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Original Article

Effectivity of Taking Vitamins C, A and D on the Recovery Period from Vibrio Cholera

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ABSTRACT

The bacterium is Gram-negative comma shaped facultative anaerobe, biotype: Vibrio cholerae is also called cholera vibrio – it is a comma-shaped bacterium. The bacteria are marine pathogens that are naturally isolated from brackish or saltwater environment where they can adhere to the chitin substratum of crabs, shrimps and other crustacean. Some strains of Vibrio cholerae directly impacts human beings with a fatal disease commonly referred to as cholera and one is likely to be infected by consuming boiled or raw seafood products or drinking water that is contaminated with the bacteria, Aim of study:A study ofthe effect of vitaminsA, Cand Daddedto medicationand fluidsonthe recoveryperiodfrom cholera infection compared withpeoplewho tookmedicationand fluidsonly,methodology: the number of samples was 80 samples were infected with cholera through biochemical, microscopic and physical examinations , they were treated with three different types of vitamins, namely to find out the extent of the effect of vitamins when taken with special treatments and liquids compared with the recovery period for other patients who took only special treatments and liquids without vitamins, the injuries were divided into mild, medium and severe according to the symptoms of each patient , The effectiveness of the vitamins used in the study contributed to reducing the recovery time, and this indicates their contribution to raising the level of the immune system, and their effectiveness combined with each other as a synergistic effectiveness contributed more to accelerate recovery from cholera infection.

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Introduction

Cholera, which is an abdominal disease, is the result of the attack of the bacterium Vibrio cholerae, which is the etiological agent of cholera attacks. This particular organism is most commonly in contaminated water and food. The cholera vibrio is very harmful because of the highly potent toxins that are secreted; these toxins act on the inner side of the intestines and cause the body to lose a lot of fluids, causing dehydration. The subsequent sections will further discuss the structure, pathogenesis, transmission, epidemiology, prevention, and treatment of cholera which is one of the important public health issues [1].

1.1. Identification of the Bacteria Causing Cholera

The organism Vibrio cholerae is a Gram-negative bacillus and a motile organism with a single polar flagellum. There are different serogroups of the bacteria, and O1 and O139 are the most common serogroups that causes cholera pandemics. According to biotypes, O1 strains comprise of Classical and El Tor biotypes with EL tor due to current cholera outbreaks prevailing in the Third World Countries. The bacterium successfully adapts to various conditions including saline and brackish waters and extends to environmental biofilm, bio film formation enhancement and persistence in aquatic environments [2,3].

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1.2. Pathogenesis

The development of this disease always starts with consumption of contaminated water or food products. After the bacteria has been introduced into the body it passes through the stomach and then settles in the small intestine. Bacteria has the ability to attach itself to the cells lining the intestine by utilizing the structures called fimbriae and releases cholera toxin which is a powerful toxin impairing the normal functionality of the small intestines.[4]

Cholera toxin consists of two main components: A subunit, and the B subunit. The B subunit targets the epithelial cell receptors and helps in the entry of A subunit into the cytoplasm. On entering the cell, the A subunit binds to the target cell and initiates the activation of an enzyme known as adenylate cyclase this causes an increase in cyclic adenosine monophosphate (cAMP). The raised levels of cAMP stimulate the secretion of electrolyte and water into the intestinal lumen producing voluminous, watery stool called “rice-water stool.” Due to this, dehydration occur and may prove fatal [5,6].

1.3. Transmission and Epidemiology

Cholera is an aquatic borne disease that expresses itself through the fecal-oral route and the primary route in transmission of the bacteria is water. Poor hygiene practices, and poor access to clean water are the main causes of cholera due to poor provision of sanitation provisions. Cholera infection is most common in overcrowded and impoverished neighborhoods that are most prevalent in the developing countries [7].

The cholera disease has been known to affect the global community since as early as the 19th century with seven pandemics having been recorded. The seventh and the most recent pandemic started in 1961 through the El Tor biotype of V; cholerae O1. Cholera is still present today; the Asian, especially the African, and the South-East Asia as well as the Indian subcontinent areas. The World Health Organization (WHO) has documented thousands of cholera cases every year with the ability to cause outbreaks among the population groups in a short span of time [8,9].

1.4. Prevention

Main prevention of cholera is wash which emphasis on quality water, sanitation &hygiene. wash is all about the quality, sanitation and hygiene concern with better water. Proper sanitation for instance the use of pipe borne water for drinking, proper sanitation amenities and observing good hygiene practices help control the spread of cholera. In the cholera affected areas, OCVs are also administered to the people to offer immunity for a sometime for the most at-risk persons. Some outbreak control measures include but not limited to, giving out clean water during epidemic cholera outbreaks together with other health care facilities are useful in reducing the disease [10].

1. 5. Treatment

Another is giving of ORS also known as Oral Rehydration Therapy while others prescribe intravenous rehydration in severe cases. ORS are home scaled up electrolyte and glucose oral rehydration solutions which have been found to be useful in moderate to mild degree of dehydration. There are a few moments when adequate rehydration employing such methods as intravenous infusion and antibiotics is required to minimize the duration of diarrheal infection and its severity, Cholera has also been managed and controlled through formulation of new diagnostic tools which include the rapid diagnostic tests and improved surveillance systems in the recent past. More money should be reinvested into scientific research and into promoting health and into cholera preventive measures so as not to get close to the negative impact that this disease has on human life [11,12,13].

1.6. Vitamin C

Vitamin C is an ascorbic acid which is a water-soluble vitamin that plays particular roles in performing several functions in out body. This, on top of the facts that it has very had proven, antioxidant compounds which enable the body, to protect its cells against damage by the free radicals, Vitamin C is needed for many roles in the body such as to be strong enough to defend the body against infections, It is useful for the synthesis of collagen which is a protein which is important for skin, blood vessels, bones and cartilage, Vitamin C facilitates the absorption of the non-heme this means that one cannot develop anemia as a result of iron deficiency/ores, Some examples of vitamin c rich diets includes fruits and vegetables which include; oranges, lemons, grape fruits, strawberries, kiwi fruits, bell peppers, broccoli, tomatoes and green vegetables, Vitamin C deficiency leads to scurvy and this is a disease that gives flu-like symptoms such as sensitivity to bruising, ray developing gum disease and weakness, The recommended dietary allowance (RDA) of this nutrient for age, sex and life cycle is distinct for each but for the adult it is ranging from 75-90mg day [14,15].

1.7. Vitamin A

It's a fat-soluble vitamin whereby it plays a role in performing a number of activities in the body. It is essential for:1. Vision: As a function of vision, the night vision and other relative body functions concerning vision are vital in the life of a man2. Immune Function: Also, it has been observed that vitamin A is essential for the development of immunity since it assists the body to eliminate busted intruders, 3. Cell Growth: It is known that this amino acid is involved in cell division and growth that is why it is so important for maintaining healthy skin and skin tissue generation, 4. Reproductive Health: Essentials such as vitamin A equally has its role to play in reproduction as it does towards the formation of the young ones [16,17].

1.8. Vitamin D

It is a fat-soluble vitamin and one of the body's many essential vitamins and it plays a major part in many important body functions mainly it is involved in the formation of proteins and aids in calcium and phosphorus transport in the blood. The vitamin is also used in other important functions which include immunity, inflammation and mitotic division, there are two main forms of vitamin D, Vitamin D2 (ergocalciferol): A few plants based sources and fungi have this vitamin, many of the latter normally participating in the fortification of foods, and Vitamin D3 (cholecalciferol): Produced within the human body absolutely, in response to the direct sunshine and those available in animal sourced foods [18,19,20].

Aim of study:A study ofthe effect of vitaminsA, Cand Daddedto medicationand fluidsonthe recoveryperiodfrom cholera infection compared with people who took medication and fluids only.

2. Methods and materials

The study was conducted on patients in different areas of the Babil governorate of Iraq for the period from 1/3/2024 to 1/4/2024 and the number of samples was 80 samples were infected with cholera through biochemical, microscopic and physical examinations, they were treated with three different types of vitamins, namely to findout the extent of the effect of vitamins when taken with special treatments and liquids compared withthe recovery period for other patients who took only special treatments and liquids without vitamins, the injuries were divided into mild, medium and severe according to the symptoms of each patient.

3. Results

3.1. Age range

The samples were divided into age groups to facilitate their study and find out which age group is most affected and most responsive to treatment.

Table no. (1)age range

No.	Age range	No. of samples	%
1	10-20 years	19	23.75
2	21-30 years	13	16.25
3	31-40 years	23	28.75
4	41-50 years	16	20
5	51-60 years	9	11.25
		80	

Figure no. (1) distribution of samples according to age

3.2. distribution according to sex

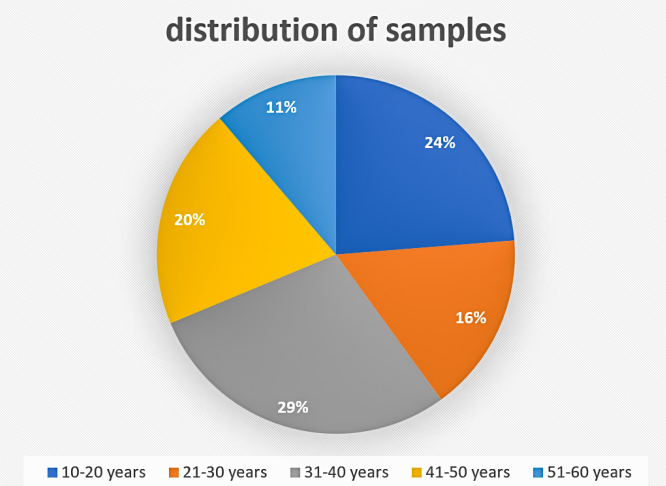


Table no. (2) distribution according to sex

No.	Sex	Numbers	%
1	Male	53	66.25
2	Female	27	33.75

3.3. degree of severity

Table no (3) degree of severity

No.	Severity	Numbers	%
1	Mild	5	6.25
2	Moderate	32	40
3	High	43	53.75

3.4. Vitamins

Table no. (4) effectivity of Vitamin A

No.	Severity	Numbers before use vitamin A	Numbers after use vitamin A
1	Mild	5	20
2	Moderate	32	26
3	High	43	34

Table no. (5) effectivity of Vitamin D

No.	Severity	Numbers before use vitamin D	Numbers after use vitamin D
1	Mild	5	16
2	Moderate	32	28
3	High	43	36

Table no. (6) effectivity of Vitamin C

No.	Severity	Numbers before use vitamin C	Numbers after use vitamin C
1	Mild	5	28
2	Moderate	32	23
3	High	43	29

Table no. (7) All vitamin with each other

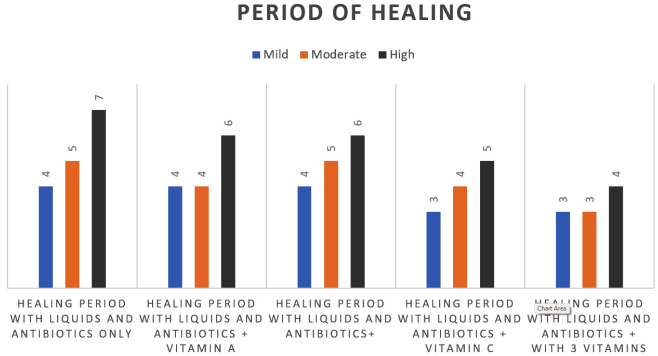
No.	Severity	Numbers before use	Numbers after use
1	Mild	5	30
2	Moderate	32	33
3	High	43	17

3.5. period of healing

Table no. (8) Period of healing

Severity degree	Healing period with liquids and antibiotics only	Healing period with liquids and antibiotics + Vitamin A	Healing period with liquids and antibiotics+ Vitamin D	Healing period with liquids and antibiotics + Vitamin C	Healing period with liquids and antibiotics + with 3 vitamins
Mild	4 days	4 days	4 days	3 days	3 days
Moderate	5 days	4 days	5 days	4 days	3 days
High	7 days	6 days	6 days	5 days	4 days

Figure no. (2) periods of healing with different types of vitamins



4. Discussion

We note through Table No. (1) that the most vulnerable age group was the age group (31-40 years), where the number of injuries was 23, with a percentage of 28.75. this may be due to the fact that this age group is more active and more susceptible to pathogenic factors than other age groups, while the lowest percentage of injuries was among the age group (51-60 years), with a percentage of 11.25, as Table No. (2) showed that the prevalence among males is higher than females because females are more committed and out of concern for the sanitary instructions of the male.

TableNo. (3) shows that severe infections are the highest, and this may be due to weakened immunity or ingestion of bacteria in high doses.Table No. (4) shows a decrease in cases of severe infection by 9 cases when taking vitaminA, which contributes to raising the immune status of the body.Thesame is the case with Table No. (5) and the situation was clearer and more impactful in Table No. (6), where the cases responding to severe injuries were 14 cases, which is a good indicator compared to the tables that preceded it.While the effectiveness of vitamins with some of themwas synergistic, asstatedin the results of TableNo.)7)

Conclusions

The effectiveness of the vitaminsusedin the study contributedto reducingthe recoverytime, and this indicatestheir contributiontoraisingthe level of the immunesystem, andtheir effectiveness combinedwitheach other as a synergisticeffectivenesscontributedmoreto accelerateracoveryfrom cholera infection.

Recommendations

Studyingthe effectof other vitaminsoncholera infectionand reducingits severityand theperiod of infection, aswell as studyingthe effect of vitaminsand other elementsonthe infectionofother bacterialspecies.

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