INNSPUB

International Journal of Biosciences | IJB |
ISSN: 2220-6655 (Print) 2222-5234 (Online)
http://www.innspub.net
Vol. 24, No. 3, p. 112-124, 2024

RESEARCH PAPER OPEN ACCESS

Home-based therapeutics and organic treatment associated with recovery time of COVID-19 patients in Bangladesh: A cross-sectional survey

Fardana Binte Zaman[1], Md. Shajadul Islam[*2], Puspita Ghosh[3], Matthew Jackman[4], Musammet Rasheda Begum[5], Md Shafiqul Islam Khan[2]

[1]*Interdisciplinary Institute for Food Security, Bangladesh Agricultural University, Mymensingh, Bangladesh*

[2]*Department of Food Microbiology, Faculty of Nutrition and Food Science, Patuakhali Science and Technology University, Patuakhali, Bangladesh*

[3]*Department of Biochemistry and Food Analysis, Faculty of Nutrition and Food Science, Patuakhali Science and Technology University, Patuakhali, Bangladesh*

[4]*Department of Social Work, Australian College of Applied Professions, Melbourne Campus, Australia*

[5]*Department of Agricultural Economics and Social Sciences, Chattogram Veterinary and Animal Sciences University, Chattogram, Bangladesh*

Key words: COVID-19, Clinical symptoms, Therapeutic treatment, Recovery time, Bangladesh

http://dx.doi.org/10.12692/ijb/24.3.112-124 Article published on March 08, 2024

Abstract

Although vaccines and antivirals are at play, non-pharmacological therapies and organic treatments may have a role in patients' convalescence. This study, therefore, investigates home-based therapeutics and organic treatments in COVID-19 patients, and measures the recovery time of these confirmed cases. A cross-sectional survey was conducted where 267 patients participated in a telephone interview. Patient had positive results of reverse transcriptase-polymerase chain reaction (RTPCR) were recruited through screening test reports provided by hospitals authorities. Independent sample t-test, one-way ANOVA, and Pearson's correlation were performed. The mean age among the participants was 36.41 (±13.16) years. The mean time of recovery was 17.39 (±3.91) days. Frequent therapeutic and organic measures were having vitamin C-rich food, hot water, spiced tea, black cumin seed and using hot water vapor. Considerations of age ($p=0.001$), chronic disease ($p=0.002$), inhalation of hot water vapor ($p=0.004$), use of gloves($r = -0.13$; $p < 0.5$), use of hand sanitizer ($r = -0.14$; $p < 0.05$) were significantly correlated with the number of days required for COVID-19 recovery. The study results highlighted the benefits of support therapies and organic treatments at home as complementary to the pharmacological interventions in slowing the COVID-19 progression and improving the prognosis.

* **Corresponding Author:** Md. Shajadul Islam ✉ shajadulpstu@gmail.com

Introduction

This study investigates home-based therapeutic and organic treatments used by the patients diagnosed with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), and the association of these treatments with the patients' recovery time. Conducted in Bangladesh, our investigation in 2021 commenced at the time of the country experiencing a remarkable increase in infection rates and deaths, with difficulties in ensuring public health and primary and acute care services for all (IEDCR, 2021). The challenge for the government was to balance between lives and livelihood. Low savings, lack of financial assistance from the government, and job losses compelled many people in Bangladesh to priorities their livelihoods over public health measures (Hamiduzzaman and Islam, 2020). Consequently, this resulted in a surge of patients with respiratory illness with complex care needs.

Asymptomatic infections are common in corona virus disease-19 (COVID-19) patients, whereas the symptomatic case-patients often experience mild-upper respiratory illness, severe pneumonia, or critical respiratory or organ failure (Chen *et al.,* 2020; Rahman *et al.,* 2021). The frequently reported symptoms and conditions were fever, dry cough, dyspnea, myalgia, headache, sore throat, rhinorrhea, chest pain, diarrhea, nausea, conjunctival congestion, nasal congestion, sputum production, exhaustion (malaise), and hemoptysis (Yang *et al.,* 2020). The clinical management of these symptoms and conditions is complex, for example about 26-35% positive cases were admitted to an intensive care unit and the average incubation period for the patients was 11.5 days (CDC, 2021). While no dataset exists about reinfection and hospital readmissions, the re-infected cases are identified in different countries, such as the United Kingdom, Brazil and South Africa (CDC, 2021). Advancement in the COVID-19 treatments, including infective prevention, living therapeutic guideline, and several vaccines approved by the World Health Organization, all serve to contribute to the management of patient care.

Our interest is in the study of non-pharmacological management of COVID-19 patients in Bangladesh. The management of COVID-19 patients remains hospital-and emergency department-centered worldwide, with no exception in Bangladesh. Currently, various vaccines, along with the antivirals (i.e., Remdesivir, Favipiravir, Ribavirin, Chloroquine, Hydroxychloroquine, Azithromycin, Nitazoxanide, and Teicoplanin) and immunomodulatory molecules (e.g., hyperimmune convalescent plasma,tocilizumab, and sarilumab) are playing a key role in COVID-19 treatments (Wang *et al.,* 2020; Rabby, 2020; Alvi *et al.,* 2020). While compassionate utilization of vaccines, antivirals, and immunomodulatory molecules has shown positive outcomes, the ideal combination remains elusivein respiratory disease treatment. Furthermore, the availability and distribution of vaccines and antivirals are not guaranteed for people living in low-income countries like Bangladesh. In Bangladesh, a commonly cited healthcare seeking behavior is self-treatment, however, the self-treatment practices by COVID-19 patients regarding non-pharmacological therapies and organic treatments during the pandemic remain unexplored.

Home-based strategies (such as intake of certain foods and food supplements) and organic treatment have also been suggested to have possible protective and therapeutic effects against COVID-19 (Di Matteo *et al.,* 2020; Nuertey *et al.,* 2022). A recent study from Ghana reported that persons who practiced home-based therapy were protected from infection, severe disease, and death from COVID-19 (Nuertey *et al.,* 2022). However, not all elements of home-based therapy were effective, documented that physical exercise, deliberate inclusion of fruits and vegetables in diets, and drinking of fruit juices were as effective methods for the prevention of SARS-CoV-2 infection (Nuertey *et al.,* 2022). Another study in Morocco demonstrated that more than half of the study participants used home-based medicinal plants amid this pandemic to boost their immune system and treat respiratory tract infections that are associated with the COVID-19 infection (Belhaj and Zidane, 2021).

While the data is limited, evidence from a Bangladeshi study shows that different types of home remedies (such as medicinal plants) were used by the COVID-19 patients and got cured with or without the use of other types of treatment (Azam *et al.,* 2020).

Our study is also focused on the association of home-based therapeutics and organic treatments with the recovery time of COVID-19 confirmed cases. This study aspect was chosen because in Bangladesh,despiteCOVID-19 having resulted in 1570, 835 cases and 27,881 deaths, poor adherence to public health precautions and quarantine protocols remains prevalent (IEDCR, 2021). A low health literacy rate, combined with a lack of access to information and services, and poor living conditions all present a challenge in stymying the progression of COVID-19 and its concomitant lengthy recovery period. We chose to focus on the recovery timeline aspect of COVID-19as there is currently insufficient scientific evidence on the influence of home-based therapies and organic treatments, e.g., the consumption of vitamin-rich food and adhering to personal hygiene practices, on patients' recovery time in Bangladesh (Khayyatzadeh, 2020). Understanding COVID-19 patients' use of therapies and organic supplements during their recovery time is critical to Bangladeshi health promotion, information equity, and pandemic-related health policy.

In theory, non-pharmacological treatments, including therapies and complementary medicine use, relate to a person's healthcare-seeking beliefs and behaviors because of availability and a lack of side effects (Hamiduzzaman *et al.,* 2021). In relation to respiratory diseases, particularly in the COVID-19 pandemic, non-pharmacological measures including physical distancing, personal hygiene, and ventilation have been widely used. The available knowledge of COVID-19 symptoms was encouraged many patients, especially those whose symptoms did not progress to a critical condition, to rely on self-care practices at home that were informed by previous respiratory infections patients had experienced (Khalili *et al.,* 2020). This is particularly true for the patients living in low-income countries such as Bangladesh, that has exacerbating factors of poverty, high rates of self-medication, widespread health illiteracy, and lack of access to healthcare services remains (Hamiduzzaman *et al.,* 2018). It is possible that the COVID-19 patients in Bangladesh are at greater risk of cross-infections and progressing to severe conditions, even death, because of a lack of evidence-based non-pharmacological practices. Despite the insightful appeal, the types of non-pharmacological therapies and organic treatments and their associated effects on the COVID-19 patients remain unexplored.

Several non-pharmacological interventions have been studied in the field of medicine and public health, mainly to provide personal protection and mitigate the spread of COVID-19 (Alvi *et al.,* 2020; Pereira *et al.,* 2021; Odusanya *et al.,* 2020; Chowdhury *et al.,* 2020). These measures include physical distance, washing hands with soap and water, using masks, cleaning with 70% alcohol (Alvi *et al.,* 2020). In addition, non-pharmacological treatments, related to supportive therapies, e.g., oxygenation, have been identified as useful (Pereira *et al.,* 2021). Therapeutic elements and behavioral precautions such as hand hygiene with alcohol-based hand rub are widely used globally as one of the most effective, simple, and low-cost procedures against COVID-19 cross-transmission (WHO, 2020). As the evidence is scant, investigating the relationships of the patients' demographics with their likelihood of using therapeutic and organic treatmentsmay inform a non-pharmacological treatment plan for COVID-19 patients.

Like many other diseases, according to the literature, the recovery time from COVID-19 depends on both patients' demography and disease management (Wu *et al.,* 2020; Bi *et al.,* 2020). Earlier investigations evidenced a range of COVID-19 recovery time of 11.5 ± 5.7 days (Lechien *et al.,* 2020) to 20 and 21 days (Bi *et al.,* 2020; Yu *et al.,* 2020). The variation of COVID-19 recovery time was found to be associated with age, sex, baseline severity, comorbidity, and time of onset of treatment (Wu *et al.,* 2020; Bi *et al.,* 2020). Home-based therapeutic and organic treatment is an

important aspect to be considered to understand the episode of care and healing of COVID-19 patients. However, studies are limited on the association between the COVID-19 patients' use of home-based therapies and organic treatments and recovery time.

Materials and methods

Study design and participants selection

A cross-sectional survey was undertaken among 267 patients who were infected with COVID-19 and recovered from October to December 2021. As we all know, physical distancing is the best way of prevention COVID-19, therefore, this data was collected through a telephone call with the study population.

Initially, we contacted (over the telephone or in-person) the authorized person of different COVID-19 test centers located at Dhaka, Barishal, and Chattogram divisions of Bangladesh and explained the purposes and implications of the expected study outcomes. They provided us with a list of enrolled individuals who did a test for COVID-19 in their centers. The lists contained individual information including name, contact number, COVID-19 tested result and household location. We accumulated a total number of 1,011 individual information (both COVID-19 positive and negative reported individuals), and then the list was screened for only COVID-19 positive cases, resulting in 309 infected persons. Thereafter, we reached those patients through phone call and assessed their eligibility against the participant selection criteria. The following inclusion criteria were applied: (i) being Bangladeshi by birth, (ii) patients who had positive results of reverse transcriptase-polymerase chain reaction (RTPCR) as well as those patients who had recovered, and (iii) free from hearing difficulties. Forty-two infected persons were excluded for differing reasons including they were uncontract able via telephone, were not interested in participating, or were occupied with other commitments. We concluded with a final sample of 267 participants for this study.

Data collection procedures

Before data collection, the research protocol was reviewed and approved by the Research Ethics Committee (REC) of the Department of Food Microbiology, Patuakhali Science and Technology University, Bangladesh (approval number: FMB:22/04/2021:024). Permission letters from the participatingCOVID-19 test centers were also sought. The data collectors clarified the study objectives to the participants and asked for their consent in their voluntary participation in the study. In the case of participants aged below 18 years, interviewers spoke with their legal guardians and sought informed consent for the participation of their child in the study. If the legal guardians were absent at that time, an effort was made to call back at an appropriate time to reach them. We assured confidentiality and anonymity of the participants and obtained verbal consent from each participant before beginning survey data collection.

We collected data through a pre-tested structured questionnaire. The questionnaire was developed in English after reviewing evidence-based literatures (Wu *et al.,* 2020; Long *et al.,* 2020) and by speaking with academics of relevant subject matter. This was then translated into Bengali by a bilingual expert, which was further checked by an independent research staff to avoid any bias and inconsistency in the questionnaire. The translated-version of questionnaire was used during the interviews for ease of communication between interviewers and respondents. The questionnaire was piloted among a small group of persons who had recovered from COVID-19 (n = 10) that were accessed through the authors' personal networks to clarify any inconvenience, unclear items, and the time required to complete the survey. During pre-testing of the questionnaire, 99% of respondents (i.e., 9 out of 10 respondents) responded correctly, indicating there was no difficulty in understanding the questionnaire. The piloted samples were not included in this final study. Each survey took about 10-15 minutes to complete.

Study variables and measures

The survey tool consisted of 50 questions (close- and open-ended), involving four sub-sections: (i) sociodemographic characteristics (14 items); (ii) clinical symptoms and drug-related information (12

items); and (iii) therapeutic, organic treatments against COVID-19 (16 items) and (iv) health seeking and food security (12 items). The Cronbach's alpha of the questionnaire was 0.71, which indicates an acceptable internal consistency (Taber, 2018).

The first part of the questionnaire asked about the participants' age, gender, occupation, educational status, location of residence, religion, family member, household monthly income, history of chronic diseases, smoking status, alcohol consumption, etc. The subsequent section included COVID-19 related information of respondents such as; date of COVID-19 detection, recovery time, clinical symptoms, types of treatment, and possible source of infection.

The final section in the questionnaire comprised the information of therapeutic and organic treatments during the recovery time from COVID-19 including food intake, the consumption of vitamin-C rich food, the consumption of black cumin, tea, hot water, and inhaling hot water vapor. Moreover, the questionnaire contained information regarding preventive practices such as; the room condition where the patient was treated, whether the patient shared a bathroom, toilet, movement spaces, and kitchen with other household members, whether the patient used masks, gloves, or hand sanitizer, disinfected food items after shopping, and whether the patient observed hand hygiene practices in food preparation.

The dependent variable of this study was "recovery time of COVID-19". The recovery time was estimated in days. The recovery time was defined as the intermediate time when the patient was diagnosed positive for COVID-19 until testing negative (Tolossa *et al.,* 2021). The time of recovery from COVID-19 was assessed by the following question: "How many days did you require to recover from COVID-19?"

Statistical analysis

Descriptive statistics such as frequencies, percentages, mean and standard deviation were computed to the variable of interests. Independent samplet-test (if the independent variables had two categories) and one-way analysis of variance (ANOVA) (if the independent variables had more than two categories) tests were employed to assess the mean differences of recovery days with different subgroups. A correlation analysis was applied for the significance of parameters of recovery days with all other discrete and continuous variables by using Pearson's and Spearmen correlation, respectively. P-values less than 0.05 were considered statistically significant. All analysis was performed by using Statistical Package for the Social Sciences (SPSS) software version 23.0.

Results

Demographics and COVID-19 symptoms in participants

Out of 267 participants, more than two-thirds (69.8%) were male and the average age was 36.4 (SD = 13.16). 23.9% of participants had completed a graduate degree. Approximately 60% of the participants monthly income was between 15,000BDT ($178.5) to 40,000BDT ($476.2) [i.e., BDT =Bangladeshi taka]. The majority of participants (85.0%) had received the Bacillus Calmette–Guerin (BCG) vaccine against tuberculosis. Only 10% of the respondents had smoking habits. Nearly one-third (28.8%) of the participants had different chronic diseases (such as diabetes, high blood pressure, and asthma). One-third (34.1%) of the participants did not know their source of infection and 22.1% of participants assumed hospital as a source of infection (Table 1).

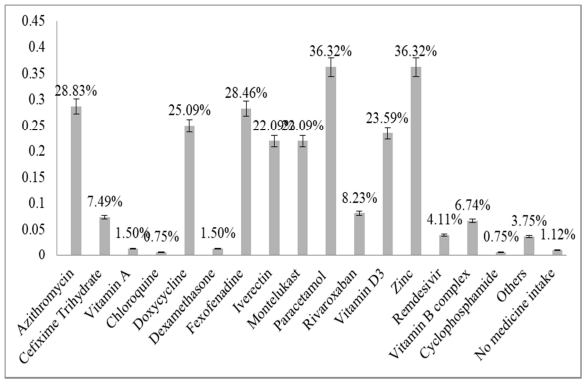

Fig. 1. Commonly used therapeutic treatments for COVID-19 infection

Table 1. Socio-demographic and other characteristics of COVID-19 patients in Bangladesh

Characteristics	Categories	Frequency (%)	Recovery days (mean ±SD)	*p*-value
Age (years)	≤ 10	7 (2.62)	13.57±3.74	0.001
	11-20	22 (8.24)	15.77±2.43	
	21-40	148 (55.43)	17.26±3.51	
	41-50	50 (18.73)	18.12± 4.41	
	51-60	31 (11.61)	19.10±4.54	
	> 60	9 (3.37)	16.11±4.48	
Sex	Male	183 (68.5)	17.22± 3.34	0.336
	Female	84 (31.5)	17.71± 4.75	
Occupation	Unemployment	5 (1.9)	14.10± 0.55	0.040
	House wife	26 (9.7)	16.96±4.57	
	Govt. Job	115 (43.1)	15.50±3.71	
	Private Job	48 (18.0)	18.08±4.67	
	Businessman	12 (4.5)	16.83±2.79	
	Health worker	27 (10.1)	18.67±2.59	
	Student	31 (11.6)	15.88±3.75	
Education	Secondary	42 (15.7)	16.41±3.90	0.232
	Higher Secondary	71 (26.6)	17.55±3.83	
	Bachelors	79 (29.6)	17.89±4.15	
	Post-graduate	73 (27.3)	17.23±3.65	
Living area	Rural	57 (21.3)	17.44±4.00	0.889
	Urban area	210 (78.7)	17.36±3.88	
Religion	Muslim	244 (91.4)	17.34±3.93	0.815
	Hindu	20 (7.5)	17.85±3.84	
	Buddhist	3 (1.1)	16.67±1.15	
Family member	<5	196(73.4)	17.24±4.07	0.349
	>5	71(26.6)	17.75±3.37	
Family income	<40000	160 (59.9)	17.22±4.19	0.246
	>40000	107 (40.1)	17.61±3.41	
Taken BCG vaccine	Yes	227(85.0)	17.43±3.60	0.569
	No	40 (15.0)	17.05±5.33	
Smoker	Yes	29 (10.9)	18.03±5.58	0.335
	No	238 (89.1)	17.29±3.65	
Drank alcohol	Yes	1(0.4)	14.00±00	0.387
	No	266 (99.0)	17.39±3.90	
Treatment taken from	Hospital	65 (24.3)	18.09±0.31	0.596
	Home	202 (75.7)	17.18±0.65	
Chronic disease	Yes	77 (28.8)	18.53±5.07	0.002
	No	190 (71.2)	16.91±3.20	
Other family member affected by COVID-19	Yes	116 (43.4)	16.80±3.52	0.035
	No	151 (56.6)	17.81±4.12	
Treatment taken at	Hospital	65 (24.3)	17.63±4.14	0.574
	Home	202 (75.7)	17.32±3.83	
Source of Infection	Family	45 (16.9)	17.65±3.97	0.778
	Hospital	59 (22.1)	18.44±3.50	
	Market	13 (4.9)	17.99±4.95	
	Transport	7 (2.6)	17.12±4.03	
	Unknown	91 (34.1)	17.99±2.97	
	Workplace	52 (19.5)	18.18±3.62	

The most reported clinical symptoms were fever (48.7%), followed by cough (19.1%), loss of taste (18.7%), loss of smell (17.6%), muscle pain (16.9%), diarrhea (10.5%), and breathlessness (10.5%). However, approximately twelve percent (11.2%) of the participants reported they were asymptomatic. In terms of medications, Paracetamol and Zinc were the highest (36.32%) in intake, followed by Azithromycin (28.83%), Fexofenadine (28.46%), Iverectin and Montelukast (22.09%), and Remdesivir (4.11%). Only 3 participants (1.12%) did not take any medicine (Fig. 1).

Support therapies and organic treatments

Majority of the (79.77%) of the patients consumed more high protein-based diet and vegetables during the recovery period than normal times.

Consuming vitamin-C dense food and fruits was common in the participants (99.6%). The participants further demonstrated a common practice of consuming black cumin seed (87.3%) (Table 2). Frequent intake of spiced tea (93.3%) was prevalent, and the types of spiced tea intake included: ginger tea (32.2%), clove tea (13.9%), cinnamon tea (12.4%) and lemon tea (12.4%) (Fig. 2). About 99% of the participants consumed hot water as a remedy. Many participants (87.3%) inhaled hot water vapor, including garlic-water vapor (24.7%), ginger-water vapor (19.5%), and menthol-water vapor (12.7%) (Fig. 2). More than two-thirds (68.5%) of participants were isolated in a single room with well-ventilated conditions. Only 12% of participants had to share their bathroom, toilet, and kitchen whilst at the hospital. Wearing masks (95.5%) and hand sanitization (87.6%) were mostly used preventative strategies at mitigating the spread of COVID-19 (Table 2).

Table 2. Supportive and preventive practices of COVID-19 patients in Bangladesh (N = 267)

Characteristics	Categories	Frequency (%)	Recovery days (mean ±SD)	*p*-value
Food intake during recovery period	Intake more high protein-based diet and vegetables than normal times	213 (79.77)	16.81±2.25	0.145
	Intake more carbohydrates and vegetables than normal times	8 (3.00)	17.48±1.91	
	Intake more liquid food (vegetables soup, chicken soup or others) than normal times	35 (13.10)	17.78±2.64	
	Intake regular food	27 (10.11)	18.11±0.12	
Intake food that contains vitamin C	Yes	266 (99.6)	17.38±3.90	0.238
	No	1 (.4)	22.00±00.	
Undertake daily physical exercise	Yes	147 (55.1)	17.56±3.57	0.448
	No	119 (44.6)	17.19±4.29	
Type of exercise	Physical	68 (25.5)	17.12±4.03	0.311
	Breathing	68 (25.5)	17.99±2.97	
	Both	11 (4.1)	18.18±3.62	
Consumption of black cumin seed	Yes	233 (87.3)	17.33±3.92	0.523
	No	34 (12.7)	17.79±3.85	
Drinking spice tea	Yes	249 (93.3)	17.43±3.91	0.572
	No	18 (6.7)	16.89±3.86	
Drinking hot water	Yes	264 (98.9)	17.42±3.92	0.360
	No	3 (1.1)	15.33±2.30	
Inhalation of hot water vapor	Yes	233 (87.3)	17.65±3.99	0.004
	No	34 (12.7)	15.62±2.73	
Room condition	Single room with well-ventilated	183 (68.5)	17.37±3.87	0.867
	Room share with other person	84 (31.5)	17.45±3.99	
Share bathroom, toilet, kitchen at home	Yes	52 (19.5)	16.69±4.46	0.867
	No	131 (49.1)	17.79±4.12	
	Sometimes	32 (12.0	17.47±3.07	
Share bathroom, toilet, kitchen at hospital	Yes	42 (15.7)	18.81±4.15	0.022
	No	79 (29.6)	16.86±4.74	
	Sometimes	18 (6.7)	15.83±2.77	
Use of masks	Yes	255 (95.5)	17.40±3.83	0.477
	No	2 (.7)	14.00±.00	
	Sometimes	10 (3.7)	17.80±5.77	
Use of gloves	Yes	103 (38.6)	17.64±3.68	0.614
	No	138 (51.7)	17.31±4.16	
	Sometimes	26 (9.7)	16.85±3.41	
Use of hand sanitizer	Yes	234 (87.6)	17.56±3.92	0.195
	No	5 (1.9)	16.40±6.54	
	Sometimes	28 (10.5)	16.21±3.09	

Recovery days and associated factors

The mean days of recovery from COVID-19 were 17.39 (SD ±3.91).Recovery days significantly varied by age (p = 0.001), occupation (p= 0.040), chronic disease (p =0.002), other family member affected by COVID-19 (p = 0.035), intake of hot water vapor (p =0.004) and whether the participant shared a bathroom, toilet and kitchen at hospital (p =0.022) (Table 1 & 2).

Table 3. Correlation matrix of days required for recovery and other covariates

	Recovery days	Age	Chronic disease	Physical exercise	Hot water Vapor inhalation	Use of gloves	Hand sanitizer
Recovery days	1						
Age	0.22***	1					
Chronic disease	-0.15*	-0.40***	1				
Physical exercise	-0.11	-0.1	0.08	1			
Hot water vapor	-0.21***	-0.14*	0.07	0.18**	1		
Gloves use	-0.13*	-0.05	0.05	0.16*	0.06	1	
Hand Sanitizer use	0.14*	0.04	-0.04	0.13*	0.05	0.32***	1

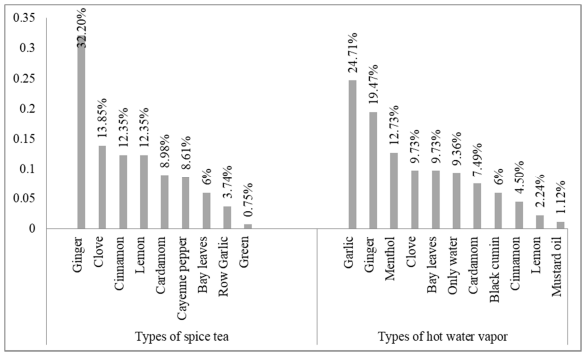

Fig. 2. Commonly used organic treatments for COVID-19 infection

Table 3 represents the correlation of the recovery days with some selected independent variables. It was observed that respondents' age (r = 0.22) was positively correlated with their recovery days from the COVID-19. However, the participants' recovery time had a negative correlation withthe pre-existing chronic diseases (r = -0.15), the inhalation of hot water vapor (r = -0.21), the wearing of gloves (r = -0.13), and use of hand sanitizer (r = -0.14) (Table 3).

Discussion

The present cross-sectional study found the mean time required for recovery from COVID-19 was 17.39 days. Numerous studies found variation in their observation. Two other single-center Chinese studies (comprising of 127 and 225 recovered patients) reported the mean recovery time or median time of 20 days and 21 days respectively (Bi *et al.,* 2020; Yu *et al.,* 2020). An Indian pilot study reported that the average recovery time of COVID-19 patients in India is 25 days (Barman *et al.,* 2020). However, the average recovery time in studies conducted in other jurisdictions was lower, the average time of recovery recorded to be between 13.24 to 14.81 days based on age or sex of patients in Israel (Voinsky *et al.,* 2020), Singapore (12 days) (Ki *et al.,* 2020), and Shanghai (11 days) (Ahmed *et al.,* 2020). The discrepancy between studies might be attributed to the differences in disease severity, sample size, study setting, socioeconomic conditions, and type of specimen for testing.

In this study, we found a significant association between age of the study participants and time of recovery. Some studies reported old age was independently associated with delayed clearance of SARS-COV-2 (Kimball *et al.,* 2020; Wang *et al.,* 2020). This delay can be related to the degeneration of physiological functions and low immune status among older adults. An older adult diagnosed with COVID-19 has poor clinical outcomes because T-cell numbers and functions are compromised with aging, resulting in less control of viral replication (Fulop *et al.,* 2013). Moreover, older patients are more likely to exhibit severe comorbidity than younger adults (Voinsky *et al.,* 2020; Mungroo *et al.,* 2020; Beigel *et al.,* 2020). Our study further revealed that the SARS-CoV-2 viral clearance was more likely to be delayed among COVID-19 patients with comorbidity compared to those without comorbidity. Several studies (Wang *et al.,* 2020; Sheahan *et al.,* 2020) also reported that comorbidity was an independent risk factor that can delay viral clearances while other studies (Khayyatzadeh, 2020; Kimball *et al.,* 2020; Nasir *et al.,* 2020) reported no significant association between comorbidity and viral clearance. There may be differences due to the nature of treatment for comorbidities and/or whether patients had been compliant with treatment regimens or not.

Comorbidity is of particular concern for persons living in Bangladesh. About 29% of COVID-19 recovered cases had comorbidities such as diabetes

mellitus, cardiovascular disease, hypertension, asthma, and other conditions (Amin *et al.,* 2021). Diabetes is the most frequently observed comorbidity in COVID-19 patients. According to the present study, the prevalence of diabetes in COVID-19 recovered patients was 9.73%, which is higher than studies conducted in China (7.3%) (Wu and McGoogan, 2020). Zhou *et al.* (2020) reported that hypertension was the most common comorbidity followed by diabetes and coronary heart diseases among Chinese COVID-19 patients. Chudasama *et al.* (2020) found asthma as comorbidity at a rate of 7% in the United Kingdom which supports the present study. This finding differs from the results of the previous meta-analyses conducted in different studies which found that the association between diabetes and severe COVID-19 was non-significant (Güler and Öztürk, 2020). Regardless, the present study's findings suggest that all of the comorbidities mentioned above should be taken into account when predicting the prognosis in patients with COVID-19, and better protection should be given to the high-risk patients upon diagnosis.

The current study found a negative correlation between the inhalation of hot water vapor and COVID-19 recovery time which is opposed to a previous study (Pani *et al.,* 2020). Incongruously, Pani *et al.* (2020) found water vapor showed a positive significant correlation with COVID-19 in Singapore. Enveloped viruses can remain active for long periods in low temperatures, and their lipid envelopes are destroyed by temperature which is intolerable to humans. The heat sensitivity of viruses is used routinely to deactivate viruses within vaccines, and temperatures of 55 to 65°C for 15 to 30 minutes are reported to deactivate a range of enveloped viruses, including coronaviruses (Hu *et al.,* 2020).In contrast, studies have shown that there is no additional symptomatic relief from the use of steam inhalation therapy to treat the common cold (Singh *et al.,* 2017).

There is a negative correlation between gloves use and COVID-19 recovery time. Gloves can be used to prevent infection with proper techniques (Verbeek *et al.,* 2018). There remains neither any clinical evidence accepting nor refuting the benefit of glove-wearing among the public concerning the COVID-19 pandemic nor any anecdotal evidence to support the benefit of glove use outside a medical setting.

In the present study, hand sanitization was significantly associated with the COVID-19 recovery days (Banik *et al.,* 2021) also found about 75.2% of patients always washed their hands with soap or hand sanitizer during the COVID-19 pandemic which was remarkably similar to findings of other studies (Al-Hanawi *et al.,* 2020), except one study in Thailand which found 54.8% of people did not regularly use soap in hand wash (Srichan *et al.,* 2020). Kundu *et al.* (2021) reported that to avoid COVID-19, 96.6% of participants wore masks outside the home, and 98.7% washed their hands with soap when they returned home. Like other coronaviruses, SARS-CoV-2 has a lipid envelope, thus proper hand-washing with soap can break apart that lipid envelope and therefore makes it difficult for the virus to survive (Cohen, 2020). So far, hand wash has been identified as one of the most effective preventative measures. The present authors observed that 95.5% of participants used masks when going outside the home. A similar number of patients were recorded doing so, Cowling *et al.* (2020) noting that 97.5% of the general adult population wore masks when going out. Likewise, Banik *et al.* (2021) found that about 90% of participants respond positively to wearing masks when going outside the home. Rahman and Sathi (2020) found knowledge about COVID-19 has a direct association with wearing a mask when going outside and staying home. Human perceptions were closely associated with the community initiative, where the government and the health system of Bangladesh should focus more to strengthen community actions.

This study has several limitations. First, the sample was relatively small. Additionally, such methods require direct interaction between patients and researchers and are thus impractical for patients who are isolated at home or in hospital.

Moreover, this study used telephone calls with a convenience sample. As a result, there is a possibility of bias as we were not able to cover all classes of the population in the study. Besides, therapeutic practices and organic treatments might differ from one participant to another, which may potentially skew the results.

Conclusion

COVID-19 pandemic constitutes an unprecedented challenge to global public health. On the whole, persons who practiced home-based therapeutics and organic treatments had the shortest time to recover from COVID-19. In this setting, inhalation of hot water vapor, use of gloves, and hand sanitizer were found to be associated with the number of days required for recovery from COVID-19. Importantly, home-based remedies are inexpensive and can be easily implemented on a community-wide scale without any side effects. Nevertheless, all home-based therapy was not effective. In addition, preclinical and clinical trial evaluations of these therapeutics and organic agents for COVID-19 have not specifically been conducted, so further study should be carried out to evaluate the effectiveness and safety of the therapeutics and organic treatments on larger sample sizes.

References

Ahmed I, Hasan M, Akter R, Sarkar BK, Rahman M, Sarker MS, Samad MA. 2020. Behavioral preventive measures and the use of medicines and herbal products among the public in response to Covid-19 in Bangladesh: A cross-sectional study. PloS One **15(12),** e0243706.

Al-Hanawi MK, Angawi K, Alshareef N, Qattan AMN, Helmy HZ, Abudawood Y, Chirwa GC. 2020. Knowledge, Attitude and Practice Toward COVID-19 Among the Public in the Kingdom of Saudi Arabia: A Cross-Sectional Study. Frontiers in Public Health **8.**

Alvi MM, Sivasankaran S, Singh M. 2020. Pharmacological and non-pharmacological efforts at prevention, mitigation, and treatment for COVID-19. Journal of Drug Targeting **28(7–8),** 742–754.

Amin MT, Hasan M, Bhuiya NM. 2021. Prevalence of Covid-19 Associated Symptoms, Their Onset and Duration, and Variations Among Different Groups of Patients in Bangladesh. Frontiers in Public Health, **1417.**

Azam MNK, Al Mahamud R, Hasan A, Jahan R, Rahmatullah M. 2020. Some home remedies used for treatment of COVID-19 in Bangladesh. Journal of Medicinal Plants Studies **8(4),** 27-32.

Banik R, Rahman M, Sikder MT, Rahman QM, Pranta MUR. 2021. Knowledge, attitudes, and practices related to the COVID-19 pandemic among Bangladeshi youth: A web-based cross-sectional analysis. Journal of Public Health, 1–11.

Barman MP, Rahman T, Bora K, Borgohain C. 2020. COVID-19 pandemic and its recovery time of patients in India: A pilot study. Diabetes & Metabolic Syndrome: Clinical Research & Reviews **14(5)**, 1205-1211.

Beigel JH, Tomashek KM, Dodd LE, Mehta AK, Zingman BS, Kalil AC, Kline S. 2020. Remdesivir for the treatment of Covid-19 preliminary report. New England Journal of Medicine.

Belhaj S, Zidane L. 2021. Medicinal plants used to boost immunity and decrease the intensity of infection caused by SARS-COV-2 in Morocco. Ethnobot Res Appl **21,** 1–17.

Bi Q, Wu Y, Mei S, Ye C, Zou X, Zhang Z, Zhang T. 2020. Epidemiology and transmission of COVID-19 in 391 cases and 1286 of their close contacts in Shenzhen, China: A retrospective cohort study. The Lancet Infectious Diseases **20(8)**, 911–919.

CDC. 2021. Interim Clinical Guidance for Management of Patients with Confirmed Coronavirus Disease (COVID-19). Retrieved from https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-guidance-management-patients.html

Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, Wei Y. 2020. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: A descriptive study. The Lancet **395(10223)**, 507–513.

Chowdhury R, Luhar S, Khan N, Choudhury SR, Matin I, Franco OH. 2020. Long-term strategies to control COVID-19 in low and middle-income countries: An options overview of community-based, non-pharmacological interventions. European Journal of Epidemiology **35(8),** 743–748.

Chudasama YV, Gillies CL, Zaccardi F, Coles B, Davies MJ, Seidu S, Khunti K. 2020. Impact of COVID-19 on routine care for chronic diseases: A global survey of views from healthcare professionals. Diabetes & Metabolic Syndrome: Clinical Research & Reviews **14(5),** 965–967.

Ciprandi G, Aragona SE. 2020. Non-pharmacological remedies for upper respiratory diseases in the pandemic COVID-19 era. Journal of Biological Regulators and Homeostatic Agents **34(6 Suppl. 1),** 41–49.

Cohen M. 2020. Turning up the heat on COVID-19: heat as a therapeutic intervention. F1000Research **9,** 292. https://doi.org/10.12688/f1000research.23299.2

Cowling BJ, Ali ST, Ng TWY, Tsang TK, Li JCM, Fong MW, Chiu SS. 2020. Impact assessment of non-pharmaceutical interventions against coronavirus disease 2019 and influenza in Hong Kong: an observational study. The Lancet Public Health **5(5),** e279–e288.

Di Matteo G, Spano M, Grosso M, Salvo **A,** Ingallina **C,** Russo **M,** Ritieni **A,** Mannina L. 2020. Food and COVID-19: preventive/co-therapeutic strategies explored by current clinical trials and in silico studies. Foods **9**, 1036.

Fulop T, Larbi A, Pawelec G. 2013. Human T cell aging and the impact of persistent viral infections. Frontiers in Immunology **4,** 271.

Güler AA, Öztürk MA. 2020. COVID-19 in chronic diseases. Gazi Med. J., 266–270.

Hamiduzzaman M, De Bellis A, Abigail W, Kalaitzidis E, Harrington A. 2021. The World Is Not Mine-Barriers to Healthcare Access for Bangladeshi Rural Elderly Women. Journal of Cross-Cultural Gerontology **36(1),** 69–89.

Hamiduzzaman M, De Bellis A, Abigail W, Kalaitzidis E. 2018. Elderly women in rural Bangladesh: Healthcare access and ageing trends. South Asia Research **38(2),** 113–129.

Hamiduzzaman M, Islam MR. 2020. Save life or livelihood: Responses to COVID-19 among South-Asian poor communities. Local Development & Society **1(2),** 177–189.

Hu Y, Sun J, Dai Z, Deng H, Li X, Huang Q, Xu Y. 2020. Prevalence and severity of corona virus disease 2019 (COVID-19): A systematic review and meta-analysis. Journal of Clinical Virology **127**, 104371.

IEDCR. (2021). Coronavirus COVID-19 Dashboard, 2020. Retrieved from http://dashboard.dghs.gov.bd/webportal/pages/covid19.php

Khalili M, Chegeni M, Javadi S, et al. 2020. Therapeutic interventions for COVID-19: A living overview of reviews. Ther Adv Respir Dis **14,** 1753466620976021.

Khayyatzadeh SS. 2020. Nutrition and Infection with COVID-19. Journal of Nutrition and Food Security **5(2),** 93-96.

Ki M, Nco VT. 2020. Epidemiologic characteristics of early cases with 2019 novel coronavirus (2019-nCoV) disease in Republic of Korea. Epidemiol. Health **42**, e2020007.

Kimball A, Hatfield KM, Arons M, James A, Taylor J, Spicer K, Chisty Z. 2020. Asymptomatic and presymptomatic SARS-CoV-2 infections in residents of a long-term care skilled nursing facility-King County, Washington, March 2020. Morbidity and Mortality Weekly Report **69(13),** 377.

Kundu S, Al Banna M, Sayeed A, Begum MR, Brazendale K, Hasan MT, Chowdhury S. 2021. Knowledge, attitudes, and preventive practices toward the COVID-19 pandemic: an online survey among Bangladeshi residents. Journal of Public Health 1-15.

Lechien JR, Chiesa-Estomba CM, Place S, Van Laethem Y, Cabaraux P, Mat Q, Hans S. 2020. Clinical and epidemiological characteristics of 1420 European patients with mild-to-moderate coronavirus disease 2019. Journal of Internal Medicine **288(3),** 335–344.

Long KQ, Hanh HH, Hanh TTT, 2020. Treatment for COVID-19 patients in Vietnam: Analysis of time-to-recovery. Asian Pac. J. Trop Med. **13,** 397. DOI: 10.4103/1995-7645.289505

Mungroo MR, Khan NA and Siddiqui R. 2020. Novel coronavirus: Current understanding of clinical features, diagnosis, pathogenesis and treatment options. Pathogens **9(4),** 297.

Nasir M, Chowdhury A and Zahan T. 2020. Self-medication during COVID-19 outbreak: A cross sectional online survey in Dhaka city. Int J Basic Clin Pharmacol **9(9),** 1325–1330.

Nuertey BD, Addai J, Kyei-Bafour P, 2022. Home-Based Remedies to Prevent COVID-19-Associated Risk of Infection, Admission, Severe Disease and Death: A Nested Case-Control Study. Evidence-Based Complement Altern Med **9.** https://doi.org/10.1155/2022/4559897

Odusanya OO, Odugbemi BA, Odugbemi TO, Ajisegiri WS. 2020. COVID-19: A review of the effectiveness of non-pharmacological interventions. Nigerian Postgraduate Medical Journal **27(4),** 261.

Pani SK, Lin N-H and RavindraBabu S. 2020. Association of COVID-19 pandemic with meteorological parameters over Singapore. Science of The Total Environment **740,** 140112.

Pereira AA, De Oliveira Andrade A, De Andrade Palis A, Cabral AM, Barreto CGL, De Souza DB, Guimarães JFV. 2021. Non-pharmacological treatments for COVID-19: Current status and consensus. Research on Biomedical Engineering 1-16.

Rabby MII. 2020. Current drugs with potential for treatment of COVID-19: A literature review: Drugs for the treatment process of COVID-19. Journal of Pharmacy & Pharmaceutical Sciences **23,** 58–64.

Rahman A, Sathi NJ. 2020. Knowledge, Attitude, and Preventive Practices toward COVID-19 among Bangladeshi Internet Users. Electronic Journal of General Medicine **17(5).**

Rahman MM, Bhattacharjee B, Farhana Z, Hamiduzzaman M, Chowdhury MAB, Hossain MS, Uddin MJ. 2021. Age-related risk factors and severity of SARS-CoV-2 infection: A systematic review and meta-analysis. Journal of Preventive Medicine and Hygiene **62(2),** E329.

Sheahan TP, Sims AC, Leist SR, Schäfer A, Won J, Brown AJ, Clarke MO. 2020. Comparative therapeutic efficacy of remdesivir and combination lopinavir, ritonavir and interferon beta against MERS-CoV. Nature Communications **11(1),** 1–14.

Singh M, Singh M, Jaiswal N, Chauhan A. 2017. Heated, humidified air for the common cold. Cochrane Database of Systematic Reviews **8.**

Srichan P, Apidechkul T, Tamornpark R, Yeemard F, Khunthason S, Kitchanapaiboon S, Upala P. 2020. Knowledge, attitude and preparedness to respond to the 2019 novel coronavirus (COVID-19) among the bordered population of northern Thailand in the early period of the outbreak: a cross-sectional study. Available at SSRN 3546046.

Taber KS. 2018. The use of Cronbach's alpha when developing and reporting research instruments in science education. Res Sci Educ **48,** 1273–1296. DOI: 10.1007/s11165-016-9602-2

Tolossa T, Wakuma B, Seyoum Gebre D, Merdassa Atomssa E, Getachew M, Fetensa G, Turi E. 2021. Time to recovery from COVID-19 and its predictors among patients admitted to treatment center of Wollega University Referral Hospital (WURH), Western Ethiopia: Survival analysis of retrospective cohort study. Plos One **16(6),** e0252389.

Verbeek J, Ijaz S, Tikka C, Ruotsalainen J, Mäkelä E, Neuvonen K, Mihalache R. 2018. 303 Personal protective equipment for preventing highly infectious diseases due to exposure to contaminated body fluids in healthcare staff. BMJ Publishing Group Ltd.

Voinsky I, Baristaite G, Gurwitz D. 2020. Effects of age and sex on recovery from COVID-19: Analysis of 5769 Israeli patients. Journal of Infection **81(2),** e102–e103.

Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, Xiong Y. 2020. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. Jama **323(11),** 1061–1069.

Wang M, Cao R, Zhang L, Yang X, Liu J, Xu M, Xiao G. 2020. Remdesivir and chloroquine effectively inhibit the recently emerged novel coronavirus (2019-nCoV) *in vitro*. Cell Research **30(3),** 269–271.

WHO. 2020. Infection prevention and control during health care when novel coronavirus (nCoV) infections: Is suspected: Interim guidance, 25 January 2020.

Wu J, Li W, Shi X, Chen Z, Jiang B, Liu J, Cui L. 2020. Early antiviral treatment contributes to alleviate the severity and improve the prognosis of patients with novel coronavirus disease (COVID-19). Journal of Internal Medicine **288(1),** 128–138.

Wu Z, McGoogan JM. 2020. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72 314 cases from the Chinese Center for Disease Control and Prevention. Jama **323(13),** 1239–1242.

Yang X, Yu Y, Xu J, Shu H, Liu H, Wu Y, Yu T. 2020. Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single-centered, retrospective, observational study. The Lancet Respiratory Medicine **8(5),** 475–481.

Yu F, Yan L, Wang N, Yang S, Wang L, Tang Y, Xie R. 2020. Quantitative detection and viral load analysis of SARS-CoV-2 in infected patients. Clinical Infectious Diseases **71(15),** 793–798.

Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z, Gu X. 2020 Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: A retrospective cohort study. Lancet **395,** 1054–62. https://doi.org/10.1016/S0140-6736(20)30566-3