



The value of Mountain Sidr Honey in treating and controlling chronic constipation: A Prospective comparative study between Ziziphus honey and Lactulose in 1000 Saudi Arabian patients

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ABSTRACT

Background and Objectives: Chronic constipation is a common clinical condition. Lactulose is used in the treatment of chronic idiopathic constipation in patients of all ages as a long-term treatment. Mountain Sidr Honey (Ziziphus Spina-Christi) is a natural honey commonly used in our local community for many health conditions. We aim to evaluate the value of Ziziphus honey in treating and long-term controlling chronic constipation in comparison to Lactulose syrup. **Materials and Methods:** A prospective comparative study of the results of 1000 patients diagnosed and treated for chronic constipation was done, 500 patients were enrolled in each of the two group (Ziziphus (Sidr) honey and Lactulose). Treatment and follow-up for one year were done. **Results:** The mean time for Ziziphus (Sidr) honey to treat constipation and help to achieve soft stool was 1.75 days, range 0.5-3 while it was 3.25 days, range 2-5 for Lactulose. In the short time treatment of constipation, Ziziphus (Sidr) honey was statistically found to represent a significant difference regarding short healing time, ($p=0.0021$), compared to Lactulose. In the long time control of chronic constipation, Ziziphus (Sidr) honey was statistically found to represent a significant difference regarding good sustained control of constipation, ($p=0.0011$), compared to Lactulose. Relating to the occurrence of adverse effects, Ziziphus (Sidr) honey was statistically found to represent a significant difference regarding fewer occurrences, ($p=0.0023$), compared to Lactulose. **Conclusion:** Mountain Sidr Honey (Ziziphus Spina-Christi) is a very promising treatment for the long-term control of chronic constipation. It is superior to Lactulose in both short and long term results. Also, it is associated with no or minimal adverse occurrence compared to many side effects of Lactulose, but is much expensive financially.

KEY WORDS: Mountain sidr honey; Ziziphus Spina-Christi; Lactulose; Chronic constipation.

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INTRODUCTION

Chronic constipation is the delayed evacuation of dry, hard stools. It is also defined as infrequent bowel movements or the difficult passage of stools that persists for several weeks or longer. The diagnosis is often considered if no bowel movements occur for three or more days and if the irregularity persists for longer than six days. Its symptoms include hard, dry stool, bloating and abdominal pain[1-3].

The reported prevalence of constipation in the general population ranges from 1.9% to 27.2%. Females are 2 - 3 times more likely to have constipation than males[4,5]. The most common causes are associated with nutritional factors such as the consumption of food with poor dietary fiber content, which results in the insufficient filling of the intestine, the intake of excess amounts of readily absorbed food with a reduced water-binding capacity or lack of exercise. Lifestyle behaviors are associated with constipation, particularly the level of fluid intake, insufficient dietary fiber, prolonged history of laxative usage, sedentary life habits, and delaying the urge to defecate[2-4].

The risk factors include low fluid intake which is linked to slow colonic transit and little stool output. The prevalence of different forms of digestive diseases is increasing due to a roughage-free modern diet. Many studies have shown that dietary fiber influences bowel transit time, fecal weight and bowel movement frequency. Constipation is prevalent in

people who do a little exercise, with chair- or bed-bound people at the highest risk. Issues like reduced privacy, remote toileting facilities and reliance on other people for assistance, may contribute to the development of constipation. Constipation could occur due to anxiety, depression and impaired cognitive function. Some medications, such as opioid analgesics, anticholinergics, and antidepressants, may also increase the risk of constipation[1-5].

Assessment of the risk factors, a detailed clinical history, a thorough physical examination which includes auscultation, palpation, and percussion of the abdomen and pelvis, with a digital rectal examination, should be done to establish a baseline of each at-risk person's history and presentation. Currently, there is no substantial scientific evidence to support the use of diagnostic tests, although for abdominal X-ray the absence of signs may not imply a proof of no effect[4,5].

Constipation treatment considerations include dietary approaches (e.g. fiber supplementation), behavioral modifications (bowel habit training), physiotherapy, regeneration of healthy intestinal flora, change of lifestyle, and pharmacological approaches. As constipation is unpleasant and the constant feeling of abdominal bloating combined with flatulence and pain that is reminiscent of colic, many patients look for short term relief which leads to the administration of laxatives[5,6].

Lactulose (non-absorbable sugar) is used in the treatment of chronic idiopathic constipation in patients of all ages as a long-term treatment. It begins working after eight to twelve hours but may take up to two days to improve constipation. It is broken down in the large intestine into mild acids that draw water into the colon, which helps soften the stools. Common side effects of Lactulose include abdominal cramping, borborygmus, and flatulence. A comparison between Lactulose and placebo in three studies found that Lactulose was safe and efficient for managing idiopathic constipation, although it was associated with bloating and flatulence[7].

Mountain Sidr Honey (*Ziziphus Spina-Christi*) is a natural honey extracted by bees from the jujube nectar (the Christ's Thorn Jujube) derived from the acanthoid subfamily that grows in arid mountains in the Arabic island and the surrounding areas. It is well acknowledged for its health benefits including the strengthening of the nervous system, helping reduce gasses, and a perfect soothing agent for nervous colon, gastric and duodenum ulcers, constipation, allergy, gout, joint pains. It removes hyperacidity and is applied topically to wounds and burns. It strengthens the heart and is very beneficial for insomnia, migraines, and anemia. Beneficial for pregnant women and the nutrition of the fetus, and can be used for eye diseases after being diluted with distilled water[8-11].

Several studies showed the nutritional value of honey. It provides about 304 calories for each 100 gram. Also many essential nutrients such as Vitamins: Riboflavin (B2) (3%), Niacin (B3) (1%), Pantothenic acid (B5) (1%), Vitamin B6 (2%), Folate (B9) (1%), Vitamin C (1%). Also Minerals: Calcium (1%), Iron (3%), Magnesium (1%), Phosphorus (1%), Potassium (1%), Sodium (0%), Zinc (2%). It is composed of 17% water and 82% carbohydrates. Honey has a low content of fat, dietary fiber, and protein[9-15].

Clinical evidence indicates that honey can exert several health-beneficial effects such as gastroprotective, hepatoprotective, reproductive, hypoglycemic, antioxidant, antihypertensive, antibacterial, antifungal and anti-inflammatory effects. It consists of primary sugars such as monosaccharides, disaccharides, oligosaccharides, and polysaccharides. It contains enzymes like glucose oxidase, diastase, invertase, catalase, and peroxidase. Honey also contains many other bioactive constituents such as organic acids, ascorbic acid, trace elements, vitamins, amino acids, proteins and Maillard reaction products[16-20].

Honey is reported to have effects on preventing and treating gastrointestinal disorders such as peptic ulcers, gastritis, and gastroenteritis. It is a potent inhibitor of the causing agent of peptic ulcers and gastritis, *Helicobacter pylori*. It is natural and will not raise blood-sugar levels; a mix of honey and water is a real cure for colic. It has prebiotic effects: increasing the population of bacterial microflora essential for the health of gastrointestinal tract. The regular consumption of honey increases the population of normal flora called bifidobacteria, where its constituents were found to pose prebiotic effect that resembles the effect of fructooligosaccharides[21-24].

For an extended period, in traditional medicine, the extracts of *Ziziphus Spina-Christi*, and the honey produced by bees from it have been used for the treatment of many diseases. The most common are digestive disorders, weakness, obesity, liver complaints, urinary troubles, fever, diabetes, skin infections, loss of appetite, pharyngitis, bronchitis, anemia, diarrhea, and insomnia. The leaves are applied locally to sores, and the roots are used to cure and prevent skin diseases. The seeds are sedative and are occasionally taken together with buttermilk to halt nausea, vomiting and abdominal pains associated with pregnancy. The leaves are commonly applied as poultices and are very helpful in liver troubles, bronchial asthma, and fever. *Ziziphus Spina-Christi* extract has also been reported to possess protective effect against aflatoxicosis, anti-conceptive properties, gastroenteritis, travelers' diarrhea, and have a calming effect on the central nervous system. One *Ziziphus* tree is estimated to produce about 3.6 kg of pure honey (range 2.2 - 5.2 kg) [25,26].

Honey, in general, has an extensive history of traditional human medicine use and also is an attractive ingredient for healthy foods. It has been postulated that the healing effect of honey could be due to various physical and chemical properties. The acidity and high osmolarity of honey are both among the physical characteristics which contribute to its antibacterial activity. Hydrogen peroxide, flavonoids, volatiles, organic acids, beeswax, nectar, pollen, and propolis are important chemical factors that provide antibacterial properties to honey. In a study, Shin and Ustunol[27] related the sugar composition of honey from different floral sources to the growth inhibition of many intestinal bacteria. Thus, the floral source of honey plays a major role in its biological properties[28].

Sidr honey is categorized as one of the finest, purest, and the most expensive honey worldwide. Its distinctive taste and aroma, high nutritional value, and limited quantity produced annually are the reasons for its popularity. The high marketing price of Sidr honey is mainly due to its health benefits and limited availability. It is considered the most expensive honey type due to its believed healing properties which include rejuvenating properties in addition to the valuable cosmetic and aphrodisiacal qualities. In our local community, 1 kg of Sidr honey costs about 100 US dollars, compared to 5 US dollars for a 500 ml bottle of Lactulose.

A thorough literature review showed no articles at all dealing with honey in the specific treatment of chronic constipation. Also, no articles were found comparing any honey to Lactulose in treating chronic constipation. We hope that our paper might explore some highlights on the value of honey not only in the short-term treatment of constipation but also on the long-term control of it.

During 20 years of clinical practice in Saudi Arabia, we encountered so many cases of constipation with an average of 400 patients per year. Therefore, we aim to evaluate and compare the effectiveness of Mountain Sidr Honey and Lactulose in the treatment and long-term control of chronic constipation.

MATERIALS AND METHODS

A prospective comparative study of the results of 1000 patients who were diagnosed and treated for chronic constipation between January 2010 and December 2014 in Al Ansar general public health hospital in Medina, Saudi Arabia was done. The treatment protocol, part of our quality care clinical pathway program, was designed on a digital database file in the outpatient department of Al Ansar public health general hospital in Medina, Saudi Arabia. Patients were referred from local hospitals and primary care centers. They were all seen and managed in the outpatient clinic by the same surgeon.

Ethical approval was granted from Al-Ansar hospital ethical committee and the management guidelines and clinical pathway subcommittee of the quality care program at the same hospital. The inclusion criteria included adult patients (above 12 years old as per the Saudi Arabian Ministry of age health guidelines), and a proven diagnosis of chronic constipation not related to any chronic illness (full clinical workup concluded no apparent disease). No exclusion criteria.

All patients had the same pretreatment essential work up (complete blood count- coagulation profile- blood chemistry- abdominal x-ray- electrocardiogram- and abdominal ultrasound). The clinical management was thoroughly discussed with the patients. The treatment protocol consisted of two regimens: 1) Ziziphus (Sidr) honey 20 ml orally after breakfast daily. 2) Lactulose syrup 20 ml orally after breakfast daily.

The first consecutive 500 patients who accepted the Ziziphus (Sidr) honey protocol were enrolled in the study while the first consecutive 500 patients who preferred Lactulose syrup were included. All the patients were followed up in the outpatient surgical clinics once every week for one month, then once every two weeks for two months, and once every month for the following nine months to complete one year follow up. All the patients completed one year follow up, and no drop out was recorded. The follow-up data recorded included the status of bowel habits, side effects, the occurrence of diarrhea, and recurrence of constipation.

The clinical profile of the patients was analyzed for age, sex, clinical features, risk factors, co-morbid diseases, and the treatment outcome. The standard deviation was calculated. The Chi-square test was applied to all possible categorical variables at 95% confidence interval and the P value ≤ 0.05 was considered statistically significant.

RESULTS

1000 Saudi Arabian chronic constipation patients were included, 739 (73.9%) were males, and 261 (26.1) were females. Male to female ratio was 2.8:1. The mean age was 33.97 ± 1.4 years, range 17-53. The demographic distribution of chronic constipation patients showed that 538 (53.8%) patients were from Medina city, 251 (25.1%) were from nearby towns, 117 (11.7%) from villages, and 94 (9.4%) were from rural areas. (Figure 1)

The mean duration of chronic constipation was $38 \pm$

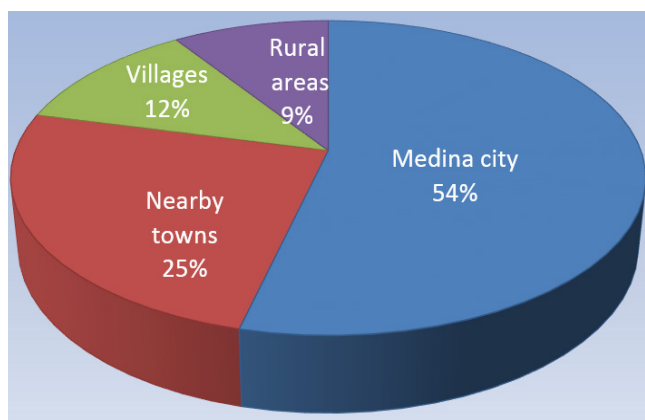


Figure 1. Demographic distribution of the study population

2.3 months, range 24-52. The most common presenting complaints were dyschezia (painful defecation) in 836 (83.6%) patients, hard bulky stool in 627 (62.7%), recurrent abdominal cramps in 592 (52.9%), excessive bloating in 483 (48.3%), chronic straining in 416 (41.6%) patients, and bleeding per rectum after defecation in 364 (36.4%). Co-morbid diseases and conditions were recorded as follows: Anal fissures in 372 (37.2%), hemorrhoids in 294 (29.4%), diabetes mellitus in 217 (21.7%), hypertension in 174 (17.4%), pregnancy in 126 (12.6%) female patients, obesity in 93 (9.3%) patients, and ischemic heart disease in 31 (3.1%) patients.

The most common predisposing factors were inadequate daily water intake (less than one liter per day) in 739 (73.9%) patients, unbalanced daily diet consumption in 694 (69.4%), low fiber intake in 587 (58.7%), chronic excessive red tea daily intake (more than two liters per day) in 516 (51.6%), chronic daily soda soft beverages consumption in 468 (46.8%), and chronic fatty fast food consumption in 412 (41.2%). (Figure 2)

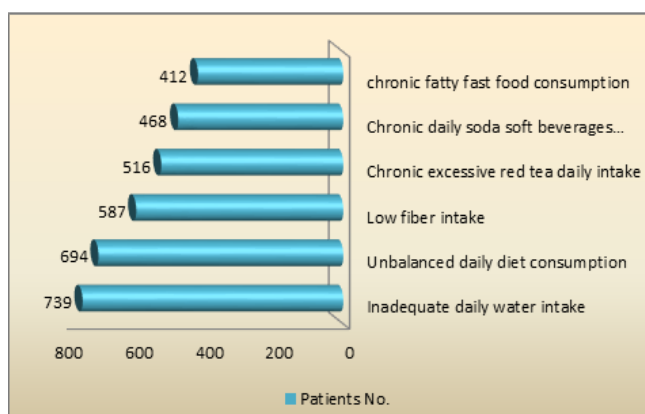


Figure 2. The most common predisposing factors to chronic constipation

In the Ziziphus (Sidr) honey group, all the patients tolerated the daily dose of 20 ml with no significant occurrences. The majority, 371 patients, reported having a regular soft stool and no recurrence of constipation. In the Lactulose group, only 34 patients tolerated the dose of 20 ml; the rest had to adjust the dose due the occurrence of many side effects (diarrhea, bloating, and cramps), but the majority, 328

patients, reported having soft stool. In fact, 37 patients had to stop the intake completely for a while, then restart the intake as recurrent constipation occurred.

The mean time for Ziziphus (Sidr) honey to treat constipation and help to achieve soft stool was 1.75 days, range 0.5-3. The mean time for Lactulose to treat constipation and contribute to obtaining soft stool was 3.25 days, range 2-5. In the short time treatment of constipation, Ziziphus (Sidr) honey was statistically found to represent a significant difference regarding short healing time, ($p=0.0021$), compared to Lactulose. In the long time control of chronic constipation, Ziziphus (Sidr) honey was statistically found to represent a significant difference regarding good sustained control of constipation, ($p=0.0011$), compared to Lactulose. Relating to the occurrence of adverse effects, Ziziphus (Sidr) honey was statistically found to represent a significant difference regarding fewer occurrences, ($p=0.0023$), compared to Lactulose. (Table 1,2)

Table 1. Comparison of the treatment occurrences between Ziziphus (Sidr) honey and Lactulose

Occurrence	Ziziphus (Sidr) honey	Lactulose	P-value
Hard stool	0	28 (5.6%)	0.0024
Bulky stool	47 (9.4%)	196 (39.2%)	0.0028
Soft stool	371 (74.2%)	328 (65.6%)	0.01
Loose stool	102 (20.4%)	168 (33.6%)	0.0012
Watery stool	18 (3.6%)	139 (27.8%)	0.0031
Diarrhea	0	73 (14.6%)	0.0023
Recurrent constipation	0	59 (11.8%)	0.0027
Need for dose adjustment	0	128 (25.6%)	0.0032
Need to completely stop the intake	0	37 (7.4%)	0.0013
Abdominal cramp	0	193 (38.6%)	0.0042
Bloating	0	203 (40.6%)	0.0046
Borborygmus	0	248 (49.6%)	0.0048
Nausea	0	61 (12.2%)	0.0015
Vomiting	0	18 (3.6%)	0.0011

Table 2. Comparison of the characteristics of Ziziphus (Sidr) honey and Lactulose

Characteristics	Ziziphus (Sidr) honey	Lactulose
Taste tolerability	Excellent	Moderate
Sweetness tolerability	Very sweet	Moderately sweet
Effect on appetite	Improved	Decreased
Abdominal discomfort	Occasional	Moderate
Financial cost	Expensive	Cheap
Dose adjustment		
5 ml	0	23 (4.6%)
10 ml	0	294 (58.8%)
15 ml	0	174 (34.8%)
20 ml	500 (100%)	34 (6.8%)

DISCUSSION

The mean age of our study patients was 33.97 ± 1.4 years which may reflect that chronic constipation in our society is more prevalent in the middle age group compared to older age groups in other international studies [1-6]. Another observation is that patients affected by chronic constipation present very late seeking medical help evident by the mean duration of chronic constipation which was 38 ± 2.3 months. It could be explained by the effect of the dry, hot climate of Saudi Arabia most of the year (about ten months). In addition to the geographic desert characteristics of the Saudi Arabian landscape which predispose to a hard daily life condition including dehydration and drought which may falsely make the patients perceive constipation as a normal lifestyle condition.

Despite that honey is a standard daily food ingredient in our society, none of our patients had used it before for the treatment of constipation. It could be explained, in combination with the age group, that the recent changes in lifestyles including food and beverages had significantly influenced our society. Unbalanced daily diet consumption, low fiber intake, chronic daily soda soft beverages consumption, and chronic fatty fast food consumption were among the most common predisposing factors in our patient population.

The majority of the patients in the Sidr Honey reported that it was very delicious, sweet, tolerable, and had an excellent effect in improving their appetite. In fact, all the patients included it as a regular daily breakfast component for the whole family. All the patients well tolerated the 20 ml daily dose; no adjustments were reported. In fact, many patients reported another dose at night with the dinner meal as a habit; no side effect was reported even with the extra dose.

Compared to many occurrences and side effects of Lactulose, zero occurrences and side effects were reported by all the patients in the Sidr Honey group, even the very few, 18, patients who reported watery stool were not adversely affected. The majority had a satisfactory soft regular bowel motion. Zero recurrence of constipation for the complete one-year follow-up was a very pleasant surprising result which in combination with zero occurrences of diarrhea could indicate that Sidr Honey is an excellent balanced, effective treatment of chronic constipation.

The relatively short mean time for Ziziphus (Sidr) honey to safely treat constipation and help to achieve soft stool which was 1.75 days is by all means a superior result over almost all known oral anticonstipation agents known in the present time. During 20 years of clinical practice, we tried all available oral anticonstipation medications with thousands of patient, but none of them were as fast and safe as honey. The only exception was fleet enema per rectum which could work within hours.

Lactulose is a natural compound (not chemical), which gives it the advantage of being safely used for extended periods of time, such as one year in our study protocol. Though, the

related side effects, mostly abdominal cramps and bloating, affected its effectiveness as a long-term treatment for the control of chronic constipation. All the other available anti-constipation agents are mainly chemical products that can not be given as prolonged treatment protocols. Combining all the facts together, natural honey could emerge as the only safe and effective long-term treatment for the management and long-term control of chronic constipation.

A recent medical symposium (April 2016) was held in Riyadh, Saudi Arabia recommended two new regimens. The first is daily 10-20 ml of honey dissolved in 100 ml of water (called honey syrup) in the morning before breakfast as a daily nutritional lifestyle habit. The second is a mixture of honey and cinnamon (10 ml + 5 mg) in the morning with breakfast as a regular prophylactic treatment for many gastrointestinal conditions including constipation.

CONCLUSIONS

Mountain Sidr Honey (*Ziziphus Spina-Christi*) is a very promising treatment for the long-term control of chronic constipation. It is superior to Lactulose in both short and long term results, but is much expensive financially. Also, it is associated with no or minimal adverse occurrences compared to many side effects of Lactulose.

AUTHORS' CONTRIBUTIONS

All authors have substantially contributed to the paper. HAS conducted the clinical part of the study. BHS wrote, edited the manuscript, and analyzed the data. Both authors read and approved the final manuscript.

COMPETING INTERESTS

The authors declare no competing interests.

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