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A collection of home remedies used in Dhaka city, Bangladesh

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Abstract
Background: Home remedies were possibly used by human beings since their advent. Even in the modern era, home remedies may form the only recourse for people in rural and urban Bangladesh, who either cannot afford conventional treatment or live in remote areas from where transport to a modern hospital is practically not possible in time. As a result, from time immemorial, home remedies have formed a practical feature of the medical landscape in Bangladesh. The objective of this study was to gather information from households in Dhaka city regarding their use of home remedies.
Methods and findings: Information was collected from households comprising of friends, relatives, and household workers through snowball sampling. Together they formed a wide spectrum of people of varying income but mostly on the low income side, that is earning less than Bangladesh Taka (BDT) 30,000 per month (1 US$ = BDT107.24). All collected information were given voluntarily by the households surveyed and duplicate information was discarded. The main question asked was as to what home remedies ('totka chikitsha' in Bengali) were used, if any. As far as possible, detailed descriptions were taken about the formulations, diseases, and dosages. Plants named by the people were common plants and easily identified from their Bengali names.
Conclusions: Interestingly, most plants used as home remedies were either cultivated plants and easily obtained in the kitchen markets of Dhaka city or could be found by roadsides and outskirts of the city on fallow lands. Despite their uses by the common people, a scientific perusal of the literature suggests that they can form a real remedial recourse for people when no better treatment modes are affordable or nearby. Furthermore, the plants used can be found all throughout Bangladesh making them readily available items for treatment.

Keywords: Dhaka city, non-conventional therapies, home remedy, Bangladesh

Introduction
Human beings quite possibly suffered from diseases stretching back to a time period since their advent [1]. Although a number of major diseases infectious for humans has been attributed to introduction of agriculture with subsequent transmission of diseases from domesticated animals to humans [2], other diseases/disorders are difficult to explain with this mode of transmission. Rational thinking suggests that even if the then environment of the early humans were free of germs and more pristine, still humans must have suffered from sprains, strains, stresses, burns, pain, and fractures simply from their lifestyle of hunter-gatherers. As such, there must have been remedies for these conditions, discovered possibly through trials and errors. Early human beings are believed to live in small groups, so any discovery of remedies/medicines had to be 'group medicine'. This 'group medicine', possibly evolved into home remedies, when larger human settlements were formed.
Irrespective of the mode of development, home remedies have survived and evolved and are still evolving. Every society have their own home remedies, with some remedy being preferred by certain households, while others are not. In a comparatively recent survey in Pakistan, it was reported that self-medication, home remedies, and spiritual healing were common responses for common diseases [3]. Traditional home remedies have been described for the village people of Maharashtra State, India [4]. Home remedies have been described for Feira, Brazil [5]. Traditional home remedies gathered from Buldhana District in Maharashtra, India highlighted the importance of homestead gardens in the use of various remedies. Some of the diseases treated included dysentery, pus formation in ears, and helminthiasis [6].

The abrupt occurrence of COVID-19 and lack of conventional medicines for its treatment led to dependency on home remedies. For instance in South Africa, the three most common remedies against COVID-19 were Lengana (*Artemisia afra*), Mušukušwane (*Lippia javanica*) and Cannabis [7]. In Zimbabwe and South Africa, home remedies against COVID-19 included drinking garlic, lemon, and ginger concoctions and inhaling steam. Additionally, herbal teas made from plants such as zumbani (*Lippia javanica*), mango leaves (*Mangifera indica*), gum leaves, or zumba (*Crotolaria ochroleuca*) leaves are used to treat COVID-19 symptoms and general illness [8]. Home remedies are fairly common among African-Americans and elderly white Americans; the diseases/symptoms treated are mostly digestive, respiratory, skin, and musculoskeletal disorders [9]. Women in a rural community of northern Maputaland in South Africa were found to use 32 plants for treatment of gynecological disorders and obstetric complaints [10]. Sub-Saharan countries are another region where home remedies, alone or in combination with conventional medicines are still in use. Users of home remedies reportedly tended to belong more to the illiterate and low income population [11].

Although to some it may seem illogical, from a rational view point, home remedies may be considered safe remedies if they have been tried and tested over hundreds or even thousands of years. Otherwise, they would have been discarded, if not found to be safe. Indigenous people still use home remedies. In a study conducted in Haveri district of Karnataka State, India, home remedies were found to be mostly for gastrointestinal disorders. For instance, for diarrhea, lemon juice or pomegranate leaf juice with butter milk or banana with Bengal gram or black tea with lemon juice or liquorice with sandalwood and honey or menthol with lime juice was taken orally [12].

Bangladesh is no stranger to home remedies. This form of remedial treatment is practiced in all households to a greater or lesser extent. People opt for home remedies for a number of reasons. Use of home remedies may be so frequent in a household that home remedial treatment becomes the initial choice of treatment. People may not be able to afford modern doctors and medications. People may be living in remote areas to be able to rapidly seek conventional (modern) treatment. Home remedies are also sought when a patient/ patient's relative(s) have been told that the disease is at a terminal stage. Most commonly, plants and/or plant parts form the common ingredient(s) of home remedies in Bangladesh. Since information on the medicinal plants of Bangladesh is relatively scarce, we are trying to build up a data base of medicinal plants of Bangladesh. Some of our information has been reported in various scientific journals [13-42]. To make the data base a comprehensive list, we have also included medicinal plants used as home remedies in our information (including home remedies against COVID-19), which is ongoing [43-45]. The objective of the present study was to collect information on home remedies used in Dhaka city, the capital of Bangladesh with a population of more than 15 million [https://iigh.unu.edu/publications/articles/sick-cities-a-scenario-for-dhaka-city.html].

Methods

Information was collected from friends and relatives and household helps through the snowballing survey technique where one informant introduces the author (s) to other informants. Although a broad spectrum of people were surveyed of varying income and literacy rate, the informants were mostly on the low income side, that is earning less than Bangladesh Taka (BDT) 30,000 per month (1 US$ = BDT107.24). All collected information were given voluntarily by the households surveyed and duplicate information was discarded. Women formed the majority of informants. The main question asked was as to what home remedies ('totka chikitsha' in Bengali) were used in their households, if any. As far as possible, detailed descriptions were taken about the formulations, diseases, and dosages. Plants named by the people were common plants and easily identified from their Bengali names. A map of Dhaka district is shown in Figure 1.

Results and Discussion

Dhaka district has an area of 1497.17 sq km, and is located in between 23°53' and 24°06' north latitudes and in between 90°01' and 90°37' east longitudes (Figure 1).

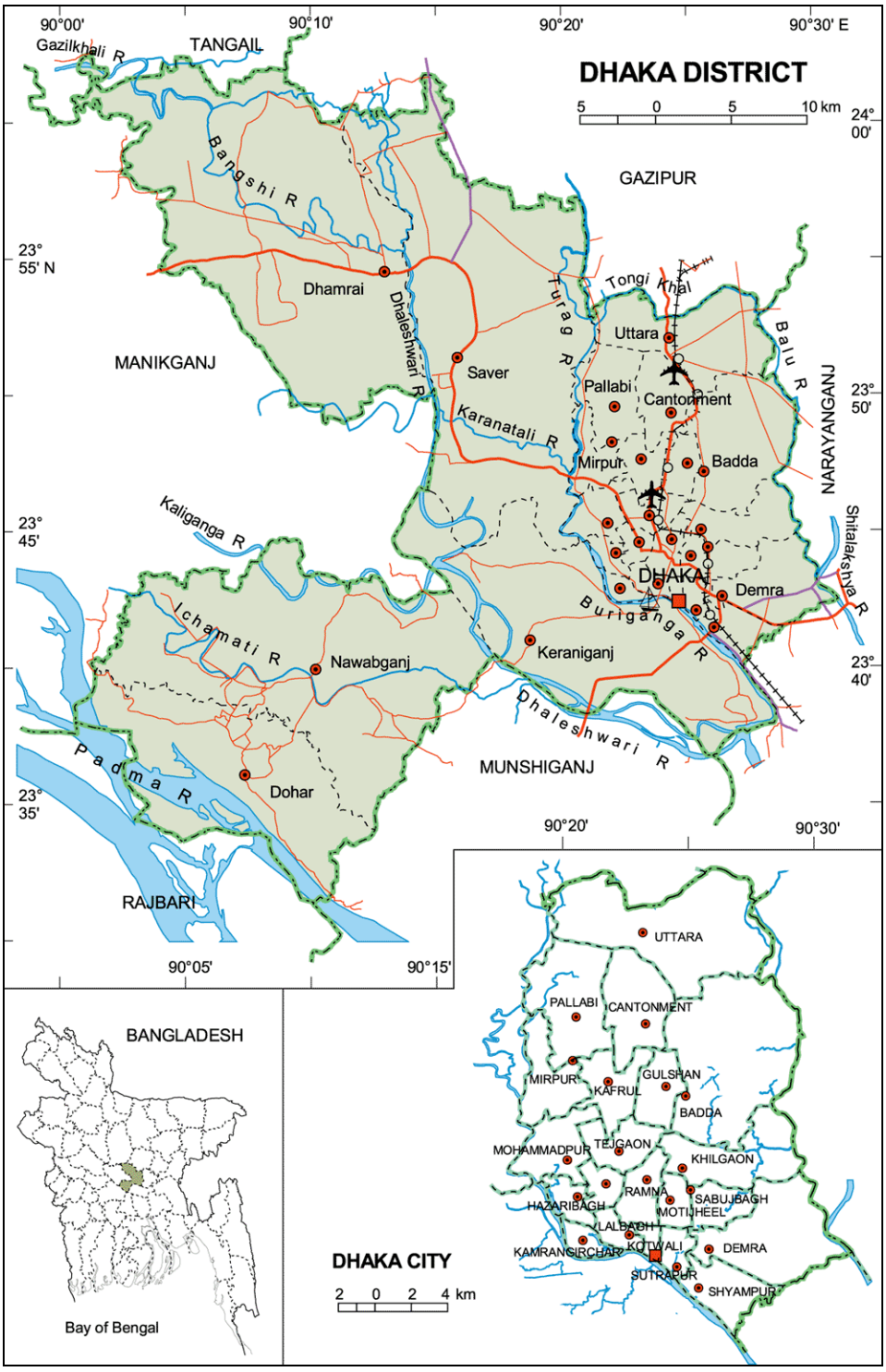

Fig 1: Maps of Dhaka district, Dhaka city, and Bangladesh

Dhaka city is the sixth largest and seventh most densely populated cities in the world. The city is conspicuous by its absence of greenery and lack of open spaces. A number of brick kilns are spread on the outskirts of the main city, which along with heavy traffic within the city contributes to air pollution (Figure 2), also see [https://www.thedailystar.net/environment/pollution/air-pollution/news/air-pollution-dhaka-5th-worst-city-the-world-3096571]. Water pollution is also present because of discharge of untreated effluents from various industries in the rivers surrounding the city [https://www.aa.com.tr/en/asia-pacific/dhaka-becomes-unlivable-as-industrial-pollution-kills-rivers/2407165]. The congested living spaces along with the polluted air and water contributes to the rise of manifold diseases of the city inhabitants. Untreated garbage left and/or burnt by the roadside (Figure 3) also contributes to air, water and soil pollution, all of which contributes to common and serious maladies of the population.

Fig 2: A brick kiln on the outskirts of Dhaka city

Fig 3: Untreated garbage left by the roadside

A total of 22 plant names were collected, which were used in home remedies by the households surveyed. The results are shown in Table 1. The plants were distributed into 18 families, the Asteraceae family contributing the highest number of plants. Some of the formulations used were monoherbal and some polyherbal or plant mixed with other constituents like honey. Interestingly, all the plants were common plants. Some like *Allium sativum* and *Zingiber officinale* can be easily procured from the kitchen markets of Dhaka city, while others can be found growing on fallow lands or by the roadsides of the city outskirts or often within the city.

Three formulations were used to treat gastrointestinal tract disorders, five formulations for treatment of various types of pain, three for bleeding from external cuts and wounds, one each for fever, coughs, and Tinea infection. Juice obtained from crushed whole plant of *Eclipta prostrata* and *Achyranthes aspera* was used for treatment of severe pain in hands or legs. Hydroethanol extract of *Eclipta prostrata* reportedly showed antinociceptive activities in various mice models like acetic acid-

induced mouse writhing test, formalin-induced pain, hot plate-induced pain, and tail clip test. It appears that the bioactive constituent(s) of the plant may act via potassium ion channel opening and cholinergic receptor [46]. Hydroalcoholic extract of leaves and roots of *Achyranthes aspera* also reportedly showed analgesic activity in rodent models using hot plate, tail flick, and acetic acid-induced writhing tests [47]. It is then reasonable to expect that the combination of the two plants may give a synergistic effect in alleviating pain.

Warmed leaves of *Calotropis gigantea* (Figure 4) soaked or brushed with mustard oil were also used to alleviate pain following application of the soaked leaf as a poultice. This home remedy appears to be a common folk treatment of pain in Bangladesh, being used by tribal [48] and folk medicinal practitioners alike [49]. The leaves of the plant are used in a similar way by inhabitants of Jodhpur, Jaisalmer, Bikaner and Barmer districts in Rajasthan, India for treatment of chest pain, headache, and knee pain [50].

Fig 4: Calotropis gigantea.

Table 1: Home remedial treatments in Dhaka city

Serial Number	Scientific Name	Family Name	Local Name	Parts used	Ailments treated
1	*Achyranthes aspera* L.	Amaranthaceae	Biral achra	Whole plant	See *Eclipta prostrata*.
2	*Allium sativum* L.	Amaryllidaceae	Roshun	Clove	See *Nigella sativa*.
3	*Centella asiatica* (L.) Urb.	Apiaceae/Umbelliferae	Thankuni	Leaf	Diarrhea. Juice obtained from macerated leaves is mixed with mishri (crystalline sugar) or batasha (sweet snack) and taken orally. See also *Nigella sativa*.
4	*Calotropis gigantea* (L.) Dryand.	Apocynaceae	Akondo	Leaf	Severe pain, paralysis. Leaves are soaked in warm mustard oil and applied to affected areas.
5	*Eclipta prostrata* (L.) L.	Asteraceae	Kalo keshar	Whole plant	Severe pain in hands or legs. Juice obtained from crushed whole plant of *Eclipta prostrata* and *Achyranthes aspera* is massaged on hands or legs.
6	*Mikania cordata* (Burm.f.) B.L.Rob.	Asteraceae	Jarmani lota	Leaf	To stop bleeding from external wounds. Leaf paste is applied to wounds.
7	*Tagetes erecta* L.	Asteraceae	Gada	Leaf	To stop bleeding from external wounds. Leaf paste is applied to wounds.
8	*Kalanchoe pinnata* (Lam.) Pers.	Crassulaceae	Pathor kuchi	Leaf	Vomiting. Two teaspoons of juice from crushed leaves are taken orally with salt or fried and flattened rice and several slices of *Musa paradisiaca* fruit.
9	*Coccinia grandis* (L.) Voigt	Cucurbitaceae	Telakucha	Leaf	Fever. Leaf juice is applied to head.
10	*Lablab purpureus* L.	Fabaceae	Shim	Leaf	Dermatophytosis/Tinea. Crushed leaves are mixed with a little salt and applied topically to affected areas.
11	*Ocimum tenuiflorum* L.	Lamiaceae	Tulshi	Leaf	Whooping cough. Juice obtained from crushed leaves is taken orally with honey.
12	*Cinnamomum verum* J. Presl	Lauraceae	Darchini	Bark	See *Syzygium aromaticum*.
13	*Musa paradisiaca* L.	Musaceae	Kacha kola	Fruit	See *Kalanchoe pinnata*.
14	*Psidium guajava* L.	Myrtaceae	Peyara	Bark	Toothache. Bark is boiled in water followed by gargling with the water when it is still lukewarm.
15	*Syzygium aromaticum* (L.) Merr. & L.M. Perry	Myrtaceae	Lobongo	Floral bud (dried)	Toothache. Powdered floral buds of *Syzygium aromaticum* and bark of *Cinnamomum verum* are applied to painful tooth base.
16	*Piper betle* L.	Piperaceae	Paan	Leaf	Bloating. One leaf of *Piper betle* is chewed and taken orally with two slices of *Zingiber officinale* rhizomes and a pinch of table salt. Itching and/or inflammation at nail edges. Macerated leaf is applied topically to affected areas.
17	*Piper peepuloides* Roxb.	Piperaceae	Peepulti	Leaf	Body heat. Juice obtained from leaves is orally taken.
18	*Cynodon dactylon* (L.) Pers.	Poaceae	Durba ghash	Leaf	To stop bleeding from external wounds. Leaf paste is applied to wounds.
19	*Nigella sativa* L.	Ranunculaceae	Kalo jeera	Seed	Headache, body pain. Seeds of *Nigella sativa*, cloves of *Allium sativum*, and leaves of *Centella asiatica* are crushed together to obtain juice, which is then massaged onto painful areas.
20	*Solanum melongena* L.	Solanaceae	Baegoon	Plant sap	Itching and/or inflammation at nail edges. Sap is applied topically to affected areas.
21	*Clerodendrum viscosum* Vent.	Verbenaceae/Lamiaceae	Vati	Young fruit	Indigestion, burning sensations in chest due to acidity. Juice obtained from crushed young fruits is taken orally in the morning on an empty stomach.
22	*Zingiber officinale* Roscoe	Zingiberaceae	Ada	Rhizome	See *Piper betle*.

Fig 5: *Tagetes erecta*

Fig 6: *Cynodon dactylon*

Bark of *Psidium guajava* (guava in English) or floral buds of *Syzygium aromaticum* and bark of *Cinnamomum verum* were used for home remedial treatment of toothache. In the first instance, the bark of *Psidium guajava* was boiled in water followed by gargling with the water while the water was still warm. Guava leaves reportedly has analgesic properties [51], and can be effective against dental caries [52]. In our cumulative experiences, we have heard of guava leaves being used for alleviating toothache [53]; this is possibly the first instance of using bark for the same purpose. The analgesic and anti-inflammatory activities of *Syzygium aromaticum* floral buds (clove) has been reported from experimental studies in mice [54]. A recent review summarizes the anti-inflammatory activity of *Cinnamomum verum* [55]. Clove oil contains eugenyl acetate, eugenol, and β-caryophyllene as the principal constituents. Eugenol, because of its analgesic and

local anesthetic actions, is widely used in dentistry [56]. Eugenol is also present in *Cinnamomum verum*, which may account for its analgesic effects [55].

For headache and body pain, seeds of *Nigella sativa*, cloves of *Allium sativum*, and leaves of *Centella asiatica* are crushed together to obtain juice, which is then massaged onto painful areas. Analgesic and anti-inflammatory activities of *Nigella sativa* (black cumin) seeds have been demonstrated in acetic acid-induced writhing tests and carrageenan-induced rat paw edema [57]. A constituent of the seeds, thymoquinone, has been shown responsible for these two effects among others [58]. It has been reviewed that the anti-inflammatory effect of garlic (*Allium sativum*) can be attributed to reduced expression of pro-inflammatory cytokines, with possibly two of garlic's phytochemicals – diallyl sulfide and allyl methyl sulfide mediating this effect [59]. Significant analgesic and anti-inflammatory effects have been shown in mice with *Centella asiatica* extract [60]. Thus the polyherbal combination of these three plant parts can be an effective means to alleviate pain, and where necessary (like as in rheumatoid arthritis), to alleviate any accompanying inflammation as well.

The plants and formulations discussed thus far possibly suffices to show that home remedies should not be discarded as 'myths', as happens in the conventional thinking of many modern doctors, but rather analyzed in a scientific manner. As shown in the preceding sections, these home remedies can be validated scientifically. Possibly more studies are necessary to optimize dosages and keep an eye on possible toxicities (if any), but to reiterate, these remedies have been time-tested and found to work. In fact, the World Health Organization (WHO) has acknowledged the value of traditional medicines and have initiated a program 'to promote a realistic approach to this subject' [https://pubmed.ncbi.nlm.nih.gov/6475036/].

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