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Morbidity and Mortality associated with Community used Herbal (sagwa) use in children with acute gastroenteritis in Diyala Governorate

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بِسْمِ اللهِ الرَّحْمنِ الرَّحِيمِ

﴿ وإِذَا قِيلَ انشُزُوا فَانشُزُوا يرْفَعِ اللَّهُ الَّذِين آمَنُوا مِنكُمْ والَّذِين أُوتُوا الْعِلْم درجاتٍ واللَّهُ بِما تَعْملُون خبيرٌ ﴾

صدق الله العلي العظيم

﴿١١﴾ المجادلة

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Dedication

To *those who have made precious and good; Martyrs of Iraq*

To *my deceased father may Allah have mercy upon him*

With …

love, respect and gratitude

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Abstract

Background: Gastroenteritis (GE) in pediatrics reports one of causes of mortalities in children less than 5 years old, rotavirus is the most common recognizable viral cause. GE treated according to the causative agent starting with rehydration, in our country herbal use is one of line of treatment mostly in the rural area. Usually contain leaves, flowers, seeds, fruit, bark, stems, wood roots and may contain natural organic or inorganic compounds. These herbs given by herbalists by an old habit which is a risky habit on the health because of these remedies have a lot of harmful actions causing toxicity. Sagwa is one of these remedies or herbs used to treat gastroenteritis in children in our country.

Aims of the study:

1- To determine the morbidity and mortality of herbals use in acute gastroenteritis in children in diyala province, Iraq.
2- Detection the toxic content of sagwa
3- Find out the relationship of the age, weight, gender, residency, parents' education level, with sagwa user.

Patients and Method: This is a case control study conducted in the Al-Batool Pediatrics, Obstetrics and Gynecology Teaching Hospital in Baqubah city, Diyala, Iraq, during a period of six months from first of August 2017 to first of February 2018. Comprised (200) patients aged (6-59) months, they are presented to the hospital with sever gastroenteritis. Ten samples of sagwa was undergone screening for heavy metals by Atomic Absorption Spectroscopy.

Results:

There is significant association of sagwa use with the rural residency 81(81%), mother education level 57(57%) illiterate mother), the order of the child in the family 13(13%)1st child; the least), diarrhea complications (regarding central nervous system 43(43%), cardiac 58(58%), renal 49(49%) and metabolic 83(83%), hospital stay and condition deterioration and the mortality rate was 9(9%) in sagwa group while only 1(1%) in control group. Sagwa toxicity is positively proportional to the number of doses 57(57%) in 3rd dose & more) given to children and grandmothers 66(66%) were the person who decided and encourage to use sagwa. The chemical analysis for (10) sagwa samples revealed heavy metal like lead, cadmium and mercury; that exceed the permissible level.

Conclusion:

There is significant morbidity and mortality caused by (sagwa) use in children with acute gastroenteritis.

Key words: Gastroenteritis, Herbalism, Sagwa poisoning, Morbidity and Mortality.

List of abbreviations:

A	Text	A	Text
AAS	Atomic Absorption Spectrometry	**AYUSH**	Ayurveda,Yoga naturopathy, Unani, Siddha, Homeopathy
Ach.	Acetyl choline	**ACLS**	Advanced cardiac life support
AMA	American Medicinal Association	**AV**	Atrioventricular
AHG	American Herbalist Guild	**AP**	Aerial Part
AD	Anno Domini	**AS**	Arsenic
B	**Text**	**B**	**Text**
BA	Bark	**BM**	Bowel Movement
BC	Before Christ	**BP**	Blood Pressure
BCE	Before Common Era	**BU**	Bulb
C	**Text**	**C**	**Text**
CAM	Complementary & Alternative Medicine	**CME**	Council Medical Education
CNS	Central Nervous System	**CBC**	Complete Blood Count
CV	Cardiovascular	**CT**	Computed Tomography
CN	Cyanide	**Cd**	Cadmium
D	**Text**	**E**	**Text**
DSHEA	Dietary Supplement Health and Education Act	**EDTA**	Ethylene Ediamine Tetraacetic Acid
D.	Diarrhoea	**ECG**	Electrocardiography
DMA	Di Methyl Arsenical	**ER**	Emergency Room
F	**Text**	**G**	**Text**
FAO	Food and Agricultural Organization	**GC-MS**	Gas Chromatography – Mass Spectrometry
FL	Flower	**GABA**	Gamma-Amino Butyric Acid
FR	Fruit Rhizome	**GIT**	Gastrointestinal Tract

H	Text	L	Text
HR	Heart rate	**LE**	Leave
Hs.CRP	Highly selective C-reactive Protein	**LFTs.**	Liver Function Test
Hg	Mercury	**LP**	Lumber Puncture
M	**Text**	**N**	**Text**
MAO	Mono Amine Oxidase	**NIH**	National Institute of Health
MMA	Mono Methyl Arsenicals	**NCCIH**	National Center for Complementary and Integrative Health
MRI	Magnetic Resonance Imaging	**NM-BAPTA**	1,2-bis(*o*-aminophenoxy) Ethane-*N*′-Tetraacetic Acid
P	**Text**	**R/S**	**Text**
PTI	Provisional Tolerable Intake	**RBS**	Random Blood Sugar
PTWI	Provisional Tolerable Weekly Intake	**RCU**	Respiratory Care Unite
PMTDI	Provisional Maximum Tolerable Daily Intake	**R**	Root
PL	Permissible Level	**STP**	Standard Temperature and Pressure
Pb	Lead	**SCN**	thiocyanate
T/U/W	**Text**	**V/Z**	**Text**
TAIM	Traditional Arabic and Islamic Medicine	**V**	Vomiting
TCM	Traditional Chines Medicine	**V-fib.**	Ventricular Fibrillation
UPS	United Pants Savers	**V-tachy**	Ventricular Tachycardia
US	United States	**V-V**	Volume-Volume
WHO	World Health Organization	**ZPP**	Zinc Protoporphyrin

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CHAPTER ONE INTRODUCTION

Introduction

1.1 Gastroenteritis:

Usual clinical manifestations of gastroenteritis are sudden watery diarrhea+/-vomiting. Acute diarrhea is defined as sudden onset of excessively loose stools of >10 mL/kg/.day in infants and >200 g/24 hr in older children, which lasts <14 days. When the episode lasts longer than 14 days, it is called chronic or persistent diarrhea (Robert M. et al; 2016). It has been recognized as an important health problem in all age groups and is a major cause of morbidity and mortality in rural communities of socio-economically backward and developing, third-world countries. It may be infectious or non-infectious (De Hostos E, et al; 2011), mostly caused by:

- **Viral:** the causative viruses are; rota, calcivirus, norovirus, adenovirus and others.
- **Bacterial**: the Causative bacteria are; Salmonella, Shigella, E. coli, V. cholera, Staph auras, Clostridia, Campylobacter, Yersinia, & others. Extraintestinal infections following bacterial invasion may cause meningitis, endocarditis, UTI, vulvovaginitis, pneumonia, peritonitis, hepatitis, septic arthritis, osteomyelitis, & sepsis.
- **Parasitic**: the causative agents are; Giardia & E. histolytica.

1.2. Treatment of acute gastroenteritis:

1- Rehydration: it is the broad principle of management of GE, by intravenous fluid or oral rehydration solution (ORS).
2- Feeding: it encourages to; continue breast feeding, yogurt, fruits, vegetable, lean meat, food with complex carbohydrate. Avoid fatty food and food with high simple sugar.
3- Medication:

- Antibiotics: It indicates only in selected cases with culture.
- Antiemetic drugs: little value.

- Antimotility drugs: It does not have any role in the management, may contraindicated.
- Zinc supplement: In developing countries, may lead to reduce duration, severity and recurring of diarrhea.
- Probiotics: Nonpathogenic bacteria for prevention and therapy of diarrhea. **(**Kliegman RM, et al; 2004).

Many causes call for the development of alternative strategies for GE management such as the use of herbals, so many studies have confirmed the use of different herbs in the management of diarrhoea (Nduche MU & Omosun G.; 2016, Offiah NV et al; 2011, Agbor GA et al; 2004, Akah PA et al; 1999, Besra SE et al; 2003, Ojewole JA et al; 2008). The antidiarrheal effects of these herbs have been shown to be due to the biological activity of the extracts of such herbs which have anticholinergic effects, postpone intestinal passage, able to hold gut motility, encourage water adsorption or reduce electrolyte secretion (Palombo EA; 2006).

1.3 Herbal medicine:

Definition of herbal medicine is the art and science of using herbs for supporting health, avoiding and managing illness (AHG; 1989). It includes herbs, herbal materials, herbal preparations and finished herbal products (Robinson M.M and Zhang X.; 2011). Many of these have useful effects on health when used rationally and can be used efficiently to treat human diseases (Tapsell L et al, 2006, Lai PK et al, 2004). Herbal medicine can be generally categorized into four classifications: traditional Chinese herbalism; Arab traditional medicine; Western herbalism and Ayurvedic herbalism, which forms the basis for alternative and herbal medicine in use today (B. Saad H. et al, 2006). According to the World Health Organization (WHO) define the herbs as any plant, plant product or plant part which contain substances that can be used for therapeutic uses, or which are

precursors for chemo pharmaceutical semi synthesis (Amritpal S., 2011, WHO, 2005). Herbs contain raw plant material, such as leaves, flowers, seeds, fruit, bark, stems, wood, roots, rhizomes or other plant parts, which may be whole, fragmented or powdered (Barrett S, 2017, Varro E, 2016).

Researchers are not confirm what particular constituent in an exact herb works to treat a condition. Whole herbs contain many constituents which may work together to give a beneficial influence. Several factors control how efficient an herb will be, e.g the type of environment (climate and soil quality) in which a plant developed will affect it and how and when it was gathered and handled (Abeloff M. et al; 2008).

Herbal preparations are classified as dietary supplements by the U.S. **D**ietary **S**upplement **H**ealth and **E**ducation **A**ct **(DSHEA)** of 1994, which means that herbal supplements can be sold with no need to prove the safety and effectiveness while in Europe herbs are classified as drugs (Ernst E.; 2011). Herbs can manage different conditions and in some cases may have less side effects than some conventional medications. Herb consumption on your own increases the risk, so it is important to consult doctor or pharmacist (Damery S; 2011). It is still significant to ask concerns making standardized herbals about their product's assurance, and it is important to talk to your doctor or skilled in herbal medicine about the doses of herbal products. (Izzo AA, 2009).

1.4. Traditional medicine in Iraq:

Iraq traditional medicine and its therapeutic practices is as old as the written human history and the oldest scripts about traditional medicine were found in Asuria, Nenavah in Iraq and go back to about 2100 BC (CDCP; 1993). A 60.000 years old Iraqi burial sites was found to contain different medicinal plants suggesting very early historical usage (Joanne B. et al; 2007). Traditional medicine in Iraq can be traced back to the

Sumerian period (3000-1970 B.C.) and then to the Babylonian and Assyrian periods (1970-589 B.C.). Babylon and Nineveh were the two centers of civilization around 2000 B.C. Hammurabi who ruled Babylon between (1728-1686 B.C.) issued 285 mandatory declarations, one of which particularly referred to medicine and medicinal plants. "This declaration stated that a man practicing medicine must be well acquainted and must be authorized". A physician was called Hakim and most of the Hakims were using medicinal plants for healing of different ailments. Among the famous Hakims were Abu-Baker Al-Razi (850 - 923 A.D.) who wrote 184 articles and books, among the famous pharmacist in Iraq was Abdullah Ben Ahmad Albetar (1021–1080 A.D.), an Arabic botanist and pharmaceutical scientist. (Al-khalili J, 2010; Ara D. et al; 2010).

Iraq, like any other country of Middle East and elsewhere in the world, is differentiated into two societies: rural and urban; both of these societies use traditional medicinal plants for the treatment of different illnesses, hence folk medicine is widely practiced by the people of the cities and the inhabitants of the remote areas or the nomads who generally inhabit the desert areas of the steppe and the uplands (Chakravarty, 1976; Mohmod et al, 1988; Ghazanfar 1994). Iraq is well known for the great variation in wild plants due to the geographical variety and climatic environments and has no less than 363 medicinal plant species belonging to about 270 genera from approximately 98 families (Al-Douri NA and Al-Essa L; 2010).

It is usually used among limited literacy and the low socioeconomic classes to treat neonates, infants and children with abdominal discomfort and diarrhoea (Clarke TC et al, 2015). Methods used in the traditional medicine of Iraq have been passed from our forefathers by oral education. However, these methods are lapsing from our present community, few of them still persist in the countryside and in the desert areas (Al-Douri NA and Al-Essa L; 2010). Adequate experience and proper handling of herbal

medicine requires the licensing of knowledgeable and professional herbalists and regulating the procedures of medicinal plants handling, storage and method of use in order to avoid mistreatment and malpractice (Black L et al, 2015)..

There is a strong and apparent desire regarding the use of herbal therapy either as additional or adjuncts for the treatment of mild illness (such as diarrhea, constipation, napkin rash, etc). The major cause for using herbs was its low cost in comparison with modern drugs and believe to be free of side effect as its natural, also it is related inversely with educational level of users (Narjes C, 2012). For many families and their children the use of herbal products is an accepted adjunct or alternative to orthodox medical care. Because women make up the largest percentage of herbal users (Gardiner P et al, 2007; Tindle HA et al, 2005), it is not unexpected that they also administer herbal remedies to their children.

However, data about the efficacy and safety in childhood populations are scarce since most surveys have excluded children from their analyses.

There is new reappearance of public interest in herbals has been referred to several issues some of which include:

1- Many declarations on the efficacy or effectiveness of plant medicines, by uncontrolled Medias' and social media commercial ads for herbs.

2- Favorite of users for natural remedies and a larger concern in alternative medicines

3- Incorrect confidence that herbals are superior to industrial products.

4- High cost and side effects of modern drugs.

5- Think of progresses in the safety, efficacy, and quality of herbals.

6- Patients' ideas that their doctors have not accurately recognized the condition; hence the feeling that herbals are alternative choice.

7- A society toward self-medication (Bandaranayake, 2006; Chan, 2003).

These explains in part the reason sales of herbal medicines are booming and represents a substantial proportion of the global drug market (Blumenthal et al. 1998; WHO 2002a; Kong et al. 2003; Pal and Shukla 2003; WHO 2005). In paediatric patients herbals are used to promote health, to prevent illness and to treat acute but overall chronic, recurrent or incurable conditions such as asthma, diarrhea, atopic dermatitis, allergic rhinitis, cystic fibrosis, inflammatory bowel disease. In one study, herbal teas containing chamomile seemed to have a favorable effect on infantile colic (Weizman Z et al, 1993). Two controlled trials involving a limited number of subjects have been performed on the use of cranberry for the prevention and treatment of urinary tract infections in children with neurogenic bladder (Darren M., 2004; Schlager TA et al, 1999).

1.5. Herbalists

Herbalists are persons who offer their lives to operating with medicinal plants. Traditional medicine has an important role in health care in Iraq especially in country side and in desert areas and practiced by what is called Attar (Herbalist), who have shops or stores for preparing and selling the herbs (Al-Douri NA and Al-Essa L; 2010). Usually herbalism and even the stores are inherited from fathers or grandfathers. The woman called "Om al-sagwa or al-jedah" (the woman who prepare the sagwa at her home) which is considered one or mixture of the remedies or herbs used in Iraq that is widely used among imperfect literacy and the low socioeconomic classes' families to treat their children. This woman is well-known, sometimes by most of peoples of the region or the village or even the city; had the improper experience in dealing with herbal preparations to treat not only pediatric cases, but other problems as renal, respiratory, chronic illness and diabetic patients in old age group **(A**l-Rawi A 1966).

They obtained herbs from either surrounding villages or from herbalists' stores "Al-attar". Usually mother brings her child to her at home, sometimes with grandmother or aunt, she prepares the sagwa by dissolving and mixing multiple powders of herbs in water then given to the child by drinking or spreading it on his body. Sometimes given in single or multiple doses, usually the first dose given by the (Om al-sagwa) and if the need for more doses are decided then the further doses given to parents to be continued at home **(A**laddin Naqishbandi 2014).

1.6 Aims of the study:

1- To determine the morbidity and mortality of herbals use in acute gastroenteritis in children in diyala province, Iraq.
2- Detection the toxic content of sagwa
3- Find out the relationship of the age, weight, gender, residency, parents' education level, with sagwa user.