

Medicinal Plants Used for Treatment of Diarrhea and Dysentery in Chandpur District, Bangladesh

Mohammed Sohel Howlader¹, Khoshnur Jannat², Mohammed Rahmatullah^{2*}

¹Department of Pharmacy, University of Development Alternative, Bangladesh

²Department of Biotechnology and Genetic Engineering, University of Development Alternative, Bangladesh

***Corresponding author:** Mohammed Rahmatullah, Department of Biotechnology and Genetic Engineering, University of Development Alternative, Bangladesh.

Citation: Howlader MS, Jannat K, Rahmatullah M (2019) Medicinal Plants used for Treatment of Diarrhea and Dysentery in Chandpur District, Bangladesh. Arch Nat Med Chem 4: 1022. DOI: 10.29011/2577-0195.101022

Received Date: 26 October, 2019; **Accepted Date:** 20 November, 2019; **Published Date:** 26 November, 2019

Abstract

Objective: To document medicinal plants used to treat diarrhea and dysentery by Folk Medicinal Practitioners (FMPs) in Chandpur district, Bangladesh.

Methods: Interviews of folk medicinal practitioners were carried out with the help of a semi-structured questionnaire and the guided field-walk method. Scientific validations of the plants' folk medicinal uses were done through literature search of phytochemicals and pharmacological activities reported of the plants.

Results: Interviews of four FMPs resulted in obtaining names of seven plants along with formulations and dosages for treatment of diarrhea and dysentery.

Conclusion: Perusal of scientific literature suggested that the FMP's selections of these plants for treatment of diarrhea and dysentery were quite valid from the scientific view point and the plants merit potential for further scientific studies leading to discovery of effective anti-diarrheal and anti-dysentery drugs.

Keywords: Bangladesh; Chandpur; Diarrhea; Dysentery; Folk Medicine

Introduction

Diarrhea and dysentery are prevalent in developing countries where according to the World Health Organization (WHO), an estimated 1.3 thousand million episodes 3.2 million deaths occur every year in children under 5 years of age [1]. Diarrhea is the passing of watery stool at least 3 times within a 24 hour period, watery stool being defined as stool which takes the shape of the container in which it is placed. Dysentery is diarrhea where mucus and blood are also present. According to WHO [1], causative agents for diarrhea and dysentery include rotavirus, various bacteria like enterotoxigenic *Escherichia coli*, *Shigella*, *Campylobacter jejuni*, *Vibrio cholerae*, *Salmonella* (non-typhoid), and the protozoa *Cryptosporidium*.

In a study conducted in Bangladesh, it was found that poor rural families use drinking water from shallow tube wells rather

than deep tube wells. It was further observed that amongst shallow tube well users, children have more severe *Shigella flexneri* diarrheal episodes versus the less severe *Shigella sonnei* diarrheal episodes among deep tube well user family children [2]. Rotavirus and norovirus has been indicated to be the most prevalent viral pathogens amongst rural children in Bangladesh suffering from moderate to severe diarrhea or MSD [3]. On average, rural Bangladeshi households with children < 5 years of age spent 1.3% of their annual income for treatment of diarrhea and acute respiratory infections in those children [4]. This represents a considerable burden on a large number of rural households, who not only have more children and less income but also live under unhygienic conditions with less access to quality drinking water. It is to be further noted that Bangladesh has 86,000 villages but the villages lack modern (allopathic) doctors and modern medical facilities.

It has been reported that in Bangladesh about 85% of women studied who lived in slums and 41% of rural women washed

their hands only with water even after defecation [5], a practice which can cause spread of diarrhea and dysentery. Water quality, sanitation, and hand washing have been described as major causes behind growth faltering in children caused through environmental enteropathy [6]. Illiteracy, poor economic conditions, and lack of proper healthcare education are among the factors behind the prevalence of enteric pathogens and diseases in Bangladesh. Combined with lack of proper medical facilities in rural areas and access to proper medical facilities in urban areas, even in the capital city of Dhaka, it has been reported that about 80% of people who are at high risk for diarrhea in Dhaka sought care initially from a non-professional healthcare provider [7].

Among non-professional healthcare providers, Folk Medicine (FM) and Folk Medicinal Practitioners (FMPs) plays a major role in providing healthcare in Bangladesh; in fact through possibly millennia, FMPs have provided healthcare to the people. FMPs use various plants and plant parts for treatment of diarrhea and dysentery [8-15]; such practices of treatment of enteric diseases with plants are also known in other parts of the world [16-20]. Phytotherapy can prove to be a readily available and possibly safe method for treatment of diarrhea and dysentery. In areas where modern medical facilities are absent or amongst people who are not familiar with or cannot afford modern treatment, phytotherapy can prove to be a valuable tool for treatment. The objective of this study was to document the use of plants by four randomly selected FMPs in Chandpur district, Bangladesh for treatment of diarrhea and dysentery.

Materials and Methods

The four FMPs selected for interviews were:

- (1) Moktar Mia, male, age 56 years, Boro Station, Chandpur Sadar;
- (2) Abdur Rob Sheikh, male, age 52 years, No. 9 Kolia Union, Chandpur Sadar;
- (3) Shahid Bepari, male, age 47 years, Notun Bazaar, Chandpur Sadar;
- (4) Abdur Babar, male, age 76 years, Gondamara village, Faridganj, all FMPs being from Chandpur district, Bangladesh.

The selection of the FMPs was facilitated by one of the authors (MSH) hailing from Chandpur Sadar in Chandpur district. Prior Informed Consent was first obtained from all FMPs. The

FMPs were informed about the purpose of our visit and consent obtained to disseminate any provided information including their names both inside and outside Bangladesh.

Actual interviews were carried out in Bengali language with the help of a semi-structured questionnaire and the guided field-walk method of Martin [21] and Maundu [22]. In this method, the FMPs took the interviewers through areas from where they collected their plants, showed the plants, and described their uses. All plants were photographed on the spot and specimens collected, dried and brought to Dhaka for identification by a competent botanist at the University of Development Alternative. Voucher specimens were deposited with the Medicinal Plant Collection Wing of the University of Development Alternative. *Nigella sativa* and *Cuminum cyminum* are cultivated in Bangladesh as spices; the FMPs used the seeds in conjunction with other plants. Seeds were obtained by the FMPs from a kitchen market shop in Chandpur Sadar, which is a sub-district of Chandpur district.

Results and Discussion

Chandpur district has an area 1704.06 sq km, located in between 23°00' and 23°30' north latitudes and in between 90°32' and 91°02' east longitudes. The district has eight sub-districts (known as Upazilas in Bengali), namely Kachua, Chandpur Sadar, Faridganj, Matlab Uttar, Matlab Dakshin, Shahrasti, Haimchar, and Hajiganj. Apart from one FMP who practiced and resided in Faridganj Upazila, the other three FMPs practiced and resided in Chandpur Sadar Upazila.

An interesting feature was that the various FMPs mentioned different plants and monoherbal or polyherbal formulations for treatment of diarrhea and dysentery. FMP 1 mentioned *Eclipta prostrata* and *Scoparia dulcis*, FMP 2 mentioned *Glycosmis pentaphylla*, FMP 3 mentioned a combination of *Smilax perfoliata* and *Cuminum cyminum*, and FMP 4 mentioned a combination of *Leea indica* and *Nigella sativa*. The results are shown in Table 1. Some of the plant pictures are also shown in Figures 1-5. This goes on to show the wide diversification of plant selection practices of Bangladesh FMPs and which cannot be due to regional variations or non-availability of any particular plant in or near the residence of a FMP. It is to be noted that three of the FMPs resided in Chandpur Sadar Upazila, which has an area of only 308.78 sq km, and located in between 23°07' and 23°20' north latitudes and in between 90°34' and 90°48' east longitudes [23]. This point has been noted before for Bangladesh FMPs [24].

S.No	Scientific Name	Family Name	Local Name	Parts Used	Ailments Treated
1	<i>Cuminum cyminum</i> L.	Apiaceae/ Umbelliferae	Jeera	Seed	See <i>Smilax perfoliata</i> .
2	<i>Eclipta prostrata</i> L.	Asteraceae	Kalikumsa	Leaf	Diarrhea. One glass of leaf juice is daily taken orally with a pinch of salt on an empty stomach in the morning.
3	<i>Scoparia dulcis</i> (L.)	Plantaginaceae	Chini gura	Leaf	Diarrhea, dysentery. Leaf juice (one glass) or alternately paste of green leaves with one glass of water is taken orally once daily.
4	<i>Nigella sativa</i> L.	Ranunculaceae	Kalo jeera	Seed	See <i>Leea indica</i> .
5	<i>Glycosmis pentaphylla</i> (Retz.) DC.	Rutaceae	Bon chondol	Leaf, bark, root	Diarrhea. Leaf, bark and roots are crushed and kept in water for several days. Half cup of the water is taken orally with half teaspoon honey daily orally 3-4 times.
6	<i>Smilax perfoliata</i> Lour.	Smilacaceae	Kumari lota	Top of young stems	Diarrhea. Juice obtained from top of young stems (one-third cup) is taken orally 1-2 times daily with 4-5 pinches of <i>Cuminum cyminum</i> seeds.
7	<i>Leea indica</i> (Burm.f.) Merr.	Vitaceae	Koi gach	Leaf	Dysentery. Half cup leaf juice is taken orally with a pinch of powdered <i>Nigella sativa</i> seeds twice daily.

Table 1: Medicinal plants and formulations for treatment of diarrhea and dysentery by the FMPs of Chandpur district, Bangladesh.



Figure 1: *Eclipta prostrata*.



Figure 2: *Scoparia dulcis*.



Figure 3: *Glycosmis pentaphylla*.



Figure 4: *Smilax perfoliata*.



Figure 5: *Leea indica*.

Extract of *Eclipta prostrata* has been found to be effective against gastroenteritis causing bacteria [25]. Ethnomedicinal reports indicate that whole plant decoction is given orally thrice a day for seven days for diarrhea and dysentery in Uttar Pradesh, India [26]. Roots of *Leucas aspera*, *Eclipta prostrata* and *Amaranthus spinosus* reportedly were used in combination to treat dysentery by a FMP in Hajiganj Upazila of Chandpur district, Bangladesh [27]. Anti-diarrheal effect has been observed with aqueous extract of *Cuminum cyminum* seeds in castor oil-induced diarrhea model in albino rats [28]; the anti-diarrheal effect of the seeds is also mentioned in traditional medicines of Iran, Tunisia and India (Ayurveda). Although *Smilax perfoliata* does not appear to be previously reported as treatment for diarrhea and dysentery, a related plant *Smilax zeylanica* is used by Chittagong Hill Tracts region tribals to treat dysentery [29]. The use of *Smilax perfoliata* and *Cuminum cyminum* thus appears to be a novel combination for treating diarrheal diseases, which merits scientific attention.

Another two plant combination used by the FMP was *Leea indica* leaves along with *Nigella sativa* seeds. Roots and leaves of *Leea indica* have been traditionally used as treatment for diarrhea and dysentery in India and other countries. Roots are used for diarrhea or dysentery in Kut Chum district, Yasothon Province, Thailand; in Hassan district, Karnataka, India; Thrissur district, Kerala, India; and Dindigul district, Tamil Nadu, India [30-33]. Roots and leaves are used to treat diarrhea, dysentery and ulcer in Kannur district, Kerala, India [34]. The plant is a source of some important bio-active constituents like lupeol, gallic acid, quercitrin, ursolic acid and farnesol [35]. Any of these or other constituent(s) of the plant may be responsible for the reported anti-diarrheal activity of methanolic extract of leaves in castor oil-induced diarrhea in mice [36]. The various therapeutic and protective effects of *Nigella sativa* seeds and its active component thymoquinone against gastric disorders have been reviewed [37].

Aqueous decoction of *Scoparia dulcis* has been shown to be effective against castor oil-induced diarrhea in rats; this anti-diarrheal action was reportedly mediated via an inhibition in intestinal transit due to impairment of intestinal peristalsis [38]. The anti-diarrheal activity of methanolic extract of *Glycosmis pentaphylla* leaves has also been reported [39].

Conclusion

Several plants were found to be used by Folk Medicinal Practitioners (FMPs) in Chandpur district, Bangladesh for treatment of diarrhea and dysentery. Phytochemicals and pharmacological activity reports on these plants in scientific journals suggest that the FMPs were quite justified in the anti-diarrheal and anti-dysentery uses of these plants or plant parts. Thus these plants not only can be affordable and readily available sources for alleviating these two gastrointestinal disorders (diarrhea and dysentery), but also can potentially be sources of effective drugs against gastrointestinal disorders.

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