



Notifiable Communicable Diseases in Turkey and Their Notification Status: Antakya Sample

Antakya Örneğinde Türkiye’de Bildirimi Zorunlu Bulaşıcı Hastalıklar ve Bildirim Durumu

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SUMMARY

Introduction: The aim of this study was to determine the frequency and notification status of notifiable infectious diseases (NIDs) in primary, secondary and tertiary healthcare institutions in Antakya.

Materials and Methods: This cross-sectional research was conducted in 2015, in Antakya. In 19 family medicine units, 1 state, 1 private and 1 university hospitals representing health care institutions, the electronic codes of NIDs (Groups A, B, C, D) for the year 2014 in accordance with the case identification in surveillance system were analyzed by being scanned based on ICD-10 diagnostic codes. Descriptive statistics and Chi-square test were used in the analyses, and $p < 0.05$ was considered significant.

Results: Having made 30 different types of 3923 NID diagnoses, 75.2% of the NIDs were in Group A, 15.0% in Group D, and 9.8% in Group C; 16.4% of the diagnoses were gotten in Syrian refugees. The wrong ICD-10 diagnostic code was given to 59.8% of the NIDs. 41.9% of the NIDs were notified; 51.7% of Group A, 17.7% of Group D and 0.6% of Group C were notified. State hospital notified 54.5% of the NIDs, private hospital 30.9% of and university hospital 12.0% ($p < 0.001$). Most frequently diagnosed NIDs were rabies and rabies risky contact (32.4%), varicella (18.4%), rotavirus (11.0%), toxoplasmosis (7.5%), leishmaniasis (7.3%), acute hepatitis A (6.7%), brucella (4.7%) and tuberculosis (3.1%). In Syrian patients, the most frequently diagnosed NCD was leishmaniasis (27.0%). Among the cases with NIDs diagnosis, the most notified ones were salmonella (100.0%), malaria (100.0%), rabies and rabies risky contact (96.8%), measles (81.0%), tuberculosis (76.9%), acute hepatitis A (26.3%), brucellosis (26.1%) and rotavirus (%16.6).

Conclusion: NIDs are frequently observed in Turkey in the Antakya sample, and more than half of them are not notified.

Key Words: Notification; Communicable diseases

ÖZET

Antakya Örneğinde Türkiye’de Bildirimi Zorunlu Bulaşıcı Hastalıklar ve Bildirim Durumu

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Giriş: Bu çalışmanın amacı, Antakya’da birinci, ikinci ve üçüncü basamak sağlık hizmet kurumlarında bildirim zorunlu bulaşıcı hastalıkların (BZBH) görülme sıklığını ve bildirim durumunu saptamaktır.

Materyal ve Metod: Bu kesitsel çalışma 2015 yılında Antakya’da yapılmıştır. Sağlık kurumlarını temsil eden 19 aile hekimliği birimi, bir devlet, bir özel ve bir üniversite hastanesinde süreyans sistemi olgu tanımlamasına uygun BZBH (A, B, C, D Grubu)’lerin 2014 yılı elektronik kayıtları, ICD-10 tanı kodlarına göre taranarak analiz edilmiştir. Analizlerde tanımlayıcı istatistikler ve ki-kare testi kullanılmış, $p < 0.05$ önemli kabul edilmiştir.

Bulgular: Otuz farklı tipte 3923 BZBH tanısı konulmuş olup, %75.2’si A, %15.0’ı D ve %9.8’i C grubundadır; %16.4’ü Suriyeli sığınmacılara aittir. BZBH’lerin %59.8’ine yanlış ICD-10 kodu verilmiştir. BZBH’lerin %41.9’u bildirilmiştir; Grup A’nın %51.7’si, Grup D’nin %17.7’si ve Grup C’nin %0.6’sı bildirilmiştir. BZBH’lerin devlet hastaneleri %54.5’ini, özel hastaneler %30.9’unu, üniversite hastaneleri ise %12.0’ını bildirmiştir ($p < 0.001$). En sık tanısı konulan BZBH’ler; kuduz ve kuduz riskli temas (%32.4), suçiçeği (%18.4), rotavirüs enfeksiyonu (%11.0), toksoplazmozis (%7.5), leşmanyaz (%7.3), akut hepatit A (%6.7), brusellozis (%4.7) ve tüberküloz (%3.1)’dur. Suriyeli sığınmacılarda en çok tanısı konulan leşmanyadır. BZBH tanısı konulanlar içinde en çok bildirim yapılanlar; salmonella enfeksiyonu (%100.0), sıtma (%100.0), kuduz ve kuduz riskli temas (%96.8), kızamık (%81.0), tüberküloz (%76.9), akut hepatit A (%26.3), brusella (%26.1) ve rotavirüs (%16.6)’tür.

Sonuç: Bildirimi zorunlu bulaşıcı hastalıklar Türkiye’de Antakya örneğinde sık gözlenmekte olup, yarısından fazlası bildirilmemektedir.

Anahtar Kelimeler: Bildirim; Bulaşıcı hastalıklar

INTRODUCTION

Case notification of nationally notifiable communicable diseases (NCD) and conditions helps public health authorities monitor the effect of these diseases and conditions, measure the disease and condition trends, assess the effectiveness of control and prevention measures, identify populations or geographic areas at high risk, allocate resources appropriately, formulate prevention strategies, and develop public health policies^[1].

A regular data collection on communicable disease cases, reviewing of the collected data by analyzing and be announced the results obtained to the people and organizations that offer services in this area provides significant benefits in the fight against communicable diseases. Therefore, countries are working to strengthen their surveillance systems^[2]. The most important

activities of an effective surveillance system is the data collection. Data collection can be done in countries in many different ways^[3-5].

In Turkey until 2003, when the notification of 39 diseases is obligatory, the number of NCD was 51 by the circular issued in 2004^[3]. In this circular, the standard case definitions were developed, physicians as well as laboratories have also been included in the reporting system and NCD are classified in 4 groups (A, B, C, D) according to their notification ways. When clinicians are responsible for notification of the group A, B and C diseases, group D diseases are reported by the laboratories. With the changes made in notification system in 2007, the Early Warning and Response System (EWRS) definition was formed, the number of NCD was increased to 55^[6]. In 2011, the number of NCD increased

to 73 and case definitions were determined under the International Health Regulations, EWRS and the European Union adjustment programs by making needed updates^[4]. But it was not clearly specified in which groups the added disease would take place, how and by whom they would be reported.

In Turkey communicable disease notifications are carried out using International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) diagnosis codes created in the National Health Data Set. Notifications are collected in two different systems: Health Net 2 and Basic Health Statistics Module (BHSM) which connect to information systems of hospitals and family physicians. But, the use of different information systems in the first, secondary and tertiary health institutions and the presence of deficiencies in the systems leads to defects in the notification, exactly standardization can not be achieved in the notification.

In Turkey notification of NCD is carried out mostly over physicians, awareness on the issue and knowledge levels of physicians occupy an important place in notification^[5]. A limited number of researches conducted shows that most of physicians reported 12-36% of the NCD^[7]. These researches are based on hospitals and laboratories so that didn't assessment all three steps with a holistic approach.

The aim of this study is to create awareness about the frequency of the NCD and the shortcomings of notification in Turkey by determining the notification status of the NCD that was diagnosed in the first, second and third level health institutions in 2014.

MATERIALS and METHODS

This cross-sectional study was conducted in Antakya in 2015. Antakya is the center of the province of Hatay which borders with Syria in the eastern Mediterranean region of Turkey. Since the Syrian civil war, Syrian refugees are living in.

The Research Population

Antakya has 38 Family Health Centers (FHC) in primary care, 5 hospitals (two public and three private hospitals) in the second stage and an university hospital in tertiary. Research population includes NCD records which were diagnosed defi-

nately or likely in accordance with case definition in these health care institutions in 2014.

The Research Sample

Multi-stage sampling method was used in the selection of the research sample, in the first stage the middle of the primary and secondary level health institutions (19 FHC, 1 public hospital and 1 private hospital) were selected by simple random method. In the second stage, one Family Health Unit (FHU) from each of the 19 FHCs was again selected by simple random method. In this way, 19 primary, 2 secondary and 1 tertiary health institutions were selected. The NCD records of these institutions in 2014 created the research sample. Data was obtained by scanning the ICD-10 diagnostic codes of the NCD in information systems. There were 3923 NCD in the sample. The records of HIV/AIDS, acute gastroenteritis and hospital infection cases were not included in the sample.

The Course of the Research

The NCD were evaluated in terms of availability of gender, nationality, health institutions, departments, given the correct ICD-10 diagnostic codes and notification status.

In assessing the notification status; notification rates of group A and C diseases were studied to determine by comparing with the data imported to BHSM by means of Form 014 and forms specific to certain diseases [measles, rabies-rabies risky contact (RRRC)], notification rates of group D diseases were studied to determine by comparing with the data imported to BHSM by means of Group D Infectious Agents Form, notification rate MERS-CoV was studied to determine by comparing with the data imported to public health directorate by means of MERS-CoV possible case information and laboratory request form. Data entry of group A diseases to BHSM is carried out by Community Health Centers. Data entry of group C and D diseases to BHSM is carried out by the statistical units of the hospitals. The tuberculosis records were compared with data on disease-specific notification system.

Statistical Analysis

Frequency tables and chi-square test analysis were performed in the SPSS 22 package program and $p < 0.05$ was considered significant.

Ethics Approval and Consent to Participate

The ethics committee of the Mustafa Kemal University approved this study. The managements of the health care institutions in this research gave their informed consent in writing.

RESULTS

In 3923 NCD cases forming the research sample was determined 30 different diseases (Table 1). The average age of the cases 19.8 ± 18.5 years (2 month-91 years), 56.9% male, 16.4% were Syrian refugees. The 75.2%, 15.0%, 9.8% of the cases were respectively group A, D and C. There was a MERS-CoV case considered within the scope of international public health emergency (likely group B). The most common NCD were respectively RRRC (32.4%), varicella (18.4%), rotavirus (11.4%), toxoplasmosis (7.4%), leishmaniasis (% 7.3), acute hepatitis (6.8%) and brucellosis.

In Syrian patients, the most common NCDs were respectively leishmaniasis (27.0%), varicella (18.4%) and acute hepatitis A (17.1%).

According to the records; 66.2% of the NCD was registered in the public hospital information system, 24.1% the NCD was registered in the university hospital information system, 8.3% of the NCD was registered in the private hospital information system, 3.1% of the NCD was registered in the FHU information system, 1.7% of them was registered in more than one institution information systems.

The departments which mostly diagnosed NCD respectively were emergency, laboratory and pediatrics. 90.0% of cases in the emergency department constituted rabies and rabies risky contact.

When evaluated according to the case definition of is 55.9% of cases were probable cases, 44.0% of cases were certain cases (detected positive in hospital laboratories) and 0.1% of cases were suspicious cases.

The other diseases or findings (mistaken) ICD-10 diagnosis codes were given to 59.8% of group A and C (certain cases) which identified positively in the hospital laboratories. The diseases given most mistaken ICD-10 diagnosis code were toxoplasmosis (82.4%), echinococcosis

(68.6%) and acute hepatitis A (63.7%) (Table 2). The mistaken ICD-10 diagnosis codes were given to 40.0% of acute hepatitis A and B cases, 47.4% of leishmaniasis cases and %49.1 of brucellosis cases which were defined exact in hospital laboratories.

When evaluated according to the departments; at the orthopedics, physical therapy, urology and plastic surgery departments mistaken ICD-10 diagnosis code was given (Table 3). When compared with the other institutions, at the public hospital mistaken ICD-10 diagnosis codes were given more to certain diagnosed group A NCD ($p < 0.001$). At the public hospital mistaken ICD-10 diagnosis code was given to certain diagnosed group C NCD.

When evaluated according to the status of notification; 3810 of 3923 NCD constituting the research group were required to be notified according to the surveillance guide; 41.9% of cases to be notified was reported (Table 4). Also, 113 cases not to be notified were reported. The most frequently reported ones in the reported diseases were respectively RRRC (77.0%), rotavirus (4.5%), acute hepatitis A (4.4%), leishmaniasis (3.2%) and tuberculosis (3.1%).

Another result in this research; 59.7% of possible NCD, 30.9% of certain NCD in group A were reported. Excluding RRRC cases, 16.2% of NCDs in group A was reported. 0.6% of group C diseases was reported and 17.7% of group D diseases was reported. The diseases reported at the highest ratio were respectively salmonella (100.0%), malaria (100.0%), RRRC (96.8%), measles (81.0%), tuberculosis (76.9%), kala-azar (66.7%). Any of the chicken pox, mumps, typhoid, acute hepatitis D, whooping cough, rubella, syphilis, toxoplasmosis, echinococcosis, crimean congo haemorrhagic fever, viral hemorrhagic fever, invasive pneumococcal disease and shigella cases was not reported. Furthermore 26.1% of acute hepatitis A cases, 12.5% of acute hepatitis B cases, 14.3% of acute hepatitis C cases, 26.1% of brucellosis cases and 81.0% of measles cases that should be reported in possible or certain cases were reported. 63.5% of cases of tuberculosis and 17.9% of leishmaniasis cases that should be reported in certain cases were reported.

Table 1. Distribution of notifiable communicable diseases by gender and nationality

Notifiable communicable disease (NCD)	Gender				Nationality				Total	
	Male		Female		Turkish		Surian		n	%**
	n	%*	n	%*	n	%*	n	%*		
Group A NCDs										
RRRC	880	69.2	392	30.8	1197	94.1	75	5.9	1272	32.42
Varicella	408	56.4	315	43.6	604	83.5	119	16.5	723	18.43
Leishmaniasis	139	48.8	146	51.2	111	38.9	174	61.1	285	7.26
Acute hepatitis A	146	54.9	120	45.1	156	58.6	110	41.4	266	6.78
Brucellosis	90	48.9	94	51.1	172	93.5	12	6.5	184	4.69
Tuberculosis	77	59.2	53	40.8	92	70.8	38	29.2	130	3.31
Acute hepatitis B	21	65.6	11	34.4	23	71.9	9	28.1	32	0.82
Measles	11	52.4	10	47.6	13	61.9	8	38.1	21	0.54
Malaria	17	100.0	0	0	17	100.0	0	0	17	0.43
Acute hepatitis C	1	14.3	6	85.7	4	57.1	3	42.9	7	0.18
Mumps	2	66.7	1	33.3	3	100.0	0	0	3	0.08
Tetanus	2	66.7	1	33.3	2	66.7	1	33.3	3	0.08
Typhoid	2	66.7	1	33.3	2	66.7	1	33.3	3	0.08
Rubella	0	0	2	100.0	2	100.0	0	0	2	0.05
Acute hepatitis D	0	0	1	100.0	1	100.0	0	0	1	0.03
Pertussis	0	0	1	100.0	1	100.0	0	0	1	0.03
Syphilis	1	100.0	0	0	1	100.0	0	0	1	0.03
Total	1797	60.9	1154	39.1	2401	81.4	550	18.6	2951	75.22
Group C NCDs										
Toxoplasmosis	61	20.8	232	79.2	247	84.3	46	15.7	293	7.47
Echinococcosis	28	50.0	28	50.0	42	75.0	14	25.0	56	1.43
Influenza	16	64.0	9	36.0	25	100.0	0	0	25	0.64
Kala-azar	0	0	3	100.0	1	33.3	2	66.7	3	0.08
Crimean-Congo hemorrhagic fever	3	100.0	0	0	2	66.7	1	33.3	3	0.08
Viral hemorrhagic fever	0	0	2	100.0	2	100.0	0	0	2	0.05
Invasive pneumococcal disease	0	0	1	100.0	1	100.0	0	0	1	0.03
Total	108	28.2	275	71.8	320	83.6	63	16.4	383	9.76
Group D NCDs										
Rotavirus	233	53.8	200	46.2	411	94.9	22	5.1	433	11.04
<i>Giardia intestinalis</i>	72	63.2	42	36.8	105	92.1	9	7.9	114	2.91
<i>Entamoeba histolytica</i>	14	51.9	13	48.1	27	100.0	0	0	27	0.69
<i>Salmonella</i>	9	75.0	3	25.0	12	100.0	0	0	12	0.31
<i>Shigella</i>	1	50.0	1	50.0	2	100.0	0	0	2	0.05
Total	329	56.0	259	44.0	557	94.7	31	5.3	588	15.00
Public health emergency situations of international importance (Likely Group B)										
MERS-CoV	1	100.0	0	0	1	100.0	0	0	1	0.03
General Total	2235	57.0	1688	43.0	3279	83.6	644	16.4	3923	100.00

* The percentage of row, ** The percentage of column.
RRRC: Rabies and rabies risky contact.

Table 2. The status of granted true or false ICD-10 diagnosis codes to notifiable communicable diseases with positive laboratory results

Notifiable communicable disease	True ICD-10 Diagnosis Code		False ICD-10 Diagnosis Code		Total Certain Case	
	n	%*	n	%*	N [#]	%**
Toxoplasmosis	52	17.6	243	82.4	295	25.1
Leishmaniasis	150	52.6	135	47.4	285	24.3
Acute hepatitis A	93	36.3	163	63.7	256	21.8
Brucellosis	85	50.9	82	49.1	167	14.2
Tuberculosis	33	48.5	35	51.5	68	5.8
Echinococcosis	11	31.4	24	68.6	35	3.0
Acute hepatitis B	10	38.5	16	61.5	26	2.2
Malaria	17	100.0	0	0	17	1.5
Measles	14	87.5	2	12.5	16	1.4
Kala-azar	3	100.0	0	0	3	0.3
Typhoid	2	100.0	0	0	2	0.2
Invasive Pneumococcal Disease	0	0	1	100.0	1	0.1
Rubella	1	100.0	0	0	1	0.1
Syphilis	1	100.0	0	0	1	0.1
MERS-CoV	0	0	2	100.0	2	0.2
Total	472	40.2	703	59.8	1175	100.0

* The percentage of row, ** The percentage of column.

The cases which were in more than one health institution information system were included in.

Differences were detected on reporting of NCD according to hospitals; 45.4% of the NCD at the public hospital, and 69.1% of the NCD at the private hospital and 88.0% of the NCD at the university hospital were not reported ($p < 0001$). The family doctors did not report any by using Form 014. At the family health units, 115 NCD in group A were determined in family medicine information system. Case definition of 97.4% of these cases was possible case. The most diagnosed NCD was varicella (73.0%) and case definitions of all were possible diagnosis.

DISCUSSION

In our study, 56.9% of NCD case records forming the study group is male patients. 53.9%-56.6% of cases performed in two different studies in Turkey are male^[8,9]. It is an expected condition that the NCD are more common in men because they are more active in social life.

The most common NCD are respectively; RRRC, varicella, rotavirus, toxoplasmosis, leishmaniasis, acute hepatitis A and brucellosis. In

a study conducted in 1999 in Izmir in the western part of Turkey, measles, RRRC and acute hepatitis A and in a study conducted in 2007 in Edirne in the northwest part of Turkey, tuberculosis, brucellosis and echinococcosis are the most frequent NCD^[10,11]. In the study that was performed by Topal in Hatay in 2009 by excluding RRRC, the most frequently observed NCD were acute viral hepatitis, brucellosis and mumps^[5]. The most common NCD may also be different in different countries. For example; most frequently observed in the United States in 2013; *Chlamydia trachomatis* infection, gonorrhea, lyme disease and HIV^[1]. The most common NCD in the hospital records for 2006-2011 years in Ireland were viral meningitis (11%) and tuberculosis (10.4%) except for acute gastroenteritis^[5]. The frequencies and distributions of the NCD may vary based on the country or the city in which the study was performed, the struggle against disease over time.

In our study 16.4% of the NCD is the cases belong to Syrian refugees and the most common

Table 3. The status of granted true or false ICD-10 diagnosis codes to notifiable communicable diseases with positive laboratory results by departments

Department	True ICD-10 Diagnosis Code		False ICD-10 Diagnosis Code		Total Certain Case	
	n	%*	n	%*	N [#]	%**
Dermatology	148	52.1	136	47.9	284	24.2
Infectious diseases	149	65.6	78	34.4	227	19.3
Pediatrics	81	35.7	146	64.3	227	19.3
Obstetrics and gynecology	11	8.2	123	91.8	134	11.4
Internal medicine	24	29.1	61	71.8	85	7.2
Chest diseases	29	49.2	30	50.8	59	5.0
Otolaryngology	1	2.6	37	97.4	38	3.2
General surgery	3	11.1	24	88.9	27	2.3
Ophthalmology	1	6.3	15	93.7	16	1.4
Pediatric surgery	11	91.7	1	8.3	12	1.0
Orthopedics	0	0	12	100.0	12	1.0
Emergency	1	9.1	10	90.9	11	0.9
Neurology	1	9.1	10	90.9	11	0.9
Family health center	5	50.0	5	50.0	10	0.9
Thoracic surgery	5	50.0	5	50.0	10	0.9
Neurosurgery	2	40.0	3	60.0	5	0.4
Physiotherapy	0	0	4	100.0	4	0.3
Urology	0	0	2	100.0	2	0.2
Plastic surgery	0	0	1	100.0	1	0.1
Total	472	40.2	703	59.8	1175	100.0

* The percentage of row, ** The percentage of column.

The cases which were in more than one health institution information system were included in.

diseases in them are respectively leishmaniasis, varicella and acute hepatitis A. In several studies in Syrian refugees patients in Turkey, it is indicated that especially leishmaniasis, measles and tuberculosis pose a risk for the community^[12-14].

In Turkey, because of the diseases in D group was reported numerically, when D group was excluded, notification of Syrian patients (28.1%) is lower than Turkish patients (50.5%) ($p < 0.001$). Therefore, notification of the NCD cases seen in Syrian patients is very important for the surveillance and taking necessary measures against diseases.

A MERS-CoV case originated in Arabia have been reported in our study. MERS-CoV that is emerged in 2012 and a new seen infectious disease is not included in the notification list. So

it is assessed in the public health emergency of international importance^[15].

When the emergency services and the laboratory excluded, the sections which most diagnosed NCD is pediatrics and dermatology. This situation depends on vaccine preventable diseases in children are still high in pediatrics and leishmaniasis cases in dermatology department. The most frequently diagnosed diseases in children are rotavirus and varicella. Rotavirus is not included in the national immunization program. Varicella is added to the national immunization program in 2013^[6].

In our study it was found to be given correct ICD-10 diagnosis codes to 40.2% of NCD determined positive by the laboratory in group A and C. In the study that was made by Gumus and Durusoy in 2012 in Izmir, this frequency

Table 4. Notification rates of the notifiable communicable diseases

	Notified		Non-notified		Total n
	n	%	n	%	
Group A					
RRRC	1231	96.8	41	3.2	1272
Varicella	0	0	723	100.0	723
Leishmaniasis	51	17.9	234	82.1	285
Acute hepatitis A	70	26.3	196	73.7	266
Brucellosis	48	26.1	136	73.9	184
Tuberculosis	50	76.9	15	23.1	65
Acute hepatitis B	4	12.5	28	87.5	32
Measles	17	81.0	4	19.0	21
Malaria	17	100.0	0	0	17
Acute hepatitis C	1	14.3	6	85.7	7
Mumps	0	0	3	100.0	3
Tetanus	2	66.7	1	33.3	3
Typhoid	0	0	3	100.0	3
Acute hepatitis D	0	0	1	100.0	1
Pertussis	0	0	1	100.0	1
Rubella	0	0	1	100.0	1
Syphilis	0	0	1	100.0	1
Total	1491	51.7	1394	48.3	2885
Group C					
Toxoplasmosis	0	0	293	100.0	293
Echinococcosis	0	0	34	100.0	34
Kala-azar	2	66.7	1	33.3	3
Crimean-Congo hemorrhagic fever	0	0	3	100.0	3
Viral hemorrhagic fever	0	0	2	100.0	2
Invasive pneumococcal disease	0	0	1	100.0	1
Total	2	0.6	334	99.4	336
Group D					
Rotavirus	72	16.6	361	83.4	433
<i>Giardia intestinalis</i>	17	9.3	97	90.7	114
<i>Entamoeba histolytica</i>	3	11.1	24	88.9	27
<i>Shigella</i>	0	0	2	100.0	2
<i>Salmonella</i>	12	100.0	0	0	12
Total	104	17.7	484	82.3	588
Public health emergency situations of international importance (Likely Group B)					
MERS-CoV	1	100.0	0	0	1
General Total	1598	41.9	2212	58.1	3810

is 41.9%^[7]. When the rates of given mistaken ICD-10 diagnosis codes to echinococcosis and toxoplasmosis were high in our study, the rates of given mistaken ICD-10 diagnostic codes to these diseases were lower in Gumus and Durusoy's study. In giving wrong ICD-10 diagnosis code, not to know the case definitions and ICD-10 code diagnosis codes, ability and willingness to fill in Form 014 in hospital information systems of physicians may have been effective. Using the mistaken ICD-10 diagnosis codes not to fill in Form 014 information systems, not changing the diagnosis types as definitive after the laboratory results of the diseases diagnosed possible were confirmed of physicians can cause that the diseases remain hidden, data loss or incorrect notification of case definitions. Various studies cite that excess work and lack of time, lack of familiarity of the list of statutory notifiable diseases, lack of understanding of the importance of notification, using different ICD-10 diagnosis codes and concern regarding confidentiality contributes to poor physician reporting^[4,16-18].

The most frequently reported diseases are RRRC, acute hepatitis A, leishmaniasis and tuberculosis in our study; syphilis, leishmaniasis, tuberculosis and brucellosis in Topal's study; RRRC, tuberculosis and salmonella in Ibrahim and Ucku's study; RRRC, brucellosis and acute bloody diarrhea in Mete's study; *Giardia lamblia*, *Salmonella*, *Shigella* and tuberculosis in Kartal's study are the most commonly reported NCD^[5,9,10,19].

In Turkey, in taking place in frequently reported diseases of tuberculosis and RRRC, having separate notification systems and forms of these diseases as well as being known of high morbidity and mortality of these diseases, also being made effective fight against tuberculosis can be said to be effective. In Australia in 2013, the most frequently notified diseases were sexually transmissible infections (45.0%), vaccine preventable diseases (26.6%) and gastrointestinal diseases (14.5%)^[16]. The most frequently reported NCD in different countries may vary depending on taking part in notification system or not, system updates as well as the common of these diseases. For example, while viral meningitis is notifiable in Ireland, not in Turkey. In this regard, the cause of taking in the first place of varicella and rotavirus is added to the notification system in 2011.

In our study, when the notification status was evaluated based on case definitions, 59.7% of possible group A diseases and 30.9% of certain group A diseases were reported. In Topal's study 77.7% of certain group A diseases was reported^[5]. Having lower rate of notification of probable cases than notifications of certain cases shows that not be used of the laboratories to the extent necessary and be used incorrect ICD-10 diagnosis codes for the NCD. Group C NCD are cases that must be confirmed by a laboratory, they are only reported from inpatient treatment institutions and notification rate is 0.6%. Not only in Turkey likewise also in different countries it is estimated that notification is significantly below the expected number of cases^[20,21]. Especially, it has proven to be notified of missing diseases such as hepatitis A, B, C, legionnaires disease, malaria, varicella, tuberculosis, viral meningitis^[15,22-30].

Group D NCD are the reported diseases diagnosed by laboratory. In our study, 17.7% of group D diseases were reported. In general lack of knowledge and interest, lack of diagnosis according to case definition (*Entamoeba histolytica*, *Campylobacter*, *Cryptosporidium*), lack of diagnosis of sub-species, not to send the samples to the reference laboratory leads to underreporting of these diseases. According to a study conducted by the Ministry of Health, it is found that diagnosis in 15-20% of cases weren't based on the current procedure^[30].

In our study the institutions reporting most NCD are respectively state hospital, private hospital and university hospital. The information of the NCD were being received from the family medicine information system by the Ministry of Health, so the family doctors did not report any by using the form. This situation may cause not to be input the NCD data to BHSM, data loss and data inconsistencies between recording systems.

It is necessary to collect NCD data in time and completely to prevent communicable diseases and to be able to interfere with diseases in time and accurately within the scope of control struggles^[16]. Therefore, firstly appropriate and useful information systems for notification system, then saving data accurately and completely and forwarding outputs to the relevant authorities of health professionals especially physicians using information systems are very important for the healthy functioning of the notification system.

CONCLUSIONS and RECOMMENDATIONS

More than half of NCD in Antakya wasn't reported. The lack of knowledge and false application about notification of physicians, not being made of laboratory processes for agents or being made inaccurately and incompletely in first, secondary and tertiary health institutions, differences and deficiencies in information systems cause to be reported less of diseases.

CONFLICT of INTEREST

The authors reported no conflict of interest related to this article

AUTHORSHIP CONTRIBUTIONS

Concept/Design: ÖA, NS

Analysis/Interpretation: ÖA, NS

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