

Studying the Epidemiological Features of Appendicitis Including Age, Gender, and Seasonal Distribution in Yazd Province in 2014

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Abstract:

Introduction:

Acute appendicitis is a common surgery disease which may affect about 7% of people during their longevity. This disease is one of the most common surgical emergencies and one of the most common abdominal emergency cases in the US. Approximately, 11 persons out of every 10 thousand experience appendicitis in their lifetime. The present research aims to study the epidemiological features of appendicitis including age, gender, and seasonal distribution in Yazd Province in 2014.

Material and Methods:

The present study was a retrospective analysis. After referring to the HIS system, information on all cases of appendicitis patients admitted to hospitals of Yazd province was extracted based on census sampling and then analyzed is SPSS-18 and shown in frequency tables and charts. In this study, Yazd Province's population in 2014 was estimated based on the 2011 census conducted by the Statistics Center of Iran and those who were not from Yazd Province were excluded from the study.

Results:

the prevalence of appendectomy was studied in health-medical centers of Yazd province. Out of 24 hospitals in this province, 18 hospitals were selected and studied. According to the hospital record systems, 3743 cases of appendectomy have been done in 2014, 1898 of which were related to men and the rest of them was related to women. In addition, using chi-square, no significant relationship was found between season and gender of patients ($p=0.362$).

Conclusion:

In this study we learn that there were no relation between gender and prevalence of appendicitis.

Key words: appendicitis, prevalence, surgery

Introduction:

Acute appendicitis is a common surgery disease which may affect about 7% of people during their longevity. This disease is one of the most common surgical emergencies and one of the most common abdominal emergency cases in the US. Approximately, 11 persons out of every 10 thousand experience appendicitis in their lifetime [1]. Appendicitis mostly occurs at ages 15-25. This disease affects all age groups and both genders and its epidemiological prevalence in men and women is 8.6% and 6.7%, respectively. It is often difficult to get an accurate diagnosis of appendicitis. In France, 75,000 cases of normal or fibrotic appendectomy are annually done which is indicative of poor preoperative diagnosis as a major problem in diagnosis of acute appendicitis. On the other hand, two important complications of appendicitis, that are gangrene and perforation, are caused due to late diagnosis in most cases [2]. The classical signs and symptoms of appendicitis are not always the same and different symptoms can make difficult the diagnosis of acute appendicitis. Clinical diagnosis is a common misdiagnosis problem and the rate of negative laparotomy is approximately 20-40% [3]. Delay in diagnosis of appendicitis is associated with increased morbidity and mortality. Laboratory, ultrasound, and CT scan findings can be helpful in clinical diagnosis of patients. However, clinical method is the best diagnosis procedure for this disease and considered part of the art of clinical surgery. This ongoing inflammatory process requires the immediate removal of the appendix and prevention of life-threatening complications such as ruptured appendix and peritonitis. The results of appendicitis surgery have been satisfactory so far. On the other hand, if simple appendicitis is progressed to complicated appendicitis, it increases morbidity and mortality and also imposes high cost on patients and health systems [4]. In the US, about 250,000 cases of

appendectomy are done annually done in the whole population and this figure in the population aged under 18 is 4 cases in every 1000 people [5]. Rate of appendectomy has declined in most countries since 1950. For example, it reached the lowest rate in the US (15 cases in every 1000 people) in the US in 1990. In recent years, a few studies have specifically conducted on clinical aspects and problems of diagnosis and prognosis of acute appendicitis. In addition, some studies have been carried out on age, gender, and seasonal distribution of this disease but the reason for these changes is not yet known. The present research aims to study the epidemiological features of appendicitis including age, gender, and seasonal distribution in Yazd Province in 2014.

Methodology:

The present study was a retrospective analysis. After referring to the HIS system, information on all cases of appendicitis patients admitted to hospitals of Yazd province was extracted based on census sampling and then analyzed is SPSS-18 and shown in frequency tables and charts. In this study, Yazd Province's population in 2014 was estimated based on the 2011 census conducted by the Statistics Center of Iran and those who were not from Yazd Province were excluded from the study.

Results:

In the present research, the prevalence of appendectomy was studied in health-medical centers of Yazd province. Out of 24 hospitals in this province, 18 hospitals were selected and studied. According to the hospital record systems, 3743 cases of appendectomy have been done in 2014, 1898 of which were related to men and the rest of them was related to women (Table 1). These patients were in the age group of below 1 to 80 with a mean of 24.97 (Table 2). The minimum and maximum days of hospitalization were 2 and 8, respectively, with a mean of 3.66 days (Table 2 and Table 3). In terms of seasonal distribution, 23.4%, 46.9%, 8.7%, and 21% of surgeries were performed in spring, summer, fall, and winter, respectively (Table 4). Based on the study of distribution among the seasons using chi-square analysis, no significant relationship was found between seasons and frequency of appendectomy ($p=0.365$) (Table 5).

According to Table 6, patients were divided into 18 age groups in order to obtain the annual prevalence of appendicitis. According to the results, the highest and the lowest prevalence of appendicitis were related to the age groups 15-19 (4.39 cases in every 1000 people during the year) and 70-79 (0 case in every 1000 people during the year), respectively. Accordingly, an analytic comparison was made between age group and gender of

patients using the chi-square and the results showed that there is no significant relationship between age and gender of patients (Table 7). Comparison of hospitalization days with age of patients suggested a significant relationship between them. This means that the length of hospitalization in younger and older patients is higher than the middle-aged ones ($p=0.03$). In addition, using chi-square, no significant relationship was found between season and gender of patients ($p=0.362$) (Table 7). In this research, the relationship of seasons with hospitalizations days and gender of patients was also studied but no significant relationship was observed between them (Table 8).

Discussion:

Acute appendicitis is the most common emergency general surgery that its standard treatment is appendectomy. In the case of no treatment, inflamed appendix may be ruptured or perforated and its infectious materials spread into the abdominal cavity. This can cause a condition called peritonitis, a serious inflammation of the abdominal cavity. If it is not immediately treated by taking strong antibiotics, it may be followed by fatal consequences. Peritonitis is just one of the hazards of bursting appendix. This represents an inflammation of the tissue that makes up the abdominal wall. Other organs may get inflamed after a ruptured appendix. In this case, the affected areas may include intestine, urinary bladder, and splenic flexure colon. If the damaged appendix is perforated instead of rupture, it can cause an abscess. In this case, infection would be limited to one area. However, the abscess can also be dangerous to health [1-2]. Hence, the epidemiological features of patients with appendicitis were studied in this research.

The present study was a retrospective analysis. After referring to the HIS system, information on all cases of appendicitis patients admitted to hospitals of Yazd province was extracted based on census sampling and then analyzed is SPSS-18 and shown in frequency tables and charts.

In a study conducted by Mohammed Al-Omran *et al.* (2003), epidemiological features of acute appendicitis were studied in all acute care hospitals in Ontario. The results showed that appendicitis is more prevalent among people in the age group 10-19 [10].

Jahangiri *et al.* (2007) studied the epidemiological features of acute appendicitis in Ray, Tehran and reported that appendicitis is more common in those aged 20-29 [2].

Michelle T. Buckius *et al.* (2012) conducted a study on the changing epidemiology of acute appendicitis in the United States in the years 1993-2008 and reported that acute appendicitis is more prevalent among people aged 10-19 [5].

In the study of David G. Addiss *et al.* (1990) on the epidemiology of appendicitis and appendectomy in national hospitals of the US in the years 1979-1984, it was reported that the highest incidence of early positive appendectomy (appendicitis) (23.3 in every 10,000 people) belong to the age group 10-19 [5].

In the present study, patients were in the age group of below 1 to 80 with a mean of 24.97. According to the results, the highest and the lowest prevalence of appendicitis were related to the age groups 15-19 (4.39 cases in every 1000 people during the year) and 70-79 (0 case in every 1000 people during the year), respectively.

Mohammed Al-Omran *et al.* (2003) reported that the prevalence of appendicitis in men is higher than women [6]. Jahangiri *et al.* (2007) and David G. Addiss *et al.* (1990) also reported the same result. Epidemiologically, the prevalence of appendicitis in men and women is 8.6% and 6.7%, respectively. In addition, the risk of appendectomy is 12.0% for men and 23.1% for women [7]. In the present study, 1898 men and 1845 women were diagnosed with appendicitis which suggests higher prevalence of appendicitis among men.

Mohammed Al-Omran *et al.* (2003) reported that the prevalence of appendicitis during summer months is higher than other seasons [8]. Jahangiri *et al.* (2007) also obtained the same result [9]. In terms of seasonal distribution, 23.4%, 46.9%, 8.7%, and 21% of surgeries studied in this present research were performed in spring, summer, fall, and winter, respectively. This indicates higher prevalence of appendicitis in summer compared to other seasons.

Conclusion:

In this study we found the

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Table1: Relation between gender and season of admission for appendectomy

p.value	female		male		season
	percent	number	percent	number	
0.365	48.5	424	51.5	450	spring
	50.7	891	49.3	865	summer
	46.3	151	53.7	175	autumn
	48.2	379	51.8	407	winter
	49.3	1845	5.7	1897	total

Table2: relation between gender and age and admission days

p.value	St deviation	mean	number	gender	
0.02	13.185	24.96	1898	male	age
	13.69	24.99	1845	female	
0.562	1.3	3.63	1898	male	admission days
	1.32	3.68	1845	female	

total			female			male			age
population in 2014 and 2015	incidence in year in 1000	number of apandectomy	population of females in 2014 and 2015	incidence in year in 1000	number of apandectomy	population of males in 2014 and 2015	incidence in year	number of apandectomy	
46800	0.06	3	22919	0.09	2	23881	0.04	1	under 1 year
167425	0.30	50	81944	0.33	27	85481	0.27	23	1-4 years
170280	1.48	252	83818	1.57	132	86462	1.39	120	5-9 years
149257	3.01	449	73190	3.21	235	76068	2.81	214	10-14 years
151330	4.35	659	74199	4.29	318	77132	4.42	341	15-19 years
205757	3.37	694	103069	3.13	323	102689	3.61	371	20-24 years
250654	2.15	538	123176	2.04	251	127479	2.25	287	25-29 years
213981	1.85	396	101465	1.92	195	112516	1.79	201	30-34 years
154297	1.57	243	72257	1.66	120	82040	1.50	123	35-39 year
127691	1.20	153	59225	1.35	80	68466	1.07	73	40-44 year
105613	0.68	72	50194	0.82	41	55419	0.56	31	45-49 year
95750	0.56	54	44555	0.56	25	51195	0.57	29	50-54 year
75930	1.07	81	37604	1.28	48	38326	0.86	33	55-59 year
51666	0.52	27	25395	0.51	13	26271	0.53	14	60-64 year
38079	0.71	27	19228	0.68	13	18852	0.74	14	65-69 year
32882	0.82	27	16751	0.90	15	16131	0.74	12	70-74 year
27073	0.00	0	13574	0.00	0	13500	0.00	0	74-79 year
19264	0.93	18	9778	0.72	7	9485	1.16	11	80-84 year
13899	0.00	0	6875	0.00	0	7024	0.00	0	upper 85
2097630	1.78	3743	1019216	1.81	1845	1078414	1.76	1898	total

Figure 1: gender percent by age

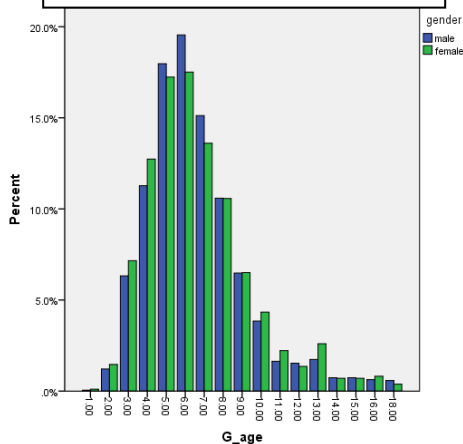


Figure 2: patient percent by season

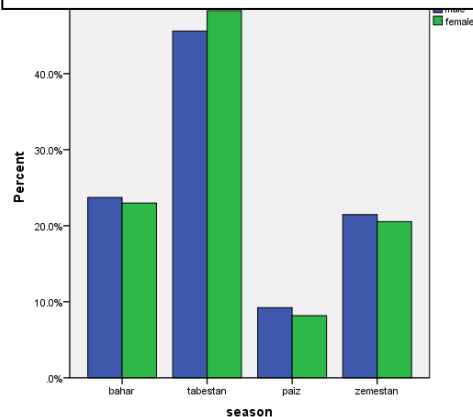


Figure 3: age percent by season

