

Impact of Home-Based Self-Isolation Abiding on Outcome of COVID-19 Patients: An Exploratory Study in Egypt

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ABSTRACT

Background: The ongoing Coronavirus Disease 19 (COVID-19) pandemic has caused an increased burden on healthcare organizations and public health resources.

Objective: This study aimed to examine the potential impact of home-based self-isolation on health-related outcomes of patients suffering from COVID-19, to assess patients' and household contacts' compliance to physicians' instructions while isolated at home, and to explore predictors affecting home-based self-isolation compliance.

Methods: A cross-sectional analytical study of 393 mild/moderate adult cases of COVID-19 patients referred to home isolation by Cairo University Hospital through the period from June 1st to September 30, 2020.

Results: The proportion of patients admitted to the hospital while isolated at home was 76 (19.3%). When examining the factors contributing to hospital admission among the home isolation instructions measures, we found that 74.5% of those who abide by the home isolation rules were not hospitalized compared to 25.5% hospitalized (P-value<0.001; OR= 11.8; 95% CI: 3.65–38.59). The infection rate among household contacts while patients isolated at home was 38.42%. About 66.8% of those who abided by the home isolation instructions did not infect contacts compared to 33.2% who got infection (P-value=0.001; OR= 2.207; 95% CI: 1.404–4.807). Significant predictors for compliance with home-based isolation instructions were the presence of hypertension, previous hospitalization, and absence of chronic liver diseases.

Conclusion: Compliance with isolation instructions and conforming to infection and control procedures are important factors to decrease hospital visits and infection rates among household contacts.

Keywords: COVID-19, Home isolation, Outcome, Egypt, Impact, Feasibility, Follow-up.

INTRODUCTION

Coronavirus disease-2019 (COVID-19) is an infectious disease of pandemic proportions, with more than 85,000,000 cases and approximately 1,800,000 deaths reported worldwide as of January 3, 2021 ⁽¹⁾.

COVID-19 is a public health emergency of international concern ⁽²⁾, and as such, it requires coordinated, protective responses from national and supranational entities around the world. The absence of specific preventive or therapeutic medical interventions for COVID-19 infection, alongside its rapid transmission rate and apparently substantial undocumented contamination and transmission numbers, has led to the scientifically sound recommendation that individuals must stay home to avoid social interactions and restrain the disease spread, thereby reducing pressure on health systems worldwide. Therefore, physical distancing, intensive contact tracing, and case isolation remain frontline measures in controlling the spread of COVID-19 infection ⁽³⁾.

In Egypt, with a population of over 100 million, since most cases of COVID-19 are mild ⁽⁴⁾ and health care

resources limited, home-based self-isolation is a key public health strategy to curb the spread of the pandemic under the country's coronavirus treatment protocol, mild and moderate COVID-19 patients are treated at home or at the university hostels, to free up beds for critical cases at isolation hospitals. The total number of home-isolating coronavirus patients in Egypt has so far reached 10,168 cases since the health ministry launched its program for non-hospitalized cases in July 2020 ⁽⁵⁾.

Home-based self-isolation, however, has several important limitations. For one, home-based isolation is not effective in preventing transmissions within households. In China, before the implementation of facility-based isolation, more than half of COVID-19 patients had at least one family member with the disease, and 75-80% of all clustered infections occurred within families ^(6,7). In New York City, 66% of COVID-19 cases were people who had stayed in their homes ⁽⁸⁾, suggesting high rates of intra-family transmission of COVID-19. Furthermore, it is difficult to achieve high compliance with home-based isolation ⁽⁹⁾.

Studies have shown that home-based isolation decreases non-household contacts of patients by only 10% to 50%⁽¹⁰⁻¹²⁾. A rigorous review concluded that 46–66% of transmission is household-based (using the standard formula for attributable fraction)⁽¹³⁾.

Thus, home-based isolation may fail to effectively prevent both household and non-household transmission of COVID-19.

In this study, we aimed to examine the potential impact of home-based isolation on the outcome of patients suffering from COVID-19 in Egypt, to provide policymakers evidence-based decision-making about the impact of home-based isolation in mitigating the COVID-19 pandemic.

Specific objectives: 1- To measure the proportion of patients admitted to hospital or visited the emergency care setting while isolated at home. 2- To estimate the infection rate among household contacts while patients isolated at home. 3- To determine the proportion of patients with prolonged symptoms while isolated at home. 4- To assess patients' and household contacts' compliance to physicians' instructions while isolated at home. 5- To explore factors affecting home-based isolation abiding and 6- To assess patients' satisfaction regarding follow-up phone calls.

Methods:

Study Design and setting: A cross-sectional analytical study was conducted at Cairo University Hospitals to assess the impact of home-based isolation on the outcome of patients suffering from COVID-19 in Egypt.

Study population: The study was conducted on Egyptian patients suffering from mild to moderate symptoms of COVID-19.

Sample Size and Technique: A total sample of 393 patients diagnosed with COVID-19 who visited Cairo University Hospital seeking treatment from the 1st of June to the 30th of September 2020 were included and were followed-up for 3 months.

Inclusion criteria: All Egyptian patients diagnosed with mild symptoms of COVID-19, visited Cairo University Hospital seeking treatment, giving their cell phone numbers, and agreed to participate in the study, were included.

Exclusion criteria: Patients with severe symptoms not feasible for home isolation, patients refusing to give their cell phone numbers or had no cell phones and patients who couldn't complete the questionnaire, or refusing to complete the questionnaire.

Data Collection Tool:

A structured questionnaire, composed of 35 questions was administered. Questions were presented in the Arabic language. Content and face validity were checked by the authors. The questionnaire was pretested on 20 participants who were later on omitted from the analysis. The internal consistency of the study questionnaire was assessed by calculating the Cronbach alpha (0.812). A group of physicians (40) from different departments at the Faculty of Medicine, Cairo University were assigned to contact the patients and fill in the questionnaire. Each physician was assigned to 10 patients and called them 3 times through the 14-day isolation period from 1st of June to 30th of September 2020.

The questionnaire enclosed the following sections (I) Demographic characters (4 items): age, gender, occupation, phone number.

(II) Different Symptoms of COVID-19 (11 items).

(III) assessment of home based-isolation (14 items): the need for hospital admission or emergency care, satisfaction with phone calls, restriction to home isolation rules, presence of a separate room with good ventilation, presence of own bathroom, or sterilization of a shared bathroom after each use, eating personal items, share eating or sitting with family members, wearing a mask, social distancing at home, using air conditioning or fan, washing hands frequently with every use of tissue for coughing or sneezing, measuring temperature daily, who was helping with food preparation/cleaning, if family members wearing masks and gloves when dealing with him/her and if there were infections among household contacts. The score used for assessment of home-based isolation (14 items): correct responses assigned one point while do not know or incorrect responses received nil. Those who attained ≥ 8 points (out of 14 points, the 60th percentile or average for the score) were assigned as achieving good score, while those who attained < 8 points were assigned as achieving bad score.

Ethical Consideration:

Objectives of the study were explained to the participants, and they were completely free to accept or refuse to participate. Strict confidentiality about participants' data (this was secured by the questionnaire being anonymous) was maintained throughout data collection, entry, and analysis (according to the Helsinki declaration). This study was approved by the Research Ethics Committee, Faculty of Medicine, Cairo University (N- 83- 2020).

Data Analysis

The data were coded and exported on a data sheet prepared on Excel program, version 2013. The statistical package for social science (SPSS version 21) was used for data analysis. Simple descriptive statistics were used for

the summary of quantitative data and frequencies used for qualitative data. The bivariate relationship was displayed in cross-tabulations and a comparison of proportions was performed using the chi-square and Fisher’s exact tests where appropriate.

Independent T-test, one-way ANOVA, and post-hook tests were used to compare normally distributed quantitative data. Pearson correlation was performed to explore correlations between continuous variables. The level of significance was set at probability P-value ≤ 0.05.

RESULTS

A total of 393 COVID-19 patients (43.8% males and 56.2% females) with a mean age of 37.6 ± 12 years, were included in this study. Of the 393 COVID-19 patients, 316 (80.4%) had mild symptoms of COVID-19 while almost 19.6% had moderate ones. About 43.2% were from the medical team members, 14.5% were smokers and the most prevailing co-morbidities were previous treatment, HTN, DM, cardiac diseases, lung diseases, and liver diseases with 15.5%, 11.1%, 8.4%, 4.3%, 3.3%, and 1.6% respectively (**Table 1**).

The proportion of patients admitted to the hospital while isolated at home was 76 (19.3%). When examining the factors contributing to hospital admission among the home isolation instructions measures, we found that 74.5% of those who abided by the home isolation rules were not hospitalized compared to 25.5% that were hospitalized (P-value<0.001; OR= 11.8; 95% CI: 3.65–38.59). Staying in a well ventilated separate room, sterilization of the bathroom after each use, using patient’s own personal utensils for eating, wearing a mask while staying with family members for eating or socializing, talking to others inside the house via mobile phone or with at least two meters’ distance away from them with a mask, lack of air conditioning or a fan, washing hands frequently when using a tissue for coughing or sneezing, measuring temperature daily, presence of someone helping the patient for food preparation and/or cleaning and wearing masks and gloves while helping them, were significantly associated (P-value<0.001) with the absence of hospital admission or visiting emergency care setting (**Table 2**).

The infection rate among household contacts while patients isolated at home was 38.42%. When analysing compliance with home isolation instructions and increased rate of infection among household contacts, we detected that 66.8% of those who abided by the home isolation rules, their contacts weren’t infected compared to 33.2% who got an infection (P-value=0.001; OR= 2.207; 95% CI:1.404–4.807). Staying in a well ventilated separate room (OR= 5.18; 95% CI:2.92–9.17), presence of someone helping the patient for food preparation

and/or cleaning (OR= 2.94; 95% CI:1.79–4.84), wearing masks and gloves while helping them (OR= 3.20; 95% CI:2.08–4.92), using a private bathroom (OR= 2.31; 95% CI:1.48–3.61), were significantly associated (P-value<0.001) with the absence of infection among household contacts (**Table 3**).

Symptoms lasting more than 21 days were determined in 25.19% of the patients while remaining less than 21 days in 74.8% of them. Patients who stayed in a well-ventilated separate room and performed sterilization of the bathroom after each use were 1.5 times less associated to have prolonged symptoms (OR= 1.23; 95% CI:0.65–2.30) (OR= 1.45; 95% CI:0.82–2.59), respectively (**Table 4**).

Patients who achieved a good score regarding abiding with home-based isolation instructions were 73.53%. The significant predictors for the good score were the presence of hypertension, previous hospitalization, and absence of chronic liver diseases (**Table 5**).

Table (1): Demographic and diseases characteristics of the studied sample

Items	N (393)	% (100)
Age (Years) Mean ± SD	37.6±12	
Sex		
Male	172	43.8
Female	221	56.2
Smokers	57	14.5
Medical team member	159	43.2
Comorbidities		
DM	31	8.4
HTN	41	11.1
Cardiac	16	4.3
Lung dis	12	3.3
Liver dis	6	1.6
Others	18	4.9
Previous TTT	57	15.5
Hospitalized	76	19.3
Prolonged duration >=21 days	99	25.2
Severity of symptoms		
Mild	316	80.4
Moderate	77	19.6

Table (2): Relation between home-based isolation abiding and hospital admission/ emergency room visit

		Did you get hospitalized COVID-19 infection?				P-value	OR	95% CI	
		Hospitalized		Not hospitalized				Lower	upper
		N (76)	%(100)	N(317)	%(100)				
1. Did you abide by the home isolation rules?	Yes	73	25.5	213	74.5	<0.001	11.881	3.657	38.595
	No	3	2.8	104	97.2				
2. Did you stay in a well ventilated separate room?	Yes	74	22.8	251	77.2	<0.001	9.729	2.327	40.673
	No	2	2.9	66	97.1				
3. Did you use a separate Private bathroom?	Yes	69	46.9	78	35.1	<0.001	30.203	13.324	68.467
	No	7	2.8	239	97.2				
4. was the bathroom sterilized after each use?	Yes	71	23.4	232	76.6	<0.001	5.203	2.032	13.322
	No	5	5.6	85	94.4				
5. Did you use your own personal utensils for eating?	Yes	72	21.3	266	78.7	0.016	3.451	1.207	9.867
	No	4	7.3	51	92.7				
6. Were you staying with your family members while eating or socializing?	Yes	63	36.8	108	63.2	<0.001	9.378	4.942	17.797
	No	13	5.9	209	94.1				
7. If yes, did you wear a mask?	Yes	62	37.3	104	62.7	<0.001	9.070	4.852	16.955
	No	14	6.2	213	93.8				
8. Did you wear a mask while you were alone in your room?	Yes	66	82.5	14	17.5	<0.001	142.843	60.806	335.561
	No	10	3.2	303	96.8				
9. Were you talking to others inside the house via the mobile phone or with at least two meters' distance away from them with a mask?	Yes	69	30	161	70	<0.001	9.551	4.257	21.428
	No	7	4.3	156	95.7				
10. Did you use air conditioning or a fan?	Yes	65	30	152	10	<0.001	6.414	3.263	12.610
	No	11	6.3	165	93.8				
11. Did you wash your hands frequently when you used a tissue for coughing or sneezing?	Yes	74	21.3	273	78.7	0.005	5.963	1.413	25.173
	No	2	4.3	44	95.7				
12. Did you measure your temperature daily?	Yes	72	27.1	194	72.9	<0.001	11.412	4.067	32.027
	No	4	3.1	123	96.9				
13. Is there anyone helping you with food preparation / cleaning	Yes	17	6.2	258	93.8	<0.001	15.151	8.264	27.777
	No	59	50	59	50				
14. Whoever used to help you, did they wear mask and gloves when they prepared your food? / or when they entered the room for cleaning?	Yes	71	28.4	179	71.6	<0.001	10.947	4.304	27.848
	No	5	3.5	138	96.5				

Table (3): Relation between home-based isolation abiding and infection among household contacts

		Were there any relatives that have got infected?				P-value	OR	95% CI	
		Yes		No				Lower	Upper
		N (151)	% (100)	N (242)	%(100)				
1. Did you abide by the home isolation rules?	Yes	95	33.2	191	66.8	0.001	2.207	1.404	4.807
	No	56	52.3	51	47.7				
2. Did you stay in a well ventilated separate room?	Yes	103	31.7	222	68.3	<0.001	5.181	2.923	9.174
	No	48	70.6	20	29.4				
3. Did you use a separate Private bathroom?	Yes	39	26.5	108	73.5	<0.001	2.314	1.485	3.610
	No	112	45.5	134	54.5				
4. was the bathroom sterilized after each use?	Yes	114	37.6	189	62.4	0.622	.864	.535	1.396
	No	37	41.1	53	58.9				
5. Did you use your own personal utensils for eating?	Yes	125	37	213	63	0.178	.655	.369	1.162
	No	26	47.3	29	52.7				
6. Were you staying with your family members while eating or socializing?	Yes	74	43.3	97	56.7	0.094	1.437	.954	2.164
	No	77	34.7	145	65.3				
7. If yes, did you wear a mask?	Yes	51	30.7	115	69.3	0.009	1.776	1.165	2.702
	No	100	44.1	127	55.9				
8. Did you wear a mask while you were alone in your room?	Yes	21	26.3	59	73.8	0.014	1.996	1.156	3.448
	No	130	41.5	183	58.5				
9. Were you talking to others inside the house via the mobile phone or with at least two meters' distance away from them with a mask?	Yes	75	32.6	155	67.4	0.006	1.805	1.194	2.732
	No	76	46.6	87	53.4				
10. Did you use air conditioning or a fan?	Yes	73	33.6	144	66.4	0.037	1.569	1.042	2.364
	No	78	44.3	98	55.7				
11. Did you wash your hands frequently when you used a tissue for coughing or sneezing?	Yes	125	36	222	64	0.010	2.309	1.239	4.310
	No	26	56.5	20	43.5				
12. Did you measure your temperature daily?	Yes	89	33.5	177	66.5	0.004	1.897	1.233	2.915
	No	62	48.8	65	51.2				
13. Who was helping you with food preparation / cleaning	Yes	125	45.5	150	54.5	<0.001	2.949	1.796	4.841
	No	26	22	92	78				
14. Whoever used to help you, did they wear mask and gloves when they prepared your food? / or when they entered the room for cleaning?	Yes	71	28.4	179	71.6	<0.001	3.205	2.083	4.926
	No	80	55.9	63	44.1				

Table (4): Relation between home based isolation abiding and prolongation of symptoms

		PROLONGED SYMPTOMS				P- value	OR	95% CI	
		Yes		No				Lower	Upper
		N (99)	%(100)	N(294)	% (100)				
1. Did you abide by the home isolation rules?	Yes	71	24.8	215	75.2	0.795	.932	.561	1.548
	No	28	26.2	79	73.8				
2. Did you stay in a well ventilated separate room ?	Yes	84	25.8	241	74.2	0.645	1.232	.659	2.300
	No	15	22.1	53	77.9				
3. Did you use a separate Private bathroom?	Yes	33	22.4	114	77.6	0.401	.789	.489	1.275
	No	66	26.8	180	73.2				
4. was the bathroom sterilized after each use?	Yes	81	26.7	222	73.3	0.216	1.459	.821	2.596
	No	18	20	72	80				
5. Did you use your own personal utensils for eating?	Yes	84	24.9	254	75.1	0.738	.882	.464	1.677
	No	15	27.3	40	72.7				
6. Were you staying with your family members while eating or socializing?	Yes	37	21.6	134	78.4	0.162	.713	.447	1.137
	No	62	27.9	160	72.1				
7. If yes, did you wear a mask?	Yes	37	22.3	129	77.7	0.290	.763	.478	1.219
	No	62	27.3	165	72.7				
8. Did you wear a mask while you were alone in your room?	Yes	22	27.5	58	72.5	0.665	1.163	.668	2.023
	No	77	24.6	236	75.4				
9. Were you talking to others inside the house via the mobile phone or with at least two meters' distance away from them with a mask?	Yes	52	22.6	178	77.4	0.194	.721	.456	1.141
	No	47	28.8	116	71.2				
10. Did you use air conditioning or a fan?	Yes	48	22.1	169	77.9	0.130	.696	.441	1.099
	No	51	29	125	71				
11. Did you wash your hands frequently when you used a tissue for coughing or sneezing?	Yes	85	24.5	262	75.5	0.372	.742	.378	1.455
	No	14	30.4	32	69.6				
12. Did you measure your temperature daily?	Yes	70	26.3	196	73.7	0.535	1.207	.735	1.982
	No	29	22.8	98	77.2				
13. Who was helping you with food preparation / cleaning	Yes	65	23.6	210	76.4	0.311	.765	.470	1.243
	No	34	28.8	84	71.2				
14. Whoever used to help you, did they wear mask and gloves when they prepared your food? / or when they entered the room for cleaning?	Yes	64	25.6	186	74.4	0.904	1.062	.660	1.708
	No	35	24.5	108	75.5				

Table (5): Predictors of home based-isolation abiding

		Home based isolation abiding score				P-value	OR	95% CI	
		Good		Bad				Lower	Upper
		N (289)	% (100)	N (104)	% (100)				
Symptomatic	Yes	245	72.5	93	27.5	1	.958	.412	2.227
	No	22	73.3	8	26.7				
Severity	Mild	213	72.9	79	27.1	0.773	1.098	.628	1.921
	Moderate	54	71.1	22	28.9				
Gender	Female	163	73.8	58	26.2	0.909	1.026	.653	1.611
	Male	126	73.3	46	26.7				
Smoking	Yes	39	68.4	18	31.6	0.335	.745	.405	1.372
	No	250	74.4	86	25.6				
DM	Yes	23	71.9	9	28.1	0.837	.932	.416	2.088
	No	255	73.3	93	26.7				
HTN	Yes	24	58.5	17	41.5	0.038	2.118	1.084	4.132
	No	254	74.9	85	25.1				
Heart diseases	Yes	11	68.8	5	31.3	0.773	.799	.271	2.359
	No	267	73.4	97	26.6				
Chronic liver	Yes	1	16.7	5	83.3	0.006	14.285	1.647	125
	No	277	74.1	97	25.9				
Chronic chest	Yes	8	66.7	4	33.3	0.741	.726	.214	2.464
	No	270	73.4	98	26.6				
Other chronic condition	Yes	18	81.8	4	18.2	0.460	1.696	.560	5.137
	No	260	72.6	98	27.4				
Medications	Yes	44	73.3	16	26.7	1	1.011	.542	1.885
	No	234	73.1	86	26.9				
Hospitalized	Yes	73	96.1	3	3.9	<0.001	11.378	3.501	36.974
	No	216	68.1	101	31.9				
Medical personal	Yes	119	74.8	40	25.2	0.411	1.226	.769	1.954
	No	148	70.8	61	29.2				
Marital status	Single	75	75	25	25	0.694	1.138	.674	1.920
	Married	203	12.5	77	27.5				
Prolonged duration	≥21 days	71	71.7	28	28.3	0.693	.884	.531	1.471
	<21 days	218	74.1	76	25.9				
Have you been to the emergency room	Yes	22	75.9	7	24.1	1	1.142	.473	2.757
	No	267	73.4	97	26.6				
Daily follow up	Yes	205	73.2	75	26.8	0.9	.944	.573	1.553
	No	84	74.3	29	25.7				
Do you serve yourself	Yes	206	74.9	69	25.1	0.383	1.259	.779	2.034
	No	83	70.3	35	29.7				

Home-based isolation abiding score Mean ±SD (61.8±21.5%)

DISCUSSION

COVID-19 or SARS-CoV-2 is a viral infection transmitted through exposure to infectious respiratory fluid⁽¹⁴⁾. The best approach to control a respiratory disease outbreak is the isolation of the patients at healthcare facilities with appropriate respiratory precautions. However, this will lead to a shortage of beds at healthcare facilities for those in need of respiratory support⁽¹⁵⁾ so alternative strategies to curb the spread are necessary. In August 2020, the World Health Organization (WHO) released guidance for home care for suspected or confirmed COVID-19 cases and their contacts. The criteria to decide home isolation should be based on the following: assessment of their clinical presentation, home condition, and the plausibility for follow-up at home⁽¹⁶⁾. Recommendations for the contacts were also mentioned in this guide as limiting the number of caregivers to only one healthy person, avoid entering the room of the isolated person if not possible at least keep 1 meter distance, limit patient movements and keep shared spaces well ventilated, avoid visitors, perform hand hygiene according to the WHO five moments, wearing a face mask, proper cleaning, disinfection, and waste management⁽¹⁶⁾.

In the current study, the total number of patients was 393 COVID-19 patients (43.8% males and 56.2% females) with a mean age of 37.6 ± 12 years. Of the 393 COVID-19 patients, 316 (80.4%) had mild symptoms of COVID-19, while almost 19.6% had moderate ones. About 43.2% were from the medical team members, 14.5% were smokers and the most prevailing comorbidities were previous treatment, HTN, DM, cardiac diseases, lung diseases, and liver diseases with 15.5%, 11.1%, 8.4%, 4.3%, 3.3%, and 1.6% respectively. The proportion of patients admitted to the hospital while isolated at home was 76 (19.3%). A study performed in the outpatient clinic of Hacettepe University Adult Hospital in Ankara showed that 41 patients with COVID-19 were followed on home isolation without hospital admission. The median age of the patients was 36 years, 58.5% were female, 70.7% patients were healthcare workers, 46.3% patients were current smokers and four (9.8%) were readmitted to the outpatient clinic and hospitalized⁽¹⁵⁾. Another study in Italy showed the following characteristics of home isolated patients out of the 77 patients in home isolation males were 55%, the age median was 45, and out of 48 subjects, 24 were healthcare workers (50%). Regarding symptoms 13 (17%) were asymptomatic and 64 (83%) had few symptoms. Out of 75, there were 28 subjects with underlying chronic disease (36%) as following: Hypertension (27%), diabetes (4%), cardiovascular disease (9%), chronic obstructive pulmonary disease (4%), and chronic kidney disease (4%)⁽¹⁷⁾.

The age of the patients is deliberated during the assessment before considering home isolation for COVID-19 patients. According to the Egyptian, May 2020 version of the protocol for the management of COVID-19 patients, patients with mild symptoms but their age is 60 or above should be isolated at a healthcare facility⁽¹⁸⁾. This could interpret the mean age in the current study (37.6). On the other side, the median age of patients in hospitalized patients tends to be higher for example in one of the multicenter studies in Wuhan China showed that among 191 inpatients median age was 56 years, and also concluded that mortality increases with increased age⁽¹⁹⁾.

Regarding healthcare workers and their risk, many emergent viral infections are recognized to affect healthcare workers as in the current COVID-19 pandemic^(20 & 21). 29% of COVID-19 patients detected in early cases were healthcare workers⁽²²⁾. Mortalities among healthcare workers with COVID-19 are rare and affect mainly older healthcare workers above 50 years^(23 & 24).

As mentioned above the percentage of health care workers among home isolated patients in the current study were 43.2%, while in the Italian and Turkish study the percentages were 50% and 70.7% respectively. the former Italian study mentioned that health care workers are more likely to be early diagnosed as a part of hospital surveillance, also they are confident to monitor themselves at home setting and can communicate with their colleagues more than the general population⁽¹⁷⁾.

In the current study, the following were significantly associated with the absence of hospital admission or visiting emergency care setting: Staying in a well ventilated separate room, sterilization of the bathroom after each use, using patient's own personal utensils for eating, wearing a mask while staying with family members for eating or socializing, talking to others inside the house via mobile phone or with at least two meters' distance away from them with a mask, lack of air conditioning or a fan, washing hands frequently when using a tissue for coughing or sneezing, measuring temperature daily, presence of someone helping the patient for food preparation and/or cleaning and wearing masks and gloves while helping them. Most of these factors were highlighted in all guidelines for home isolation including WHO and CDC^(16, 25).

In the current study, the infection rate among household contacts while patients isolated at home was 38.42%. After analysing compliance with home isolation instructions, the study detected that 66.8% of those who abided by the home isolation rules, their contacts weren't infected compared to 33.2% who got an infection (P-value=0.001; OR= 2.207; 95% CI:1.404–4.807). Staying in a well ventilated separate room (OR= 5.18; 95% CI:2.92–9.17), presence of someone helping the patient for food preparation and/or cleaning (OR= 2.94; 95%

CI:1.79–4.84), wearing masks and gloves while helping them (OR= 3.20; 95% CI:2.08–4.92) and using a private bathroom (OR= 2.31; 95% CI:1.48–3.61), were significantly associated (P-value<0.001) with the absence of infection among household contacts. This was reflected also in a review study stated that although home-based care isolation increases the probability of familial transmission especially among spouses and in households with large numbers of inhabitants, however, the obedience to infection prevention and control measures was described as a chance for decreasing the transmission of COVID-19 to household contacts. Hand hygiene plus wearing face masks, disinfection, and household ventilation decrease household COVID-19 transmission⁽²⁶⁾. In the study performed in Turkey out of 33 household contacts, 12 (36.4%) of them were detected as positive. Also, the study mentioned that proper isolation of cases at home, with proper monitoring and testing of contacts, are vital to decreasing household contact infection⁽¹⁵⁾.

In the current study, symptoms lasting more than 21 days were determined in 25.19% of the patients, while remaining less than 21 days were in 74.8% of them. A report mentioned that even in adult patients managed in outpatient settings symptoms took weeks to resolve. In one-third of the studied respondents reported more than 2–3 weeks to return to their usual health. This report mentioned also that one in five young adults aged 18–34 years who had no chronic conditions, reported that they didn't resume their regular health state 14–21 days after testing. The same report recommended delivering health messages targeting populations that might not perceive new coronavirus disease as being severe or prolonged, including young adults and those without chronic underlying medical conditions. Also, it strongly encouraged the following measures to decrease the rate of infection such as social distancing, hand wash, and the use of face masks⁽²⁷⁾.

LIMITATION OF THE STUDY

This study limitation included absence of a comparative group of hospitalized patients to test the predictors and comorbidity association on the outcome of COVID-19 cases and the limited research mentioning the obedience to home isolation precautionary measures and COVID-19 outcome in the cases.

CONCLUSION

Home isolation during the COVID-19 pandemic is used to manage mild cases instead of facility isolation. Evaluation of the housing condition, environment, education, and other socioeconomic factors are important. Compliance with isolation precautions and conforming to infection and control procedures are important factors to decrease hospital visits and infection rates among household contacts.

RECOMMENDATIONS

At the research level testing predictors and comorbidity association on the outcome of COVID-19 cases among patients with different severity, also its effect on infection rates among household contacts. A comparison arm is vital to examine this association.

At the policy level improving the surveillance process for early detection and proper management of infected cases, also strengthening the system to properly follow up the home isolated patient to ensure conforming to infection control practices. Training is vital for health care providers following cases isolated at home. Health education is essential for the cases and the contacts to guarantee compliance.

List of Abbreviation:

COVID-19: Corona virus disease

OR: Odds Ratio

SPSS: Social package of statistical sciences

SARS-Cov-2: severe acute respiratory syndrome

WHO: World Health Organization

CDC: Center of Disease Control.

Availability of data and material: The data sets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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REFERENCES

1. **World meters statistics (2021):** Coronavirus disease (COVID-19) pandemic. Retrieved from: <https://www.worldometers.info/coronavirus/>.
2. **World Health Organization (2020):** Statement on the Second Meeting of the International Health Regulations (2005) Emergency Committee Regarding the Outbreak of Novel Coronavirus (2019-nCoV). Retrieved from: [https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-\(2005\)-emergency-committeeregarding-the-outbreak-of-novel-coronavirus](https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committeeregarding-the-outbreak-of-novel-coronavirus).
3. **Wilder-Smith A, Freedman D (2020):** Isolation, quarantine, social distancing and community containment: pivotal role for old-style public health measures in the novel coronavirus (2019-nCoV) outbreak. DOI: [10.1093/jtm/taaa020](https://doi.org/10.1093/jtm/taaa020)
4. **Wu Z, McGoogan J ((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.
5. **Center for disease prevention and control (2021):** Isolation and Precautions for People with COVID-19. Available at: <https://www.cdc.gov/coronavirus/2019-ncov/your-health/isolation.html>
 6. **Tian S, Hu N, Lou J *et al.* (2020):** Characteristics of COVID-19 infection in Beijing. *J Infect.*, 80 (4): 401-6.
 7. **World Health Organization (2020):** Report of the WHO-China joint mission on coronavirus disease 2019 (COVID-19). Geneva, Switzerland, 2020. Available https://reliefweb.int/report/china/report-who-china-joint-mission-coronavirus-disease2019covid19?gclid=CjwKCAiAhqCdBhB0EiwAH8M_GiYWzDTfRb08URWINNZSLWab4QRnnc0sVpiROq9DPSXHZe4WTdbmzhoChcwQAvD_BwE
 8. **CNBC website (2020):** Cuomo says it's 'shocking' most new coronavirus hospitalizations are people who had been staying home. Available at: <https://www.cNBC.com/2020/05/06/ny-gov-cuomo-says-its-shockingmost-new-coronavirus-hospitalizations-are-people-staying-home.html>.
 9. **Las Vegas Review Journal (2020):** COVID-19 nursing home patients not isolated — 7 dead, 38 infected. Available at: <https://www.reviewjournal.com/investigations/covid-19-nursing-home-patients-notisolated-7-dead-38-infected-2034760/>.
 10. **Haber M, Shay D, Davis X *et al.* (2007):** Effectiveness of interventions to reduce contact rates during a simulated influenza pandemic. *Emerging infectious diseases*, 13 (4): 581.
 11. **Ferguson N, Laydon D, Nedjati-Gilani G *et al.* (2020):** Impact of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand. <https://www.imperial.ac.uk/media/imperial-college/medicine/mrc-gida/2020-03-16-COVID19-Report-9.pdf>
 12. **Hendrickx D, Abrams S, Hens N (2019):** The impact of behavioral interventions on co-infection dynamics: an exploration of the effects of home isolation. *J Theor Biol.*, 476: 5-18.
 13. **Lee E, Wada N, Grabowski M *et al.* (2020):** The engines of SARS-CoV-2 spread. *Science*, 370 (6515): 406-7.
 14. **Center for disease prevention and control (2021):** Scientific Brief: SARS-CoV-2 Transmission. Available at: <https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/sars-cov-2-transmission.html>.
 15. **Ayaz C, Dizman G, Metan G *et al.* (2020):** Out-patient management of patients with COVID-19 on home isolation. *Infez Med.*, 28 (3): 351-356.
 16. **World Health Organization (2020):** Home care for patients with suspected or confirmed COVID-19 and management of their contacts: interim guidance. Available at: <https://apps.who.int/iris/handle/10665/333782>.
 17. **Pisaturo M, De Angelis G, Maggi P *et al.* (2021):** Clinical Features of Patients with Home Isolation Sars-Cov-2 Infection: A Multicenter Retrospective Study in Southern Italy. *Life*, 11: 347.
 18. **Masoud H, Elassal G, Zaky S (2020):** Management protocol for COVID-19 patients, version 1.4, 30th May 2020. Ministry of Health and Population (MOHP), Egypt. Coronavirus Disease. https://www.researchgate.net/publication/345813633_Management_Protocol_for_COVID-19_Patients_MoHP_Protocol_for_COVID19_November_2020
 19. **Zhou F, Yu T, Du R *et al.* (2020):** Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet*, 395 (10229): 1054-1062.
 20. **Suwanarat N, Apisarnthanarak A (2015):** Risks to healthcare workers with emerging diseases: lessons from MERS-CoV, Ebola, SARS, and avian flu. *Curr Opin Infect Dis.*, 28: 349–61.
 21. **Wang Y, Wang Y, Chen Y *et al.* (2019):** Unique epidemiological and clinical features of the emerging 2019 novel coronavirus pneumonia (COVID-19) implicate special control measures. *J Med Virol.*, 92: 568–76.
 22. **Wang D, Hu B, Hu C *et al.* (2020):** Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *JAMA.*, 323: 1061–69.
 23. **CDC (2020):** Characteristics of health care personnel with COVID-19—United States. *MMWR Morb Mortal Wkly Rep.*, 69: 477–81.
 24. **Wu Z, McGoogan J (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: 1239–42.
 25. **Center for disease prevention and control (2021):** If You Are Sick or Caring for Someone. Available at: <https://www.cdc.gov/coronavirus/2019-ncov/if-you-are-sick/care-for-someone.html>.
 26. **Ilesanmi O, Afolabi A (2021):** A scope review on home-based care practices for COVID-19: What Nigeria can learn from other countries. *Ibom Med J.*, 14 (1): 1-9.
 - Tenforde M, Kim S, Lindsell C *et al.* (2020):** Symptom Duration and Risk Factors for Delayed Return to Usual Health Among Outpatients with COVID-19 in a Multistate Health Care Systems Network — United States. *MMWR Morb Mortal Wkly Rep.*, 69: 993-998.