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Isolation and Identification of pathogenic bacteria from drinking water from different regions in Nasseriya city from October 2014 to September 2015

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Abstract:

In this study isolate 134 organism from tap water at the time reaserach through the seasens winter and Sumer , to determinate pathogenic bacteria of drinking water from different regions in Nasseriya city from October 2014 to September 2015 , many people do not have access to clean and safe drinking water and many die of waterborne bacterial infections, *Salmonella typhi ,Salmonella typhimurium Streptococcus faecalis ,Esherichia coli ,Aeromonas hydrophilli , Campylobacter jejuni ,Enterococcus faecalis ,Staphylococcus aureus ,Citrobacter freundii,Citrobacter diversus , Vibrio cholerae Pseudomonas aeruginosa , Helicobacter pylori , Mycobacterium avium* complex, (MAC is presented, focusing on the biology and ecology of the causal agents and on the diseases' characteristics and their life cycles in the environment, the different city ,that contain many microbial pathogenic in tap water,the main bacteria present in human feces for example *Enterobacter cloacae ,Pseudomonas aerogenosa* , important sources of bacterial fecal pollution of waters are also briefly indicatedin pollution and break point in pipe line ,the aim of this study was to isolate and identify bacteria from drinking water distributions system in Nasseriya city.

Keywords: Drinking water,*Mycobacterium avium* complex , *Helcobacter pylori*.

Introduction

The relationship between disease and drinking water was not established until 1854 (Snow, 1855).

Waterborne infections are common, two and a half billion people have no access to improved sanitation, and more than 1.5 million children die each year from diarrheal diseases (Fenwick,2006).

Some waterborne bacterial pathogens, such as atypical *Mycobacteria* that can grow in water and soil reach the host by inhalation or direct contact where they can cause infections of respiratory tract, skin or brain tissues.

The majority of *Salmonella* are of enteric origin of animals particularly of pigs, cows, goats, sheep, rodents, hens, ducks and other poultry(WHO, 2006).

Escherichia coli and *Pseudomonas aeruginosa, Aeromonas. SSP*. isolate from drinking water and cause diseases (Holt,*et,al*,1994).

Vibrio cholerae Cells of certain species (*V. cholerae*, *V. parahaemolyticus* and *V. vulnificus*) have pili (fimbriae), structures composed of protein TcpA. TcpA formation is co-regulated with cholera toxin expression and is a key determinant of *in vivo* colonization (Farmer ,*et.al*., 2005).

Helicobacter pylori:

The causative agent of gastritis and peptic ulcer, human pathogen may be found on the gastric mucosa of man and spread through the gastrointestinal tract (Wisneiwska, *et al*., 2002). The transmission may be facilitated by saliva or gastric fluids between the members of a population (Mazari-Hiriart, *et al*., 2001).

Campylobacter:

There are 16 species and six subspecies in drinking Water assigned to the genus *Campylobacter*, of which the most frequently reported in human disease are *C. jejuni* (subspecies *jejuni*) and *C. coli.C. laridis* and *C. upsaliensis* are also regarded as primary pathogens, but are generally reported far less frequently in cases of human disease, (WHO and UNICEF , 2000).

The *Mycobacterium avium* is a group of environmental mycobacteria that can cause illness in humans, the group consists of *Mycobacterium avium* (includes subspecies *avium*, *sylvaticum* and *paratuberculosis*) ; and *Mycobacterium intracellulare* (Cangelosi, *et al.*, 2004).

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The aim of the study:

The aim of this study was to isolate and identify pathogenic bacteria from various raw water sources and drinking water distributions system in Nasseriya city.

Material and Mathods:

Study Areas:

Drinking water samples were collected from eight areas in Nasseiya including , Aredo ,Summer, Alhussen ,Alrafiden ,Alshihada ,Althwira , Alfidaa , Altathihia samples collected by one sample per month.

Samples collection:

It was Collected 96 samples from drnking water in sumer and winter from October 2014 to September 2015 ,one samples throw month ,134 microorganism ,and 15 kinds from bacterial species , water source were filtered such that, as far as practicable, the membrane filters ,drinking water come to laboratoryby tubes 500 ml and filteration at fiter paper that dimeter o.2µm and culture at nutrient agar.

Isolation and Dignosis of bacteria:

It was used filteration methods to isolation of bacteria from drinking water samples ,500 ml of sample was filtered by membrane filters and then transfer the filter paper and cultured on nutrient agar.

All bacterial isolate identification using API 20 (anylitical profile index) and biochemical test.

statistical analysis:

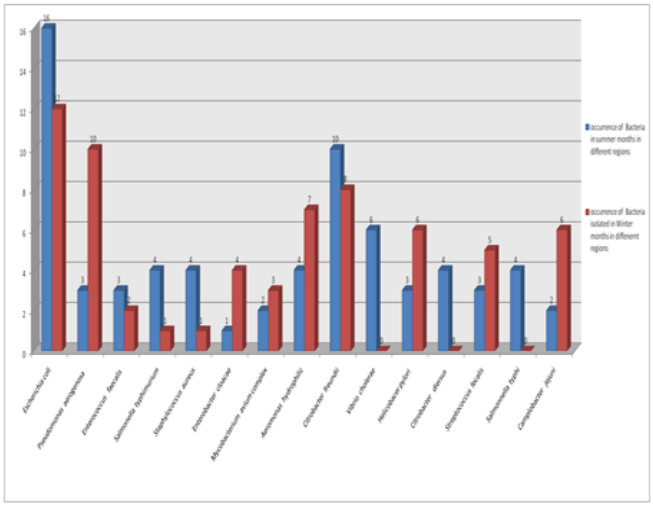
Chi sequre (ANOVA) tests between sumer and winter seasons for the pathogenic bacteria at 5% significance level (Nenman ,2001).

RESULTS:

Table (1)Explain the Number of pathogenic bacteria that isolation from drinking water throw the summer and winter seasens .The isolate *Escherichia coli* is High number in Sumer and Winter and the low isolate *Enterobacter cloacae* in summer and no isolate in Winter *Vibrio cholerae, Citrobacter diersus and Citrobacter diversus* ,

No.	Types of Bacteria	Bacteria isolated in Sumer	Bacteria isolated in Winter	Total numberand ofbacteria
1.	*Escherichia coli*	16	12	28
2.	*Pseudomonas aerogenosa*	3	10	13
3.	*Enterococcus faecalis*	3	2	5
4.	*Salmonella typhimurium*	4	1	5
5.	*Staphylococcus aureus*	4	1	5
6.	*Enterobacter cloacae*	1	4	5
7.	*Mycobacterium avium* complex	2	3	5
8.	*Aeromonas hydrophilia*	4	7	11
9.	*Citrobacter freundii*	10	8	18
10	*Vibrio cholera*	6	0	6
11	*Helicobacer pylori*	3	6	9
12	*Citrobacter diversus*	4	0	4
13	*Streptococcus feacalis*	3	5	8
14	*Salmonnella typhi*	4	0	4
15	*Camplobacter jejuni*	2	6	8
		69	65	134

$X2=28.58$, dF=14, P≥0.05



(Figure1) Diphram for number of that isolation from drinking water

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Volume 6, Number 4, June 2018

Table (2) The pathogenic bacteria isolated from drinking water from Aredo region

Summer			Winter		
No	Name of organism	Date collection	No	Name of organism	Date collection
1	*Escherichia coli* *Pseudomonas aerogenosa*	2\4\2015	1	*Pseudomonas aerogenosa* *Escherichia coli* *Aeromonas hydrophilic*	3\10\2014
2	*Enterococcus faecalis* *Salmonella typhimurium* *Escherichia coli*	3\5\2015	2	*Camplobacter jejuni* *Helicobacer pylori* *Citrobacter freundii* *Escherichia coli*	4\11\2014
3	*Staphylococcus aureus* *Escherichia coli* *Enterobacter cloacae*	3\6\2015	3	No growth	5\12\2014
4	*No growth*	4\7\2015	4	*Pseudomonas aerogenosa*	3\1\2015
5	*Mycobacterium avium* complex *Aeromonas hydrophilic*	4\8\2015	5	*Streptococcus fecalis*	2\2\2015
6	*Vibrio cholera* *Escherichia coli*	3\9\2015	6	*Escherichia coli* *Citrobacter freundii*	4\3\2015

Table (3) The pathogenic bacteria isolated from drinking water from sumer region

Summer			Winter		
NO	Name of organism	Date collection	No	Name of organism	Date collection
1	*Citrobacter freundii* *Pseudomonas aerogenosa*	3\10\2014	1	*Salmonella typhimurium* *Streptococcus fecalis* *Escherichia coli*	3\10\2014
2	*Escherichia coli* *Aeromonas hydrophilic*	4\11\2014	2	*Camplobacter jejuni* *Enterococcus faecalis*	4\11\2014
3	*Staphylococcus aureus* *Helicobacer pylori*	5\12\2014	3	*Pseudomonas aerogenosa* *Citrobacter freundii*	5\12\2014
4	*Citrobacter diersus*	3\1\2015	4	*Staphylococcus aureus* *Escherichia coli* *Citrobacter freundii*	3\1\2015
5	*Mycobacterium avium* complex *Citrobacter freundii*	2\2\2015	5	*Streptococcus-fecalis* *Escherichia coli*	2\2\2015
6	*Pseudomonas aerogenosa* *Escherichia coli*	4\3\2015	6	No growth	4\3\2015

Table (4) The pathogenic bacteria that isolated from drinking water from Alhussen region

Summer			Winter		
NO	Name of organism	Date collection	No.	Name of organism	Date collection
1	No growth	3\10\2014	1	*Pseudomonas aerogenosa* *Aeromonas hydrophilic*	3\10\2014
2	*Salmonella typhimurium* *Streptococcus fecalis*	4\11\2014	2	*Camplobacter jejuni* *Helicobacer pylori*	4\11\2014
3	*Escherichia coli* *Citrobacter freundii*	5\12\2014	3	*Citrobacter freundii* *Enterobacter cloacae*	5\12\2014
4	*No growth*	3\1\2015	4	*Mycobacterium avium* complex	3\1\2015
5	*Aeromonas hydrophilic* *Salmonnella typhi*	2\2\2015	5	No growth	2\2\2015
6	*Citrobacter freundii* *Escherichia coli*	4\3\2015	6	*Escherichia coli* *Aeromonas hydrophilic*	4\3\2015

Table (5) The pathogenic bacteria that isolated from drinking water from Alrafiden region

Summer			Winter		
NO	Name of organism	Date collection	No	Name of organism	Date collection
1	*Helicobacer pylori*	3\10\2014	1	*Escherichia coli* *Camplobacter jejuni*	3\10\2014
2	*Enterococcus faecalis*	4\11\2014	2	No growth	4\11\2014
3	*Camplobacter jejuni*	5\12\2014	3	*Streptococcus fecalis*	5\12\2014
4	*Citrobacter diersus*	3\1\2015	4	*Pseudomonas aerogenosa*	3\1\2015
5	*Citrobacter freundii*	2\2\2015	5	No growth	2\2\2015
6	*Vibrio cholerae* *Escherichia coli*	4\3\2015	6	*Enterobacter cloacae* *Camplobacter jejuni*	4\3\2015

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Volume 6, Number 4, June 2018

Table (6) The pathogenic bacteria that isolated from drinking water from Alshihada region

Summer			Winter		
No	Name of organism	Date collection	No	Name of organism	Date collection
1	*Salmonnella* typhi	3\10\2014	1	*Pseudomonas aerogenosa* *Aeromonas hydrophilic*	3\10\2014
2	*Salmonella typhimurium* *Streptococcus fecalis*	3\10\2014	2	*Camplobacter jejuni* *Helicobacer pylori*	4\11\2014
3	*Escherichia coli* *Citrobacter freundii*	4\11\2014	3	*Citrobacter freundii* *Enterobacter cloacae*	5\12\2014
4	*Escherichia coli*	5\12\2014	4	*Mycobacterium avium*	3\1\2015
5	*Aeromonas hydrophilic*	3\1\2015	5	No growth	2\2\2015
6	*Citrobacter freundii* *Escherichia coli*	2\2\2015	6	*Escherichia coli* *Aeromonas hydrophilic*	4\3\2015

Table (7) The pathogenic bacteria that isolated from drinking water from Althwira region

Summer			Winter		
NO	Name of organism	Date collection	No	Name of organism	Date collection
1	*Helicobacer pylori*	3\10\2014	1	*Escherichia coli*	3\10\2014
2	*Enterococcus faecalis*	4\11\2014	2	*Camplobacter jejuni*	4\11\2014
3	*Camplobacter jejuni*	5\12\2014	3	*Streptococcus fecalis*	5\12\2014
4	*Citrobacter diersus*	3\1\2015	4	*Pseudomonas aerogenosa*	3\1\2015
5	*Citrobacter freundii*	2\2\2015	5	*Helicobacer pylori*	2\2\2015
6	*Vibrio cholerae* *Escherichia coli*	4\3\2015	6	*Enterobacter cloacae*	4\3\2015

Table (8) The pathogenic bacteria that isolated from drinking water from Alfidaa region

Sumer			Winter		
No	Name of organism	Date collection	No	Name of organism	Date collection
1	*Salmonnella* typhi	3\10\2014	1	*Aeromonas hydrophilic*	3\10\2014
2	No growth	4\11\2014	2	*Escherichia coli*	4\11\2014
3	*Staphylococcus aureus*	5\12\2014	3	*Citrobacter freundii*	5\12\2014
4	*Vibrio cholerae*	3\1\2015	4	No growth	3\1\2015
5	*Citrobacter freundii*	2\2\2015	5	*Helicobacer pylori*	2\2\2015
6	No growth	4\3\2015	6	*Pseudomonas aerogenosa*	4\3\2015

Table (9) The pathogenic bacteria that isolated from drinking water from Altathihia region

Sumer			Winter		
NO	Name of organism	Date collection	No	Name of organism	Date collection
1	*Salmonnella* typhi	3\10\2014	1	*Aeromonas hydrophilic* *Enterococcus faecalis*	3\10\2014
2	*Salmonella typhimurium* *Streptococcus fecalis*	4\11\2014	2	*Camplobacter jejuni* *Helicobacer pylori* *Citrobacter freundii*	4\11\2014
3	*Staphylococcus aureus* *Escherichia coli*	5\12\2014	3	*Pseudomonas aerogenosa* *Escherichia coli*	5\12\2014
4	*Citrobacter diersus* *Escherichia coli*	3\1\2015	4	No growth	3\1\2015
5	*Vibrio cholera* *Citrobacter freundii*	2\2\2015	5	*Pseudomonas aerogenosa* *Mycobacterium avium* complex	2\2\2015
6	*Vibrio cholerae* *Escherichia coli*	4\3\2015	6	No growth	4\3\2015

Discussion:

The presence of pathgens in ambient water bodies and related diseases are a major water quality concern through out the world. Pathogen contamination is a serious issue for almost all types of ambient water bodies,making its recognition and understanding essential (U.S.EPA 2012a).

Bacterial infections, *Salmonella typhi ,Salmonella typhimurium Streptococcus faecalis* , ,Bacterial infections Salmonella typhi ,Salmonella typhimurium , Streptococcus faecalis ,Esherichia coli , *Esherichia coli ,Aeromonas hydrophilli*, *Campylobacter jejuni ,Enterococcus faecalis*, *Staphylococcusaureus , Citrobacter freundii , Citrobacter diversus,Vibrio cholera*, *Pseudomonas aeruginosa , Helicobacter pylori , Mycobacterium avium*, this pathogenic bacteria are causing disease by differnet microorganisms, the demand and supply of water use-cycle puts pressure on human needs for fresh water and continuous alteration in river ecology (Holt,*et al*.,1994).

Direct discharge of domestic wastes leaching from poorly maintained septic tanks take place diseases if water was contamination by sewage refers to degradation of water quality from a public health, water pollutants include heavy metals, sediments, certain radioactive isotopes, phosphorus, nitrogen, sodium, arsenic, heat, fecal coliforms bacteria(WHO,2004).

Other pathogenic bacteria, virus and protozoan pathogens, the pollution of municipal water by human and animal sources is the major threat to the public health in poor countries,. water ontaminated with excreta from animal or anthropogenic sources, which may be the carrier or active cases of infectious diseases serve as the vector of disease. (WHO,2006).

In this study determinate the pathogenic bacteria that pollution the drinking water if the distribution system was not act exacitly by changing the secondary disinfectant from chlorine to chloramine, pipe line that damage throw transing or cut of the regins the presence of pathogenic bacteria from sites where the chlorine residual was above 3 mg/L., in this same study, samples from the distribution system (WHO and UNICEF,2000).

Drinking water was important to health because the pathogenic bacteria enter the body throw use the water from tap water ,was not clean or not put chlorine for treatment ,bacteria was increase in the distribution system ,cause diseases by pollution by sewage ,if the pipe line cutting by persons between regions (WHO,2006).

Conclusions:

1-Drinking water contain pathogenic bacteria if the persons are using direct from tapwater.
2- Drinking water was pollution by sewage if the pipe line was not safe .
3- Drinking water should be carried out by assaying the presence of *Escherichia coli* by the culture methods.
4- The ecology and behavior of human and animal fecal bacteria in environmental waters.

References:

Farmer, J.J.; Janda, J.M.; Brenner, F.W.; Cameron, D.N.; Birkhead, K.M. Genus *Vibrio*. In *Bergey's Manual of Systematic Bacteriology*, 2nd ed.; Brenner, D.J., Krieg, N.R., Staley, J.T., Eds.; Springer: New York, NY, USA, 2005; Volume 2, Part B, pp. 494–546.

Fenwick, A.Waterborne Diseases-Could they be Consigned to History? *Science* **2006**, *313*, 1077–1081.

H0lt J.G.Kreig, N.R.;Sneath , P.HA.;Sraley, J.T and Williams, S.t.,(1994) .Bergys Manual of determinative Bacteriolgy."9th ed".Williams and Wilkins. CoBaltimore ,London.

Levinson W and Jwetz, E. 2000. Gram negative Rods related to the enteric tract: In medical Microbiology and immunology.6th ed. Lange Medical Books/McGraw-Hill New York pp-116-117.

Mazari-Hiriart, M.; Lopez-Vidal, Y.; Castillo-Rojas, G.; Ponce de Leon, S. and Cravioto, A. 2001. *Helicobacter pylori* and other enteric bacteria freshwater environments in Mexico City. Arch. Med. Res. 32, 458-467.

Newman ,S.C(2001) Biostatistical methods in epidemiology 7th Ed. .JohnWily and Sons ,Inc.New York.72-77.

Snow J.on the mode of communication of cholera ,2ed John Churchill:London 1855.

U.S. Environmental Protection Agency (U.S. EPA) (2012a) Impaired Waters and Total Maximum Daily Loads., Accessed May 8 2014.

Wisneiwska, M.; Nilsson, H-O. and Back-Romaniszyn, L. et al. 2002. Detection of specific Helicobacter pylori DNA and antigen in stool samples in dyspeptic patients and healthy subjects.Microbiol.Immunol. 46: 657-665.

WHO (2006). Guidelines for Drinking-Water Quality. Vol-1 Geneva, Switzerland.

WHO, 2004 *Guidelines for Drinking Water Quality*, vol.1,World Health Organization, Geneva, switzerland, 3rd edition.

WHO and UNICEF (2000). *Global Water Supply and Sanitation Assessment 2000 Report.* WHO/UNICEF, Geneva/New York.