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Epidemiological outline of animal bites in Bandar Abbas County, Iran

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Abstract
Rabies as a viral zoonotic disease is widespread particularly in developing territories. It mostly transmits through bite or scratch of animals such as dog and cat. According to WHO, rabies responsible for thousands of human mortality. Our data included all animal bite cases in Bandar Abbas county between 2012-2016 period. Many features of cases are recorded in a database of the center for disease control and prevention (CDC). These characteristics analyzed by Chi-square test. Out of 2887 individuals who injured by animals, 2298 (79.59%) were men and 589 (20.4%) were female. In total, 65.53% and 34.46% of reported bite were from urban and rural areas, respectively. The 21-40 age category (57.01%) were common victims. The feet with hand together were the highest involvement part of the body (91.61%). Domestic dogs were the most acting animal of the wound (72.67%). The most bites occurred in the spring (27.39%) and winter (27.43%) seasons. Most of the owners have no enough experience on keep animal in their home or workplaces. Therefore, training the technics of animal maintenance and handling a dog attack or agitate can decrease the risk. Also, the collar should be used for control and identification of dog in rural areas since most of them were shepherd or guardian dogs in these territories. Most of the monkeys are smuggled into Iran across the borders. Notably, the number of emergency units should be increased in remote areas for people who seek medical attention in case of an animal bite.

Keywords: animal bite, rabies, vaccination, epidemiology, Iran

Introduction
Many domestic and wild animals commonly dog injure human through bite or scratch. Indeed, these wounds serve as medical emergency in the world [1]. Animals attack people by chance or non-accidental. However, they can be dangerous for all ages groups [2]. The rabies infection is a viral disease that causes neurological involvement in human and other vertebrates. The causing microorganism of it enters into body from the saliva of a rabid animal whereas the clinical signs demonstrate two weeks later [3, 4]. The various technics have been recommended for diagnosis of rabies depending on the form of disease (furious, paralytic and atypical rabies), specificity and their cost. Nowadays, the nucleic acid amplification, RT–PCR and Fluorescent antibody test (FAT) as the reliable methods extensive used in developed laboratories [5, 6]. Human rabies is potentially preventable if pre-exposure immunization or post-exposure prophylaxis (PEP) are applied exactly [7]. It should be stated that oral flora of the biting animal is rich in case of bacterial genera such as *Pasteurella*, *Streptococcus* and *Fusobacterium* [8]. According to WHO (world health organization) report, rabies responsible for thousands of human mortality predominantly in Asia and Africa. It is documented that 40% of victims are children under 15 years of age [9]. Notably, 20, 000 deaths are reported due to rabies annually in India [10]. Although control of Rabies is possible via accomplishment of post-exposure prophylaxis (PEP) strategy, there are several reasons such as the lack of health services, the low level of awareness concerning to PEP, the cost of practices and inconsistency between authorities and medical facilities failed the cover of this process in developing countries [11]. According to statistical data, animal bites cases are 100-450 (per 100, 000) in different districts either urban or rural of Iran. Similarly, prevalence rate of bites was 5, 939/100, 000 to 2011 each year. This indicator was increased toward 6, 115/100, 000 after 2011 until now [12]. The important biting animals are dog and wolf in north and Northwestern Iran respectively [13]. Moreover, most recorded victims were males [14]. Our survey aimed to review the epidemiological profile of animal bite and rabies between 2012 and 2016 in Bandar Abbas county in southern Iran where no investigation has not conducted in this part so far. The results can be useful to develop and management of rabies control into health policies based on medical and veterinary aspects of the animal bite.

Materials and Methods
In this cross-sectional study, data included all animal bite cases in Bandar Abbas county between 1 April 2012 and 31 March 2016. This county as the largest port is located on the coast of Persian Gulf with 680, 366 population, in the southern Iran. It has hot desert climate and its average relative humidity is 65%. Required information was recorded into special forms by professional health experts in the center for disease control and Prevention (CDC) of Hormozgan University of Medical Sciences (HUMS). This project was confirmed by the research ethics committee of HUMS. Our database included several characteristics as follows: age, sex, occupation, place of residence, the site of scratch, wound or

laceration and the type of biter. Data analyzed by Chi-square test and p-value of ≤ 0.05 was employed for point of Significant difference.

Results

In our study, 2887 animal bite cases were reported in Bandar Abbas county south of Iran. Figure 1 has shown that animal bite profile increased during the study period. In total, 2298 (79.59%) of victims were male and 589 (20.4%) were female (Table 1). There was a significant relationship between sex and prevalence of animal bite cases (P=0.002). Besides, more bites occurred in spring (27.39%) and winter (27.43%) (Figure 1). Since the majority of them were registered in March (9.62%) and the lowest injuries were seen in September (6.61%) (Table 2). Overall, 1892 individuals (65.53%) lived in urban and 995 (34.46%) in rural areas. A correlation was presented between the type of residence (urban or rural areas) and frequencies of cases (P=0.036). Up to 57.01% of cases categorized into 21-40 age group followed by 6-20 ages (22.23%), ≥41 (14.92) and less than 5 y/o (5.81%). Most specimens were injured in hand with feet site (91.61%), followed by trunk (4.36%) and head with neck together (4.01%). Dogs were the main biting animal (83.85%), followed by cats (8.38%) and other animals (5.95%) (Figure 2). Out of 2421 biting dogs, 2098 (72.67%) were domestic and the rest of them (11.18%) were stray dogs (Table 3). There is a significant difference was seen between the causing animal bite and the number of cases (P=0.043) (Figure 6). All monkeys were the non-native animal in Iran. No human rabies was recorded in our site of study.

Table 1: Futures of Animal bite cases

Characteristics	Classification	Number	Percent
Sex	Male	2298	79.59
	Female	589	20.4
Age category	≤5	168	5.81
	6-20	642	22.23
	21-40	1646	57.01
	≥41	431	14.92
Residence	Urban	1892	65.53
	Rural	995	34.46
Occupation	Student	612	21.19
	Rancher	82	2.84
	Employee	142	4.91
	Housekeeper	396	13.71
	Self-employed	666	23.06
	Others	989	34.25
Site of wound	Trunk	126	4.36
	Hand and Feet	2645	91.61
	Head and Neck	116	4.01

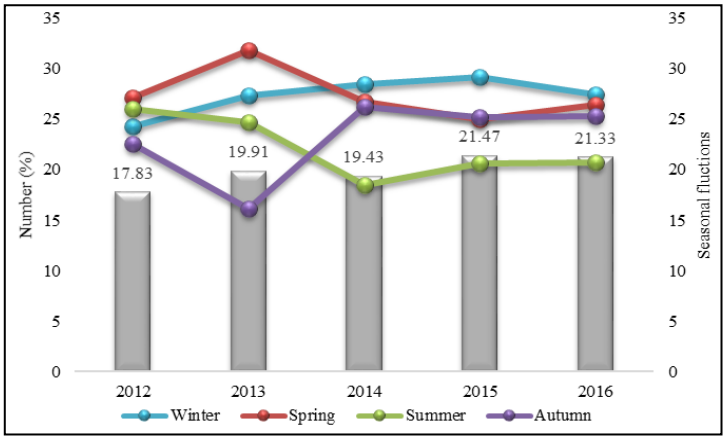

Fig 1: Frequency of animal bite cases based on season in a five-year period (2012-2016)

Table 2: Monthly distribution of animal bite cases

Months	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Frequency	248	266	278	252	272	267	219	226	191	202	235	231
percent	8.59	9.21	9.62	8.72	9.42	9.24	7.58	7.82	6.61	6.99	8.13	8.00

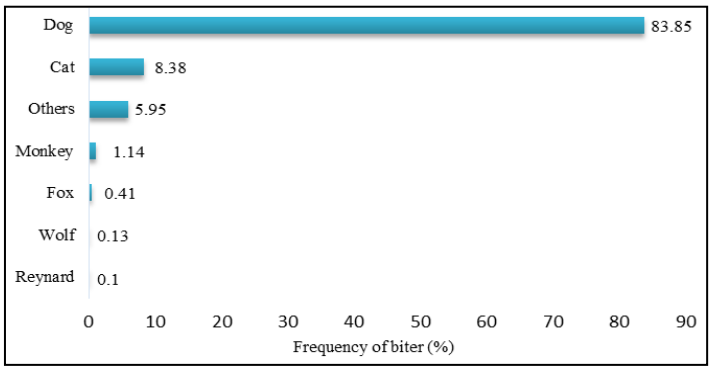

Fig 2: Tend to animal biter in Bandar Abbas county

Table 3: Type of causing animal bite

Biter animals	Reynard	Wolf	Fox	Monkey	Others	Cat		Dog		Total
						Owned	Stray	Owned	Stray	
Number	3	4	12	33	172	97	145	2098	323	2887
Percent	0.1	0.13	0.41	1.14	5.95	3.35	5.02	72.67	11.18	100

Discussion

Animal bites and rabies infection, are considered to be the public concern within health care, particularly in the developing countries. Anti-rabies vaccine or immunoglobulin impose additional expenditure on socio-economic development of these countries annually [15]. In the present study, the number of animal bites gradually increased within five years from 2012-2016 (Figure 1). In addition to, 79.59% of bite cases were male while 20.4% were female ($p<0.05$). As most male has self-employment job. The same results have been reported in previous investigations [16, 17]. Perhaps, males, by far, are more closed to the animal because they work outside. Also, some male cases deal with animal due to their jobs such as shepherds, zookeepers, and veterinarians. The result was indicated that most people who have been bitten by animals lived in urban (65.53%) ($p<0.05$) (Table 1). Our knowledge is consistent with others literatures [18, 19, 20, 21]. They limited animal especially dog in their houses or gardens [22, 23]. Since the most biting animal was dogs (Figure 2) while 72.67% of the owner were injured by own dogs ($p<0.05$) (Table 3). It agrees with another view [24]. It should be noted that many people in Iran housed animals in their building without any experience or knowledge. Subsequently, these animals show aggressive behaviors also invade their owner occasionally. Apart from domestic dog or cat, some citizen or tourists injure by wild animals when they travel to rural areas [25]. In the recent paper, most cases were bitten in spring (27.39%) and winter (27.43%) seasons (Figure1) (Table 2). This pattern is contrasted with other studies that conducted in Quchan [26] and Ardabil [27] in North of Iran. Apparently, this dynamic of the animal bite can be described upon its climate so-called "hot desert climate". The seasons are usually warm throughout the year and very hot in the summer. Moreover, the difference is low between winter and spring in term of temperature. On the other Bandar Abbas has moderate weather in winter [28]. Thus, appropriate environmental parameters can affect the prevalence of mammalian bites [29]. Animals wander throughout the day in urban and countryside to give food thereby, they exposure to human intensively. In fact, urbanization, drought period as well as encroachment of human into animal shelter destroy the structure of wildlife and loss of food sources in nature. Hence, the hungry carnivorous attack the villagers and livestock corral [30]. Human-Wolf Conflict and livestock depredation have been reported from many parts of Iran in recent years frequently [31, 32]. The 21-40 age group was the common cases who were bitten by animals while the lowest reported bite belongs to less than 5 age group. The same data was observed in another research [22, 33] but the children (less than 5 or 10 years) were frequent victims in other records [34, 35]. It's more likely that the persons of >20 ages have social activity and are more being subjected to bitter than others. An alternative hypothesis for this outcome, some school-aged children fear dogs and avoid to touch while some kids are interested in pet animals. Maybe parents supervision has decreased the dog bite in children in our work [36]. This pattern can be different in poor income countries. In noted communities, children work outside and more contact with animals. However, social characteristics can impress our interpretation. The hand with feet together included 91.61% of the biting site. This finding is accordance with others papers [16, 37]. Maybe these limbs more used to protect against animal attack or dog bite. It noteworthy that no rabies cases are reported from Bandar Abbas county in the 2012-2016 period, south of Iran.

Conclusion

Owned dogs are the major causing animal bite or scratch in Iran, especially in urban areas. Most of the owners have no enough experience on keep animal in their home or workplaces. Often, they have the history of dog/cat aggression. Therefore, training the technics of animal maintenance and handling a dog attack or agitate can decrease the risk of vulnerability. Also, the collar should be used for control and identification of provoked dogs in rural areas since most of them are shepherd or guardian dogs in these territories. It is noteworthy that washing and clear the bite wound by water with soap or detergent for at least 5-10 minutes decrease the chance of rabies infection [38]. Fortunately, PEP and Rabies immunoglobulin (RIG) are available in surveillance and health care system in Iran. However, the number of emergency units should be increased in remote areas for people who seek medical attention in the case of an animal bite. Also, oral bait vaccination such as SAG2 is an operational strategy for rabies control in the defined population of feral animals. Furthermore, chemical compounds such as GnRH (Gonadotropin Releasing Hormone) associated with vaccine applied for sterilization of animal community within surveillance implements [39]. Most of the monkeys are exotic species that kept as pets in Iran. They are smuggled into Iran across the borders. These animals are a threating for the indigenous ecosystem. Clearly, they can transmit the infectious disease to human. Therefore, the strict laws should be enacted in order to the prevention of wildlife trafficking.

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