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Drinking Water Toxicity in Health and Diseases

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Abstract

The quality of the drinking water is a universal health concern. This paper is an attempt to clarify concerns about the quality and safety of drinking water quality both tap and mineral on health of the people living in Dakahlia Governorate-Egypt. Drinking water samples were collected from 14 different locations of Dakahlia Governorate representing 73 samples and 7 samples of mineral water. These samples were analyzed for physicochemical and bacterlogical parameters. The found values of physicochemical and bacterlogical parameters were compared with the World Health Organization (WHO) and Egyptian Minstry of Health (EMH) water quality standards.

Study of all these characteristics and correlation studies indicate that in some of the studied areas water was polluted and not suitable for drinking purpose. The drinking water of these areas needs some degree of treatment before consumption and prevention steps to be taken from contamination.

Keywords: Drinking water; Physicochemical parameters; Bacterlogical parameters; Atomic Absorption Spectrophotometer (AAS)

Introduction

Water is a chief natural resource essential for the existence of life and is a basic human entity. The quality of drinking water is vital concern for mankind since it is directly linked with human health. According to WHO, nearly 80% of all the diseases in human beings are caused by water [1,2]. Chemical contaminants of drinking water are often considered a lower priority than microbial contaminants, as adverse health effects from chemical contaminants are generally associated with long-term exposures, whereas the effects from microbial contaminants are usually immediate. Nonetheless, chemical in water supplies can cause serious problems [3]. Trace metals function mostly as catalysts for enzymatic activity in human bodies; however, their accumulation in the human body causes harmful effects [4]. Availability of safe drinking water is very important. To ensure this, reliance has to be placed on regular bacteriological analyses to assess portability and to determine the best course of action for protecting the population against water-borne diseases [5,6]. Several outbreaks of gastroenteritis and hepatitis [7], giardiosis and cryptosporidiosis [8] in communities with water meeting current regulations [9] have been recorded.

The current study was carried out to evaluate the physiochemical and bacteriological characteristics of drinking water used for human consumption and to what extent the people of Dakahlia Governorate suffer from community health problems.

Study Area

Dakahlia governorate

It is one of the most densely populated governorates in Egypt. It is the fourth Governorate in area after El-Sharqia, El-Behera and Kafr el-Sheikh governorates. It is bounded and then crossed by Damietta Nile branch, dividing it into two parts where Talkha, Bilqas and Sherbin districts in the western side and the other districts, eg; El- Mansoura, El-Manzala, El-Sinbillawin in the eastern side, (Figure 1).

Topography

Dakahlia governorate, in general, is a flat area, triangular in shape with apex in the south and base in the north. It lies between latitudes,

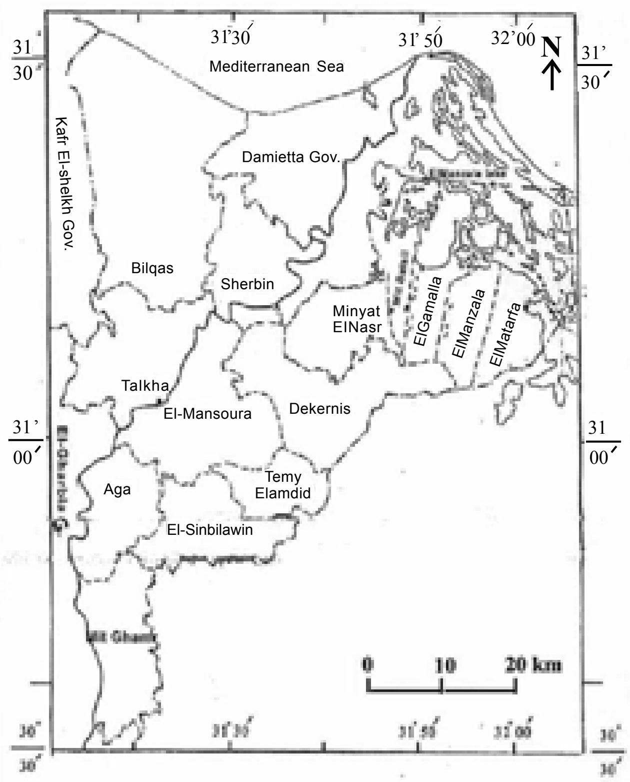

Figure 1: Dakahlia Governorate.

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30°30'–31°30' N and longitudes 31° 15'–32° 00' E. It is characterized by a gentle slope to the north. Elevation varies from about 12 m above sea level (a. s. l) in the south to less than 1 m a. s. l. in the north near the sea shore. The cultivated lands possess a network of irrigation and drainage canals related to Damietta branch. It contains some localities less than one meter a. s. l, particularly in the north including Manzala coastal lagoon [10]. High coastal sand dunes protect some localities, but others are flooded by winter surges. The coastal belt can be subdivided into the following three geomorphic units; the extensive back-shore flats, the flooded low lands and the coastal dunes [11].

Water Resources and Hydrogeology

The water resources in the governorate comprise surface and ground waters. The surface water is mainly the River Nile flowing in Damietta branch and its distributaries irrigation canals. The southern part of governorate is supplied by groundwater (Mit-Ghamr, el-Sinbillawin and Aga), and the rest of the governorate is supplied by regional and municipal systems which rely on surface water. Abd el-Daiem [11], stated that about 40 MCM/Y' is used from the main aquifer in Dakahlia Governorate. This amount of water is used for drinking and domestic use at the southern sector of the governorate, particularly at Mit-Ghamr, Aga and El-Sinbillawin districts. This amount of water represents 25% of the used water supply for the whole governorate. However, the gradient of the surface water of the Nile River is toward the north.

Abd el-Daiem et al. [12] reported that at Mit-Ghamr, the surface water level is almost +9 m where it is about +6 m for the surrounding groundwater level, here-in there is downward movement of the surface water to recharge the groundwater from the influent stream in this sector. At Mansoura, the surface water level in the Nile branch is +1.8 m, while it is about +4m in the near-by water wells, where the river is recharged by groundwater and becomes effluent stream in that sector and the Nile branch downstream of Mansoura behaves as a drain. The groundwater slopes towards the north and the direction of flow from the southern recharge area of the Damietta branch and El-Rayah El-Tawfiky to the northern discharged area. The Quaternary succession in the northern Nile Delta area in particular could be subdivided into two water-bearing units according to the stratigraphic succession [13,14]. These two units are mostly separated from each other by a sticky and almost continuous clay layer near the bottom of Bilqas Formation (Holocene) at top. The top unit of Bilqas Formation is considered as an aquitard (semi-previous layers), whiles the lower Mit-Ghamr Formation, and so called sub deltaic layer of [15] is considered as the main aquifer of the Nile Delta. The latter consists of a thick sand and gravel of Pleistocene age with thickness generally decreasing southward but with average thickness more than 700 m in the area of Dakahlia, dominated by permeable sands and gravels with minor clay lenses [13,14].

Material and Methods

Seventy three water samples were collected from 14 different locations of Dakahlia governorate as well as seven different types of mineral water were purchased from local markets, table 1. Heat-sterilized bottles of 500 ml capacity were used and the methods of sampling were developed from the WHO guidelines for drinking water quality [3]. Flaming the mouths of taps, and allowing water to run for 1-2 min was done before running it into the bottle. The bottles were delivered to the laboratory and kept in refrigerator at 4°C until the time of analysis.

Results and Discussion

Physiochemical Evaluation

The physiochemical obtained data on analysis of the collected water samples were tabulated in (Tables 2-6); Table 2 represents analysis of drinking water samples of the main surface water stations. Table 3 represents the polluted drinking water samples of compact units. Table 4 represents the polluted drinking water samples of groundwater. Table 5 represents the results of different types of mineral water. Table 6 represents the polluted drinking water samples by some heavy metals which exceed than the permissible limits of [3,16].

The tabulated and represented data are showing that pH of the drinking water samples in Temy el-amdid district; Abo-dawoud compact unit, (Table 3) and Mit-ghamr district; Network of Tafahna el-Ashraf well, El-Maasara well, Network of Mit-Mohsen well, Atmeda well and Network of Sampomakam well and Aga district; Miyet

No	District	Surface drinking water		Drinking groundwater (Wells)	Total No of samples
		Main	Compact		
1	El-Mansoura	2	4	--	8
2	Talkha	1	3	--	5
3	Dekrnis	1	-	--	2
4	Sherbin	2	1	--	5
5	Bilqas	1	2	--	4
6	El-Gamalia	1	-	--	2
7	El-Manzala	1	2	--	4
8	Nabaru	-	1		1
9	Mit-Salsil	-	1		1
10	Minyet el-nasr	-	3		3
11	Temy el-mdid	-	2		2
12	El-Sinbillawin	1	1	2	5
13	Mit-Ghamr	-	-	13	15
14	Aga	-	1	5	9
	Total No of Units	**10**	**21**	**20**	
	Mineral water samples				**7**
	Total No of Samples	**20**	**21**	**25**	**73**

Table 1: Localities of the different drinking water samples in Dakahlia governorate.

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NO	District / sample name	pH	EC µm/cm at 25°C	TDS ppm	TH ppm	Cl_2 ppm	Cl^- ppm	SO_4^{--} ppm	Alkal. ppm
	WHO (20011)	6.5 – 8		1000	500	5	250	250	
	EMH (2007)	6.5 – 8.5		1000	500	5	250	250	
I	El-Mansoura district								
	1- Main station 1	7.75	444	288.6	144	0.66	35.45	75	150
	2- Network1	7.85	450	292.5	140	0.52	34.75	81.73	140
	3- Main station2	7.69	443	288	136	1.56	34.73	99	145
	4- Network2	7.6	446	290	137	1.5	34.03	80	140
II	Talkha district								
	5- Main station	7.68	425	276.3	144	1.95	35.45	60	146
	6- Network	7.75	436	283.4	136	1.3	34.03	46	142
III	Dekernis district								
	7- Main station	7.65	428	278.2	132	0.53	32.6	90	135
	8- Network	7.72	461	269.6	142	0.33	34.03	78.85	150
IV	Sherbin district								
	9- Main station1	7.74	438	284.7	137	1.5	34.03	56	155
	10- Network1	7.41	433	281.5	141	1.35	33.33	44	152
	11- Main station2	7.73	435	282.2	128	0.6	36.9	75	150
	12- Network2	7.8	460	299	140	0.33	38.28	60.57	175
V	Bilqas district								
	13-Main station	7.76	477	310.1	144	0.64	35.45	96.15	155
	14-Network	7.81	475	308.7	140	0.41	38.3	86.54	150
VI	El-Gamalia district								
	15-Main station	7.73	435	282.7	134	0.57	35.45	79.81	125
	16-Network	7.62	438	284.7	130	0.36	32.6	86.5	150
VII	El-Manzala district								
	17- Main station	7.45	390	253	124	0.08	20	35	130
	18- Network	7.75	393	255	136	0.18	33	53	151
VIII	El-Sinbillawin district								
	19-Main station	7.35	430	275	135	0.76	36.1	76	120
	20-Network	7.12	434	280	130	0.32	32.1	85	144

Table 2: Results of Physiochemical analyses (mg / l) of the **main** surface drinking water **stations.**

NO	District / sample name	pH	EC µm/cm at 25 °C	TDS ppm	TH ppm	Cl2 ppm	Cl- ppm	SO4- -ppm	Alkal. Ppm
I	El-Mansoura district								
	1- Awish el-hagar	7.53	486	315.9	150	0.4	35	43	148
	2- Mahalet damana	7.82	420	273	126	0.28	32	52	136
	3- Shoha	7.7	371	241	130	0.12	30	44	131
	4- El-Rydania	7.77	410	266	130	0.21	40	56	143
II	Talkha district								
	5- Mit-antar	7.46	445	298.5	145	1.5	34.03	65	156
	6-Mit- elkorama	7.63	486	315.9	150	0.5	31	67	140
	7- Demera	7.74	468	304.2	130	0.45	35	46	120
III	Sherbin district								
	8- Ras el-khalig	7.72	498	323.7	140	0.6	46	57	133
IV	Bilqas district								
	9-El-satamony	7.99	385	256	135	0.4	30	36	141
	10- Basindela	7.46	410	266.5	135	0.15	30	62	130
V	El-Manzala district								
	11- El-aziza	7.79	379	246	140	0.1	28	45	145
	12- El-Mawaged	7.44	375	243	132	0.48	30	45	140
VI	Nabaru district								
	13- Nabaru	7.67	480	312	140	0.71	50	60	145

VII	Mit-Salsil district								
	14-Mit-Salsil	7.9	447	290.5	140	0.66	34	57	180
VIII	Minyet el-nasr district								
	15- Minyet el-nasr	7.5	431	281.2	130	0.8	30	47	136
	16- Mit-asim	7.65	360	234	132	0.08	30	35	135
	17- Brembal	7.65	410	266.5	135	0.3	43	38	141
IX	Temy el-amdid district								
	18- Temy el-amdid	7.76	454	295.1	160	0.43	38	51	150
	19- Abo-dawoud	**8.01**	432	280.8	146	0.3	36	42	150
X	**El-Sinbillawin district**								
	20- Barqin	7.73	359	233	135	0.4	30	45	140
XI	**Aga district**								
	21- Nawasa	7.53	398	259	130	0.12	21	30	140

Table 3: Results of Physiochemical analyses (mg / l) of the surface drinking water **compact units.**

NO	District / sample name	pH	EC μm/cm at 25 °C	TDS ppm	TH ppm	Cl2 ppm	Cl- ppm	SO4- -ppm	Alkal. Ppm
I	El-Sinbillawin district								
II	1- Network of Mit-ghorab	7.85	376	245	135	0.05	41	48	133
	2- Karkera well	7.7	349	226.8	120	0.13	32	46	133
	Mit-ghamr district								
	3- Network of Mit-nagy	7.94	828	**538**	160	-	53	81	160
	4- Network of Tafahna el-Ashraf	**8.14**	522	340	140	1.1	42	63	145
	5 El-Maasara well	**8.06**	460	499	138	0.2	36	70	140
	6 Network of El-Maasara	7.94	389	258	130	0.09	32	40	132
	7- Network of Mit-Mohsen	**8.32**	566	268	145	0.12	40	51	148
	8 Atmeda well	**8.08**	480	312	152	0.92	35	48	145
	9- Mit-ghamr well after Cl2	7.88	437	284.1	52.9	0.71	33.33	152	160
	10 Network of Mit-ghamr	7.93	396	257.4	38.5	0.53	18.54	138	170
	11- Mit – elkorashi well	7.8	430	279.5	120	0.12	30	51	140
	12- El-Rahmania well	7.6	352	228.8	130	-	41	70	123
	13-Damas well	7.9	610	369.5	170	0.4	42	178	178
	14-Network of Sampomakam	**8.1**	326	212	132	0.12	40	51	128
	15- Mit-el ezz well	7.91	410	266.5	128	0.11	38	66	120
	16- Hala well	7.68	422	274.3	155	0.39	38	145	145
	17- Sahragt el-kobra well	7.82	455	295.7	160	0.43	33	140	140
III	Aga district								
	18- Miyet Sammanoud well before Cl2	**8.24**	1111	**722.1**	153.8	-	151.7	132	250
	19- Miyet Sammanoud well after Cl2	7.86	1163	**755.9**	205	0.77	151.7	142	300
	20- Network of Miyet Sammanoud	7.92	1128	**733.2**	192.3	0.59	150.2	120	245
	21- Ikhtab well	**8.67**	650	422	140	-	35	58	158
	22- Mit EL-Amil well	**8.54**	937	609	140	-	43	58	150
	23- Aga el-gadida well after Cl2	**8.26**	761	494.6	50	0.62	112	32	205
	24- Network of Aga el-gadida	**8.28**	766	497.9	78	0.52	105	18	205
	25- Tanamil well	**8.59**	1266	**822.9**	335	0.58	98	260	260

Table 4: Results of Physiochemical analyses (mg / l) of the drinking groundwater samples.

Sammanoud well before chlorine addition, Ikhtab well, Mit EL-Amil well, Aga el-gadida well after chlorine addition, Network of Aga el-gadida well and Tanamil well, table 4 are higher than the safety base line value according to [3]. Each of Cd, Ni and Pb ions are greater than their safety base line values, table 6 according to [3,16]. In El-Mansoura district; Network of Shoha compact unit shows high values of Ni and Pb and in Talkha district; Mit-antar and Demera compact units show high values of Cd and Pb and in Sherbin district; Network of main station1shows high values of Cd and Ni and in Bilqas district; main station, network of main station and El-satamony compact unit show high value of Cd and In El-Gamalis district; network of main station shows high value of Cd and Ni and In Nabaru district; Nabaru compact unit shows high value of Pb and In Miyet el-nar; Mit asm compact units shows high value of Cd and In Mit-ghamr district; Network of Tafahna el-Ashraf well, Atmeda well, Damas well show high value of Cd as well as high value of Pb in Damas well and Sahragt El-kobra well, Mit-el-ezz well shows high value of Ni and In Aga district; Ikhtab well, Mit-el-amil well, Aga el-gadida well after chlorine addition and network of Aga el-

District / sample name	pH	EC µm/cm at 25 °C	TDS ppm	TH ppm	Cl2 ppm	Cl- ppm	SO4- -ppm	Alkal. Ppm
1- B araka	7.96	700	455	290	-	110	96	300
2- Nestlhi	7.25	410	266.5	140	-	152	44	150
3- Safi	7.35	299	194.3	50	-	80	29	50
4- Shwepes	7.66	501	325.6	130	-	130	56	145
5- Dasani	7.12	282	183.3	110	-	40	30	112
6- Hayat	7.45	302	196.3	50	-	68	31	60
7- Siwa	7.44	303	197	40	-	86	31	45

Table 5: Results of Physiochemical analyses (mg / l) of the different types of mineral drinking water.

NO	District / sample name	Cd	Cu	Zn	Cr	Ni	Pb	Mn	Fe	Co
	Permissible limit of WHO (20011)	0.003	2.00	3.00	0.05	0.07	0.01	0.4	0.3	0.05
	Permissible limit of EMH (2007)	0.003	2.00	3.00	0.05	0.02	0.01	0.4	0.3	0.05
I	El-Mansoura district									
	1- Main station1	0.002	0.001	0.012	0.002	0.008	0.001	0.001	0.004	0.002
	2 Network 1	0.003	0.001	0.004	0.001	0.003	0.00	0.00	0.003	0.001
	3- Mahalet damana	0.001	0.001	0.006	0.005	0.006	0.002	0.00	0.004	0.001
	4- Network of Shoha Station	0.00	0.014	0.116	0.008	**0.022**	**0.016**	0.01	0.023	0.00
	5- El-Rydania	0.001	0.001	0.007	0.005	0.002	0.00	0.001	0.003	0.001
II	Talkha district									
	6- Mit-antar	**0.011**	0.002	0.013	0.008	0.013	**0.033**	0.011	0.001	0.00
	7- Demera	**0.032**	0.001	0.005	0.003	0.007	**0.025**	0.004	0.002	0.004
III	Dekernis district									
	8- Network	0.00	0.001	0.008	0.001	0.011	0.003	0.00	0.002	0.001
IV	Sherbin district									
	9- Main station 1	0.001	0.001	0.001	0.006	0.008	0.002	0.00	0.001	0.001
	10- Network1	**0.005**	0.001	0.002	0.003	**0.022**	0.00	0.001	0.002	0.001
V	Bilqas district									
	11-Main station	**0.005**	0.00	0.00	0.001	0.009	0.00	0.00	0.002	0.001
	12-Network	**0.007**	0.00	0.001	0.005	0.005	0.00	0.001	0.003	0.001
	13-El-satamony	**0.007**	0.001	0.001	0.00	0.01	0.003	0.00	0.001	0.002
VI	El-Gamalia district									
	14-Network	**0.01**	0.001	0.006	0.001	**0.021**	0.002	0.001	0.001	0.001
VII	El-Manzala district									
	15- Main station	0.003	0.002	0.003	0.001	0.009	0.003	0.004	0.02	0.002
	16- El-Mawaged	0.002	0.001	0.052	0.003	0.008	0.00	0.001	0.007	0.001
VIII	Nabaru district									
	17- Nabaru	0.001	0.00	0.014	0.004	0.006	**0.028**	0.012	0.001	0.00
IX	Minyet el-nasr district									
	18- Mit-asim	**0.005**	0.00	0.012	0.00	0.018	0.003	0.001	0.011	0.001
	19- Brembal	0.001	0.001	0.009	0.002	0.005	0.00	0.00	0.005	0.001
X	Temy el-amdid district									
	20- Abo-dawoud	0.003	0.001	0.003	0.003	0.008	0.001	0.00	0.005	0.00
XI	El-Sinbillawin district									
	21-Main station	0.002	0.00	0.003	0.00	0.008	0.004	0.00	0.003	0.002
	22- Network of Mit-ghorab	0.002	0.00	0.06	0.004	0.012	0.001	0.001	0.00	0.001
XII	Mit-ghamr district									
	23- Network of Mit-nagy	0.002	0.00	0.005	0.00	0.017	0.003	0.033	0.012	0.002
	24- Network of Tafahna el-Ashraf well	0.002	0.00	0.00	0.00	0.007	0.001	0.001	0.003	0.001

	25- Network of Mit-Mohsen well	0.005	0.00	0.002	0.003	0.011	0.00	0.001	0.002	0.002
	26- Atmeda well	0.007	0.00	0.005	0.004	0.007	0.00	0.014	0.038	0.002
	27- Mit-ghamr well after Cl2	0.003	0.001	0.012	0.001	0.014	0.002	0.014	0.011	0.001
	28-Damas well	0.019	0.002	0.018	0.022	0.015	0.029	0.009	0.001	0.00
	29- Mit-el ezz well	0.00	0.027	0.032	0.004	0.021	0.001	0.00	0.008	0.00
	30- Sahragt el-kobra	0.027	0.001	0.019	0.005	0.007	0.037	0.005	0.002	0.00
XIII	Aga district									
	31- Nawasa	0.001	0.001	0.00	0.001	0.001	0.004	0.001	0.005	0.015
	32- Ikhtab well	0.007	0.001	0.001	0.00	0.013	0.003	0.00	0.002	0.001
	33- Mit EL-Amil	0.007	0.001	0.00	0.002	0.005	0.001	0.00	0.001	0.001
	34 Aga el-gadida well after Cl2	0.006	0.00	0.001	0.002	0.02	0.002	0.00	0.002	0.001
	35- Network of Aga el-gadida	0.005	0.001	0.002	0.001	0.021	0.001	0.004	0.005	0.001
	Mineral drinking water									
	36- B araka	0.002	0.003	0.009	0.001	0.005	0.001	0.001	0.004	0.00
	37- Nestlh	0.002	0.003	0.031	0.00	0.002	0.002	0.00	0.004	0.00
	38- Safi	0.00	0.002	0.041	0.002	0.004	0.00	0.001	0.007	0.00
	39- Shwepes	0.002	0.002	0.012	0.001	0.002	0.001	0.005	0.005	0.00
	40- Dasani	0.001	0.002	0.032	0.004	0.002	0.00	0.004	0.01	0.00
	41- Hayat	0.00	0.003	0.008	0.001	0.004	0.00	0.00	0.004	0.00
	42 Siwa	0.002	0.001	0.022	0.00	0.005	0.001	0.005	0.008	0.00

Notes: highlight values: abnormal values

*Cl2: Chlorine

ppm: Part per million = mg/L, EC: Electrical conductivity µm/cm: µmohs/cm, TDS: Total dissolved salts,

TH: Total hardness, Cl2: Chlorine, Cl^-: Chloride, $SO4^{2-}$: Sulfate, Alkal: Alkalinity

Cd: Cadmium, Cu: Copper, Zn: Zinc, Cr: Chromium, Ni: Nickel, Pb: Lead, Mn: Manganese, Fe: Iron, Co: Cobalt

Table 6: Results of heavy metals (mg / l) of some different drinking water samples

gadida well show high value of Cd as well as high value of Ni in network of Aga el-gadida well.

The great difference between the assayed concentrations and the acceptable limits may be ascribed to the geological characteristics of the studied area or to the unbounded amounts of phosphates fertilizers and so many types of pesticides used in the agriculture activities may also led to the high concentrations of Cd and Ni in drinking water in this area. The contamination of water is directly related to the degree of contamination of our environment. Rainwater collects impurities while passing through the air. Streams and rivers collect impurities from surface run off and through the discharge of sewage, industrial and agriculture effluents. These are carried to the rivers, lakes or reservoirs that supply our drinking water [17]. In general, a strong relationship between contaminated drinking water with heavy metals and chronic diseases such as renal failure, liver cirrhosis, hair loss and chronic anemia has been identified [18]. These diseases are apparently related to the contamination of drinking water with heavy metals. Renal failure is related to the contamination of drinking water with Cd and Pb. Hair loss to the contamination with Ni and chronic anemia to the contamination with Cd. In addition, examples of chronic health effects include cancer, birth defects, organ damage, and disorders of nervous system and damage of immune system [19]. Cadmium appears to accumulate with age progress especially in the kidney and it is considered as carcinogenic.

It was reported that [20] the geochemical implications of Cd in human health related to bone and renal failure in populations drinking contaminated water. Toxicity of nickel is enhanced in presence of some other metals in drinking water. Hair loss and derma toxicity in hypersensitive are related to contaminated drinking water with nickel. High concentration of lead in the body can cause death or permanent damage to the central nervous system, the brain and kidney [21]. The damage commonly results in behavior and learning problems. Such problems are hyperactivity, memory and concentration problems, high blood pressure, hearing problems, headaches, slowed growth, reproductive problems in men and women, digestive problems, muscle and joint pain. Lead is considered the most health threat for children

Bacteriological Evaluation

Infectious diseases caused by pathogenic bacteria, viruses and parasites are the most common and widespread health risk associated with drinking water. The elimination of all these agents from drinking water has a high priority. The provision of a safe supply of drinking water depends upon use of either a protected high-quality ground water or a properly selected and operated series of treatments capable to reduce pathogens and other contaminants to the negligible health risk [22]. The results revealed that samples of Network of Shoha Station, Mit-ghorab well, El-Rahmania well, Mit-el ezz well and Miyet Sammanoud well before addition of chlorineall contain high numbers of Total count of Bacteria and exceed the permissible limit recommended by [16]. Many researchers got the fact that such high records of diarrheic cases and renal colics and failures were associated with water treatment and distribution system deficiencies [23-25]. Natural untreated water is a good source for pathogenic bacteria; Aderson [26] found that the lack of chlorination supply has been blamed for the rapid spread of cholera in Peru. Payment et al. [27] in an epidemiological study confirmed that tap water is a significant source of gastrointestinal illnesses (14-40%).

The data obtained in this study support the need for monitoring drinking water especially groundwater and compact units that will be consumed by the people of Dakahlia Governorate. Different types of mineral water are good, no pollution either physiochemical or bacteriological and safe for drinking purposes. In conclusion, the obtained results suggested a recommendation for the new treatment and distribution systems of investigated suspicious water is needed to prevent human illness.

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References

1. Rani DG, Suman M, Rao NC, Rani R P, Prashanth GV, et al. (2011) Assessment of Ground Water Quality and its Impact in and around Mangalam near Tirupathi, Andhra Pradesh, India. Current World Environment 6: 191-193.
2. Venkateswarlu P, Suman M, Rao N C (2011) Evaluation of physicochemical parameters of ground water of Renigunta, Andhra Pradesh, India. Res J Pharm Biol Chem Sci 2: 464-469.
3. Thompson T, Fawell J, Kunikane S, Jackson D, Appleyard S (2007) Chemical safety of drinking water: Assessing priorities for risk management. WHO Press, World Health Organization, Geneva, Switzerland.
4. Tayyeb ZA, Farid SM, Otaibi KA (2004) Trace element concentration of commercially available drinking water in Makkah and Jeddah. JKAU Eng, Sci 15: 149-154.
5. Diab AM, Abdel Azi MH, Abel Hamid S (2000) Drinking Water Qualities of Different Purification Systems in Ismailia Governorate. Egypt J Microbiol 35: 533-554.
6. Ramteke PW, Bhattaacherjee JW (1992) Bacterial Pollution of Drinking Water Sources in North Tripara District. Proc Acad Environ Biol 1: 19.
7. Kramer MH, Herwaldt BL, Craun F, Calderon RL, Juranek DD (1996) Surveillance for water – borne disease outbreaks, United States, 1993-1994. JAWWA 88: 66-80.
8. Smith HV, Smith PG (1990) Parasitic Protozoa in drinking water. Endeavor. 14: 74-79.
9. Anonymous (1994) Guidelines for Canadian Drinking Water Quality. Ottawa, Canada; Health Canada.
10. Abu el-Izz MS (1971) Landforms of Egypt. Dar Al-Maaref. Cairo, 281.
11. Abd el Daiem AA (1995) Water resources; groundwater, Dakahlyia governorate. Preliminary report. :16.
12. Abd el Daiem AA, Ramsussen KR (1991) A mathematical model for the north part of the Nile Delta Quaternary aquifer, Egypt. Journal of Environ Sci 3: 339-363.
13. Farid MS (1985) Management of groundwater system in Nile Delta. PhD Thesis: Cairo Univ.
14. Farid MS (1980) Nile Delta groundwater study. MSc Thesis: Cairo Univ.
15. Attia MT (1954) Deposits in the Nile valley and the Delta mine and quarries. Department of geological survey. Egypt : 356
16. Egyptian Ministry of Health (2007) Standards and specifications of water quality for drinking and domestic uses. Internal Report : 8
17. Skeat WO (1969) Water Quality and Treatment. Manual of British Water Engineering Practice. (4th edition), The Institution of Water Engineers. London.
18. Salem HM, Eweida AE, Farag A (2000) Heavy Metals in Drinking Water and the Environmental Impact on Human Health. ICEHM2000 Cairo University, Egypt : 542-556.
19. USGAO (2000) Health effect of lead in drinking water: US General Accounting Office Reports.
20. Webb M (1979) The geochemistry, Biochemistry and Biology of Cadmium. Elsevier / North Holland Biomedical Press, Amsterdam.
21. Jenning GD, Sneed RE, St Clair MB (1996) Metals in drinking water. North Carolina Cooperative Extension service. Publication no AG473-1. Electronic ver 3.
22. Shaban AM, El-Taweel GE (2002) Fate of New Indicator of Pollution and Pathogenic Bacteria During Water Treatment Systems. Egypt J. Microbiol. 37: 57-69.
23. Dufour AY (1982) Disease Outbreaks Caused by Drinking Water. JWPCF 54: 980.
24. 24 Guerrant RL, Kirchhoff LV, Shields DS, Nations MK, Leslie J, et al. (1983) Prospective study of diarrhoeal illness in northern Brazil: pattern of disease nutritional impact, etiologies, and risk factors. J. Infect. Diseases 148: 986-997.
25. Ferley JP, Zmirou D, Collin JF, Charrel M, (1986) Longitudinal study of the risks associated ala consummation water non Conforms to normen bacteriological. Rev. Epidemiol Sante Publique 34: 89.
26. Aderson C (1991) Cholera Epidemic Traced to Risk Miscalculation. Nature 354: 255.
27. Payment P, Siemiatycki J, Richardson L, Renand G, Franco E, et al. (1997) A prospective epidemiological study of gastrointestinal health effects due to the consumption of drinking water. Inter. J. Environ. Health Res. 7: 5-31.

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