

ASSESSING BARRIERS TO ADOPTION OF SUSTAINABLE PERSONAL HYGIENE BEHAVIOUR AND LIFESTYLE CHANGE IN COMMUNITIES IN RAWALPINDI DURING COVID-19 PANDEMIC

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ABSTRACT

Objective: To assess the current habits of personal hygiene practices, to determine the role of demographic characteristics in personal hygiene practices and to identify barriers to sustainable behavioral change during COVID-19 pandemic in general communities of Rawalpindi.

Study Design: A cross sectional mixed method study.

Place and Duration of Study: Different communities of Rawalpindi city, from Aug 2020 to Apr 2021.

Methodology: Non-probability consecutive sampling was used. Both qualitative and quantitative data (sample size; n=400) was collected for understanding of the barriers in sustainability of modified behaviour during and after COVID-19.

Results: Out of 400 respondents, 43% were in the age group of 15-30 years while 30% were between 31-45 years. More than half 65% of them were males and 35% females. About 98% of the respondents practice frequent hand washing, 87% uses hand sanitizers, 75% wear masks, 67% practice social distancing and 95% cover their mouth during coughing and sneezing. The educational and occupational status of the respondents was significantly associated with personal hygiene and lifestyle change behaviour. About 391 respondents (97%) were used to practice hand washing, 350 (87.3%) hand sanitizer 301 (75%) wear masks outside home. About 269 (67%) practice social distancing and 382 (95%) cover their mouth while coughing/sneezing.

Conclusion: Sustainable behaviour change for positive health and reduced transmission of communicable diseases is possible, if the nature of human beings and the cultural and religious beliefs that define them are taken into account.

Keywords: Barriers, Lifestyle change, Personal hygiene, Sustainable behaviour.

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INTRODUCTION

Coronavirus, first originating in the city of Wuhan, China in December 2019, has claimed >3 Million lives globally since its origin. With reportedly 5.2 million new cases since the second week of April 2021, the pace with which its spreading across the globe and within countries, it shows no signs of slowing down. According to the recent epidemiological report published by WHO it was identified that causes of increased positivity rates are due to emergence of three SARS-CoV-2 Variants of Concern (VOC's) with high transmissibility rates and relaxation of public health and safety measures (PHSM).^{1,2} Reluctance to vaccination and misinterpretations about side effects or efficacy are a new challenge to control despite success at scientific development front.

The virus is here and is expected to stay longer as it is continuously evolving. What can contain the virus is our behaviour evolving accordingly by adhering to

infection prevention and control measures as our second nature. By identifying the predictors and barriers to behaviour change in response to pandemic we can aim to achieve a successful sustained response at community level to fight the pandemic which is neither the first one nor the last one in course of mankind.

A recent study in the US suggested that the barriers to non-adherence to infection prevention and control (IPC) measures were low socio-economic status, low level of education and absence of chronic diseases.³ One more study conducted in Singapore showed that citizens trust in Government communication of risk factors was perceived as a positive predictor of adherence to IPC measures.⁴ One more study from our neighbouring country Nepal showed that interventions that promoted hygiene behaviour and habit formation were drivers towards behaviour change while water shortage and socio-economic status were identified as the main barriers.⁵

Pakistan is currently facing a huge burden of communicable and non-communicable disease due to change in lifestyles and lack of proper IPC measures.

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Pakistan ranks 5th in terms of high TB burden countries and 4th in terms of multi drug resistant TB cases.⁶ Since the emergence of pandemic Pakistan has taken multiple steps to control the infection in country like formation of a dedicated website to provide preventive measures and the government routinely communicate preventive measures on caller tunes for the listeners.⁷

Lessons from past outbreaks like Ebola have shown that community engagement is critical for achieving any action and although communities play a fundamental role, they are poorly engaged while formulating even simplest of policies concerning them and their implementation.⁸

The outbreak of COVID-19 reminds the need of strengthened and sustained commitment for global public health readiness and this is the right time when it is essential to break this panic-then-forget cycle, through identification of barriers to adoption of sustainable personal hygiene practices and implementing preparedness interventions.

According to a study Pakistan has a 38% burden of communicable diseases, a large portion of which comprise of respiratory as well as gastrointestinal infections. Control of spread of these respiratory and gastrointestinal infections requires efforts to modify personal hygiene behaviour of people and to identify the barriers to the sustained adoption of these behaviours post COVID-19 to prevent future outbreaks.

Pilot study was done by engaging employees of FUI including faculty and staff. The main assumption being that they may serve as bridge and role models for the less privileged members of society. It is imperative to know the barriers they report being faced in maintaining good personal hygiene practices even in absence of pandemic emergency. Indeed, if these practices had been in place prior to the explosion of cases on a global level, the spread of the disease may have been controlled.

Now this research is undertaken in general community to see their personal hygiene behaviours and to identify barriers for sustainability of behaviour change. When these barriers are identified, public health specialists, in liaison with the government, can formulate policies to address them. We can create focused awareness using social media, electronic media, radio, celebrity endorsements, billboards, newspapers.

Practicing simple personal hygiene measures and adopting these as a part of accepted life style and not temporary measures out of fear or coercion will in

turn be seen as a social trend and be followed by the masses. This can lead to sustained behaviour change and lifestyle habits even in the absence of a respiratory illness pandemic, greatly reducing the burden of communicable diseases.

The main objectives are to assess the current habits of personal hygiene practices, to determine the role of demographic characteristics in personal hygiene practices and to identify barriers to sustainable behavioral change during COVID-19 pandemic in general communities of Rawalpindi.

METHODOLOGY

A cross sectional mixed method study was conducted in Rawalpindi using non-probability consecutive sampling, from August 2020 to April 2021. Both qualitative and quantitative data was collected from 400 respondents (n=400) for in depth understanding of the barriers in the sustainability of modified behaviour during and after the outbreak of the COVID-19.

Inclusion Criteria: All the residents of city Rawalpindi.

Exclusion Criteria: Those who are unwilling to participate.

Data was collected through a structured questionnaire by trained data collectors in a low socio-economic community of Kotha Kallan. Data entry and analysis was done using SPSS-20. Descriptive statistics were presented using frequencies and percentages, means and standard deviations, and frequencies was assessed on each variable. Chi-square test was applied for categorical variables to find out the significance level of the findings at 95% CI with 5% margin of error. The p -value ≤ 0.05 was considered statistically significant.

Ethical approval was obtained from the ERC of FUI. Ethical considerations were followed according to the recommendations of ethical review board, including informed consent for a voluntary unpaid participation in survey while ensuring confidentiality and privacy of their response.

RESULTS

Maximum of the study participants was: males 262 (65%), married 258 (64%), majority belong to age group 15-30, 173 (43%). Education status has revealed that majority were literate having education middle and intermediate 138 (134; 34% & 33% respectively). A sound number of respondents had no children 159 (40%) (Table-I).

Table-I: Socio demographic characteristics of the respondents.

Variables	n (%)	Variables	n (%)
Educational Status		Occupation	
Illiterate	58 (15)	Laborer	43 (11)
Primary	40 (10)	Merchant/Trader	36 (9)
Middle	134 (33)	Shop keeper	97 (24)
Intermediate	138 (34)	Private Job	122 (30)
Graduate	24 (6)	Government Job	6 (2)
Diploma/ certificate course	7 (2)	Stay at home	97 (24)
Gender		Marital Status	
Male	262 (65)	Married	258 (64)
Female	139 (35)	Un married	143 (36)
No of Children		Age of the Respondents	
None	159 (40)	15-30	173 (43)
1-2	80 (20)	31-45	117 (30)
3-5	126 (31)	46-60	93 (23)
>5	35 (9)	61-75	18 (5)

n=400

In the light of findings of Table-II, majority of the respondents practiced hygienic measures and showed healthy attitude such as hand washing, using hand sanitizers, staying at home, social distancing, covering mouth, using disinfectants and eating healthy diets (Table-II).

Table-II: Assessment of personal hygiene behaviour and life style change of the respondents during COVID-19 pandemic.

Variables	n (%)
Do you practice frequent hand washing	
Yes	391 (97.5%)
No	10 (2.5)
Do you use hand sanitizer when soap is not available	
Yes	350 (87.3)
No	12.7 (51) (12.7)
Do You wear a mask when leaving your home	
Yes	301 (75)
No	100 (25)
Do you currently practice social distancing at work and social events	
Yes	269 (67)
No	132 (33)
Do you cover your mouth or use tissue paper while coughing or sneezing	
Yes	95 (382) (95)
No	5 (19) (5)
Do You regularly disinfect surfaces, doorknobs and electric switches at home	
Yes	71 (285) (71)
No	29 (116) (29)
What changes you have made to your lifestyle after COVID	
Increase use of fruits	220 (55)
Increase use of vegetables	56 (14)
Avoidance of food rich in salt/fat	28 (7)
30 minutes of healthy/physical	70 (18)
All of the above	26 (6.6)

n=400

The educational status of the respondents was significantly associated with personal hygiene and lifestyle change behaviour of the respondents i.e., use of hand sanitizer ($p=0.001$), wear masks outside home ($p=0.001$), disinfect surfaces at home ($p=0.001$), practice social distancing ($p=0.001$) and covering their mouth while coughing/sneezing($p=0.006$) (Table-III).

Significant association of occupational status with Personal Hygiene & lifestyle behaviour change of the Respondents was found such as; use of hand sanitizer ($p=0.001$), wear mask outside home ($p=0.001$), disinfect surfaces at home ($p=0.001$), practice social distancing ($p=0.002$), covers mouth while coughing/sneezing (Table-IV).

The main themes from our Focus Group Discussion (FGD) identified social norms as a barrier to the adoption of preventive behaviours such as not shaking hands or hugging as a form of greeting (Table-V).

The FGDs also identified religious beliefs as a motivator against following COVID-19 SOPs and respondents believed that certain religious practices encouraged positive social behaviour. Our respondents felt that Standard Operating Procedures (SOPs) for COVID-19 not only interferes with certain practices encouraged by religion, but also implied a lack of faith in God.

The respondents who answered negatively when asked about whether they practiced habits such as frequent handwashing, use of sanitizer, use of face mask, upon asking the reason mainly cited not believing such precautions were necessary, cost of hand sanitiser, and not being in the habit of such practices.

DISCUSSION

With a transmissible respiratory infection like COVID-19, it is of paramount importance to make lifestyle behaviour changes, including the use of masks and sanitizers, and increased personal hygiene practice.⁹ The general public needs to follow pre-set SOPs in order to reduce the spread of the virus. However, even medical professions and healthcare workers often find it difficult to follow these practices, despite being fully aware of the easy transmissibility and complications of COVID-19. The reasons cited for this include the perception that the use of PPE added to their already heavy workload, feeling tired due to repeated donning and doffing of PPE, and lack of appropriate PPE. Healthcare workers reported being more amenable to following infection prevention and control (IPC) protocols when they understood the benefits associa-

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ted with them.⁹ Studies from the UK show that by including IPC guidelines, of which hand hygiene is a

Table III: Association between educational status and personal hygiene & lifestyle behaviour change of the respondents.

Variable	Educational Status of the Respondents							p-value
	Illiterate	Primary	Middle	Intermediate	Graduation	Others	Total	
Frequent hand washing								
No	1	1	4	4	-	-	10	0.949
Yes	57	39	130	134	24	7	391	
Use of Hand sanitizer								
No	51	2	3	2	5	-	63	0.001*
Yes	7	40	130	134	20	7	338	
Wear Mask outside home								
No	42	7	18	26	4	3	100	0.001*
Yes	16	33	116	112	20	4	301	
Disinfect surfaces at home								
No	34	9	31	39	3	-	116	0.001*
Yes	24	31	103	99	21	7	285	
Practice social distancing								
No	44	10	32	38	5	3	132	0.001*
Yes	14	30	102	100	19	4	269	
Cover mouth while coughing/sneezing								
No	8	-	3	8	-	-	19	0.006*
Yes	50	40	131	130	24	7	382	
Changes made in lifestyle after COVID-19								
Increase use of fruits	31	22	71	79	12	5	220	0.433
Increase use of vegetables	10	5	20	19	2	0	56	
Avoidance of food rich in salt/fat	3	-	10	9	4	2	28	
30 minutes of healthy/physical	11	6	24	24	5	-	70	
All of the above	3	7	9	7	1	-	26	

n=400

Table IV: Association between occupation and personal hygiene & lifestyle behaviour change of the respondents.

Variable	Occupational Status of the Respondents						Total	p-value
	Labourer	Merchant/Trader	Shop Keeper	Private Job	Government Job	Stay at Home		
Frequent hand washing								
No	1	1	5	3	0	0	10	0.361
Yes	42	35	92	119	6	97	391	
Use of Hand sanitizer								
No	37	0	0	0	0	14	51	0.001*
Yes	6	36	97	122	6	83	350	
Wear Mask outside home								
No	28	5	11	26	0	30	100	0.001*
Yes	15	31	86	96	6	67	301	
Disinfect surfaces at home								
No	20	13	21	26	0	36	116	0.001*
Yes	23	23	76	96	6	61	285	
Practice social distancing								
No	30	10	20	34	1	37	132	0.002*
Yes	13	26	77	88	5	60	269	
Cover mouth while coughing/sneezing								
No	6	0	4	4	0	5	19	0.054*
Yes	37	36	93	118	6	92	382	
Changes made in lifestyle after COVID-19								
Increase use of fruits	23	21	55	64	4	53	220	0.878
Increase use of vegetables	7	5	14	18	0	12	56	
Avoidance of food rich in salt/fat	2	1	7	11	1	6	28	
30 minutes of healthy/physical	8	5	14	24	1	18	70	
All of the above	3	4	7	5	0	8	26	

n=400

keystone, in the management of infectious diseases, has led to a 59% decrease in Methicillin Resistant Staph Aureus and 64% in Clostridium Difficile infection incidence.¹⁰

Table-V: Barriers to adoption of sustainable personal hygiene behavior and lifestyle change.

Barriers in adoption	n (%)
Not practicing frequent hand washing	10 (2.5)
Not feel this is necessary	7 (1.7)
Not habitual to this	3 (0.7)
Non availability of water	1 (0.2)
Not using hand sanitizer when soap is not available	51 (12.7)
Expensive	13 (3.2)
Non availability	2 (0.5)
Not feel this is necessary	7 (1.7)
Non habitual to this	10 (2.5)
All of the above	5 (1.2)
Not wearing mask when leaving home	100 (25)
Non habitual to this	4 (0.04)
Non availability of mask	2 (0.02)
Feels suffocation by wearing mask	1 (0.01)
Non serious attitude of others towards mask	1 (0.01)
Not currently practice social distancing at work and social events	132 (33)
Not feel this is necessary	3 (0.03)
Not habitual to this	3 (0.03)
Due to others behavior	1 (0.01)
Due to nature of work	14 (0.14)
All of the above	2 (0.02)
Not covering mouth or use tissue paper while coughing or sneezing	19 (5)
Not habitual to this	6 (1.5)
Mostly wear mask	9 (2.2)
Used hands for this	4 (0.9)
Not regularly disinfect surfaces, doorknobs and electric switches at home	116 (29)
Not habitual to this	15 (3.7)
Not feel this is necessary	18 (4.5)
Difficult to do this everyday	33 (8.2)
Requires a lot of time	10 (2)

In our study, most respondents reported inculcated preventive behaviours for COVID-19 in their daily lives, including frequent handwashing (97.5%), use of face mask outside the home (75%), use of hand sanitizer (87.3%), practicing social distancing (67%) and covering the nose and mouth while coughing or sneezing (95%). This is in line with a regional study,¹¹ where respondents had a generally positive attitude towards COVID-19 SOPs, including handwashing (87.8%), wearing a mask outside the home (51.2%) and social distancing (83.4%).

This study shows significant difference in personal hygiene practices across education levels of

respondents, including use of sanitizer ($p=0.001$), use of face mask ($p=0.001$), social distancing ($p=0.001$) and covering the mouth and nose while sneezing ($p=0.006$). This is consistent with another study from Pakistan that showed lower literacy levels negatively impact abiding to COVID-19 preventive SOPs.¹²

There was no significant difference in preventive practices across age groups. This is consistent with a study from Libya, where no significant difference in preventive practices regarding COVID-19 was seen across age groups.¹³

We found that 18% respondents added 30 minutes of daily exercise to their day and 55% respondents increased the use of healthy food, including fruit, in the pandemic period. This is in consistence with a studies from Italy and Poland, where 27% and 19% of subjects started regular exercise and 34% and 33.6% improved their diet quality during the COVID-19 pandemic respectively.^{14,15} Another study from Northern Italy reported similar findings, with increased physical activity in over 38%, and positive dietary changes, including increased use of fruits and vegetables in 15% of respondents.¹⁶ There was no significant difference between the genders with respect to improved diet or physical activity ($p=0.67$) in our study. This is also in line with international studies.¹⁴

This study included 262 (65%) males and 139 (35%) females. We found no significant difference between genders when it came to hygiene and preventive practices related to COVID-19, including frequent hand washing ($p=0.246$), use of face mask ($p=0.833$), use of hand sanitizer ($p=0.820$), practicing social distancing ($p=0.767$), or covering the mouth while coughing and sneezing ($p=0.957$). This is in contrast with other studies, which show that women are more likely to adopt preventive behaviour during the COVID-19 pandemic than men, both from Pakistan¹⁷ and abroad.¹⁸ This is most likely to sociodemographic factors. The study from abroad focused on countries including the UK, USA, Australia, France and Germany, where literacy rates, whereas the study from Karachi included only people who had access to the internet and were social media users. They were, therefore, of a higher socioeconomic status than our respondents.

We saw a significant difference among occupations regarding the use of face masks outside the home ($p=0.001$), use of hand sanitizer ($p=0.001$), practicing social distancing ($p=0.002$). This is in line with studies from China and Nigeria where a difference in attitude

and practices towards COVID-19 was identified among different occupations.^{19,20}

The main themes from our focus group discussion (FGD) identified social norms as a barrier to the adoption of preventive behaviours. This is in line with a study from USA and Canada, which states that humans are socially and culturally motivated and that any policy that motivates behaviour change should take human nature into account.²¹

The FGDs also identified religious beliefs as a motivator against following COVID-19 SOPs, which is in line with a study from Indonesia.²² Our respondents felt that Standard Operating Procedures for COVID-19 (SOPs) not only interfered with certain practices encouraged by religion, but also implied a lack of faith in God. This is consistent with international studies,²³ which found religiosity to negatively impact following SOPs, as well as irrational behaviour.²⁴

The respondents who answered negative mainly cited reason for not believing such precautions as unnecessary, expensive hand sanitiser, and not being in the habit of such practices. Not believing that these SOPs were necessary or positive was a reason also cited in a UK based study which aimed to explore people's perceptions of COVID SOPs.²⁵

This study also aimed to identify which preventive practices regarding infections transmitted through respiratory droplets or due to poor hygiene, were sustainable post-COVID-19 pandemic. We found that the vast majority of respondents intended to continue frequent handwashing (97%), using sanitizer in the absence of soap and water (89%), use a face mask outside the home (93%), practicing social distancing (84%) and covering the mouth and nose while coughing or sneezing (94%). This shows that people are amenable to sustained behaviour change in order to improve their health and prevent diseases transmissible via droplet. Theorists have explained that people are far more likely to follow health policies that are in line with their social values, provided the law implements said policies. They also need to be made aware of the importance of following these policies and protocols, and the pitfalls of failing to comply.⁹

LIMITATION OF STUDY

The limitation of our study is that it has been performed in only one area of Rawalpindi. The way forward should be similar researches conducted all over Pakistan in order to identify barriers to sustain-able behaviour changes post COVID-19 pandemic.

CONCLUSION

In conclusion, sustainable behaviour change for positive health and reduced transmission of communicable diseases is possible, if the nature of human beings, and the cultural and religious beliefs that define them are taken into account. Developing health policies that respect socio-cultural and religious boundaries are the need of the hour, along with laws that ensure the implementation of such policies.

The strength of our study is its relevance in the midst of the global COVID-19 pandemic, which shows no sign of diminishing in the near future. Even when this pandemic does recede, good hygienic practices are exceedingly valuable in minimizing droplet infections, and those transmitted due to poor hand hygiene.

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Author's Contribution

NA: Study design, final manuscript & methodology, RA: Data analysis, methodology & manuscript writing, FA: Data collection & discussion, MR: data entry & introduction, NFB: Introduction & methodology, MR: Data entry & analysis.

REFERENCES

1. Coronavirus disease (COVID-19) 2020 [Internet]. Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019> (Assessed 2020 Nov 8).
2. World Health Organization. COVID-19 Weekly Epidemiological Update 22. WHO 2021; 12: 1-3.
3. Islam JY, Vidot DC, Camacho-Rivera M. Determinants of COVID-19 preventive behaviours among adults with chronic diseases in the USA: An analysis of the nationally representative COVID-19 impact survey. *BMJ Open* 2021; 11(2): e044600.
4. Lim VW, Lim RL, Tan YR, Soh ASE, Tan MX, Othman NB, et al. Government trust, perceptions of COVID-19 and behaviour change: cohort surveys, singapore. *Bull World Health Organ* 2021; 99(2): 92-101.
5. McMichael C, Robinson P. Drivers of sustained hygiene behaviour change: a case study from mid-western Nepal. *Soc Sci Med* 2016; 163: 28-36.
6. WHO EMRO | Tuberculosis | Programmes | Pakistan [Internet] 2021. Available from: <http://www.emro.who.int/pak/programmes/stop-tuberculosis.html> (Assessed 2021 Apr 23).
7. COVID-19 Health Advisory Platform by Ministry of National Health Services Regulations and Coordination [Internet] 2021. Available from: <https://covid.gov.pk/prevention> (Assessed 2021 Apr 23)
8. Anoko JN, Barry BR, Boiro H, Diallo B, Diallo AB, Belizaire MR, et al. Community engagement for successful COVID-19 pandemic response: 10 lessons from Ebola outbreak responses in Africa. *BMJ Global Health*. BMJ Publishing Group 2020; 4: 3121.
9. Houghton C, Meskell P, Delaney H, Smalle M, Glenton C, Booth A, et al. Barriers and facilitators to healthcare workers' adherence with infection prevention and control (IPC) guidelines for respiratory infectious diseases: A rapid qualitative evidence synthesis. *Cochrane Database of Systematic Reviews*. John Wiley and Sons Ltd 2020; 4: 1-55.

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10. Edwards R, Charani E, Sevdalis N, Alexandrou B, Sibley E, Mullett D, et al. Optimisation of infection prevention and control in acute health care by use of behaviour change: A systematic review. *The Lancet Infectious Diseases*. Lancet Publishing Group 2012; 12: 318-29.
 11. Azlan AA, Hamzah MR, Sern TJ, Ayub SH, Mohamad E. Public knowledge, attitudes and practices towards COVID-19: A cross-sectional study in Malaysia. Tu W-J, editor. *PLOS One* 2020; 15(5): e0233668.
 12. Noreen N, Dil S, Niazi SUK, Naveed I, Khan NU, Khan FK, et al. COVID 19 Pandemic and Pakistan; Limitations and Gaps. *Glob Biosecurity* 2020; 1(4): 1-11.
 13. B. Hweissa N, Shawesh F, Krema S, Mansour A. Knowledge, attitude and practice (KAP) for preventing the coronavirus (COVID19) pandemic among libyan health care workers. *Libyan J Med Sci* 2020; 4(3): 109.
 14. Canello R, Soranna D, Zambra G. Determinants of the lifestyle changes during COVID-19 pandemic in the residents of northern Italy. *Int J Environ Res Public Health* 2020; 17(17): 6287.
 15. Górnicka M, Drywień ME, Zielinska MA, Hamułka J. Dietary and lifestyle changes during COVID-19 and the subsequent lockdowns among polish adults: a cross-sectional online survey. *P Life COVID-19 study*. *Nutrients* 2020; 12(8): 2324.
 16. Di Renzo L, Gualtieri P, Pivari F, Soldati L, Attinà A, Cinelli G, et al. Eating habits and lifestyle changes during COVID-19 lockdown: an Italian survey. *J Transl Med* 2020; 18: 229.
 17. Rabbani F, Khan HA, Piryani S, Khan AR, Abid F. Gender-specific psychological and social impact of COVID-19 in Pakistan. *BJ Psych Open* 2021; 8(1): e5.
 18. Galasso V, Pons V, Profeta P, Becher M, Brouard S, Foucault M. Nber working paper series gender differences in COVID-19 related attitudes and behavior: evidence from a panel survey In Eight Oecd Countries. 2020.
 19. Xu H, Mendez MJG, Guo L, Chen Q, Zheng L, Chen P Knowledge, awareness, and attitudes relating to the COVID-19 pandemic among different populations in central china: cross-sectional survey. *J Med Int Res JMIR Publications Inc* 2020; 22: e22628.
 20. Adesegun OA, Binuyo T, Adeyemi O, Ehioghae O, Rabor DF, Amusan O, et al. The COVID-19 crisis in sub-saharan Africa: Knowledge, attitudes, and practices of the Nigerian public. *Am J Trop Med Hyg* 2020; 103(5): 1997-2004.
 21. Moya C, Cruz Y Celis Peniche P, Kline MA, Smaldino PE. Dynamics of behavior change in the COVID world. *Am J Hum Biol* 2020; 32(5): e23485.
 22. Fatimah M, Aly A. Religious culture development in community school: a case study of boyolali middle school, central Java, Indonesia. *Humanit Soc Sci Rev* 2020; 8(2): 381-388.
 23. DeFranza D, Lindow M, Harrison K, Mishra A, Mishra H. Religion and reactance to COVID-19 mitigation guidelines. *Am Psychol* 2021; 76(5): 744-754.
 24. Kranz D, Niepel C, Botes E, Greiff S. Religiosity predicts unreasonable coping with COVID-19. *Psychology of religion and spirituality*. Advance online publication, 2020. Available at: <https://doi.org/10.1037/rel0000395>
 25. Williams SN, Armitage CJ, Tampe T, Dienes K. Public perceptions and experiences of social distancing and social isolation during the COVID-19 pandemic: A UK-based focus group study. *BMJ Open* 2020; 10(7): 39334.
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