

Why Do Some People Not Get COVID-19?: A Mixed Methods Study of Household Members With and Without COVID-19 in Singapore

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INTRODUCTION

The COVID-19 pandemic has spread globally in successive waves, infecting much of the world's population. However, a small subset of individuals appears to have never contracted the virus. While genome-wide association studies have not identified genetic markers of protection, few studies have examined behavioural differences between those who have and have not been infected. We thus aimed to explore what some of these differences might be.

METHODS

We conducted a mixed-methods study including 20 semi-structured dyadic interviews and an online survey of 259 members of the public to explore behavioural factors influencing COVID-19 infection risk. Participants were recruited via purposive and snowball sampling and data were analysed descriptively (independent sample and Fisher's exact tests) and thematically.

RESULTS

Variables	Infected	Uninfected	Total	p value
Avoid Crowds (n = 226)				
Yes	52 (67.5%)	25 (32.5%)	77 (34.1%)	0.02
No	122 (81.9%)	27 (18.1%)	149 (65.9%)	
Home Remedies (n = 226)				
Traditional Medication	82 (83.7%)	16 (16.3%)	98 (43.4%)	0.04
No Adopt	92 (71.9%)	36 (28.1%)	128 (56.6%)	
Strict Mask Wearing since Covid 2020 (n = 225)				
Yes	11 (44%)	14 (56%)	25 (11.1%)	0.00
No	162 (81%)	38 (19.0%)	200 (88.9%)	
Exercise pre-post Covid (n = 256)				
Changed to Seldom	52 (80.0%)	13 (20.0%)	65 (25.4%)	0.61
No Change	147 (77.0%)	44 (23.0%)	191 (74.6%)	
Attend Large Events (n=256)				
Yes	180 (77.9%)	51 (22.1%)	231 (90.2%)	1.00
No	18 (78.3%)	5 (21.7%)	23 (9.8%)	
Someone on Regular Medication at Home (n = 256)				
Yes	21 (84.0%)	4 (16.0%)	25 (9.8%)	0.61
No	178 (77.1%)	53 (22.9%)	231 (90.2%)	
Work Involves Contact with Overseas Personnel (n = 256)				
Involves Contact	74 (74.7%)	23 (23.2%)	99 (38.7%)	0.76
No Contact	125 (79.6%)	34 (21.6%)	157 (61.3%)	
Work Pattern/Status (n = 256)				
Working	184 (79.3%)	48 (20.7%)	232 (90.6%)	0.07
Don't Work	15 (62.5%)	9 (37.5%)	24 (9.4%)	
Hand Sanitiser Use (n = 226)				
Use	86 (76.8%)	26 (23.2%)	112 (50.4%)	1.00
Don't Use	88 (77.2%)	26 (22.8%)	114 (49.6%)	
Smoking (n = 256)				
Smoke	34 (77.3%)	10 (22.7%)	44 (17.2%)	1.00
Don't Smoke	165 (77.8%)	47 (22.2%)	212 (82.8%)	
Work Environment (n = 256)				
Primarily Indoors	188 (76.7%)	56(22.9%)	245 (95.7%)	0.31
Primarily Outdoors	11 (91.7%)	1 (8.3%)	12 (4.3%)	
Air-Conditioned Working Environment (n = 256)				
Yes	5 (71.4%)	2 (28.6%)	7 (2.7%)	0.65
No	194 (78.0%)	55 (22.1%)	249 (97.3%)	
Diet Restrictions (n = 256)				
Dietary Restrictions	41 (77.4%)	12 (22.6%)	53 (20.7%)	1.00
No Dietary Restrictions	158 (77.8%)	45(22.2%)	203 (79.3%)	

Survey findings showed individuals who avoided crowds (OR=0.46; 95%CI 0.24, 0.87) and consistently wore masks (OR=0.18; 95%CI 0.08, 0.44) had lower odds of self-reported infection. In contrast, those who used traditional medicine had higher odds of infection (OR=2.01, 95%CI 1.04, 3.88). However, masking and avoiding crowds were less cited in interviews and traditional medicine was noted as a means of immune strengthening. Vaccination was not highlighted in either dataset. Reportedly never-infected interviewees were divided on whether strict infection prevention compliance or strengthening their own immunity was most effective, while many believed in the benefits of traditional medicine.

Characteristics		Survey (n = 259)	Interview (n = 40)
Gender	Female	164	25
	Male	91	15
	Others	4	0
Age	21 to 29	132	14
	30 to 39	70	5
	40 to 49	24	4
	50 to 59	18	10
	60 and above	15	7
Ethnicity	Chinese	169	27
	Malay	20	0
	Indian	55	12
	Others	15	1
Highest qualification	Primary School & below	2	0
	Secondary School	5	4
	A-levels/Diploma	39	8
	Bachelor's Degree	154	19
	Post-graduate degree	59	9
Industry	Accounting	1	0
	Advertising and Marketing	7	0
	Architecture	1	0
	Business and Corporate	0	10
	Education	45	3
	Engineering	9	0
	Finance	4	0
	Healthcare	73	0
	Human Resource	3	7
	Information Technology	17	1
	Manufacturing	4	0
	Non-profit	7	0
	Other	76	19
	Pharmaceutical	4	0
	Retail and Sales	8	0
Infection status	Infected	199	20
	Uninfected	56	20

Focused on compliance with infection prevention

"Personally, I think I'm getting older, and more susceptible to infections you know, so I don't know, the immunity level of mine was not what it was, 20-30 years ago or something. You know, so I always felt like I had to take precautions. You know sometimes I do feel that if you're not protecting yourself and somebody sneeze right, the first person who is going to get infected would be me." - N4

"I thought my family was immune, like none of us had gotten it. My parents, myself and my brother, none of us, I'm like damn, something's right in our blood, yeah. Okay, I'm never getting it you know [...] And in fact, I didn't fall sick throughout the whole COVID period time [...] I was quite confident about my immunity. And then err it was my bachelorette party, and we had gone to the club. And then after that [...] when I tested I was positive. So um it was yeah, I felt like the whole world has crashed down..." - P4

Focused on strengthening immunity

"If I get a small cold I won't take any antibiotic medicine. I usually (touch wood) won't get sick quite often. Once in a while, if I got sick I use some herbs – basil leaves some pepper and ginger, and boil, and that medicine two to three times I take that one I become ok. Rarely I went to see the doctor [...] I won't fall sick very often." - N3

"Cultural.... hmmm....not really, because we are quite...you're talking about the Chinese medicine thing...they will say like you know, don't take cold drinks or don't take cold showers. We genuinely don't abide by these because you know it's not a temperature of your food intake that causes this right? It just makes you feel maybe it's some...some people it just makes some people feel more uncomfortable if you take a cold bath during when you have a fever, but it's really I mean not not something that I feel magically changed things." - P2

CONCLUSION

These findings indicate more in-depth mixed-method research is needed to identify psycho-behavioural differences in infection rates and develop risk communications that address cultural beliefs in Singapore. Effective health communication in 'peacetime' will also be critical in preparing for the next pandemic.

CONTACT INFORMATION

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