

Appendix 1: Comparison of frequency of hand-washing, type of detergents, procedure of hand-washing, circumstances of hand-washing and obsessive-like behaviors at the first peak of COVID-19 pandemic and at the first subsidence of COVID-19 pandemic in northern Iranian population

	at the first peak of COVID-19 pandemic		at the first subsidence of COVID-19 pandemic		P-value*
	number	%	number	%	
Detergent type					0.028
Only soap	130	22.8	162	28.4	
Soap + alcohol or bleach	441	77.2	409	71.6	
frequency of hand-washing					0.001
<4	20	3.5	30	5.3	
5-8	74	13	125	21.9	
9-12	123	21.5	159	27.8	
≥13	354	62	257	45	
circumstances of hand-washing (total score) mean/SD	10.8	3.4	10.9	3.9	0.342**
Before preparing food	486	85.1	463	81.1	0.051
During preparing food	481	84.2	459	80.4	0.062
After preparing food	488	85.5	459	80.4	0.015
Before eating food	569	99.6	568	99.5	0.912
Before caring for someone who is sick at home	353	61.8	359	62.9	0.820
After caring for someone who is sick at home	352	61.6	360	63	0.765
Before treating a wound or cut	350	61.3	365	63.9	0.621
After treating a wound or cut	351	61.5	365	63.9	0.701
After using the toilet	554	97	570	99.8	0.962
After cleaning up a child who has used the toilet or changing diapers	299	52.4	362	63.4	0.001
After sneezing, coughing or blowing nose	527	92.3	538	94.2	0.114
After animal waste, animal feed, or touching an animal	352	61.6	408	71.5	0.001
After pet treats or handling pet food	420	73.6	420	73.6	0.865
After touching garbage	570	99.8	568	99.5	0.321
procedure of hand-washing (total score) mean/SD	4.2	0.8	3.7	0.8	0.001**
Wet hands with running, clean water	509	89.1	518	90.7	0.487
Rubbing hands together with the soap to lather them including under the nails, between the fingers, and backs of the hands	565	98.9	567	99.3	0.745
Scrub the hands for at least 20 seconds	515	90.2	515	90.2	0.964
Rinse the hands well under running, clean water	359	62.9	371	65	0.321
Dry the hands by a clean towel	456	79.9	168	29.4	0.001
obsessive-like behaviors(total score) mean/SD	3.7	1.3	2.7	1.5	0.001**
Worry about Remaining a contamination on a properly washed hand	78	13.7	60	10.5	0.081
Afraid or anxious about hands are not clean enough even after repeated rinsing,	71	12.4	52	9.1	0.062
Wash in a special order	189	33.1	138	24.2	0.001
Start washing again for fear of mistake	76	13.3	86	15.1	0.421
Avoid places or situations where may be exposed to germs or soil	525	91.9	483	84.6	0.001
Avoid touching surfaces in public places	544	95.3	550	96.3	0.437
Red, cracked and scaly hands	132	23.1	94	16.4	0.001
Effect of pollution concerns and efforts to reduce them in daily activities	514	90	128	22.4	0.001
Data are expressed as number and percentages or mean and standard deviation.					
* Statistical significance based on the McNamar test					
** Statistical significance based on the paired T test					

Appendix 2: Reduction in hand hygiene behaviors over time from peak to subsidence of COVID-19 pandemic according to demographic characteristics of participants

	Reduction in obsessive-like behaviors*		Reduction in procedure of hand-washing*		Reduction in circumstances of hand-washing*		Reduction in frequency of daily hand-washing*	
	Number	%	Number	%	Number	%	Number	%
Total	376	65.8%	275	48.2%	157	27.9%	285	49.9%
Gender								
Male	222	70.3%	147	46.5%	93	29.9%	165	52.2%
Female	154	60.4%	128	50.2%	64	25.5%	120	47.1%
P-value	0.016		0.400		0.258		0.239	
Educational level								
Diploma and less	246	67%	186	50.7%	112	30.8%	183	49.9%
More than diploma	130	63.7%	89	43.6%	48	23.5%	102	50%
P-value	0.462		0.116		0.06		0.998	
Residency								
Rural	70	61.9%	58	51.3%	36	31.9%	60	53.1%
Urban	306	66.8%	217	47.4%	121	26.9%	225	49.1%
P-value	0.376		0.464		0.294		0.464	
Occupation								
Unemployed	164	65.1%	124	49.2%	79	31.7%	126	50%
Employed	212	66.7%	151	47.5%	78	25%	159	50%
P-value	0.722		0.736		0.088		1	
Marital status								
Not married /Widowed /Divorced	18	56.2%	13	40.6%	6	18.8%	14	43.8%
Married	358	66.4%	262	48.6%	151	28.5%	271	50.3%
P-value	0.253		0.467		0.311		0.586	
Age								
≤50	162	65.3%	128	51.6%	63	25.7%	136	54.2%
>50	214	66.3%	147	45.5%	94	29.7%	149	46.1%
P-value	0.859		0.152		0.343		0.043	
Underlying disease*								
No	256	65.6%	190	48.7%	98	25.7%	86	47.5%
yes	120	66.3%	85	47%	59	32.8%	199	51%
P-value	0.925		0.719		0.087		0.472	
Immune deficiency condition***								
No	369	65.8%	270	48.1%	150	27.2%	282	50.3%
yes	7	70%	5	50%	3	30%	3	30%
P-value	0.998		0.999		0.954		0.339	

* at least one point reduction
**cardiovascular disease, uncontrolled high blood pressure, uncontrolled diabetes, respiratory diseases and BMI > 40
*** corticosteroids use, chemotherapy, malignancies, organ transplants and HIV
- Statistical significance based on the chi-square test

Appendix 3: Simple and Multiple logistic regression analysis for factors related to reduction in frequency of daily hand-washing over time from peak to subsidence of COVID-19 pandemic stratify by gender in northern Iranian population

Reduction in frequency of daily hand-washing**												
Variables	male						female					
	Unadjusted			Adjusted*			Unadjusted			Adjusted*		
	OR	(95% CI)	p-value	OR	(95% CI)	p-value	OR	(95% CI)	p-value	OR	(95% CI)	p-value
Age (year)												
≤50	1.84	1.16-2.92	0.009	1.71	1.07-2.73	0.024	0.87	0.48-1.60	0.672			
>50(ref)	1	-	-	-	-	-						
Educational level												
Diploma and less	1.26	0.62-1.92	0.710				1.09	0.62-1.92	0.745			
More than diploma(ref)	1	-	-	-	-	-						
Residency												
Rural	0.87	0.49-1.56	0.655				1.51	0.81-2.85	0.191			
Urban (ref)	1	-	-	-	-	-	1					
Occupation												
Unemployed	0.99	0.51-1.92	0.981				1.62	0.81-3.24	0.163			
Employed (ref)	1	-	-	-	-	-	1					
Family history of coronavirus disease												
no	0.95	0.51-1.79	0.88				2.33	1.14-4.79	0.020	2.19	1.06-4.53	0.034
yes(ref)	1	-	-	-	-	-	1					
Underlying disease												
No	1.55	0.92-2.61	0.092				0.98	0.58-1.65	0.981			
yes(ref)	1	-	-	-	-	-	1	-	-			
Reduction in obsessive-like behaviors												
yes	1.05	0.61-1.64	0.981				1.6	0.95-2.69	0.077			
no(ref)	1						1					
Reduction in procedure of hand-washing												
yes	2.28	1.44-3.6	0.001	2.16	1.36-3.43	0.001	1.51	0.91-2.49	0.113			
no(ref)	1						1					
Reduction in circumstances of hand-washing												
yes	0.98	0.60-1.61	0.944				1.86	1.05-3.30	0.034	1.74	0.97-3.11	0.062
no(ref)	1						1					

CI = confidence interval, OR= Odds Ratio
 *Adjusted for all variables that were significant in univariate analyses.
 ** at least one time reduction