to conduct training programs and studies to improve the system.

-*"For instance, during the first period of transition to being a family doctor, I don't even remember the patient; I had diagnosed her with pregnancy. I presumed the patient was pregnant; we only talked on the phone because she worked in Adana. Later, she went to Konya, the child was born, and I had the chance to see the child when it was 3 or 4 months old. Despite the patient being in conformity with follow-ups, she could not give birth in a hospital due to her working conditions. It is very hard to maintain contact since their telephone numbers change frequently"* ***(A family physician)***.

-*"When they leave to work, some of them register with another family specialist. When a new family specialist is appointed, that family specialist replaces the first; therefore, it is not possible for me to do a follow-up when the individual returns"* ***(A family physician)***.

Discussion

This study, which provides comparative health and socioeconomic indicators of SAMFs for Turkey based on the MDGs, is important for showing the health inequalities between groups.

Environmental and living conditions of the SAMFs

As is the case in many countries around the world, we found that the majority of families were crowded. They lived in unprotected tents near fields, where 67% had no access to safe drinking/daily-use water, and approximately 30% defecated in the open field and were deprived of hygienic toilets [6,11,18,19,24]. According to the 2008 United Nations data, 39% of the world's population (2.6 billion) live away from basic sanitation, 17% defecate in open fields, and 25% use unhealthy water due to infrastructure deficiencies (WHO/UNICEF Joint Monitoring Report, 2010). The 'Primary Healthcare Services Declaration' was composed and published in Alma Ata in 1978 from international health improvement conferences with the purpose of encouraging cooperation to preserve and improve health at an international level. It stated that housing conditions and access to food are the most fundamental health indicators [25,26]. Another MDG is 'providing sustainable access to healthy drinking/daily-use water'. The inability to appropriately remove

drinking/daily-use water and waste causes frequent cases of communicable diseases, diarrheal diseases being the foremost. Thus, both in international agreements and national legislations, the right to live in a healthy environment is included and the same is considered to be a fundamental health service that must be provided ***all of the time, everywhere, and for everyone***. Findings point to the priority of establishing strategies that foster health improvements through the creation of healthy living environments. This study found that approximately 90% of the families working in agricultural fields did not have an adequate and balanced diet or access to sufficient food. For this reason, it is essential to develop programs with intersectoral cooperation to make '*improving public nutrition*' one of the fundamental health services in order to prevent diseases and premature deaths. On the other hand, the population structure requires priority to be set for reproductive health services.

In this study, we note that families from southeastern Anatolia emigrated to 48 different provinces of Turkey as seasonal workers. Migration is the most important factor when considering the provision of primary healthcare services (such as the regulation of nutrition, health education, safe water access, reproductive health services, control of communicable and endemic diseases, and provision of essential medicines), which are required to be delivered to all individuals of a society, especially for the prevention of diseases and premature deaths. Planned public health services allow awareness of the direction, timing, and duration of migration, providing significant advantages to primary health care providers, both in places where migration workers arrive and depart from. On the other hand, the majority of SAMFs are Kurdish or Arabic; hence, cultural health mediators should have training pertaining to decreased linguistic, cultural, and social obstacles to access and effectively deliver primary health care services.

Half of the seasonal migrant agricultural population was younger than the average Turkish population. Age is an important indicator to consider when planning public health services, because many health conditions are age-related, and health providers should give priority to infants, children, and reproductive-aged women, including immunization, screening for early diagnosis and treatment programs, and nutritional supplements, by an outreaching approach to SAMFs.

Our previous studies contributed to the first legal provisions accorded to seasonal

migratory farmworkers – a memorandum named 'Improvement of Working and Living Conditions of Seasonal Migratory Farmworkers (2010/6) in Official Gazette no. 27531 (24 March 2010), issued by the Ministry of Labor and Social Security. This memorandum lists measures ranging from transportation, education, wages, civil registry, residence, and access to other public services, as well as public health services provided to SAMFs in their hometowns and work places [18]. However, all of the activities prepared as a project by local governors were implemented until 2013; thus, not all of the SAMFs received coverage, especially public health services.

Comparative health indicators according to the MDGs

Similar to the rest of the world, in this study, approximately 60% of SAMFs live below the poverty threshold and at least 70% work with family members [8,24]. Studies reveal that poverty is the most important indicator for health and is one of the reasons for premature deaths. 'Absolute poverty', defined as the 'inability to meet the fundamental needs for life', is a trending notion worldwide. We know that within the scope of globalization and structural conformity procedures, supermarket franchises sell produce for lower prices, which causes the need for a cheap agricultural workforce [8]. Low pay and difficult working conditions increase poverty and migration, and by preventing access to health and social services, cause inequalities in health. As mentioned in many policies [27], priority should be given to promoting, protecting, and improving the primary health care services of poor people to reduce poverty with the collaboration of the public, private, and all external sources; particularly for those associated with poor environmental, maternal, perinatal, and nutritional problems. Because poor people have higher than average child and maternal mortality, higher levels of disease depend on many environmental exposures and more limited access to health care, including maternal and child health care programs, safe water, sanitation in agricultural settings.

During the timeframe of the research conducted in this study, when examined with respect to goals pertaining to infant mortality, maternal mortality, communicable diseases, and access to information, we see that each health indicator differentiated between 2 and 9 times, and that families are disadvantaged compared to the average in Turkey with respect to premature deaths and morbidities, and fundamental risk factors. Although there

is difficulty in providing mortality ratings for SAMFs in international literature due to the inability to record births and deaths because of the families' nomadic lifestyle, reports indicate that mortality is higher in SAMFs compared to non-SAMFs [28].

Goal 5 of the MDGs aims to improve maternal health, and to decrease maternal mortality in the world by 47% between 1990 and 2010. Along with this, in order to achieve MDG5, an annual improvement of 5.5% is required; however, in some regions (Sub-Saharan Africa and Asia being the foremost), a success rate of only 3.1% per annum has been achieved. While we find a maternal death ratio of 240 for every 100,000 live births in developing countries, this figure is 16 for every 100,000 in developed countries. It has been noted that the majority of maternal deaths are seen in mobile populations that live in rural areas, where inequalities in the access to health services are prevalent, and in low-income groups and adolescents [29,30]. In order to reduce maternal mortality, effective family planning services are required, especially in order to prevent short birth intervals, which are responsible for one-third of maternal mortality. Along these lines, we see that contraceptive use was 73% in Turkey in general, whereas this rate was 46% in the SAMFs. These results were similar in the literature [18,20–22,31,32].

In the framework of the MDGs, achieving the goal set for diminishing infant mortality was not possible. Pneumonia, birth complications, and diarrhea were among the top 5 reasons for mortality worldwide in 2011, where one-third of deaths stemmed from malnutrition. Infant mortality was more frequent in rural areas and in poor families [33]. In terms of infant mortality, prenatal maternal health and consanguineous marriages were also important factors affecting the probability of the survival of infants. Consanguineous marriages were very common in families like Pakistan (60%), while this figure was between 20% and 50% in the Middle East, North Africa, Southwest Asia, and South India for cultural and economic reasons. Previous research has found powerful links between consanguineous marriages and morbidity and mortality, such as neural tube defects, loss of hearing, and congenital anomalies [33–35].

Health services need and its utilization

Approximately 1 out of every 3 female SAMFs stated that their health was in poor condition and that they did not properly care for their health. According to the results of the quantitative and qualitative studies, we

found that SAMFs cannot apply to health centers and follow up with their illnesses due to their being far from health centers; having a nomadic lifestyle; having a priority of completing their job and earning money, and therefore, waiting for the progression of the disease; not caring properly for their health; and the inability to travel to health centers since they cannot make money if they cannot work. These findings are in conformity with the outcomes of other studies. [6,10,18,31,32].

The quantitative and qualitative data revealed that SAM pregnant women and infants who live a nomadic lifestyle do not have access to timely and sufficient prenatal and postnatal services. It is important, in order to improve the maternal and infant health level, that primary healthcare services are provided, a safe environment is established, nutrition is improved, and furthermore, consanguineous marriages are prevented.

Interpretation of the results of the present study should be in light of a number of limitations. First, as this study involved a cross-sectional household survey, it may be impossible to draw conclusions about the nature of the putative causal relationship between morbidity and mortality indicators and noted sociodemographic variables. Second, the findings were obtained from the 2 provinces where the majority of the SAMFs lived, and their reported health events. Another limitation was using lay terminology supported by quotations from the participants to report the focus group results, instead of framework analysis or other techniques. Despite this limitation, conducting the focus group meetings and all of the interviews in their own languages was important in terms of the reliability of the outcomes.

Conclusion

To conclude, SAMFs are a priority risk group with high mortality and morbidity rates due to unhealthy life and housing conditions, sanitation deficiency, insufficient/unbalanced diet, poverty [36,37], lack of education and access to information, dangerous working environments, and the nonexistence of easily accessible health services. Assuming that agricultural production will continue until humankind ceases to exist, in order to minimize regional inequalities, it is essential to develop service models for SAMFs, as they frequently encounter disease and premature mortality.

The ‘Health for All’ and health improvement strategies are key strategies, and aim to achieve the MDGs. The United Nations Economic and Social Committee and

the World Health Organization (WHO) emphasized the primary importance of improving health and primary healthcare services for social and economic development, and the importance of health literacy, intersectoral cooperation, and social indicators of health, were included in this agenda [38,39]. We note that some risks are associated with individual behaviors, some with the sociocultural environment, and some with the health system and other sectors. Hence, in order to achieve the MDGs, this study showed that there is an urgent need for a SAMFs health promotion program related to reducing risk factors and strengthening protective factors, and the need to decrease health disparities in SAMFs. Therefore, the authors have prepared an operational program, and intervention studies started in 2012 with the collaboration Harran University and UNFPA. This health promotion program for the SAMFs includes: 1) surveillance system enhancement to gather and analyze data to define and monitor SAMFs; 2) health promotion activities for strengthening health systems by improving undergraduate and in-service training programs for primary healthcare providers to increase their awareness, and to integrate agricultural health and safety issues with a monitoring program for those aged 15–49 years, antenatal care, and postnatal care; 3) community empowerment and participation programs by increasing the health education level and reaching to public health services by peer educators and health mediators selected from SAMFs, and agricultural envoys training program related to agricultural health and safety issues; 4) improving intersectoral actions for the improvement of health equality and set up a collaboration mechanism with all other related sectors.

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and, and helped the data control. All authors read and approved the final manuscript.

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