CHANGING OF RISK FACTORS RELATED TO DIARRHOEA AMONG CHILDREN AGED UNDER 5 WITHIN TEN YEARS IN TURKEY

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SUMMARY

Objectives: The aim of this study is to determine the risk factors of childhood diarrhoea in Turkey throughout Turkey Demographic and Health Survey (DHS) 1998 and 2008 data.

Methods: This study is a further analysis of the database of children under 5 years of age from the Turkey Demographic and Health Survey. Binomial logistic regression and Chi square analysis were used by weighted data of Turkey Demographic and Health Surveys.

Results: In 1998 DHS there were 3,459 and in 2008 DHS 3,463 children under 5 years of age. Diarrhoea prevalence was 30.1% and 18.3%, respectively. Multivariate analysis revealed that household wealth status index, region, mother's education, mother's age (15–19 age), age (under 2 years of age), and sex (male) of the child were the risk factors for 1998 DHS. In 2008 significant risk factors were geographic region, education of the mother and father, breastfeeding status of the child (still being breastfed), mother's age (20–29 age group), and age of child (under 2 years of age).

Conclusions: As a result, patterns of the risk factors of diarrhoea has changed from 1998 to 2008 DHS in Turkey. However, impact of factors related with socioeconomic environment such as region and mother's education persisted.

Key words: diarrhoea, risk factors, preschool children, demographic and health survey, Turkey

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INTRODUCTION

Diarrhoea is currently one of the most serious health problems in the world and the second leading cause of childhood mortality (1). Six point nine million children aged under 5 have died in 2011 as a result of pneumonia and diarrhoea totally (2). The struggle against these major health issues is being carried out on an international basis. The 4th and 7th Millennium Development Goals, which also cover preventive measures against diarrhoea, aim to prevent childhood mortality. The purpose of these goals is to reduce the mortality among children aged under 5 by 2/3 (4th goal) and to reduce the population, who have no access to basic sanitation and improved drinking water, by half until 2015 (7th goal) (2).

There determinants of diarrhoea include socioeconomic factors, housing conditions, environmental sanitation, factors related to childcare (hygiene behaviours, childhood nutrition and anthropometric features of the child, breastfeeding, etc.) which stand out as major risk factors compared to other risk factors (3). Diarrhoea is directly affected by environmental conditions and sanitation. According to WHO nearly 1 billion people have no access to healthy drinking water and 2.5 billion people are deprived of basic sanitation facilities (WHO). In 2010, according to WHO and UNICEF data, the worldwide tap water accessibility was 54%, whereas the use of well water reached 30%. Especially in rural areas, the access to a safely managed drinking water system may be as low as 29%. In this respect, safe drinking water, sanitation and hygiene are regarded as the critical intervention areas to reduce the prevalence of diarrhoeal diseases. A large number of epidemiological studies have shown that low-cost and feasible interventions can reduce the burden of diarrhoeal diseases (4–7).

Despite the importance of water, sanitation and hygiene, studies in developing countries reveal that diarrhoeal diseases have a complex epidemiological structure. Diarrhoea related risk factors have a multilayered causality and low socioeconomic status is found to be among the major determinants (8).

Although the prevalence and the burden of disease have decrease within years, data provided by Demographic and Health Surveys (DHS) reveal that diarrhoea is still common in Turkey. The prevalence of diarrhoea in Turkey is higher than expected when compared with the results of other countries' DHS (9–12). Demographic and Health Survey is an important source of information for developing countries to observe the prevalence of diarrhoea. In these studies, presence of diarrhoea among children under 5 is generally examined for the last fifteen days previous to data collection. By means of DHS carried out every 5 years, Turkey provides current health data and information for policymakers.

The aim of this study is to determine the risk factors related to diarrhoea and examine the changes within years by means of Demographic and Health Survey data in a developing country, Turkey.

MATERIALS AND METHODS

This study is a further analysis of Turkey DHS. Demographic and Health Survey provides nation-wide information related to diarrhoea and its risk factors. We used only 1998 and 2008 DHS data since 2003 and 2013 DHS did not include any questions about diarrhoea (13, 14). One of the questions in DHS was "Is there a child under 5 years of age in this house who has suffered from diarrhoea during the last 15 days?".

The data analyzed in the study is taken from DHS 1998 and DHS 2008. By means of two databases (household and women) taken from DHS, a database has been formed which includes study variables and data related to children aged under 5. The analyses have been carried out on this database. DHS data have been collected with a weighted, multistage, stratified cluster sampling approach. Permission from Hacettepe Institute of Population Studies has been granted for the use of data and the study has been approved by Hacettepe Non-interventional Clinical Researches Ethics Board.

Analyses have been carried out by taking into consideration the weight of the samples. Analyses have been processed by SPSS for Windows version 15.0. Chi-square tests and multivariate analysis have been used. Binominal logistic regression analysis has been predicated on significant relationships determined via chi-square analysis. For multivariate analysis, variable blocks have been formed considering risk factors (Table 1). In the multivariate analysis section a stepwise binomial logistic regression model was estimated to measure the impact of environmental factors and other covariates on diarrhoea. During this procedure, different sets of variables were added to the previous models (Table 1). This method enabled us to observe whether and how the impacts of specific background characteristics (in our case especially environmental factors) were conditioned by other characteristics. Significance value in all statistical analysis has been regarded as $p < 0.05$.

Table 1. *Variable blocks used in multivariate analysis*

Blocks	Variables
Socioeconomic	Household wealth index
	Mother's education
	Father's education
	Mother's working status
	Father's working status
House characteristics	Source of drinking water
	Type of toilet
	Person per sleeping room
Contextual factors	Region
	Place of residence
Biodemographic factors	Mother's age
	Age of child
	Birth order
	Sex of child
	Period of breastfeeding

RESULTS

The study covers the data from 3,459 children under 5 years of age in 1998 and 3,463 in 2008. Diarrhoea prevalence was 30.1% and 18.3%, respectively. Various characteristics of children under

Table 2. *Characteristics of households where there is a child under 5 years of age in 1998 and 2008*

	1998 (N = 3,459)		2008 (N = 3,463)	
	n	%	n	%
Region				
West	1,031	29.8	1,174	33.9
South	490	14.2	441	12.7
Central	795	23.0	741	21.4
North	271	7.8	197	5.7
East	871	25.2	911	26.3
Residence				
Urban	2,162	62.5	2,475	71.5
Rural	1,297	37.5	988	28.5
Wealth index quintile				
Lowest	791	22.9	852	24.6
Second	787	22.8	818	23.6
Middle	713	20.6	709	20.5
Fourth	613	17.7	579	16.7
Highest	554	16.0	506	14.6
Number of household members				
≤4	1,184	34.2	1,419	41.0
5–9	1,748	50.5	1,716	49.5
≥10	526	15.2	328	9.5
Person per bedroom				
≤1	250	7.2	329	9.5
2	1,135	32.8	1,244	35.9
3	922	26.6	954	27.6
≥4	1,153	33.3	935	27.0
Safe water				
Yes	2,219	64.4	2,438	70.5
No	1,227	35.6	1,023	29.5
Flush toilet				
Yes	2,189	63.6	2,604	75.6
No	1,251	36.4	839	24.4
Refrigerator				
Yes	337	9.8	135	3.9
No	3,117	90.2	3,327	96.1

5 are presented in Table 2. Data show that urban settlement has increased, crowded household percentages have decreased; houses with access to safe water (from 64.4% to 70.1%) and with a toilet connected to sewer system (63.6% to 75.6%) have increased. Table 3 shows that there have been some improvements in parents' educational status and health insurance.

In bivariate analyses, significant differences have been determined in all variables examined in 1998 (geographic region and place of residence, household wealth index, number of household members, source of drinking water, type of toilet, refrigerator in the house, age of mother, parents' education, gender and age of child). In this respect, there is a significant difference in the prevalence of diarrhoea related to the region and wealth index levels. Diarrhoea is higher in the Eastern region and the households with low income. The percentage of children under the age of 5 with diarrhoea is significantly higher in rural areas, crowded households, households with no access to safe water, no flush toilets and no refrigerator. Two thousand eight data also reveal that place of residence (rural/urban), the source of water in the house, toilet type, and gender of the children variables have lost their significance. The trend in other variables remained similar (data not shown).

Table 3. *Characteristics of children under 5 years af age and parents in DHS of Turkey in 1998 and 2008*

Characteristics	1998 (N = 3,459)		2008 (N = 3,463)	
	n	%	n	%
Sex of child				
Male	1,797	52.0	1,770	51.1
Female	1,662	48.0	1,693	48.9
Age of child (year)				
≤ 1 (12 months and less)	712	21.6	697	20.5
1	689	20.9	704	20.7
2	612	18.5	672	19.8
3	612	18.5	652	19.2
4	674	20.4	673	19.8
Mother's age group (year)				
15–19	157	4.5	82	2.4
20–24	974	28.2	791	22.8
25–29	1,151	33.3	1,202	34.7
30–34	708	20.5	836	24.1
35–39	342	9.9	393	11.3
40–44	107	3.1	134	3.9
45–49	20	0.6	26	0.7
Mother's education				
No education/prim inc.	936	27.1	761	22.0
First level primary	1,901	54.9	1,709	49.4
Second level primary	217	6.3	317	9.2
High school and higher	405	11.7	676	19.5
Mother's working status				
Not working	2,523	73.3	2,709	78.2
Working without social security	756	22.0	526	15.2
Working with social security	165	4.8	228	6.6
Father's education				
No education/prim inc.	337	9.7	211	6.1
First level primary	1,939	56.1	1,674	48.6
Second level primary	402	11.6	484	14.1
High school and higher	781	22.6	1,075	31.2
Father's working status				
Not working	14	0.4	264	7.7
Working without social security	1,792	53.4	1,209	35.4
Working with social security	1,550	46.2	1,947	56.9

Five different models used in logistic regression analyses have presented different results. Table 4 presents the results of the fourth model that covers all variables. Variables included in the first model (house characteristics), lose their significance when different variables are included in the model for the both years. In addition to the variables in the first model, wealth index, geographical region and setting (rural/urban) have been included in the second model. Both (wealth index and region) have shown significant risk increases in 1998 and 2008. The third logistic regression model has been carried out by adding variables as parents' education and employment status to the housing conditions (water, toilet and crowded households), wealth index, geographic region and setting (data not shown).

In the fourth model where all examined variables are included, it is observed that wealth index, contextual factor (geographic region) based on socioeconomic variables such as education and biodemographic factors (child's age, gender and mother's age) are effective risk factors for 1998. It was observed that parent's education is an effective socioeconomic factor instead of wealth index for 2008. Contextual factor (geographic region) and biodemographic factors (child's age, mother's age, breastfeeding status) are determined as risk factors (Table 4).

Variables, which are proved to be significant in the first four models (wealth index, region, parent's education, mother and child's age, gender of child, breastfeeding period) are included in the fifth model for both years (Table 5). In this model it has been determined that variables (1998/2008, respectively) of wealth index (all 20% layers/none), region (Central and East regions/East), mother's education (all categories/uneducated), father's education (none/primary school graduate), mother's age group (15–19/20–29), child's age (aged under 2 for both year), gender of child (male/female), breastfeeding period (none/still being breastfeeding) have been determined as significant risk factors (Table 5).

DISCUSSION

Diarrhoea has been evaluated by further analyses of DHS data in this study. In secondary data analyses, it is possible to reach a big study group. These types of studies are conducted to evaluate different topics and used in wide range areas (15–22). DHS is regarded as a reliable source of data for Turkey and it enables the analysis of questions related to diarrhoea by means of variables collected under the scope of the study. Diarrhoea is a multifactorial disease and the risk factors interact with each other. In the bivariate analyses for 1998, drinking water source

Table 4. *Multivariate analysis data of children under 5 years of age related to diarrhoea in DHS of Turkey in 1998 and 2008*

Variables	1998	2008
	OR (95% CI)	OR (95% CI)
Source of drinking water		
Safe (ref.)	1.00	1.00
Unsafe	1.15 (0.94–1.41)	1.02 (0.77–1.34)
Type of toilet		
Flush (ref.)	1.00	1.00
Non-flush	0.94 (0.75–1.18)	0.94 (0.67–1.31)
Person per bedroom		
1 (ref.)	1.00	1.00
2	0.89 (0.62–1.29)	0.79 (0.54–1.14)
3	0.99 (0.69–1.44)	0.87 (0.60–1.27)
4	0.90 (0.60–1.34)	0.96 (0.63–1.47)
≥ 5	0.99 (0.66–1.49)	0.97 (0.62–1.52)
Wealth index quintile		
Lowest	**1.95 (1.34–2.84)****	1.11 (0.66–1.87)
Second	**1.54 (1.09–2.17)***	0.96 (0.62–1.49)
Middle	**1.77 (1.28–2.44)****	0.94 (0.63–1.42)
Fourth	**1.50 (1.08–2.06)***	1.30 (0.89–1.90)
Highest (ref.)	1.00	1.00
Region		
West (ref.)	1.00	1.00
South	**1.33 (1.01–1.76)***	0.90 (0.64–1.27)
Central	**1.49 (1.18–1.90)****	1.03 (0.78–1.36)
North	1.09 (0.77−1.54)	1.08 (0.69–1.69)
East	**1.97 (1.52–2.55)****	**1.75 (1.34–2.29)****
Residence		
Urban (ref.)	1.00	1.00
Rural	1.04 (0.83–1.30)	0.87 (0.63–1.19)
Mother's education		
No education/prim inc.	1.48 (0.98–2.23)	**1.57 (1.05–2.34)***
First level primary	1.38 (0.96–1.97)	1.02 (0.73–1.42)
Second level primary	**1.64 (1.05–2.56)***	1.20 (0.80–1.80)
High school and higher (ref.)	1.00	1.00
Father's education		
No education/prim inc.	1.32 (0.92–1.88)	1.20 (0.77–1.85)
First level primary	1.13 (0.88–1.44)	**1.31 (1.01−1.70)***
Second level primary	1.16 (0.85–1.57)	0.86 (0.62–1.20)
High school and higher (ref.)	1.00	1.00
Mother's working status		
Not working	1.15 (0.70–1.89)	1.22 (0.76–1.95)
Working without social security	1.39 (0.82–2.36)	1.14 (0.66–1.96)
Working with social security (ref.)	1.00	1.00

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Variables	1998	2008
	OR (95% CI)	OR (95% CI)
Father's working status		
Not working	0.24 (0.04–1.32)	0.93 (0.64–1.35)
Working without social security	1.01 (0.83–1.21)	1.07 (0.85–1.35)
Working with social security (ref.)	1.00	1.00
Age of child		
≤2	**2.55 (2.10–3.09)****	**2.39 (1.89–3.02)****
>2 (ref.)	1.00	1.00
Sex of child		
Male	**1.21 (1.03–1.42)***	0.99 (0.82–1.19)
Female (ref.)	1.00	1.00
Birth order		
First (ref.)	1.00	1.00
Second	0.94 (0.75–1.17)	0.87 (0.68–1.12)
Third	1.08 (0.83–1.41)	0.85 (0.62–1.17)
Fourth and more	0.97 (0.73–1.29)	0.81 (0.58–1.13)
Mother's age (year)		
15–19	**2.00 (1.33–3.01)****	1.25 (0.70–2.24)
20–29	0.99 (0.81–1.22)	**1.30 (1.04–1.64)***
30+ (ref.)	1.00	1.00
Period of breastfeeding		
≥6 months (ref.)	1.00	1.00
<6 months	1.19 (0.96–1.47)	0.82 (0.61–1.11)
Never	0.77 (0.47–1.25)	1.46 (0.83–2.58)
Still breastfeeding	1.00 (0.81–1.23)	**1.30 (1.04–1.62)***

*p<0.05, **p<0.001; OR – Odds Ratio; CI – Confidence Interval

in household and toilet stand out as factors related to diarrhoea. This relationship has disappeared in 2008 survey.

"Prevalence of diarrhoea in the last fifteen days" is still around 18% in 2008 despite an important decrease from 30.1% in 1998. The prevalence of diarrhoea is observed to be higher in Turkey compared to the other countries where DHS was conducted for the same years. In 1998, the prevalence of diarrhoea was 10.7% in Egypt (23). The prevalence of diarrhoea according to DHS was 9.8% in Bangladesh in 2007, 19.5% in Cambodia in 2005, 8.5% in Egypt in 2008, and 19.8% in Ghana (9–12).

Besides the differences such as infrastructure, cultural norms, enforcement etc. between countries, climate, geographical and demographic structures might also be related factors. Since diarrhoea is affected by seasonal conditions, the data collection season in different countries might be different. This may explain the higher prevalence in Turkey. High diarrhoea prevalence in Turkey both in 1998 and 2008 still attracts attention and additional studies are needed regarding the reasons of these high levels.

Compared to 1998, the prevalence of diarrhoea has declined in different wealth index levels in 2008; however, the ascending trend has continued as the wealth index level decreased. The prevalence of diarrhoea in the poorest 20% is found to be two-fold higher than the households with higher income. In 1998 this value was 2.5-fold higher. Therefore, it can be deduced that water and sanitation are at the forefront factors in 1998; however, their effect has disappeared in 2008 but the regional differences in diarrhoea continued. Also socioeconomic environment, where some biodemographic factors are effective may be important risk factors. These results are outstanding as they bring forward poverty-diarrhoea relationship and regional inequalities for 1998 in particular. Factors such as poverty, poor housing, lack of adequate and safe water, poor sanitation conditions, crowded household, absence of refrigerator increase the episode and prevalence of diarrhoea. On the other hand, negative effects of poverty on child nutrition and access to health services deepen the problems related to diarrhoea and facilitates diarrhoea (24).

In our first model of multivariate analyses, we found a significant increase in diarrhoea with the accessibility problems to drinking water, toilet and the number of persons per bedroom (1998 and 2008). In their hospital-based studies, Mansour et al. have reviewed most of the factors which have been considered within the scope of this study (water resources other than tap water, existence of refrigerator in the house, crowded household, etc.). The factors which they have found to be relevant with envi-

Table 5. *Factors related with diarrhoea in Turkey DHS in 1998 and 2008*

Variables	1998	2008
	OR (95% CI)	**OR (95% CI)**
Wealth index quintile		
Lowest	2.35 (1.68–3.20)**	1.20 (0.78–1.83)
Second	1.71 (1.24–2.37)**	1.09 (0.73–1.62)
Middle	1.92 (1.40–2.62)**	1.05 (0.72–1.54)
Fourth	1.58 (1.15–2.16)*	1.36 (0.94–1.96)
Highest (ref.)	1.00	1.00
Region		
West (ref.)	1.00	1.00
South	1.25 (0.96–1.63)	0.87 (0.63–1.21)
Central	**1.44 (1.15–1.81)***	0.97 (0.74–1.26)
North	1.15 (0.82–1.59)	0.95 (0.62–1.47)
East	**1.85 (1.45–2.35)****	**1.71 (1.32–2.22)****
Mother's education		
No education/prim inc.	**1.65 (1.14–2.38)***	**1.62 (1.12–2.32)***
First level primary	**1.51 (1.09–2.09)***	1.04 (0.77–1.40)
Second level primary	**1.78 (1.16–2.72)***	1.22 (0.84–1.80)
High school and higher (ref.)	1.00	1.00
Father's education		
No education/prim inc.	1.28 (0.90–1.82)	1.23 (0.81–1.90)
First level primary	1.15 (0.91–1.46)	**1.32 (1.02–1.71)***
Second level primary	1.16 (0.86–1.57)	0.89 (0.64–1.24)
High school and higher (ref.)	1.00	
Age of child		
≤2	**2.55 (2.14–3.03)****	**2.64 (2.14–3.26)****
>2 (ref.)	1.00	1.00
Sex of child		
Male	**1.21 (1.03–1.42)***	1.01 (0.84–1.21)
Female (ref.)	1.00	1.00
Mother's age (year)		
15–19	**1.98 (1.37–2.87)****	1.32 (0.77–2.26)
20–29	0.99 (0.83–1.17)	**1.38 (1.13–1.68)****
30+ (ref.)	1.00	1.00
Period of breastfeeding		
≥6 months (ref.)	1.00	1.00
<6 months	0.62 (0.13–2.99)	0.83 (0.62–1.26)
Never	0.74 (0.15–3.55)	1.48 (0.85–2.60)
Still breastfeeding	0.48 (0.09–2.43)	**1.27 (1.02–1.58)***

*p<0.05, **p<0.001; OR – Odds Ratio; CI – Confidence Interval

ronmental conditions were using the toilets without soap or tissue. These environmental conditions may have effect on different age groups older than 5 years of age (5).

Fewtrell et al. conducted a systematic review and meta-analysis study published in 2005 (4). The study was about the interventions related to water, sanitation and hygiene in countries which were not included in class A and defined as underdeveloped countries according to the WHO risk assessment criteria. This study revealed that interventions on hygiene should be considered to present a protective effect against diarrhoea. These interventions are actually regarded in two headings; first one is training on health and hygienic behaviour and the second is encourage-

ment of hand washing. The researchers brought forward that healthy and safe water and sanitation interventions also show a protective effect against diarrhoea (5). From this point of view, our study reveals the effect of water and sanitation on diarrhoea in 1998 DHS data.

In various studies it is shown that the interventions to encourage hand-washing reduces the childhood diarrhoea by 31–47% and improvement of sanitation by 7–57% (25). The "high-level effective" interventions related to the reduction of diarrhoea and diarrhoeal diseases among kids aged under five are stated as encouragement of breastfeeding, good weaning practices, vaccination against some diseases, refinement of water source and sanitation, improvement of individual, and community hygiene (26).

The risk factors related to diarrhoea reveal a multi-layered causality. Besides, it is widely accepted that there is a hierarchical structure among these risk factors. This structure is evaluated by hierarchical analysis techniques and these techniques are performed by controlling confounding factors or risk determined factors one by one (8).

Ferrer et al. who used these techniques have created a conceptual framework in their studies and they have based their intervention and analyses upon this conceptual framework. In this context socioeconomic status constitutes the main block. This main block consists of specific indicators of household and some characteristics of mother (employment status, level of education, marital status) and this block directly affects both prevalence and other blocks. Infrastructure, sanitation and living conditions, behaviour of hygiene, nutrition and intestinal parasitic infections are the other determining factors (27).

Ferrer et al. in their study have formed a hierarchical modelling of risk factors related to diarrhoea (27). According to this, risk factors effective in the first level are socioeconomic factors. These factors are limited as marital status, race, mother's education, income of the family, household goods, having a father, employment status of mother. At this level gender and age group are classified as confounding variables. There are three variable groups in the second level; environmental contamination (water, toilet, solid waste etc. infrastructure), preparation of food (separate kitchen, presence of refrigerator, eating out, etc.) and contact (crowded places, contact with a person who has diarrhoea, etc.).

Victoria et al. formed a similar hierarchical order of risk factors for infectious diseases in developing countries (28). According to this, socioeconomic factors are included in the first level. In the second level, factors related to mother and environmental factors, in the third level factors related to pregnancy, in the fourth level birth weight and perinatal factors and in the fifth level child caring, diet, nutritional status are included. Researchers have stated that income, sanitation and malnutrition not only interact with each other on different levels but can also have a direct effect on diarrhoea. In our study, we did not use a hierarchical modelling. However, we used multivariate analyses, which are conducted by considering the interaction between different variables which have effect on diarrhoea-related variables at different levels.

In the final model for 1998, a significant risk increase has been observed in all variables except education of father and breastfeeding duration. It has been determined that there is risk increase in all layers of wealth index and mother's education. For 2008, a significant risk increase has been determined in wealth index and in variables other than gender of child. Different socioeconomic variables had effects on different levels in 1998 and 2008. On the other hand, regional inequalities are still present. It is thought that breastfeeding practices as a risk factor cause hygienic problems although it is not an expected result.

The limitations of the research are related to limitations of DHS. There might be errors resulting from recall bias related to survey period. It has not been questioned by DHS whether the child was present at home during or before this period, whether the factor was acquired from the house they were living or whether there was someone else with diarrhoea at the house. Furthermore, water shortage in the house recently and sufficiency of the amount of water in the household are not evaluated. One of the important limitations of the study is the different data collection periods of DHS in 1998 and 2008. DHS 1998 data have been collected in August – November whereas 2008 has been collected in October – December. Diarrhoea is intensively affected by seasonal features in respect to its prevalence and effective profile.

CONCLUSION

In conclusion this study reveals the risk factors related to diarrhoea in a developing country such as Turkey, and changes between the years 1998–2008. The socioeconomic variables are observed to have effect under different titles in both years. Despite the fact that household and environmental conditions are found to be influential risk factors in 1998, the effect disappears when analysed with different variables.

As a result, risk factors related to diarrhoea have changed from DHS 1998 to 2008. However, the factors related to socioeconomic environment such as region and education of mother still persist.

This study is important as it suggests interventions to control the determined risk factors related to diarrhoea in Turkey and it contributes to policies to be established. It is also the first further analyses carried out on diarrhoea. It will be useful to broaden the scope of DHS in accordance with changes and development of the country and to question different aspects of diarrhoea.

Conflict of Interests

None declared

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