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# PREVELANCE OF PATHOGENIC VIBRIOS IN AQUATIC ENVIRONMENT AND DRINKING WATER

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## ABSTRACT

The study involved a through investigation of quantitative and qualitative aspects of the occurrence of the vibrois in drinking water of Basrah city and aquatic environment southern of Iraq.

The counts of presumptive *Vibrio* and fecal coliforms were high especially in July-August period. Pathogenic vibrios recovered from drinking water and aquatic environment were *Vibrio cholerae* serotype inaba, ogawa and nonOl and *V. parahaemolyticus* .

## INTRODUCTION

Vibrios are natural inhabitants of marine habitat and aquatic environment (Yamasaki *et al.*,1999) and most human infections are acquired by exposure to environment or to food derived from them. (Dalsgaard *et al.*, 1996 ) .

During epidemics , toxigenic *Vibrio cholerae* Ol can be isolated from local fresh water as well as patients , but disappears from the environment after the epidemic subsides . (Islam *et al.*,1994).

In the present study , we summarize our observation on the distribution of pathogenic *Vibrio* species in drinking water and aquatic environment southern of Iraq .

## MATERIALS AND METHODS

The study extended over a period of six months from May to October, 2000. drinking water were sampled from Al-Sae'e quarter in Basrah city, while the environmental samples were taken from Shatt Al-Arab river, Shatt Al-Basrah cannel and Arabian Gulf at three different sites in each station . Two samples were taken every month using a sterile 250 ml glass bottle to which a solution of 2.5 % (w/v) sodium thiosulphate was added as a reducing agent for any residual chlorine and brought to the laboratory in ice box .

**Bacteriological analysis**

Water samples were analyzed for fecal coliforms (FCs) and vibrios . The membrane filtration (MF) technique (APHA,1989) were used by filtering 25 ml and 10 ml in two duplicates from each sample of drinking water and environment respectively, through 0.45 μ Milipore WCN type filter , (Whatman , corp. Japan ). The filter papers were then Incubated on m-FCs sucrose (TCBS) agar for enumeration *vibrio* .

**Identification**

The identification of FCs were done according to Farmer and Kelly (1991) and Holt et al.,(1994) and by using api20E strips (BioMeriex. France).

For identification of *Vibrio* from each plate of TCBS , six colonies were picked . Yellow colonies (sucose – fermenting procedure with api20E strips.

Suspected *vibrio* were screened with Polyvalent antisera (Wellcome England) and monovalent agawa and inaba artisera (Wellcome , England)

## RESULTS

During the period of the study which extended for six months the samples of drinking water were taken only from one site in Basrah city . From Table (1) the fecal coliforms and presumptive vibrio counts were reached maximum values at July-Augest period .

In aquatic environment, the samples were taken from three stations differ in its chemical and physical condition but in spite of that , we showed that, the counts of fecal coliforms and presumptive vibrio reached a majority of the values in July-Augst period (Table 2) .

The identication of 25 isolates from drinking water of *Vibrio* that are considered to be pathogenic to humans were showed *V. cholerae* serotype inaba and ogawa and *V. cholerae* non-01 , which appeared in all period .

While the identification of 33 isolates from aquatic environment were showed *V. cholerae* serotype ogawa in Shatt Al-Arab river in July-August period in Shatt Al-Basrah cannel and Arabian Gulf .

## DISCUSSION

There is particulary no information on the distribution and presentation of pathogenic vibrios in drinking water and aquatic environment in this part of the country .

The counts of presumptive *Vibrio* in drinking water (Table 1) were high and an important finding in the preent study the pathogenic *V. cholerae* serotype inaba , ogawa and non –1 the organisms that caused cholera.

The main reason for the presence of *V. cholerae* in the drinking water may be due to the fluctuation in chlorinating which has undetectable in most times and also the odor of drinking water was to bad because of the possibility of mixing with sewage water due to damages in the distribution net work Al-Taee.2001;Al-Taee and Shamshoom,2001) .

*V. parahaemolyticus* was present as the dominant *Vibrio* species in aquatic environment especially in water with moderate salinity . this bacteria considered as part of the normal flora of estuarine and other coastal water .(Blake *et al.*, 1980 ) .

Daniels *et al.*, (2000) found that , the concentration of *vibrio* increased during the wormer months . neutral to alkaline pH and moderate salinity (5-25 ppt.) . Several researchers (Nalin,1976 ; Sochard *et al.*, 1979 ; Hug *et al* ., 1983 ; Islam *et al* ., 1984 . Brayton *et al* .,1987 ; Islam *et al* .,1994) were found that , the *Vibrio cholerae* have been detected and attached to phytoplankton or zooplankton , copepods, birds, plants and algae especially an interpidemics period . also they found that *V. cholerae* survive longer and multiply in the presence of this organisms .

At last the presence of pathogenic *vibrio* species in drinking water and aquatic environment has both ecological and public health significance .

**Table 1- the fecal coliforms and presumptive *Vibrio* counts from drinking water .**

| Sampling period | Samples No. | FC/100 ml | Presumptive *Vibrio* /100 ml |
|---|---|---|---|
| May – June | 4 | 20 – 360 | 0 – 138 |
| July – August | 4 | 5 –2078 | 80 – 1389 |
| September-October | 4 | 15 -1655 | 16 – 1213 |

**Table 2 The fecal coliforms and presumptive *Vibrio* counts from aquatic environment .**

| Sampling period | Samples No. | FC/100 ml | Presumptive *Vibrio* / 100 ml |
|---|---|---|---|
| May – June | 25 | 15-1.4 x $10^4$ | 0 – 3.1 x 102 |
| July – August | 24 | 5.5 x $10^2$- 2.9x$10^3$ | 65-8.1 x $10^4$ |
| September-October | 15 | 0 – 1.1 x $10^5$ | 105- 3.6 x $10^4$ |

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## تواجد الضميات الممرضة في مياه الشرب لمدينة البصرة والبيئة المائية في جنوب العراق

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### الخلاصة

استغرقت الدراسة ستة اشهر ابتداءاً من آيار – تشرين اول عام 2000 . شملت الدراسة الكشف عن كمية ونوعية بكتريا *Vibrio* الموجودة في مياه الشرب لمدينة البصرة والبيئة المائية في جنوب العراق . وجد ان اعداد بكتريا الـ Vibrio الافتراضية وبكتريا القولون البرازية مرتفعة خصوصاً للفترة من تموز – آب . شخصت البكتريا المعزولة كممرضات من النوع *V. cholerae* ذات النوع المحلي ، non-01، Inaba ، ogawa والنوع *V. parahaemolyticus* .