The descriptive epidemiology of Pertussis In AL-Diwaniya governorate For the years 1990 through 2007

الوبئية الوصفية لمرض الشاهوق في محافظة الديوانية للسنين من ١٩٩٠ ولغاية ٢٠٠٧

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الخلاصة

تمت مراجعة أعداد الحالات المسجلة لمرض الشاهوق (السعال الديكي)في محافظة الديوانية للفترة من ١٩٩٠ولغاية ٢٠٠٧ وذلك لغرض التعرف على الوبئية الوصفية للمرض وتحديد انسب التوقيتات لتنفيذ جرعات اللقاح المضاد للمرض باعتبارها الوسيلة الأنجع للوقاية.

بوبت البيانات حسب الزمان والمكان والأشخاص وأجريت المقارنات حسب طرق الإحصاء الحيوي.

أظهرت النتائج أن المرض متوطن مع حدوث موجات وبائية واضحة سنة 1996 ثم سنة 2001، بعدها استمر المرض بالحدوث سنويا. المرض أكثر حدوثا خلال شهر مايس مقارنة مع حدوثه خلال بقية أشهر السنة (٢٣.٤٣%) يليه حزيران (١٧.١١%) ثم نيسان (١٥.٧٨%) ، في حين ظهر أن المرض أقل حدوثا خلال شهر تشرين الأول (١.٧٥%) الغالبية العظمى من الحالات سجلت في قطاع الديوانية (٦٦.٩%) وأقلها في الحمزة (٥.٠٨%) أظهرت النتائج أيضا أن الأطفال في الفئة العمرية دون الخمس سنوات هم الأكثر عرضة للإصابة بالمرض (٧٥.٢٩%). ولم يتبين وجود فرق معنوي للإصابات بين الذكور (٥٠.٨٥%) والإناث (٤٩.١٥%).

Abstract

To study the descriptive epidemiology of pertussis, all recorded cases of the disease in Al-Diwaniya province for the years 1990 through 2007 were reviewed, rearranged and analyzed.

Results showed that the disease occurred in an endemic state, previously with epidemics every five years till 2001, after which 1t showed continuous annual occurrence.

Most of the cases occurred during May (23,43%) seconded by June (17,11%) then April (15,78%). Those under five are the mostly affected (75,29%), and no significant difference that could be detected between genders.

Key words:

Pertussis. Epidemiology. Inter epidemic period. Immunization.

Introduction

Whooping cough syndrome or Pertussis is a bacterial disease involving the respiratory tract. It is a highly communicable endemic disease with world wide occurrence, and is characterized by three stages: the first is a catarrhal stage with runny nose and irritating increasingly persistent cough, then the paroxysmal stage with repeated violent coughs that have no intervening inspiration followed by aspiratory whoop and ends with expulsion of clear tenacious frothy sputum and mostly followed by vomiting (1,2). The third is a convalescent stage during which gradual resolution of symptoms occurs. The Chinese name the disease as hundred day cough (3). Milder forms of this disease in adults were also related to nurse's cough and grand mother's cough (4).

The specific infectious agent of this disease is one of the Bordetella spp. a small aerobic gram-negative coccobacillus called Bordetella pertussis, for which the human being is the only known reservoir (5).

Individuals with asymptomatic state play no important role in the spread of the disease and because of no chronic carrier; transmission occurred from patients to non immune close contacts (4). Maternal antibodies against bordetella were not demonstrated in the newborns, the disease carries a high case fatality percentages among infants especially those who are malnourished and unvaccinated (2).

Though a large decline in the incidence of the disease was noted after the advent of an effective vaccine in the late 1940s (1), it remains endemic everywhere. Outbreaks occur with marked periodicity every 3 to 5 years (1,2). Moreover a rise in pertussis cases was noticed in New Zealand during the 1990s with epidemics every 5 years (6). Since the 1980s in the United States, largely among those who were more than 10 years of age (7). This rise was also noticed in England with inter epidemic periods of 4 to 5 years (8). The target of the World Health Organization of >1 case per 100000 population in Europe by the year 2000 was not achieved and the disease remains a global concern (9).

The aim of this work is to explore the pattern of occurrence of pertussis in Diwaniya governorate, the population at risk of this disease, and the better time for the implementations of accelerated immunization of this population.

Materials and Methods

This is a descriptive correlation study (10). Descriptive epidemiology deals with the occurrence of a health related event among population and its distribution according to person, place and time (11).

Data were collected from the unit of epidemiology at the department of primary health care and department of biostatistics at the General Directorate of health in AL-Diwaniya governorate and the unit of epidemiology at the Directorate of primary health care.

Registered cases had been diagnosed by physicians and recorded depending on their clinical presentation only (12) and as directed by the Iraqi ministry of health [1]. There is no laboratory confirmation by direct fluorescent antibody (DFA), polymerase chain reaction, or the gold standard method of diagnosis by isolation of the infectious agent in culture media (13).

The data were arranged and tabulated according to: Place and Time of the occurrence of the disease (Whooping cough) and also according to: Person affected by

[1] جمهورية العراق. وزارة الصحة. دائرة الوقاية الصحية. مرض السعال الديكي- الشاهوق. كتاب رسمي بالعدد ٣٣٦١٢ في ٢٠٠٠/١٠/١٠.

it. The tabulated data were compared as percentages or as graphical presentation, discussed and frequencies were analyzed statistically by the use of the Chi-square test (14). Annual incidence rates were also calculated. The number of population used as a denominator for calculation of each rate was based on an official estimation distributed by the Iraqi ministry of health.

Results

Few sporadic cases of pertussis occurred every year for the 1990s through 2000. A sharp rise in incidence was noted during the year 1996 with a highly significant difference than what were recorded four years before and four years after (P value < 0.01). For the period before 1996, the highest annual incidence rate was 3.45 per 100000 population, and was 3.01 for the period after 1996. Since 2001 and through 2007 the results showed a yearly continuous occurrence of pertussis in higher frequencies and incidence rates than in what were during the 1990s. A second sharp rise was noted during 2001, a third during 2004 and a fourth rise during 2006.

The results also showed that most of the cases occurred during May (23,43%), then June (17,11%) and April (15,78%). Though most of cases occurred in Diwaniya qada (66.91%),the highest incidence rate was also in Diwaniya qada for each of the years 1993, 1995 through 2001, but it was in Afaq qada from 2002 and then after. Those under five years of age are the mostly affected (75,29%), and the results showed no significant difference that could be detected between genders (P value > 0.05).

Table (1). Cases of Pertussis in Diwaniya governorate according to months for the years 1990 through 2007.

Month / Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1990*													
1991*													
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	2	0	0	0	0	0	0	0	2
1994	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	2	12	1	4	4	23
1996	2	10	73	63	63	39	23	8	3	5	4	3	296
1997	1	0	1	2	0	3	0	1	1	0	0	1	10
1998	0	1	1	2	3	3	8	4	0	1	1	1	25
1999	0	1	4	3	4	4	0	0	0	0	0	0	16
2000	1	1	0	1	2	5	4	3	3	0	0	1	21
2001	1	2	12	41	94	103	50	24	15	7	11	5	365
2002	9	17	21	19	44	43	29	11	6	6	0	6	211
2003*													117
2004	12	34	70	122	161	60	37	16	5	7	5	11	540
2005	4	8	5	17	20	14	10	1	6	4	6	6	101
2006	3	21	23	31	59	43	32	31	14	4	3	4	268
2007	6	24	4	31	41	43	26	17	18	2	6	8	226
Total	39	119	214	332	493	360	219	118	83	37	40	50	2104

***Data were missing or incomplete because of war and then political unsettlement and administrative shortages.**

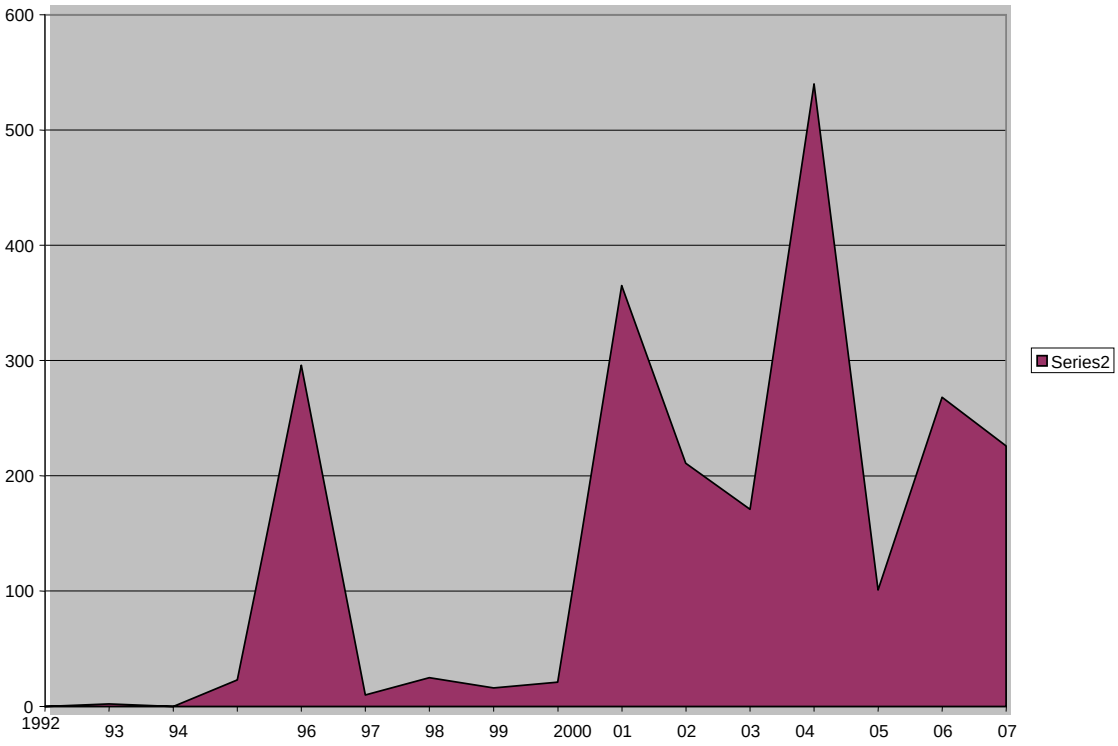

Figure (1). Cases of Pertussis in Diwaniya governorate according to the years 1990 through 2007.

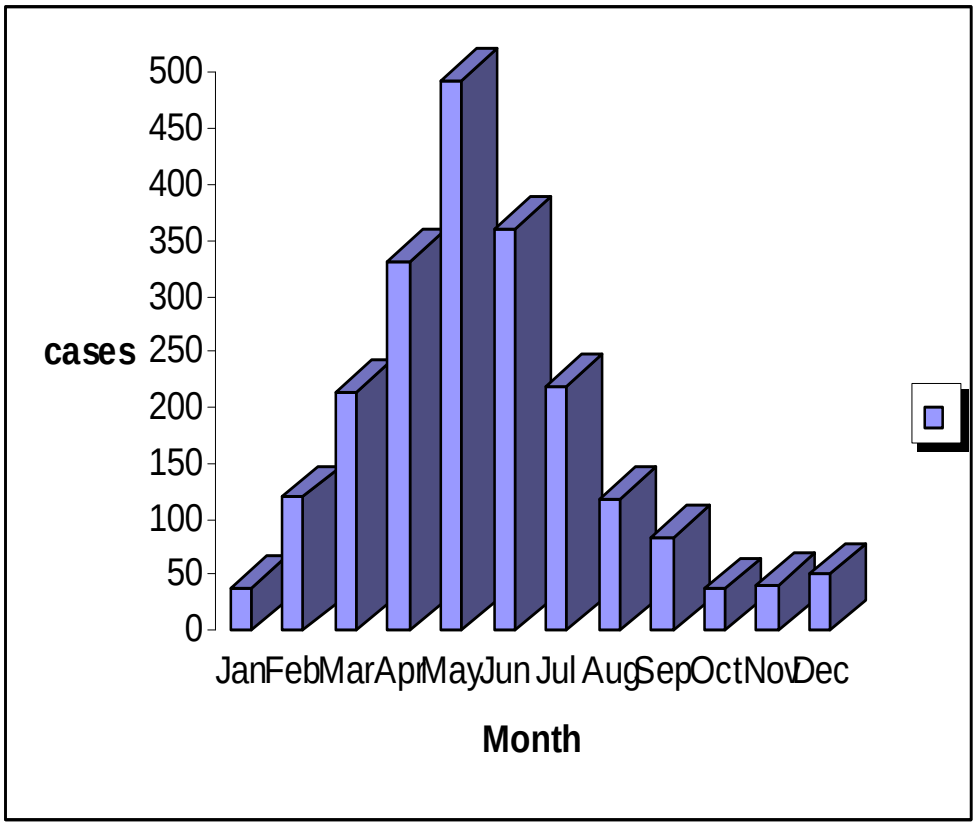

Figure (2). Cases of Pertussis in Diwaniya governorate according to the months of the years 1990 through 2007.

Table (2). Cases and Incidence rates of Pertussis in Diwaniya governorate according to Qada for the years 1990 through 2008.

Qada / Year	Diwaniya		Hamza		Shamiya		Afaq		Total	
	C.*	I.R.*	C.	I.R.	C.	I.R.	C.	I.R.	C.	I.R.
1990**										
1991**										
1992	0	0	0	0	0	0	0	0	0	0
1993	2	0.63	0	0	0	0	0	0	2	0.28
1994	0	0	0	0	0	0	0	0	0	0
1995	22	6.5	3	2.65	0	0	0	0	25	3.45
1996	258	73.81	18	15.37	9	4.89	8	8.26	293	39.18
1997	9	2.49	1	0.83	0	0	1	1	11	1.42
1998	13	3.48	3	2.4	2	1.02	6	5.8	24	3.01
1999	12	3.11	0	0	5	2.46	0	0	17	2.06
2000	18	6.03	0	0	2	0.95	3	2.72	23	2.7
2001	235	57.18	19	13.8	47	21.68	64	56.13	365	41.5
2002	99	23.37	5	3.52	42	18.78	65	55.28	211	23.27
2003**									117	12.48
2004**									540	55.74
2005	59	11.65	2	1.19	1	0.4	39	27.43	101	10.4
2006	181	29.1	28	16.49	23	8.85	53	36.27	285	29.25
2007**									226	22.43
Total	908		79		131		239		1357	

*** C = Cases. I.R. = Incidence Rate per 100000 population.**
**** Data were missing or incomplete because of war and then political unsettlements or could not be reached due to administrative shortages.**

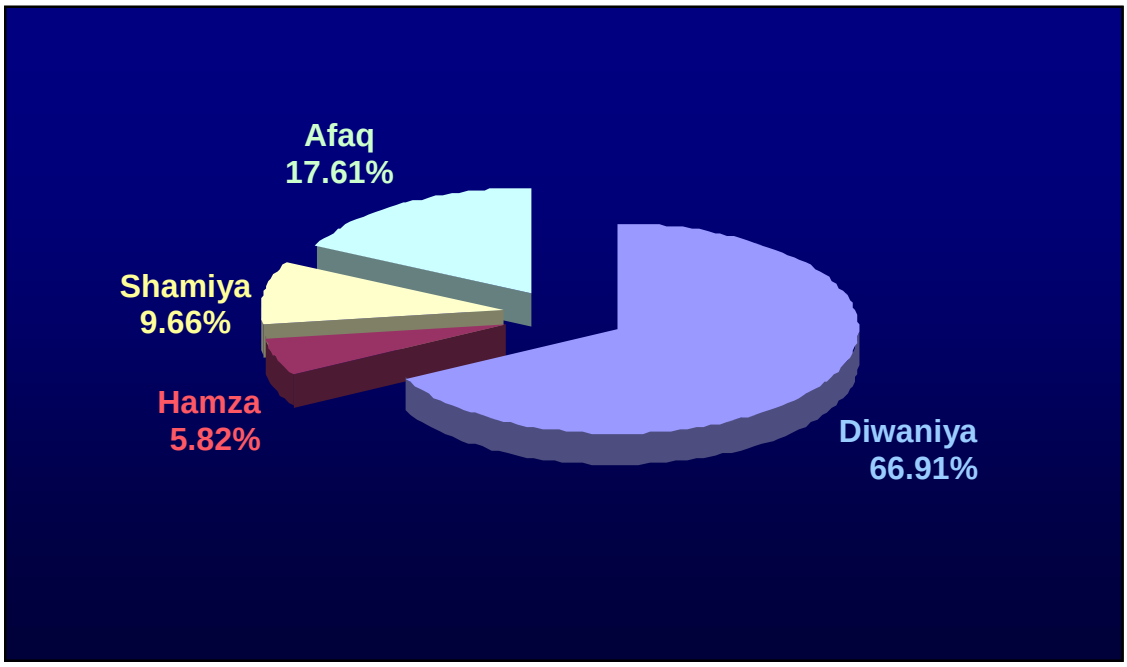

Figure (3). Cases of Pertussis as percentages according to the Qada of Diwaniya governorate for the years 1990 through 2007.

Table (3).Cases of Pertussis in Diwaniya governorate according to age and gender for the years 1990 through 2007.

Age	< 1		1 -		5 -		10 -		15-		20 -		Total	
Sex / Year	M	F	M	F	M	F	M	F	M	F	M	F	M	F
1990*														
1991*														
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	1	1	0	0	0	0	0	0	0	0	1	1
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	4	4	7	6	1	2	0	0	0	0	0	0	13	12
1996	46	51	64	72	16	19	14	14	0	0	0	0	140	156
1997	4	0	3	1	0	1	0	1	0	0	0	0	7	3
1998	5	8	4	5	1	2	0	0	0	0	0	0	10	15
1999	2	2	6	1	2	1	0	0	1	0	0	1	11	5
2000	2	2	7	3	4	2	0	0	0	0	0	0	13	7
2001	56	60	82	69	33	43	8	9	2	0	2	1	183	182
2002	18	13	57	41	18	14	4	3	-	-	-	-	97	71
2003	12	10	30	28	10	23	2	-	2	-	-	-	56	61
2004$	46	57	145	114	73			80	18			7	282	258
2005$	16	12	32	18	11			9	-			-	59	39
2006$	31	28	27	79	38			30	5			-	146	137
2007$	29	28	62	61	19			23	1			1	111	113
Total	271	275	527	500	244			276	31			10	694	670

***Data were missing or incomplete.**

$ New forms were applied for notification.

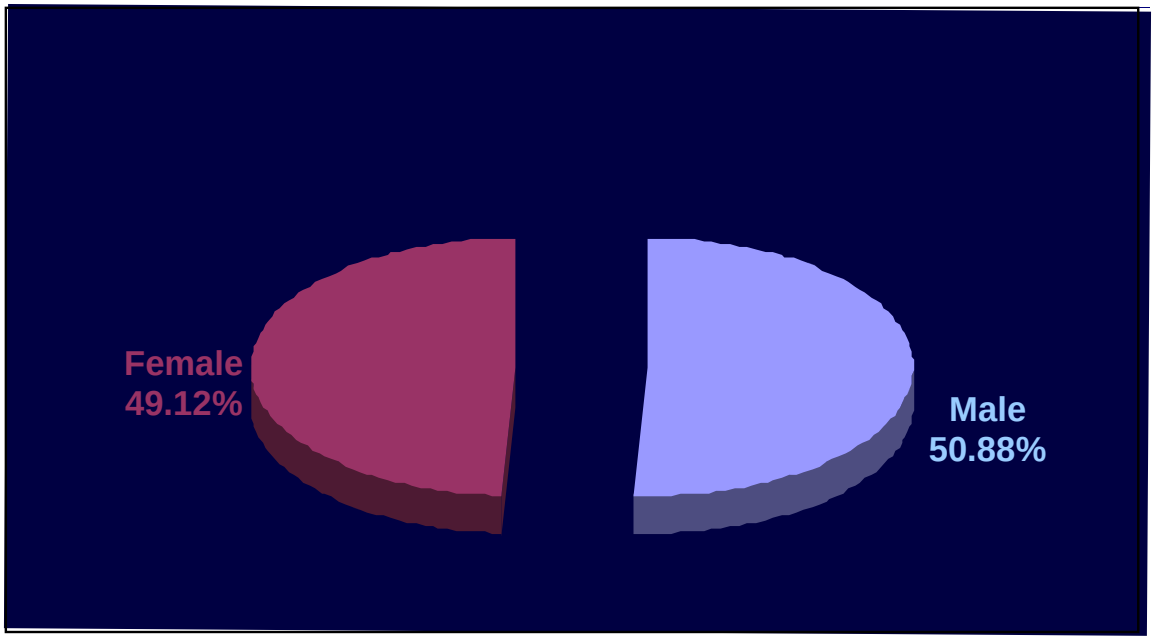

Figure (4).Distribution of Pertussis as percentage in Diwaniya governorate according to Gender for the years 1990 through 2007.

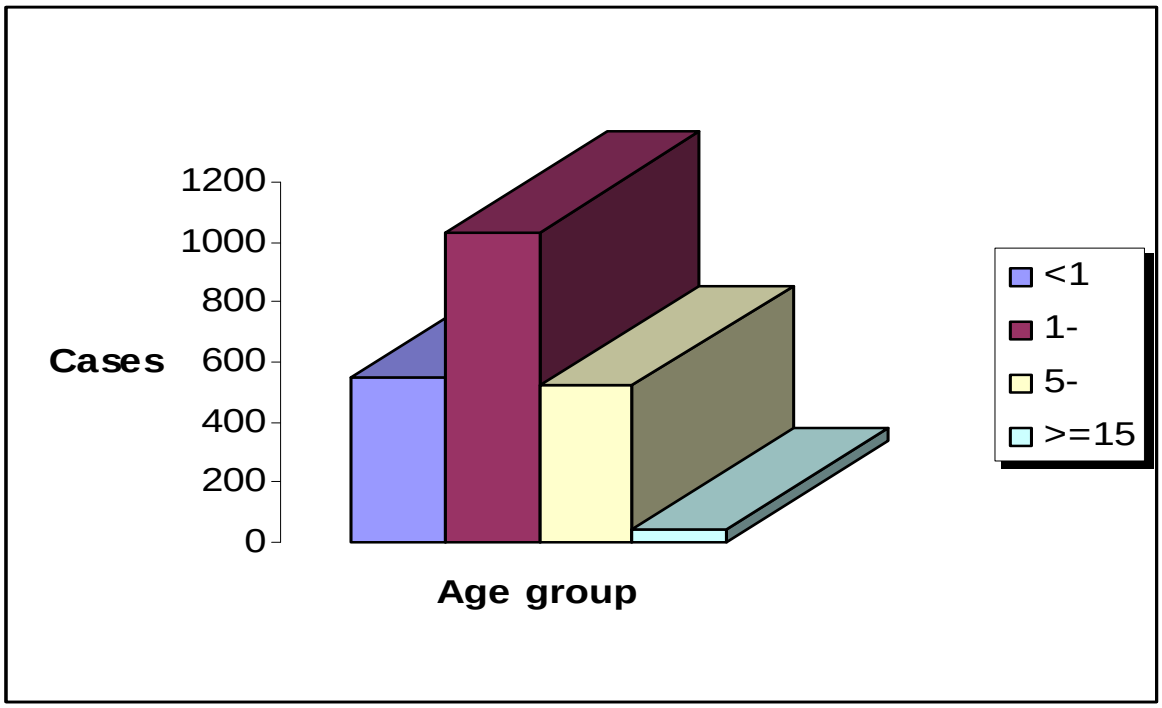

Figure (5). Cases of Pertussis in Diwaniya governorate according to age groups for the years 1990 through 2007.

Discussion

According to time: Table (1) and Figure (1). Both are showing that Pertussis is an endemic disease in Diwaniya; sporadic cases were recorded annually for the period of the study. Till the year 2001 waves of epidemics were also noticed with evident periodicity. The inter epidemic period was of five years close to what was reported in Iraq for the years 1972-1987 before the implementation of the expanded programme on immunization (15). This periodicity was noted in other countries where immunization programs were implemented (7,9). Knowing the inter epidemic period encouraged the preparation for application of a targeted immunization against Pertussis to abort the coming epidemic (16).

Since the year 2001 the periodicity of the disease was replaced by continuous annual occurrence of more than ten times higher number of cases than before 2001 (P-value < 0.05). This reflects a possible defect in immunization, and the need for more elaborated sero-epidemiologic investigations to measure the level of herd immunity in Diwaniya before vaccination. Also to calculate the sero-conversion rates among vaccinees after vaccination and the efficacy of the used vaccine (14,16,17).

Table (1) also is showing as in Figure(2) that the highest number of cases occurred during the month May seconded by Jun then April, while the lowest number occurred during October and months of the winter. This indicates that initiating a mass campaign of immunization against pertussis is better to be earlier than May.

According to place: Table (2), Figure (3) are showing that till 2002 the disease is more common in Diwaniya Qada the center urban area of the governorate than in rural areas. This is in agreement with the trends of respiratory infections being related to urban highly populated areas. For the years 2002, 2005 and 2006, the highest incidence rates were in Afaq qada despite the on going vaccinations. This finding supports the need for the suggested sero-epidemiologic investigation.

According to person: Table (3), Figure (4) are showing that the disease occurred in both sexes at a male to female ratio of 1:1 and there is no significant difference in the frequency distributions among both genders (P-value > 0.05). This result contradicts what was shown in Basra, Iraq during 1996 in which the ratio was 2:8 (18). With regards to age: Table(3)also is showing as in Figure(5) that the disease occurred more commonly among those under five year of age. This age group is still the population at the highest risk of developing pertussis even in the presence of routine vaccination and as designed in the national program of immunization.

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