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Effect of Using and Preparing of Food on Diarrhea Disease for Children

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Abstract
Introduction: In Iraq diarrhea is the main cause for clinical presentation among under 5-years child population next to pneumonia and it's also more common in rural than in capital Baghdad. Method: A community based cross-sectional study was conducted in urban Baghdad Hospital Central for Children and in Al-Mohmmodia Hospital which was in rural city. Data were collected from the patient's record registration for each hospital (age, No. of child who is infected with diarrhea, Nutritional status, breast-feeding and water supply, and socio-economic status). Also, precoded questionnaires with sociodemographics, maternal and child characteristics, child feeding, and environmental conditions. Result: Total diarrhea percent under-10 years children in the urban capital Baghdad were lower than Baghdad's rural, that were 13.73 and 69.68 respectively. The difference in diarrhea percent among males and female for both hospitals was big and the difference was statically significant ($p<0.01$). Children in the age group less than one year had the higher prevalence of diarrhea to the extent of 51.16% in rural Al-Mohmmodia than capital Baghdad 14.34%, followed by the age 1 year and above had the lowest prevalence. The difference in the prevalence of diarrhea in different age groups was showed to be statically significant ($p<0.01$). Similarity, decreasing birth weight, immunization and vitamin A consumption, personal hygiene, overcrowding, garbage and exceta disposal, source of water, and caregiver status were found associated with increased diarrhea incidence ($p<0.01$). Conclusion: in this study the prevalence of diarrhea was higher in under-five children in rural Baghdad than capital Baghdad which was significantly associated with child's sex, child's age, maternal education level, and socio-economic parameter. Therefore, this study to show the differences between Baghdad city and its rural of diarrheal incidence in children less than 10 years, and to see which season effect diarrhea incidence more. The other objective is to find out association between certain risk factors and diarrhea among children less than 10 years.
Keywords: Diarrhea- risk factors- nutrition status- stunting- parasites and bacterial infection.

Introduction

Children constitute a major proportion of the global population today. Children health has been given a greatest priority over the years both at National and state level (Park, 2012). The challenge of the time nowadays is to study child health in relation to community, social, politic and economic values (WHO, 2010). It has been estimated that 10% of the 5.8 billion people living in the whole world are children under 5 years age (WHO, 1998). However, acute diarrhea still to be one of the most health problems in children especially in developing countries. It is found that annually some of 1.8 million children die from diarrhea infections. Although diarrhea leads to 4 million people's death in developing countries each year, it remains a problem in those countries as well. One in four deaths in children under the age of five years is accounted to be due to diarrhea (Gov. of India, 1994). The high mortality and morbidity in children under five years old worldwide, due to acute diarrhea that takes place in Africa and south of Asia (Fisher, et al. 2013). Annually at least 1500 million episodes of diarrheal diseases occur in children (Muhammed, et al. 2004).

Diarrhea is a very loose or watery stool for three or more times during a 24-hour period, and that bowel movements and change in frequency or consistency of stools differ from a child normal pattern (Gerald et al. 2001). Acute diarrheal diseases are one of the main problems affecting children in the worldwide, its defined as an increased number of stools or looser from than customary for the patient, lasting less than two weeks, associated with abdominal symptoms like cramping, bloating and gas, following the reducing their essential body fluids and vital nutrients causing dehydration, malnutrition and creating considerable demand for health services (WHO, 2008; 2010). World health organization accounted that 88% of all diarrheal diseases are due to unsafe water supply, maternal education, availability of latrine facilities, living in a house with fewer number of rooms, not breast feeding, duration of breast feeding, age of child, inadequate sanitation and poor hygiene practices (Bayer, et al. 2001, Muhammad, et al. 2004). A WHO attributed that increased risk of diarrhea and many other diseases due to formula-fed babies in developing countries averaging more than 6 times that of

breast-feeding babies (Dewey, et al. 1995, Laura, et al. 2011).

Contaminated foods play a major role in the incidence of diarrheal diseases. Food contamination, transmission of infection occurs by direct contact by the habits and customs of the people. Improper storage and handling of cooked food is responsible for food-borne illnesses, and storing the foods on 28-38 °C which causes the multiplication of pathogenic organisms increase. Food safety education is a critical prerequisite and is an essential element in control and prevention of diarrheal diseases. However, no preventive measures can ever be successful without the acute involvement of the caretakers, all family members and the community (Mini, and Reeta, 2006) . So that, this study aimed to assess the prevalence of acute diarrhea among children under 10 years between rural population and in the urban capital city Baghdad. The other objective is to found out association between risk factors and diarrhea such as the handling of different food (breast feeding, complementary), water sources and the different periods of age among children less than 10 years lives in rural city Almohammodia in comparison with children who lives in the center of Baghdad. Also, this study was conducted among 100 randomly selected inpatients caregivers with at least two children under 5years old, and at least 2-3 children under 10years old. A questionnaire and an observational from patient's record registration which is used in the hospitals were used for collecting data on socio-economic characteristics, environmental hygiene, behavioral practices, and occurrence of diarrhea among children under different age from zero-10 years.

Material and Methods

This study was conducted of inpatient department in Child Central Educational Hospital /Baghdad/ urban Avenues which is very crowded, and in Al-Mohmmodia Hospital/ rural avenues, around Baghdad, and is lie far away approximately 35 kilometers from the capita Baghdad with total population of 100.500 residents. Important information about children who infected by diarrhea during Jan to Sep. months 2015 from patient's record registration which is used in hospital. Agriculture is the main source of the districts livelihood, which occupy 65%. Health services in the district are provided by seventh health center. The design was comparative cross sectional. Convenient sampling method was chosen. One hundred feeding-mothers were interviewed during the course of their visit to the hospital with the assistant of hospital workers, seeking care for their diarrhea suffering children. Interview was conducted on a questionnaire that was closed-ended formatted. . Information was collected regarding 100 infants, from age zero to one year, who were brought to the inpatient diarrhea for diarrhea management. Feeding practices and other relevant history were assessed via questionnaire. Socio-economic characteristics were also part of the interview tool.

Families with at least one child under 5 years of age were eligible for the study. Study participants were selected randomly. For families with two or more children less than 10 years of age were taken, the index child was selected by a lottery method.

Data were collected using questionnaire tested previously and administered by a specific interviewer in the health center and the observational record which is used in the health center or in hospital. The questionnaire was prepared based on the Multiple Indicator Cluster Survey (MICS), Demographic and Health Center (DHC), and World Health Organization (WHO, 1998) core questionnaire related to diarrhea. The respondents were primarily mothers of eligible children under 10year of age, but in the absence of the mother, the next primary caregiver was interviewed.

Information was collected regarding 100 children's families from age zero to 10 years and it's divided into four groups, who were brought to the inpatient to health center for diarrhea management. Feeding practices, water supply, complementary foods, personal hygiene, garbage disposal, excreta disposal, and nutrition status and other relevant history were assessed via questionnaire. Mothers knowledge, literacy status, Socio-economic characteristics were also assessed.

Analysis

Data entry and analysis were done using SPSS-8.0 software. Prevalence of diarrhea and 95% C.I was corrected for the design effect of cluster sampling by multiplying the variance by a factor of 2. The association between risk factors and diarrhea was estimated by odds ratio and 95% C.I calculated. Adjusted odds ratio was calculated by using logistic regression.

Statistical Analysis

The Statistical Analysis System- SAS (2012) program was used to effect of difference factors in study parameters . Chi-square test was used to significant compare between percentage in this study.

Definition of terms used

Acute diarrhea

Acute diarrhea is sudden onset of passage of three or more loose liquid or watery stools over 24 hours period that usually lasts 3-7 days but may last up to 10-14 days (WHO, 2005).

Literacy
A person is deemed as literacy if he or she can read or write with understanding in any language.

Waste disposal
Proper waste disposal was defined as a way of disposing refuses which included burning, burying in a pit or storing in a container, and designed site whereas disposing in open fields was considered as an unimproved-disposal method.

Home based water treatment
It's defined as methods employed for the purposes of treating water in the home using any of the following affordable water treatment techniques like boiling, filtration, and chlorination (chlorine).

Maternal knowledge
Maternal knowledge about diarrhea was defined as knowledge of child caregivers, how diarrhea can be transmitted, and methods controlling diarrheal episodes.

Results and discussion
Diarrhea infection by age and region
Respecting the age data we conducted within rural city (Al-Mohammodia Hospital) estimates for each age group (< than 1year, 1-5years, and 6-10years) for completely nine months from Jan. to Oct. /2015 as shown in table 1. Diarrhea infection rates were significant ($p<0.01$) differences among the months with each sex, which were diarrhea increased ($p<0.01$) significantly in summer season, especially in June and July months for the age under one year. Also, diarrhea infection rate were higher in boys than girls. While, diarrhea infection rate were decreased ($p>0.01$) significantly in age 1-5years group compared with age less than one year. Boys had the higher rates of diarrhea incidence than girls especially in Jan. and Jun. months. Increasing age inversely associated with diarrhea infection as shown clear in this table, also boys had higher rates of diarrhea than girls. It was clear that diarrhea infection percent significant ($p<0.01$) differences among boys compared with girls. Also, the percent of diarrhea infection were higher in hot months than in cold months as shown in table 1. Children with diarrhea incidence were represented more than half of the total inpatient to the hospital.

Table (1): Shows children diarrhea infection % of inpatient children for 9 months/2015 in Al-Mohmmodia Hospital/ rural Avenues.

Months	Less than 1 year group		1-5 years Group		6-10 years group		Total				Total of diarrheal infected patients	Total of inpatient child	Total of dirrheal incidence%
	Male	Female	Male	Female	Male	Female	Male	Male%	Female	Female%			
Jan.	33	53	95	69	35	30	163	51.7	152	48.3	315	425	74.1
Febr.	75	71	40	39	25	20	140	51.8	130	48.1	270	449	60.1
March	65	45	59	46	35	20	124	52.8	111	46.8	235	356	66.0
April	70	67	76	62	37	25	183	54.3	154	45.7	337	478	70.5
May	110	102	43	40	25	20	178	52.4	162	47.6	340	490	69.3
June	150	72	77	41	24	20	251	62.4	133	34.6	384	501	76.6
July	175	56	65	43	55	40	295	67.9	139	32.0	434	520	83.5
August	110	130	30	26	60	20	260	69.1	116	30.8	376	529	71.1
Sept.	85	41	35	57	40	10	160	59.7	108	40.3	268	487	55.0
Total	873	637	520	380	336	205	1729	58.59	1222	41.40	2951	4235	69.68
%	57.81	42.18	57.77	42.22	62.10	37.89							
Chi-square (χ^2)	6.035 **		6.129 **		10.481 **			9.316 **	---	8.025 **	---	---	11.326 **

**** (P<0.01)**

Respecting the age data we conducted within Child Central Educational Hospital /Baghdad/ urban avenues estimates for each age group (< than 1year, 1-5years, and 6-10years) for nine completely months from Jan. to Oct. /2015 as shown in table 2 also. Diarrhea infection rates were significant ($p<0.01$) differences among the months with each sex, which were diarrhea increased ($p<0.01$) significantly in summer season, especially in July and Aug. months for the age under one year. Also, diarrhea infection rates were higher in boys than girls. While, diarrhea infection rates were increased ($p<0.01$) significantly in age 1-5years group compared with age less than one year. Boys had the higher rates of diarrhea infection than girls especially in Apr. and May. Months. Increasing age inversely associated with diarrhea incidence as shown clear in this table, also boys had higher rates of diarrhea than girls. It was clear that diarrhea infection percent significant ($p<0.01$) differences among boys compared with girls. Also, the percent of diarrhea infection were higher in hot months than in cold months as shown in table 1. Children with diarrhea incidence were represented less than fifth of the total inpatient to the hospital in Baghdad city.

Table (1): Shows children diarrhea infection % of inpatient children for 9 months/2015 in Child Central Educational Hospital /Baghdad/ urban Avenues.

Months	Less than 1 year group		1-5 years Group		6-10 years Group		Total				Total of diarrheal infected patients	Total of inpatient child	Total of dirrheal incidence%
	Male	Female	Male	Female	Male	Female	Male	Male%	Female	Female%			
Jan.	4	3	10	5	6	2	20	66.67	10	33.33	30	390	7.69
Febr.	2	2	11	7	8	5	21	60.00	14	40.00	35	409	8.55
March	9	3	14	4	4	10	27	61.36	17	38.64	44	470	9.36
April	7	7	38	20	20	13	65	61.90	40	38.10	105	551	19.05
May	7	4	35	8	19	11	61	72.61	23	27.39	84	531	15.82
June	25	11	30	31	29	21	84	57.14	63	42.86	147	1030	14.27
July	8	10	24	29	11	21	43	41.75	60	58.25	103	571	18.03
August	16	6	20	8	10	10	46	65.71	24	34.29	70	705	9.92
Sept.	20	19	15	13	11	22	46	46.00	54	54.00	100	570	17.54
Total	98	65	197	125	118	115	413	57.52	305	42.48	718	5227	13.73
%	60.12	39.88	61.18	38.82	50.64	49.36							
Chi-square (χ^2)	9.337 **		9.195 **		0.0773 NS		---	11.326 **	---	10.784 **	---	---	6.214 **

**** (P<0.01)**

Age and six distribution of inpatient children Al-Mohmmodia hospital

Using cluster sampling method, 2951 under 10 years children were selected in the rural city Al-Mohammodia hospital. Among the selected under 10 years children 58.50% were male and 41.4% were female for the total inpatient children who were infected by diarrhea infection as shown in table 3. Result of this study shows the diarrhea infection with age 6-10 years old was the highest percent 62.1 among the groups for males. Among less than 1 year group, male also has been the higher diarrhea infection than female that were 57.81 and 42.18% respectively. The same thing with age 1-5 years old, there were significant ($p<0.01$) differences that chi-square was 6.41. This finding may be due to those boys at Iraq always plays outside of their houses against most of girls can't go out because of Islamic rules don't let them play far away from their houses.

Table (3): Age and Six distributions of children's in Al-Mohmmodia.

Age	Male		Female		Total		Chi-square (χ^2)
	Number	%	Number	%	Number	%	
< 1 year	873	57.81	637	42.18	1510	100.00	6.53 **
1-5 years	520	57.77	380	42.22	900	100.00	6.41 **
6-10 years	336	62.10	205	37.89	541	100.00	9.45 **
Total	1729	58.59	1222	41.40	2951	100.00	6.39 **
Chi-square (χ^2)	1.063 NS		1.063 NS		----		---

**** (P<0.01), NS: Non-significant.**

Age and six distributions of inpatient children in Baghdad hospital

Using cluster sampling method, 718 under 10 years children were selected in the Capital city Baghdad hospital. Among the selected under 10 years children 57.52% were male and 42.47% were female for the total inpatient children who were infected by diarrhea infection as shown in table 4. Result of this study shows the diarrhea incidence in age less than 1 year old was the highest percent 95.14 for males, and 63.11% of diarrhea infection of. Percent of diarrhea incidence were decreased ($p<0.01$) significantly among male and female respectively that's were 59.33 and 37.65 in 1-5 years old. Among groups 6-10 years old there was a contrast in diarrhea infection percentages between male and female.

Table (4): Age and Six distributions of children's in Baghdad Hospital.

Age	Male		Female		Total		Chi-square (χ^2)
	Number	%	Number	%	Number	%	
< 1 year	98	95.14	65	63.11	103	100.00	8.92 **
1-5 years	197	59.33	125	37.65	332	100.00	8.71 **
6-10 years	118	50.64	115	49.35	233	100.00	6.02 **
Total	413	57.52	305	42.47	718	100.00	6.37 **
Chi-square (χ^2)	12.473 **		8.512 **		---		---

**** (P<0.01).**

Prevalence of diarrhea

Out of the 4235 under 10 years old of children, 2951 had diarrhea and the prevalence of diarrhea was found to be 69.68% in the rural city of Al-Mahmmodia as shown in table 1. In contrast, out of the 5227 less than 10 years old

of children, 718 had diarrhea and the prevalence of diarrhea was founded to be 13.73 in the Capital of Iraq (Baghdad) as shown in table 2. But, there were no significant differences between the same sex comparison between the rural and the center of the capital as shown in table 4. While, there were significant differences ($p<0.01$) between sex within same region. infection of diarrhea percent comparison between rural and Baghdad cities shows no significant differences ($p>0.01$). Result of this study also shows significant differences ($p<0.01$) between ages group and region as in table 4. Results shows the highest percent of diarrhea infection in children was 51.16 with age less than 1 year, then the lowest percent was 18.3 in children with age 1-5 years in rural city. In contrast of that the highest percent of diarrhea incidence was 46.23 in children with age 1-5 years, while the lowest percent was 14.34 in children with age less than 1 year in the capital Baghdad. It has been found the percent of diarrhea infection in rural city was the highest 51.16, while was 14.23% in the Capital Baghdad in children less than 1 year. While the percent of diarrhea infection reduced to 30.49 in rural city with age 1-5 years, the percent of diarrhea infection increased to 46.23 in urban Capital Baghdad. Also, the percent of diarrhea infection reduced to 18.33 in rural city with age 5-10 years, the percent of diarrhea incidence increased to 32.24 in the Capital Baghdad.

Table (4): Comparison of Prevalence of diarrhea by sex and age (from zero-10 years) between the Capital and rural city.

		Prevalence of diarrhea in percentage Al-Mohmmodia(rural)	Prevalence of diarrhea in percentage Baghdad (Capital)
Sex	Male	58.59	57.52
	Females	41.41	42.48
Chi-square (χ^2)		6.792 **	6.521 **
Age of groups	Less than 1 years	51.16	14.34
	From 1-5 years	30.49	46.23
	From 6-10 years	18.33	32.45
Chi-square (χ^2)		10.663 **	9.224 **

** (P<0.01) .

Risk factors of diarrhea

Statistical analysis data shows the risk factors for 100 children in table 7. Birth weight was significant (OR, 0.7 for less than 2.5 kg of birth weight and 1.25 for child weight more than 2.5 kg at birth date, $p<0.01$) differences with diarrhea percent. Immunization was also associated with risk of diarrhea negatively. Vitamin A supplementation was significant ($p<0.01$) differences with diarrhea percent. Malnutrition highly affected the diarrhea also. Personal hygiene, overcrowding, garbage disposal, excreata disposal, water supply and the educational status of caregiver were significant ($p<0.01$) differences with diarrhea as shown clearly in table 7.

Table (6): Association between risk factors and acute diarrhea in under 10 years children after adjustment.

		Diarrhea		Odds Ratio	P value
		Present N	Not Present n		
Birth weight					
N=100	< 2.5kgs	56	44	0.702	0.041 *
	> 2.5kgs	38	62	1.249	0.0029 **
Immunizatio					
1-2years N=100	Partially Immunized	17	19	0.0073	0.538 NS
	Fully immunized	9	55	1.384	0.0016 **
Vitamin A supplementation					
6-60months N=100	Not received	61	11	1.395	0.0012 **
	Received	9	19	0.704	0.0396 *
Nutrition					
	Malnutrition	42	10	1.249	0.0144 **
	Normal	30	18	1.077	0.0153 **
Personal Hygiene					
	Unsatisfactory	56	5	1.428	0.0026 **
	Satisfactory	28	11	0.992	0.0154 **
Overcrowding					
	Yes=85	75	15	1.359	0.0024 **
	No=15	15	75	1.359	0.0024 **
Garbage Disposal					
	Insanitary	55	12	1.265	0.0035 **
	Sanitary	20	23	0.254	0.651 NS
Excreta Disposal					
	Insanitary	49	9	1.208	0.0138 **
	Sanitary	22	20	0.425	0.519 NS
Source of water supply					
	Public Tap	23	20	0.552	0.602 NS
	House Tap&Well	53	4	1.378	0.0018 **
Educational Status of the Caregiver					
	Illiterate	58	13	1.279	0.0026 **
	Literate	22	7	0.894	0.0154 **

*** (P<0.05), ** (P<0.01), NS: Non-significant.**

This study show the comparison in children's diarrhea % happened between the capital Baghdad and rural city as shown in table7. It was shown that diarrhea % in children with age less than 1 years in Baghdad highly significant ($p<0.01$) differences less than rural which were 6.86 and 92.12 respectively. But, diarrhea % in children with age from 1-5 years in Baghdad increased ($p<0.01$) significantly, while in rural city diarrhea % increased highly in under 5 years children. While, diarrhea % in children with age from 6-10 years in Baghdad decreased ($p>0.01$) significantly. Diarrhea % in children with age from 1-5 years in Baghdad increased ($p<0.01$) significantly.

Table (7): Percent of total prevalence of different age group of inpatients Comparison between Baghdad city and rural city.

Baghdad Hospital				
Age group	**No. Diarrhea prevalence**	**Total of inpatients**	**prevalence%**	
< 1 year	**163**	**2379**	**6.86**	**8.315 ****
1-5 years	**322**	**1203**	**26.76**	
6-10 years	**233**	**1645**	**14.16**	
Total	**718**	**5227**	**13.73**	
Al-Mahmmodia Hospital				
< 1 year	**1510**	**1639**	**92.12**	**11.673 ****
1-5 years	**900**	**1004**	**89.64**	
6-10 years	**541**	**2042**	**26.49**	
Total	**2951**	**4685**	**62.98**	

**** (P<0.01).**

Pathogens associated with diarrhea

Diarrheal diseases are most commonly stood up of all prime food-borne infections as in table 5, although brucellosis, whooping cough, polio, diphtheria, helminthic infections……etc. is also of concern. In urban avenues of Baghdad, several raw and cooked fresh and leftover weaning foods display the presence of pathogenic organisms such as parasites (Geradia and Entamoeba histolytica) and bacterial infections (Shigella and Salmonella). A study conducted out a clinical evaluation of 50 patients in a hospital of Baghdad and 50 patients in a hospital of rural Baghdad were determined. Variation in isolation rates of enter pathogens was observed in different age groups. Overall, higher percent infection with pathogenic organisms happened in rural Baghdad 62.98 than the capital Baghdad which was 13.73%. Infection with Entamoeba histolytica was the highest in both regions rural and the Capital Baghdad 89.83% and 80.04% respectively were the most common pathogen followed by Geradia 9.75 and 19.46% for both regions respectively. This finding is in agreement with previous studies (Caccio, et al. 2003;Bushra, et al. 2004; Zohair, et al. 2008) While, the bacterial infection shows the lowest percent for both regions as in table 5. The reason of this reduction in parasites and bacterial infection unless nematodes could be of an insufficient number of organisms to cause diarrhea or acquired or passive immunity acquired from breast milk feeding.

Table (8): Comparision of overall Diarrhea causes percent of inpatient child between Baghdad and Al-mahmmodia hospital (mean total% of 9 months).

Total Months	**No. total incidence**	**%**	**Gut parasites infection**				**Bacterial infection**			
			€G.L. no.	**%**	**$Ent. Sp. No.**	**%**	**öSal. Sp. No.**	**%**	**°Shi. Sp. No.**	**%**
Baghdad	**718**	**13.73**	**70**	**9.75**	**645**	**89.83**	**2**	**0.28**	**1**	**0.14**
Al-Mahmmodia	**2951**	**62.98**	**159**	**19.46**	**654**	**80.04**	**2**	**0.24**	**2**	**0.24**
Chi-square(χ^2)	**10.537 ****		**4.695 ***		**4.318 ***		**0.0062 NS**		**0.0059 NS**	

*** (P<0.05), ** (P<0.01), NS: Non-significant.**

€ =G. Giardia lamblia, $ =E. Entamoeba histolytica, öSal. Salmonella sp. °Shi. Shijella sp.

Water and food supply assessment

This study shows also the comparison of Brest-feeding and water supply for children between the capital Baghdad and the rural region as shown in table 8. There were a significant (p<0.01) differences in breast-feeding and hygienic supply of water to child between Baghdad and rural city. Breast-feeding% in Baghdad was 12% , while, increased to 25% in rural city. This increasing may be due to mothers occupation in town more than rural region, most of women doesn't having an occupation. Also, it has been founded that women in urban city gives their child mixed feeding more than the center of Baghdad, due to limited time for women who attended to an occupation compared with wife house women in rural city. In contrast of that, the hygienic water supply in the center of Baghdad more than rural city. These finding affected the diarrhea directly. These finding in agreement with previous studies (Roberts, et al. 2001; WHO, 2004, 2007, 2008, 2008b, 2012, Laura, et al. 2011).

Table (9): Comparison of breast-feeding and water supply for child (under 2 year) of inpatients between Baghdad and urban city (100 Caregivers).

Hospital	Kind of child feeding						Kind of water supply					
	Breast-feeding	%	Formula-feeding	%	Mixed-feeding	%	Boiling	%	Filtered	%	Tap-water	%
Baghdad	12	24	20	40	18	36	6	12	35	70	9	18
Al-Mahmmodia	25	50	15	30	10	20	35	70	12	24	3	6
Chi-square(χ^2)	8.933 **		4.693 *		6.022 **		11.49 **		10.65 **		4.893 *	

*** (P<0.05), ** (P<0.01).**

Nutritional status

Diarrhea inhibiting normal consumption of foods and adsorption of nutrients, leads to cause malnutrition, to impaired physical growth and cognitive development and reduced resistance of many infections. Diarrhea has been found to have lasting influence on nutritional status in that an increase in diarrhea prevalence has been related to an increased risk of stunting (Checkley, et al. 2008, Schmidt et al. 2009). Result of this study shows a high correlation between nutritional status (Anemia, under-weight) and stunting in Baghdad and it's rural inpatients. Anemia incidence increased slightly in the Baghdad population than rural residence, due to increase the low-income of more the family in the Center of the Baghdad, while most of the rural residences works in agriculture that leads to a good supply of most of the essential nutrients. So that, the percent of obesity and overweight increased significantly in town compared with rural residence, due to fast food, snack, soft drink consumption in the center of Baghdad compared with rural city that depending on house-made food and fresh-food. Also, the underweight decreased ($p<0.05$) significantly in rural compared with capital Baghdad as shown in table 8. These finding is accordance with previous finding (William, et al. 2008).

Table (8): Shows the nutritional status and anemia of diarrheal disease inpatients proportion to the total no. of diarrhea prevalence between Baghdad and Al-Mahmmodia hospital.

Total month	Nutritional status							
	Enemia% incidence		Overweight-Obesity		Underweight		Stunting	
	No.	%	No.	%	العدد	%	العدد	%
Baghdad	3	0.41	129	17.96	69	9.61	83	11.55
Al-Mahmmodia	5	0.16	133	4.50	52	1.76	90	3.04
Chi-square (χ^2)	0.0062 NS		4.718 *		4.529 *		4.182 *	

*** (P<0.05), NS: Non-significant.**

Discussion

This study showed the prevalence, socio-economic, environmental and behavioral risk factors of diarrhea infection in children under-10 years old in the capital of Iraq, Baghdad/ urban avenues and its Baghdad's rural Al-Mohmmodia district. The 9-months prevalence of diarrhea among the children in Baghdad's urban was 69.68% higher than Baghdad city which was 13.73 ($p<0.01$). The diarrhea infection was positively associated with rural residence, aged 1-10 years, may be due to poor services in all life fields in Iraq including living environmental such as inappropriate disposal of refuse and its dumping areas, so accumulations of dirt around houses at both capital and its rural make it a good environment to be a good breeding sites for insects which may carry diarrhea pathogens from refuse to water and food. This finding was consistent with the findings (Bbaale, 2011, El-Gilany and Hammaad, 2005, Rego, et al. 2005). This could be related to the fact that the lack of oncoming to water and sanitation facilities in the rural regions was more than in the urban regions (WHO/UNICEF 2012).

This study showed that diarrhea percent was significantly associated with children in the age groups <1 and 1-5 years and between males and females. This finding is in agreement with other studies (Gascon, J. et al 2000; Bezatu, M. et al. 2013, Meriton, a. et al. 2009, Christa, et al. 2012). Also, it was found that other risk factors such as (birth weight, deficient immunization and vit. A, nutrition, personal hygiene, overcrowded, garbage disposal, source of water and feeding, and maternal education). Partially immunized children had higher risk for diarrhea (OR 0.0073) compared to fully immunized children, due to the protective effect of immunization. Also it was found that children who did not take any dose of vitamin A supplementation had high percent of diarrhea compared to those who had vitamin A supplementation, due to the protective effect of

vitamin A to the intestinal epithelium (Truswell, 1985). Diarrhea infection remains a tremendous burden on children in low-and middle-income country. Also, results indicated that poor health associated with consumption of untreated drinking water at household level is one of the most significant concerns in Iraq and other developing countries. Water, sanitation and hygiene related diseases claim many of the childhood illness in Iraqi childhood. Reducing diarrhea involves providing more sanitation for the entire population and the hygiene of the caregiver of the child through the community health workers. Literacy level is very low in rural area; the same is correlated in our study that also reflected as a bad influencing factor for diarrhea. Possibility that working women status could interfere with breast – feeding, failed to prove in this study. Therefore, three rules of home treatment (give extra fluid, continue feeding, and advice the caregivers to return to health facility) is very crucial to control and prevent the diarrhea must be followed. This finding in agreement with previous studies (Thomas and Sandy 2003, Joseph et al. 2007, Christa, et al. 2012).

Conclusions

Childhood diarrhea remains an important health concern in the study community. Results of this study showed the percent of diarrhea in under- 5 years child is higher in rural compared with the urban as in the capital Baghdad of Iraq. And diarrhea incidence in male more than female. Also, diarrhea infection was higher in child with age under 5 year at both regions. The occurrence of diarrhea was positively associated with low-income levels of families, maternal education, age of child, socio-economic status and personal hygiene. Children with poor nutritional status and overall health, as well as those exposed to unsafe drinking water are more susceptible to severe diarrhea and dehydration than healthy children. Occurrence of diarrhea could be decreased by interventions aimed to improve sanitation, hygiene, treatment programs, improved household water management as well as the development of new vaccines which may help future generations.

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تأثير تداول وتحضير الاغذية في وبائية مرض الاسهال للاطفال

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الملخص

مقدمة: في العراق الإسهال هو السبب الرئيسي ومحط المحادثات السريرية للاطفال بعمر أقل من 5 سنوات بجانب الالتهاب الرئوي وانها أيضا أكثر شيوعا في المناطق الريفية منه في العاصمة بغداد. طريقة العمل: أجريت دراسة على أساس استعراض بين المجتمع الحضري في وسط بغداد في مستشفى الطفل المركزي وريف اطراف بغداد في مستشفى المحمودية. وتم جمع البيانات من سجل المرضى لكل مستشفى (العمر، عدد الاطفال المصابون بالإسهال، الوضع التغذوي، الرضاعة الطبيعية، ومصدر المياه، والوضع الاجتماعي والاقتصادي). أيضا، من الاجوبة عن اسئلة الاستبيانات من حيث الديموغرافية، وخصائص الأم والطفل، تغذية الطفل، والظروف البيئية. النتائج: نسبة الأطفال المصابون بالإسهال بعمر أقل من 10 سنوات في العاصمة بغداد الحضر كانت أقل من الريف في اطراف بغداد، إذ كانت 13.73 و 69.68 على التوالي. وكان الفارق ( ). معدل انتشار الإسهال عند 0.01> pفي نسبة الإسهال بين الذكور والإناث لكلا المستشفيتين كبيرة وكان الفارق إحصائيا كبيرا ومعنويا (الأطفال للفئة العمرية أقل من سنة هو 51.16٪ في ريف المحمودية اكبر من العاصمة بغداد 14.34٪، تليها الاطفال بعمر فوق السنة واكثر حيث pتقل نسبة حدوث الاصابة بالاسهال بتقدم العمر. وقد أظهرت النتائج بالفرق الإحصائي الايجابي للاصابة بالاسهال مع اختلاف الفئات العمرية (، والنظافة الشخصية، والاكتظاظ، والقمامة والتخلص منها A). نفس الشيء وجد أن قلة (الوزن عند الولادة والتحصين وتناول فيتامين 0.01>). الخلاصة: في هذه الدراسة كان معدل انتشار الإسهال0.01> P، مصدر المياه، ووضع الرعاية المرتبطة) إلى زيادة حالات الإسهال (excreta أعلى في الأطفال دون سن الخامسة في المناطق الريفية في بغداد من العاصمة بغداد التي كان مرتبطا بشكل كبير مع الجنس الطفل، سن الطفل، ومستوى تعليم الأمهات، والرعاية الاجتماعية والاقتصادية. وبالتالي، فإن هذه الدراسة هي لإظهار الفرق في حالات الاسهال بين مدينة بغداد

وريفها للأطفال دون الـ 10 سنوات، وإلى معرفة تأثير المواسم الفصلية لحالات الإسهال. والهدف الآخر هو معرفة العلاقة بين عوامل معينة وخطر الاصابة بالاسهال للأطفال دون الـ 10 سنوات.

الكلمات المفتاحية: الاسهال-عوامل خطر الاصابة بالاسهال-الحالة التغذوية-التقزم- الاصابة البكتيرية والطفيلية.