The Impact of Cross-Cultural Differences in Handwashing Patterns on the COVID-19 Outbreak Magnitude

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The Impact of Cross-Cultural Differences in Handwashing Patterns on the COVID-19 Outbreak Magnitude

Ganna Pogrebna[§] Alexander Kharlamov[†]

March 2020

Abstract

Frequent handwashing with soap for at least 20 seconds at a time is widely advised as one of the preventive measures against COVID-19. Yet, while it is possible to quickly influence individual hygiene behavior in the short term, in the long run, changing handwashing culture in a particular country as well as globally is a much more difficult task. Considering the relative stability of cross-cultural differences over time, we explore whether and to what extent handwashing culture can be used to explain and predict the relative penetration of COVID-19 pandemic internationally. We find that even though many different factors could have influenced the rapid expansion of the virus, handwashing culture is a very good predictor of the COVID-19 spread magnitude.

Keywords: COVID-19, handwashing, handwashing culture, cultural values

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1. Introduction

On March 11, 2020 the World Health Organization (WHO) confirmed the new coronavirus (COVID-19) as pandemic amid its continued, rapid and on-going spread around the world.[1] The WHO, along with other international as well as national health institutions (such as Centres for Disease Control and Prevention in the US, National Health Service in the UK, etc.) issued advice, that while there is currently no vaccine or cure to prevent COVID-19, the best way to decrease the spread of the virus is through lowering the propensity of individual exposure by cleaning hands and social distancing. Regular handwashing is an important part of the WHO COVID-19 prevention campaign[2] and recent simulations shows that much can be achieved in slowing down the spread of the virus through increasing the frequency of handwashing.[3] At the same time we know that handwashing habits diverge across countries and continents [1,2] and the effects of cross-cultural differences in handwashing on the expansion of COVID-19 are not well-understood. Yet, these effects may shed some light onto why the virus spread quicker in some countries compared to others, especially considering the recent findings that the travel ban was generally not effective in containing the virus [3].

We use data on human handwashing habits from 63 countries around the globe released in 2015 by the BVA France Sarl in collaboration with the Worldwide Independent Network of Market Research and GALLUP International as a proxy for handwashing culture and explore the impact of this culture on the COVID-19 outbreak magnitude[4]. The BVA France Sarl conducted an international survey, where respondents were invited to agree or disagree with the following statement "*Washing your hands with soap after using a toilet is something you do automatically*". Frequencies of negative answers (percentage of people disagreeing with the survey statement) were taken as a proxy of

[1] See https://www.who.int/ for more detail.
[2] See https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public for more detail.
[3] See https://www.businessinsider.com/bbc-pandemic-data-shows-how-washing-hands-slows-virus-spread-2020-3?r=AU&IR=T for a recent simulation example.

handwashing culture. Importantly, all data on handwashing predates the outbreak as current handwashing habits could be significantly influenced by the international media campaigns; contains representative samples of adult population from each country; and includes at least 500 respondents from each country and 64,002 respondents in total [4]. We used clustered regression with robust standards errors and several important control variables capturing economic development as well as measures of cultural values to understand the relationship between the WHO data on the number of confirmed cases and fatalities around the world as of midday GMT on March 8, 2020.

2. Cross-Cultural Differences in Handwashing

The data on handwashing culture reveals that at least 50% of people do not have a habit of automatic handwashing after using the toilet in China (77%), Japan (70%), South Korea (61%) and the Netherlands (50%).

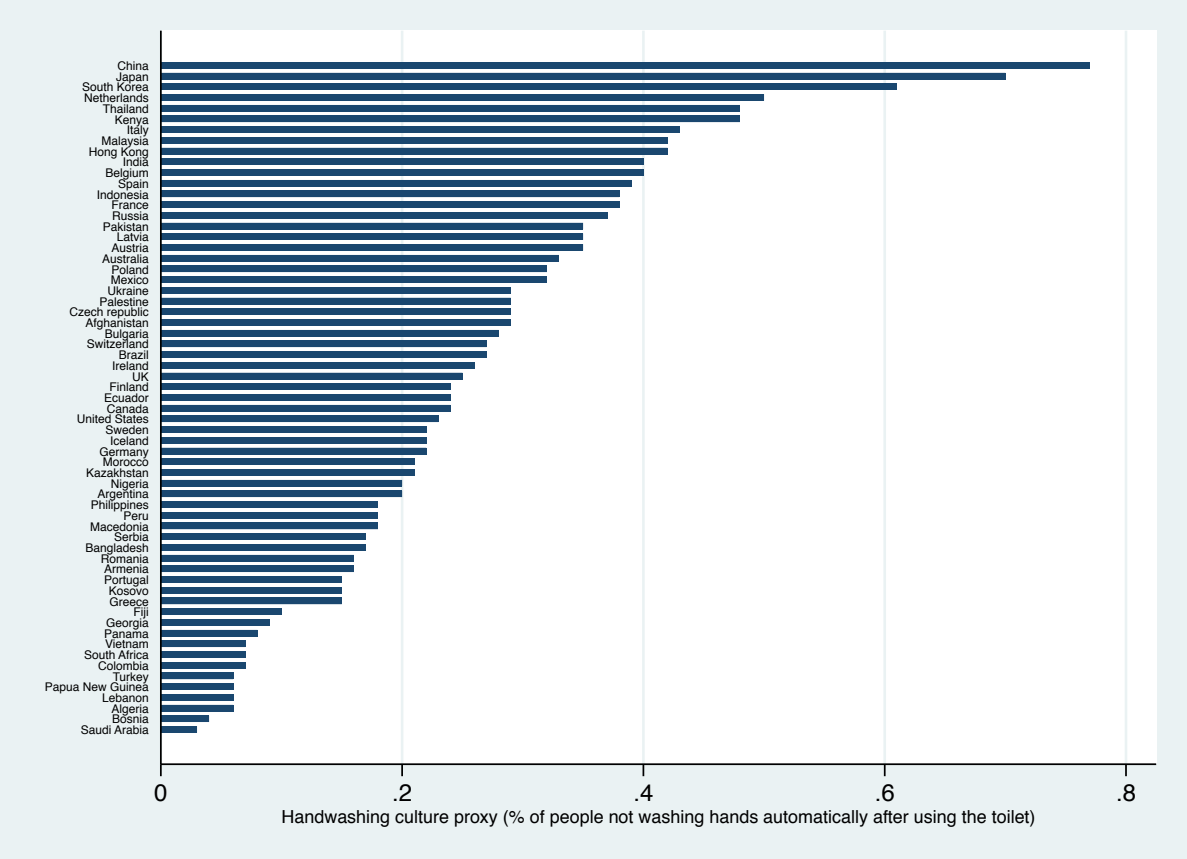

Figure 1 Cross-cultural handwashing patterns

These countries are closely followed by Thailand and Kenia, where 48% do not have this habit. In Italy this percentage is also high – 43%, whereas in the UK and in the United States the frequencies are 25% and 23%, correspondingly. The best handwashing culture is observed in Saudi Arabia, with only 3% of people not washing their hand habitually (see Figure 1). Across all 63 countries in the sample, the minimum handwashing culture proxy is equal to 3%, the maximum is 77% with the mean value of 26% and a standard deviation of 15.6%.

3. Handwashing Culture as a Predictor of Covid-19

Our regression analysis reveals a strong correlation between the handwashing culture (as measured by our proxy) and the magnitude of outbreak in different countries. Specifically, locations, where people do not have a habit of washing their hands automatically tend to have a much higher exposure to COVID-19. Figure 2 captures the total number of confirmed cases (shown on a logarithmic scale) versus our measure of handwashing culture. The size of the bubbles on Figure 2 shows the number of confirmed COVID cases per million of population as of midday GMT on March 8, 2020.

Table 1 (a, b) reports regression results predicting the number of cases (as of midday GMT March 8, 2020) corrected for population using our proxy for handwashing culture (share of people not having a habit of automatically washing hands after using the toilet). In all regressions, the dependent variable is population-corrected number of total cases of COVID-19. The OLS regression (Table 1a) shows that the handwashing culture along predicts approximately 22% of international variation in COVID-19 outbreak magnitude and the variable is highly significant at 0.1% level. This regression was conducted using data from 45 countries capturing the overlap between our handwashing data sample and the COVID-19 sample from the WHO. Table 1b shows that this result does not change even when we add control variables and cluster the countries in our sample by national income (Low Income, Lower-Middle Income, High-Middle Income

and High Income according to the World Band classification[4]). Additionally, we also controlled for GDP per capital in each country (captured in the current US dollars); as well as cultural differences not related to handwashing. Specifically, we control for cross-cultural values across countries according to the Schwartz Value Orientations Theory, which maps countries around the globe according to six human value dimensions [5]:

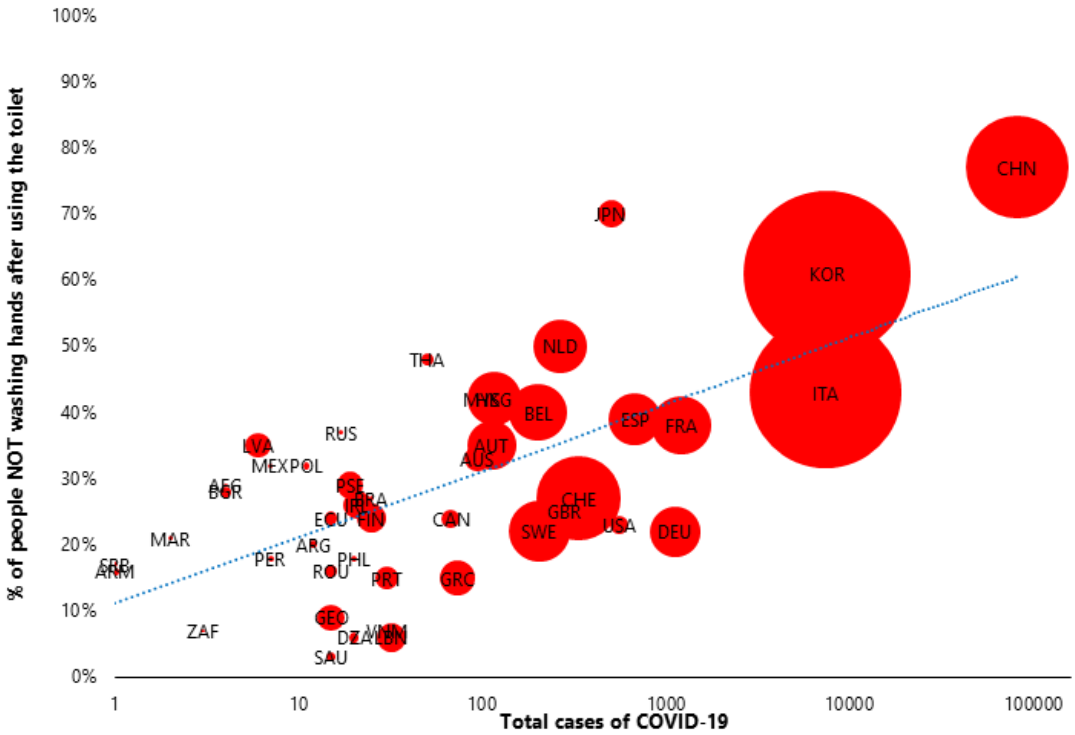

Figure 2 Cross-cultural handwashing culture versus COVID-19 outbreak magnitude

(i) harmony - human desire to fit into the environment without trying to alter it; (ii) mastery - the human tendency to take control over the environment; (iii) egalitarianism – a desire for people in the society to treat each other as moral equals; (iv) hierarchy - reliance on hierarchical systems; (v) embeddedness - the inclination for people to be viewed as a part of some collective entity; and (vi) autonomy - the cultural

[4] See https://datatopics.worldbank.org/world-development-indicators/stories/the-classification-of-countries-by-income.html#:~:text=When%20it%20comes%20to%20income,calculated%20using%20the%20Atlas%20method. for more information.

predisposition for people to be considered to be autonomous entities bounded by the society.

Autonomy has 2 subdimensions: intellectual autonomy – the cultural desire for people to pursue intellectual ideas and affective autonomy – the cultural tendency for people to maximize utility or satisfaction [5]. In sociological and psychological literature, the theory is widely used and each cultural value orientation is measured numerically.[5] Interestingly, none of the control variables returned significant coefficient values in the analysis, while handwashing culture remained a significant determinant of population-corrected total cases of COVID-19.

Table 1 Predicting the International Magnitude of COVID-19 Outbreak Using Handwashing Culture Proxy

a) Regression analysis without controls: OLS Regression						
	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Handwashing culture	87.556	23.747	3.690	0.001	39.667	135.446
Constant	-12.693	7.731	-1.640	0.108	-28.285	2.899
R^2			0.223			

b) Clustered regression analysis with controls: clustered by national income group						
	Coef.	Robust SE	t	P>t	[95% Conf.	Interval]
Handwashing culture	85.410	10.664	8.010	0.015	39.526	131.294
GDPin USD	0.000	0.000	1.790	0.216	-0.000	0.001
harmony	-6.202	13.898	-0.450	0.699	-66.001	53.597
embedded	-44.403	56.899	-0.780	0.517	-289.221	200.415
hierarchy	1.499	9.088	0.160	0.884	-37.603	40.602
mastery	9.548	12.728	0.750	0.531	-45.218	64.314
affective_autonomy	-43.682	48.811	-0.890	0.465	-253.699	166.336
inteligent_autonomy	-6.183	10.048	-0.620	0.601	-49.416	37.050
egalitar	14.426	20.593	0.700	0.556	-74.178	103.031
_cons	243.726	518.343	0.470	0.684	-1986.522	2473.974
R^2			0.354			

[5] We use data on cultural value orientations obtained from Professor Schlomo Schwartz which maps 74 countries around the globe according to the cultural value orientations. We are very grateful to Professor Schwartz for providing this dataset. Since the cultural value orientations did not have observations for some of the countries in our handwashing culture dataset, the final number of countries in Table 1b estimation was 35.

Discussion

For many years, WHO has exerted many efforts to understand and increase the hand hygiene culture [3]. In the absence of the cure or vaccine, the COVID-19 outbreak created pressures for the humanity to develop prevention mechanisms to decrease the individual propensities of potential infection. One of the recommended prevention mechanisms is frequent handwashing, yet, there is a significant heterogeneity in handwashing habits around the globe, meaning that for some cultures it might take longer to adapt to the new COVID-19 hygiene protocols. While many factors may have contributed to the current differences in the new coronavirus spread around the globe, we show that handwashing culture alone is an important factor allowing us to understand much about the currently observed heterogeneity in the outbreak magnitude. Time will tell whether the challenges posed by the current crisis will help to make handwashing culture around the globe more unified.

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Supplementary Material

The Impact of Cross-Cultural Differences in Handwashing Patterns on the COVID-19 Outbreak Magnitude

Table A Handwashing Data by Country

ID	*Country*	*Handwashing culture proxy*
1	Saudi Arabia	0.03
2	Bosnia	0.04
3	Algeria	0.06
4	Lebanon	0.06
5	Papua New Guinea	0.06
6	Turkey	0.06
7	Colombia	0.07
8	South Africa	0.07
9	Vietnam	0.07
10	Panama	0.08
11	Georgia	0.09
12	Fiji	0.10
13	Greece	0.15
14	Kosovo	0.15
15	Portugal	0.15
16	Armenia	0.16
17	Romania	0.16
18	Bangladesh	0.17
19	Serbia	0.17
20	Macedonia	0.18
21	Peru	0.18
22	Philippines	0.18
23	Argentina	0.20
24	Nigeria	0.20
25	Kazakhstan	0.21
26	Morocco	0.21
27	Germany	0.22
28	Iceland	0.22
29	Sweden	0.22

30	United States	0.23
31	Canada	0.24
32	Ecuador	0.24
33	Finland	0.24
34	UK	0.25
35	Ireland	0.26
36	Brazil	0.27
37	Switzerland	0.27
38	Bulgaria	0.28
39	Afghanistan	0.29
40	Czech Republic	0.29
41	Palestine	0.29
42	Ukraine	0.29
43	Mexico	0.32
44	Poland	0.32
45	Australia	0.33
46	Austria	0.35
47	Latvia	0.35
48	Pakistan	0.35
49	Russia	0.37
50	France	0.38
51	Indonesia	0.38
52	Spain	0.39
53	Belgium	0.40
54	India	0.40
55	Hong Kong	0.42
56	Malaysia	0.42
57	Italy	0.43
58	Kenya	0.48
59	Thailand	0.48
60	Netherlands	0.50
61	South Korea	0.61
62	Japan	0.70
63	China	0.77

Data Source: BVA, 2015[6]

[6] See ttps://www.bva-group.com/sondages/les-francais-et-le-savonnage-des-mains-apres-etre-alle-aux-toilettes/ for more detail.