Introduction

Group security and assembly protection are basic in a war atmosphere. Current events in Iraq have established a tendency for the use of explosive devices by insurgents. The security of armed bases and arrest of people who break that security are huge tasks that cannot be accomplished successfully without trained patrol dogs. Protection and safety tasks are best achieved with the help of military working dogs (MWDs/ K9). MWD/ K9 have extensively used in Iraq to help in reinforce security and investigate the explosive devices. Scene requirements and mission needs define the essentiality for allocation of MWD/ trainer groups. The necessity for dog groups branches from the value of the dogs, i.e., the capability to discover explosives or criminal drugs and to implement patrol missions. As soon as the task requirement for MWDs is recognized, service program leaders consult a MWD database for the position, ability, and fitness for responsibility status of dogs. All divisions of the military have dog teams that are trained and ready for allocation. The MWD department / K9 are distributed in all Iraqi governorates to secure the safety and prevent the terrorist action and warfare.

Canine family including MWD/K9 like other animals is susceptible to the parasitic diseases that readily zoonotic and infect humans. More than 60 zoonotic diseases are correlated with dogs. These parasitic diseases are the most significant zoonoses worldwide and are nominated to be the more dangerous hazard to socioeconomic stability particularly in the developing countries (Otranto, and Eberhard, 2011). Concerning gastrointestinal parasites, dogs are hosts of numerous species, comprising extensive parasites that affect humans. These disease including helminths such as *Ancylostoma caninum* and *Toxocara canis* that can create a serious public health problem worldwide (Rhindali *et al.,* 2006; Dantas-Torres and Otranto, 2014). Hookworms (Ancylostoma sp.), causes cutaneous larva migrans (CLM), visceral larva migrans (VLM) and eosinophilic enteritis.

Moreover, toxocariasis is a major health problem because infections often result in multisystemic disease by visceral migration and damage that may affect vital structures, such as the eyes, liver and brain (McCarthy and Moore, 2000; Despommier, 2003). Besides, dogs also are the certain host for various intestinal parasites which can cause severe zoonotic diseases like hydatidosis that caused by *Echinococcus granulosus* (Razmi , 2009).

Additionally, these diseases represent pronounced hygienic importance (Santarém *et al.*, 2004; Hohlenwerger *et al.*, 2011). Although, an extensive range of therapeutic and prophylactic methods recently available, eggs and oocysts of parasites have commonly distinguished in the feces of dogs, and their shedding in the atmosphere assists transmission to further hosts, comprising human being . Majorities of these intestinal parasites (e.g. *Toxocara spp*., *Ancylostoma spp.* and *Cystoisospora canis*) represent international spreading. Gastrointestinal parasitic diseases can cause adverse effects on MWD/ K9 and reduce its activities and values.

Additionally, these parasites can also transmitted to the workers and trainer who spend long times with these dogs and become in close contact with most significant eliminated zoonoses pathogens. Therefore, continuous treatment and prophylactic programs should applied to protect these dog from parasitic infestation. In spite of the progresses in the immunological methods and founded of molecular tests, parasitological analytical techniques, still are valuable for recognizing gastrointestinal parasites via examining for diverse parasitic stages (e.g. eggs, larvae, oocysts or trophozoites) that are shed in feces, because of their low cost and simplicity (De Santana *et al.*, 2015; Papini *et al.*, 2012; Hoffman *et al.*, 1934; Willis, 1921). Conversely, since the diagnosis is established on observing eggs or oocysts, approval may perhaps in some cases be tough (De Santana *et al.*, 2015). Moreover, selecting the best appropriate technique for use within the routine of the diagnostic laboratory may indicate a difficulty for competent diagnosis.

For zoonotic enteric parasites of dogs and cats, significance valuation of their likely impacts on animal and human health, as well as the arrangement of ideal procedures for parasite control, depend significantly on strong prevalence data in animals and in publics. In Iraq, of particular concern are *Echinococcus granulosa* , *Toxocara* species, *Cryptosporidium* and *Giardia* species, and *Toxoplasma gondii.*

These parasites also happen in other domestic animals and/or wildlife hosts in Iraq, which in some situations can be essential causes of people infection. In Iraq, scarce surveys studies on prevalence of enteric parasites in dogs have been reported and, established mainly on fecal examinations. For example, these include studies on zoonotic gastrointestinal parasites in police and house dogs in Baghdad governorate (Khalaf *et al.*, 2015). This study approved the prevalence of parasitic infestation with a total

percentage of 27.61 % . Moreover, it also approved more parasitic infestation in house dogs than police dogs with percentages of 36.36 and 25.89 % respectively. Meanwhile, the study found the following parasite: *Toxocara canis* 11 (8.20%), *Isospora spp.* 19 (14.17%), *Cryptosporidium spp.* 5 (3.73%) and *Sarcocystis spp.* 3 (2.23%) with variation in the infestation that depend on the age and sex of the dogs. There are no analogous available data from other Iraqi governorates.

Aim of study

The recent prevalence of gastrointestinal parasites in house or MWD is nearly unknown in Iraq and has never been investigated on AlMuthanna governorate. Consequently, the present study intends to diagnosis the prevalence of gastrointestinal parasite in MWD/ K9, which serve in the department of police academy in Samawah city/Al Muthanna governorate, and compare it with the house dogs using different coprological techniques.

Review of literature

Gastro-intestinal parasites are common in dogs and will lodge in the intestines of the dog and feed on the nutrients the dog consumes. There are several types of intestinal parasites that may affect dogs, the most common being hookworms, tapeworms, roundworms or whipworms. The presence of the intestinal worms will cause stomach problems resulting in vomiting and diarrhea. The parasites should be eliminated to keep these dogs healthy, so it is important to recognize the symptoms of canine intestinal parasites.

Symptoms of Intestinal Parasites

The symptoms of intestinal parasites may range from subtle symptoms such as dull coat to more severe symptoms such as chronic vomiting, diarrhea and dehydration. It is important to keep an eye on the behavior and elimination patterns of the dogs, so possible detection of the worms as early as possible (Ahmed *et al.*, 2014).

Vomiting and Diarrhea

Intestinal parasites are most often manifested through vomiting and diarrhea; the worms will be present in the intestinal tract and will cause discomfort. The vomiting or diarrhea will be chronic and this can be dangerous, as the dog can get dehydrated. The dog may also lose weight as a consequence of vomiting and diarrhea. The feces may be tarry or contain segments or worms or smaller worms that may be dead or moving. There may also be blood or mucus in the feces (Ali *et al.*, 2011).

Lack of Appetite

The presence of intestinal parasites will make the dog less interested in food. The lack of appetite can be serious as the dog will lose weight. In addition, the dog will also be deprived of certain nutrients the parasites feed on, so he may become anemic. The lack of appetite will be present if the dog has hookworms, roundworms or whipworms. If the dog has tapeworms, the appetite may not be affected and he may even eat more than usual (Ali *et al.*, 2011).

Skin and Coat Problems

Due to the fact that the dog doesn't get all his nutrients, you will notice that the skin will become dry and may be affected by secondary infections. The coat will also become dull and coarse.

Other Symptoms of Intestinal Parasites

You should also watch out for the following symptoms:

- Pot bellied appearance
- Depression
- Lack of energy
- Abdominal pain signaled by licking the abdominal area
- Itchiness in the rectal area
- Anemia
- Flatulence

Some dogs may present no symptoms at all; it all depends on how strong the dog's immunity is. Immunocompromised dogs and puppies may show more severe symptoms (Coggins ,1998).

Intestinal Parasites Treatment

The parasites are typically treated with dewormers. Each type of parasite will require a different type of dewormer. In addition to the medication, you may also opt for a few shampoos and lotions to help the dog's dry skin. Immune system boosters may also be administered. If the dog is anemic, the vet may prescribe some supplements. In severe cases, IV fluids may be needed. There are drugs that may be administered periodically to dogs to prevent the infection with intestinal worms (Dejene *et al.,* 2013).

Classification of gastrointestinal parasites of dog

Roundworms

Roundworms are visible in your puppy’s stool or vomit. They are long and thin, similar to thin spaghetti. This parasite can pass through the placenta (only in puppies), through the milk (puppies and kittens) or be ingested (puppies and kittens). Some animals become infected after ingesting another animal with roundworm eggs. It is thought that nearly all puppies

are born with roundworms since they pass through the placenta. In kittens, most become infected after nursing. The roundworm that affects dogs is *Toxocara canis*. The roundworm that affects cats is *Toxocara cati*. The roundworm *Toxascaris leonina* is shared between dogs and cats. The roundworm eggs are very resistant to chemicals and weather and remain infective in the soil for years, which can result in repeated reinfection. Typically, the eggs are found on the soil or grass. As the dog or cat walks by, the eggs are picked up on the animal's fur. During normal grooming, the animal then ingests the eggs. After reaching the stomach, the eggs hatch. The developing larvae continue to mature in the small intestines and become adults in about three to four weeks. At this point, the mature worms are able to reproduce and shed more eggs. These eggs pass out the intestines in the feces. Once in the soil, the eggs will become infective in about one week (De Santana *et al.,* 2015; Papini *et al.,* 2015).

Whipworms

Whipworms are another type of gastrointestinal parasite that affects dogs. The most common whipworm is Trichuris vulpis and it is a significant cause of large bowel diarrhea. The whipworm eggs are quite resistant and can live in the environment for up to five years. Typically, a dog becomes infected after ingesting eggs from the environment. The eggs then hatch once they reach the stomach. It takes about three months for the eggs to mature to adults and being shedding eggs. The adults then burrow into the small intestine and feed on blood and tissue. The eggs are intermittently passed in the feces and become infective in about one month. Since the eggs are not shed all the time, repeated fecal examinations may be necessary to diagnose whipworm infection (Eguia-Aguilar *et al.,* 2015).

Hookworms

Ancylostoma caninum is the most common hookworm in the dog. *Ancylostoma tubaeforme* is the most common hookworm in the cat. The eggs are relatively susceptible to cold weather and the eggs are usually destroyed after a hard freeze. Hookworm infection can occur as the worms pass through the placenta, are spread during nursing, penetrate through the skin or are ingested. After ingestion, the eggs hatch in the stomach and develop into adults into about two weeks. If the larvae penetrate the skin, it takes about four weeks for the larvae to mature. Once mature, the worms begin reproducing and shed eggs in the feces. It then takes two to eight days

until the eggs are infective. The adult worms attach to the lining of the small intestine and feed on blood. In a severe infection, profound anemia can occur (Hohlenwerger *et al.*, 2011).

Giardia

Giardia are pear-shaped, one-celled organisms that infect the small intestine of dogs and cats. Most cases of Giardia in young animals cause explosive, watery diarrhea, dehydration, weight loss and an unkempt appearance. Adult animals are capable of harboring the infection without showing clinical signs. The eggs are susceptible to chemical disinfection. Once ingested, the infective cysts develop in the small intestine. Diarrhea can begin as early as five days after exposure and cysts can appear in the feces one to two weeks after exposure. Most domestic animals contract Giardia from drinking contaminated pond or stream water (Noor-Ul-Huda *et al.*, 2011).

Tapeworms

Tapeworms are very common in dogs and cats and, despite what you may think, rarely cause illness. Most people see the tapeworm egg packets as they pass out the rectum and crawl on the animal's fur. These egg packets, referred to as proglottids, contain multiple eggs and appear about six to eight weeks after ingestion of an infective tapeworm egg. In order to become infective, the tapeworm egg is either ingested by a rodent, rabbit or flea. The egg then matures and becomes infective (Pandey *et al.*, 1987). Eggs or egg packets eaten after they pass out in the stool are not infective and do not result in more tapeworms. There are two types of tapeworms, *Taenia* and *Dipylidium*. *Taenia* tapeworms are acquired when an animal ingests an infected rabbit or rodent. *Dipylidium* tapeworms are acquired when an animal ingests an infected flea. Once the tapeworm egg is ingested, it hatches in the stomach and begins to invade the walls of the intestines. The worm then matures to a larva and then to an adult. About 35 to 80 days later, the adults begin to shed egg packets, which pass in the stool. The adult tapeworm can survive in the intestine for about seven to 34 months. Animals infected with tapeworms may scoot on the floor since the egg packets tend to crawl on the skin, causing itchiness (Zajac and Conboy, 2012).

COCCIDIA

Coccidia are intestinal protozoa that invade and infect the lining cells of the small intestine. There are many species of coccidia and almost all domestic animals can become infected. Of the numerous types that infect dogs and cats, Isospora is the most common. Coccidia spread when an animal eats infected fecal material or an infected host, such as a small rodent. Many researchers maintain that virtually all dogs and cats have been infected with the organism at one time or another during their life. Most coccidial infections are harmless, cause minimal symptoms and are eliminated by normal body defense mechanisms. More serious coccidial infections cause severe watery or bloody diarrhea and are often seen in high-density confinement situations such as kennels, catteries and pet shops.

Materials and Methods

Area of study

The study was conducted between December 2016 and March 2017 on MWD/ K9 that serve in the department of police dog academy in Samawah city /Al Muthanna governorate/ Iraq. Moreover, house dogs were also included in this study to acts as positive control, as these dogs have never been treated or vaccinated by their owner. Totally 19 MWD/K9/ exotic (pure) breeds age ranging from 4.5 to 8 years were nominated as dogs of the current study. Each animal was housed in a single cage and fed on dry food (Figure.1). All these dogs were subjected to regular deworming protocol. Moreover, two house dogs' of local breed ages 2 years were used as positive control dogs. These dogs fed on uncooked food and never subjected to any deworming medication. These fecal samples were examined for the presence of gastrointestinal parasites using different coprological techniques.

Fecal samples

Fresh fecal samples from all dogs were collected and kept at plastic containers at the morning and transferred immediately to the laboratory (Figure. 2). The animal's name, sex and age of each dog were recorded.

Examination techniques

About 3-5 grams of fecal sample were well mixed with 30 ml of water and strained through a tea strainer to remove the coarse fecal material. The sieved samples were examined grossly for adult nematodes. Each sample inspected by: direct method centrifugal fecal floatation method (1500 rpm/ 5 minutes) using different solutions as follow (Dryden *et al.,* 2005):

1. Saturated zinc sulfate solution composed of 350 grams granular zinc sulfate, dissolved in 1000 ml water / Specific Gravity 1.18.
2. Sheather's Sucrose composed of 454 grams sugar, dissolved in 355 ml water. 6 ml formalin to prevent mold growth/ Specific Gravity 1.275.
3. Saturated Salt (NaCl) 350 g NaCl dissolved in 1000 ml tap water/ Specific Gravity (1.18–1.20).

In addition, fecal sedimentation technique (Zajac and Conboy, 2012) was also used in this study. To facilitate protozoan and cyst identification the

iodine solution was used, while the modified Ziehl Neelsen (MZN) staining technique used to detect *cryptosporidium spp.* oocysts in the feces (Henriksen and Pohlenz, 1981). All parasites were recognized depending on eggs, oocysts or cysts color, shape and contents (Zajac and Conboy, 2012; Soulsby, 1982). This study was approved by research and ethical committee college of veterinary medicine/ Al Muthanna University. An agreement letter was sent to the department of police dag academy in Samawah city /Al Muthanna governorate/ Iraq to enable the researchers to collect the samples. The percentage of prevalence was calculated .The statistical analysis System- SAS (2012) was used to determine the significance of the percentages between the study groups.

Figure. 1: shows MWD/ K9/ exotic (pure) breeds

Figure.2: shows procedures of the collection and examination of fecal sample

1. Collection of fresh fecal sample from dog ; 2. Labeled the samples; 3. Transfer samples immediately to the laboratory; 4. Preparation of different solutions for coprological examination ; 5& 6 Preparation and examination each samples using various solutions ; 7. Preparation of slides for examination; 8. Examination of slide under light microscope ; 9. Capture of image using digital Camera.

Results

The total prevalence of the gastrointestinal parasite in all examined fecal samples from MWD/K9 and house dog was 17 (80.95%). The prevalence of positive samples were 15 out of 19 (78.94%) and 2out of 2(100%) in MWD/ K9 and house dogs respectively (Table.1). In both MWD/ K9 and house dog, the fecal sample of each dog revealed more than one type of parasites. The recognized parasites were *Echinococcus granulosa* (Figure.3), *Dipylidium caninum* (Figure.4), *Ancylostoma caninum* (Figure.5), *Toxocara canis* (Figure.6), *Toxoplasma gondii* (Figure.7), *Strongyloides sp* (Figure.8) Isospora spp (Figure. 9), *Cryptosporidium spp.* (Figure. 10) and *Giardia spp.* (Figure.11) (Table. 2&3). The prevalence percentages of parasites in MWD/ K9 were 68.42, 57.89, 36.84, 10.52% and 1% for *Isospora spp*, *Cryptosporidium spp.*, *Giardia spp.*, *Toxoplasma gondii* and *Aelurostrongylus abstrusus* (Figure. 12)(Table. 2). Both house dogs revealed all types of parasites except *Aelurostrongylus abstrusus* for the first dong and *Aelurostrongylus abstrusus & Ancylostoma caninum* for second house dog (Table. 3). The results of this study revealed high prevalence rate (100 %) at house dogs with significance differences ($p \leq 0.01$) in compare to the prevalence rate (78.94%) at MWD/ K9.

	Police dog		House dog	Total
	Negative	Positive		
number of dog	4	15	2	21
Percentages %	21.06 %	78.94 %	100%	80.95%

Table. 1: Shows the prevalence of parasite in the examined fecal samples from both MWD/K9 and house dogs.

Parasites	No. of Police dog	Total	Percentages %
Echinococcus granulosa	0	0	0%
Dipylidium caninum	0	0	0%
Ancylostoma caninum	0	0	0%
Toxocara canis	0	0	0%
Strongyloides sp	0	0	0
Toxoplasma gondii	2	2	10.52%
Isospora spp	13	13	68.42
Cryptosporidium spp.	11	11	57.89
Giardia spp	7	7	36.84
Aelurostrongylus abstrusus	1	1	1%

Table.2: Shows the parasites that found in the MWD/K9

No.	Name of parasite	House Dog	
		1	2
1.	*Echinococcus granulosa*	+	+
2.	*Dipylidium caninum*	+	+
3.	*Ancylostoma caninum*	+	-
4.	*Toxocara canis*	+	+
5.	*Toxoplasma gondii*	+	+
6.	*Strongyloides sp*	+	+
7.	*Isospora spp*	+	+
8.	*Cryptosporidium spp.*	+	+
9.	*Giardia spp*	+	+
10.	*Aelurostrongylus abstrusus*	-	-

Table. 3: Shows the parasites that found in the house dogs.

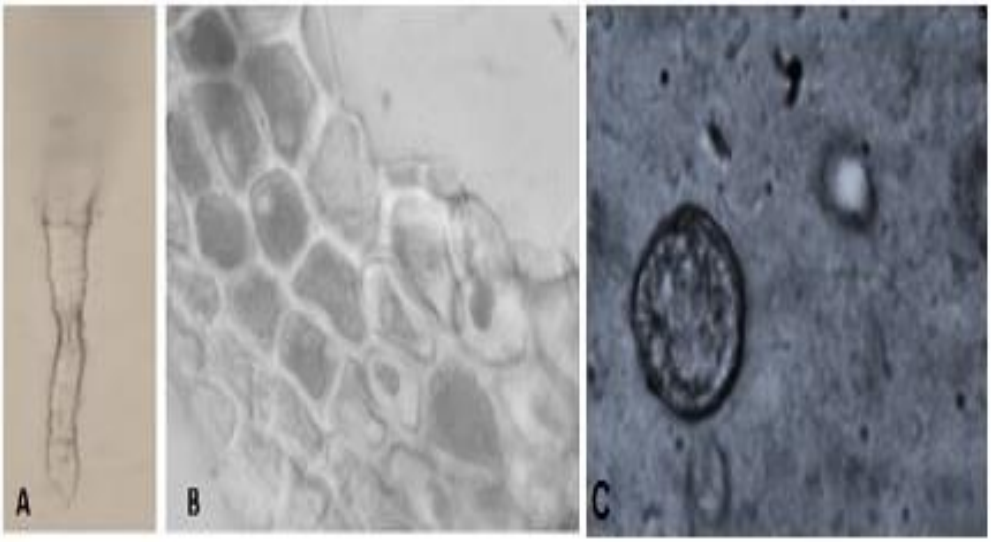

Figure.3: Shows *Echinococcus granulosa*

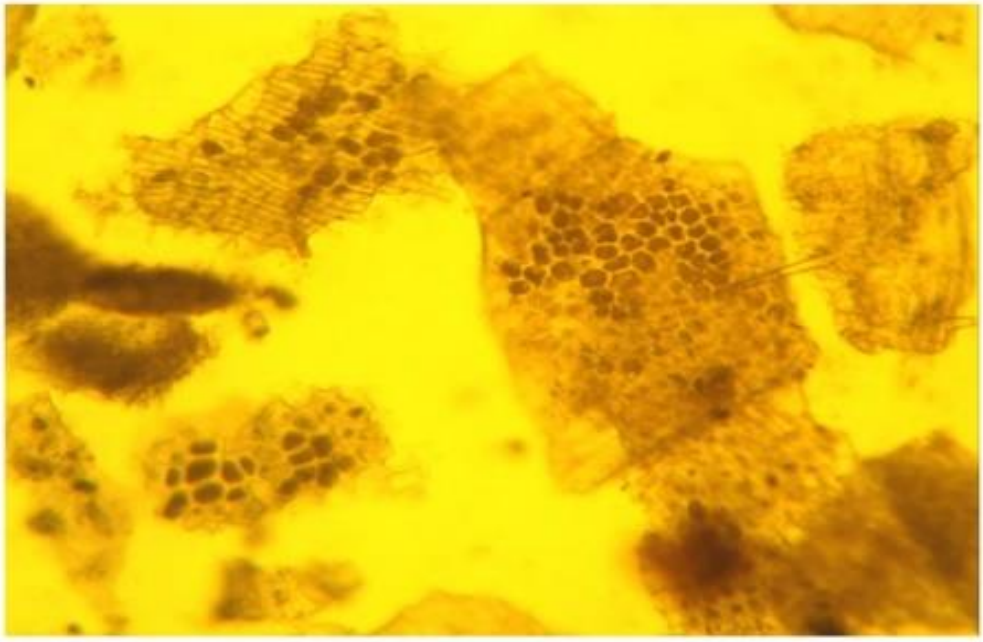

Figure.4: Shows *Dipylidium caninum*

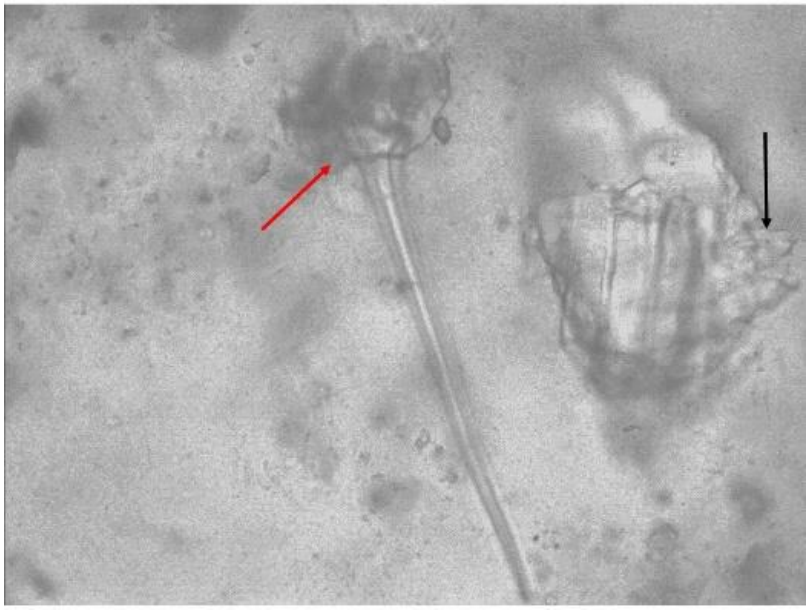

Figure.5: Shows *Ancylostoma caninum*

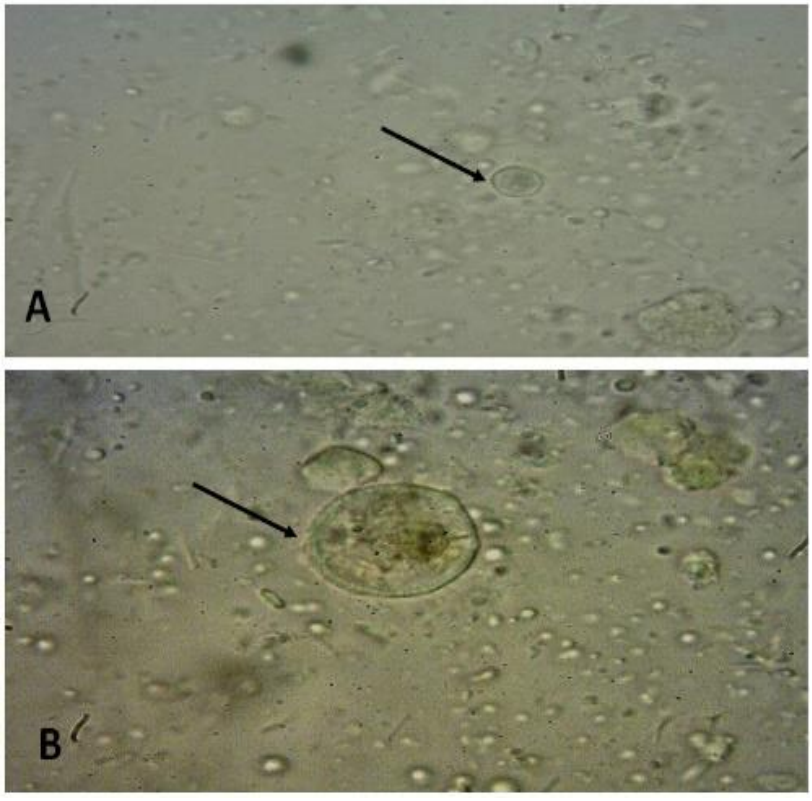

Figure.6: Shows *Toxocara canis*

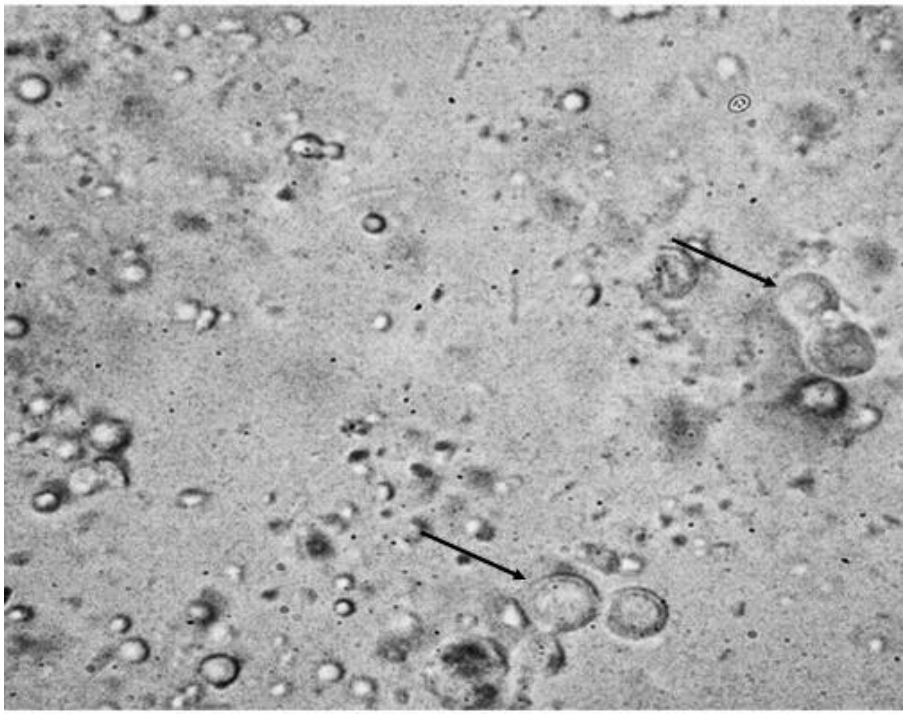

Figure.7: Shows *Toxoplasma gondii*

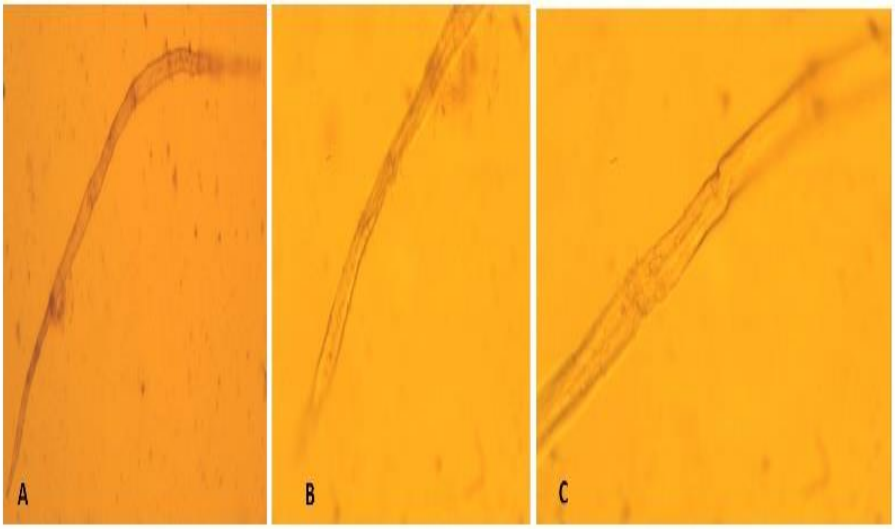

Figure.8: Shows *Strongyloides spp*.

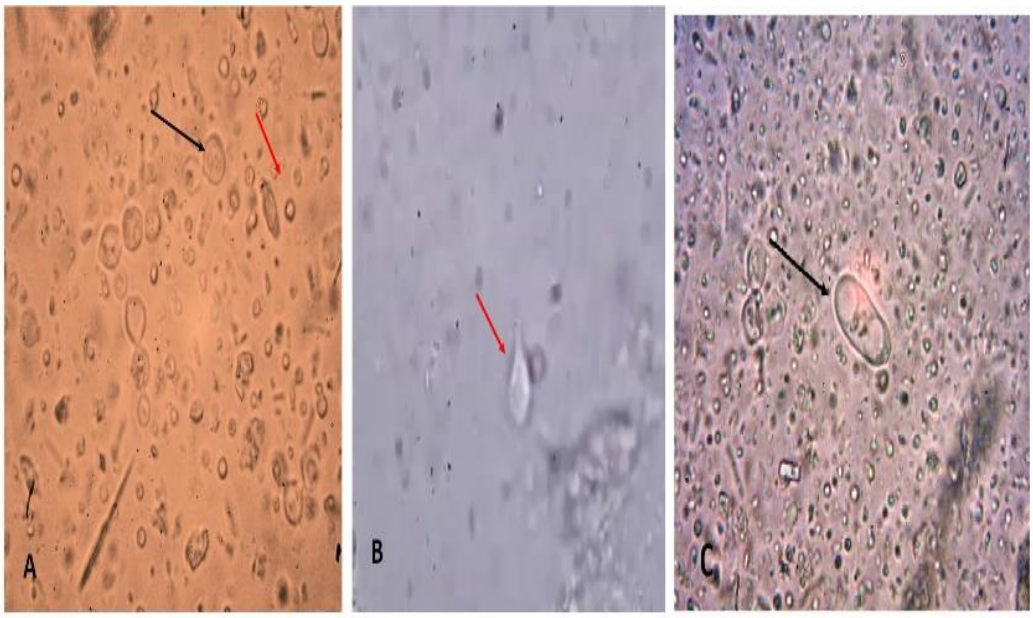

Figure. 9: Shows *Isospora spp*.

Figure. 10: shows *Cryptosporidium spp.*

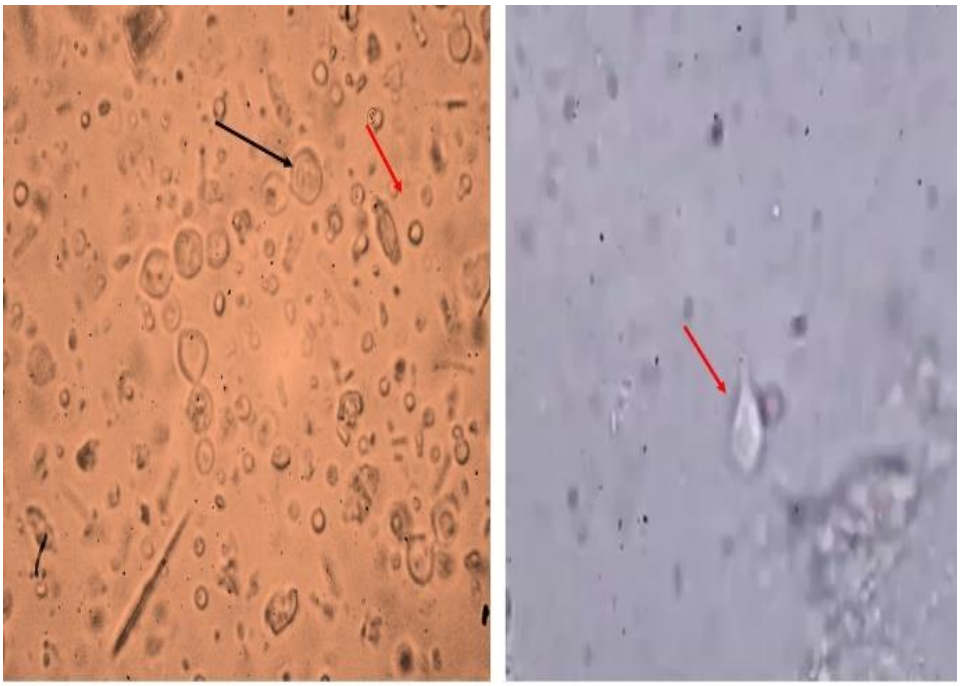

Figure.11: Shows *Giardia spp*. Red arrow

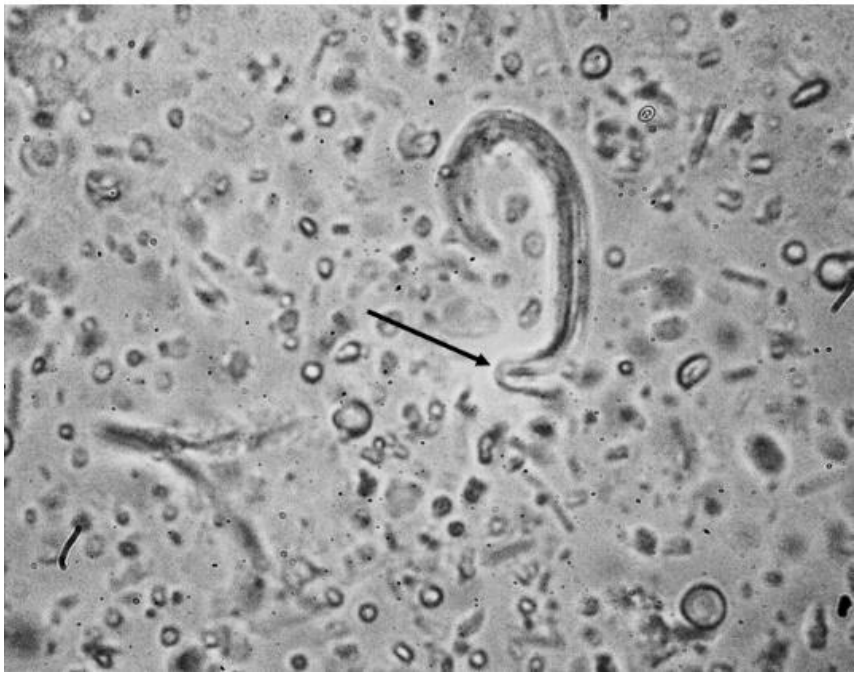

Figure. 12: Shows *Aelurostrongylus abstrusus*

Discussion

One of the old domestic animal is a dog (*Canis familiaris*). Dog has been maintained close contact with people and other livestock. There is a human demand for keeping a dog and establishing the human-dog partnership. Dogs help with chase and shepherding, and for the early warning security system (Dohoo *et al.,* 1998). Previously, police dogs were only used for some special missions in Iraq. However, the number of dogs and department of dog's academy in each governorate in Iraq have increased over the last ten years in Iraq, because of the current security situation in Iraq, the number of terrorist action targeting the Iraqi people, and the war against terrorists. Dogs are a harbor for a mystifying amount of infective stages of parasites that transmit to man and other domestic animals and create a major threat to public health (Molyneux, 2004). Therefore, any shortage of diagnosis or treatment against certain diseases helps the spread of zoonotic diseases.

Infection from parasitic diseases in animals have constantly been an important issue. It causes low production in productive animals, besides the cost of anti-parasitic treatments (Barger, 1982). Globally, there are 17 , 20, 17 and 1 species of trematodes , nematode, cestode and *acanthocephalan* parasites respectively that signify important public health problems (Labarthe *et al.,* 2004) and approved parasitizing in animals (Soulsby, 1977; Eguia-Aguilar *et al.,* 2005).

The results of the present study showed that 80.95% of the examined fecal samples from both MWD/ K9 and house dogs were observed positive for at least one of the gastrointestinal parasites. The prevalence rates were 100% and 78.94% for house dogs and MWD/K9 respectively. The first house dog was harbored for very serious zoonotic parasite. These parasites were *Echinococcus granulosa , Dipylidium caninum , Ancylostoma caninum, Toxocara canis , Toxoplasma gondii , Strongyloides sp , Isospora spp , Cryptosporidium spp. , and Giardia spp.*.While the second house dog was harbored for all parasites harbored by the first dog except *Ancylostoma caninum.* Meanwhile, no *Aelurostrongylus abstrusus* was found in both house dogs. Moreover, MWD/ K9 revealed variation in the prevalence rate of parasitic infestation ranging in ascending order from 1% 10.52%, 36.84%, 57.89 and 68.42% for *Aelurostrongylus abstrusus, Toxoplasma gondii, Giardia spp., Cryptosporidium spp.* and *Isospora spp.* respectively. This high prevalence rate of these parasites in the house dogs and MWD/K9

is in agreement with the prevalence rates reported in prior studies, which was 78.57% in Ilam province of Iran (Ali *et al.,* 2011), 71% in Cordoba/ Spain (Martinez-Moreno *et al.,* 2007) and 76% in free State Province, South Africa(Minnaar *et al.,* 2002). On the other hand the prevalence rate 80.95% of the current study is lesser than the rates that reported by other researchers elsewhere as follow: 90.7% and 89.3% in Wondo Genet and Hawassa respectively in Southern Ethiopia (Octavius *et al* .,2011; Berhanu *et al.,* 2013) ; 89.13% in Argentina (Lavallen *et al.,* 2011); 86.8% in Ethiopia (Dagmawi *et al.,* 2012) ; 93.8% in Nigeria (Dejene *et al.,* 2013); 100% in Rabat region, Morocco (Pandey *et al.,* 1987); 86.0% in Karachi (Noor-Ul-Huda *et al.,* 2014) and 100% in the Baghdad area/Iraq (Tarish *et al.,* 1986).

Meanwhile, the total prevalence rate (78.94%) reported in the current study, is higher than the total prevalence rate (27.61%) of dog parasitic infestation that reported previously in Baghdad governorate/ Iraq (Khalaf *et al.,* 2015). Khalaf *et al.,* (2015) study approved the prevalence of parasitic infestation with more parasitic infestation in house dogs than police dogs with percentages of 36.36% and 25.89 % respectively. Meanwhile, the study investigated the following parasite: *Toxocara canis* 11 (8.20%), *Isospora spp.* 19 (14.17%), *Cryptosporidium spp.* 5 (3.73%) and *Sarcocystis spp.* 3 (2.23%) with variation in the infestation that depend on the age and sex of the dogs.

The high prevalence rate 78.94% reported in the current study in the MWD/ K9 is in compatible with the results of previous study in Turkey who reported lower prevalence percentage 30.4% of the intestinal nematode in military dog with particular mention to *Toxocara canis* (Senlik *et al., 2006*). Moreover, the results of this study is also higher and in compatible with results of Ahmed *et al.,* (2014), who reported lower prevalence 18.3% of zoonotic and other gastrointestinal parasites in police and house dogs in Alexandria, Egypt.

It is worth to mention that the results of the current study revealed that the MWD/K9 reported zero prevalence rate for the public health serious and dangerous parasites such as *Echinococcus granulosa, Dipylidium caninum, Ancylostoma caninum, Strongyloides spp.*. This results might occur due to the effect of the continuous deworming plan applied for these animals. However, the prevalence of other parasite particularly the protozoa such as *Toxoplasma gondii*, *Isospora spp.*, *Cryptosporidium spp.* and *Giardia spp.* might occur due to the decrease in the immunity of the these dogs that occurred because of the stressful hard duties. It might also be due using the narrow spectrum anti-parasitic drugs that it may be not effective on these parasite group. Other factors also have roles on the prevalence rate of the

parasites such as the box cleanness, number of dogs, geographical location and veterinary care.

The results of this study revealed 100% prevalence rate of gastrointestinal parasite in the house dog that harbored very serious and dangerous parasites. This result is in agreement with previous study that done on stray dog in Baghdad city/ and reported 100 % prevalence rate (Tarish *et al.*, 1986). The absence of the deworming treatment for the home dogs and lack of owner awareness about the seriousness of these parasites on public health lead to increase the prevalence rate.

The *Isospora spp.* reported the highest prevalence rate 68.42 % among other parasite in the MWD/K9. This result is disagreed with the results of previous studies that reported low *Isospora spp.* prevalence rate such as Bahrami *et al*., (2011) and Ortuño, Castellà, (2011) and Coggins, (1998), who found that the prevalence of *Isospora spp.* were 15.17%, 16.4% and 5.2%.respectively. The *Cryptosporidium spp.* prevalence infection rates 57.89% was the second in order after *Isospora spp.* and this result is incompatible with Bahrami *et al.*,(2011), who mentioned that the existing *of Cryptosporidium spp.* in dogs and reported a lower percentage (7.14%) than this study. In the meantime, Ahmed *et al.*, (2014) and Sargent *et al.*, (1998) also indicated that *Cryptosporidium spp.* found in police dogs, house dogs and cats, and these animals considered as the origin of infection for humans.

Conclusions

In conclusion, this study approved that the MWD/ K9 harbored at least one parasite although all these dogs were subjected to regular deworming protocol. In addition, this study approved the higher prevalence rate in house dog than the MWD/K9. *Echinococcus granulosa*, *Dipylidium caninum*, *Ancylostoma caninum*, *Strongyloides spp.* were the serious zoonotic parasitic infection that found in the fecal samples of the house dogs and can infect human being and threat the public health. The prevalence rates of parasites in MWD/ K9 were in ascending order from 1% 10.52%, 36.84%, 57.89 and 68.42% for *Aelurostrongylus abstrusus*, *Toxoplasma gondii*, *Giardia spp.*, *Cryptosporidium spp.* and *Isospora spp.* respectively. To reduce the human being risk from the source of parasitic zoonotic diseases of infected dogs, precautions should be planned such as the advanced cleaning level, healthy and cooked foods should be supplied to the MWD/K9 and house dogs and an effective anti-parasitic treatment should provide according to the plan for all dogs. Moreover, action should be taken by the governorate and people to prevent and control the transmission of the intestinal parasites from dogs.

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