



Congregational Worshiping and Implementation of the COVID-19 Preventive Behavioral Measures During the Re-opening Phase of Worship Places Among Indonesian Muslims

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Abstract

This research aimed at exploring the congregational form of worshiping and the preventative behaviors against COVID-19 among Indonesian Muslims during the re-opening phase of worship places. One thousand and ninety-seven (1097) participants who were a part of one of the largest Indonesian socio-religious organizations (Muhammadiyah) were included in the study. This study found most of the respondents to have performed tarawih prayers (66.7%) and Eid prayers (67.4%) at home during the pandemic. Furthermore, some Muslim worshipers did not observe COVID-19 preventive behavioral measures during the congregational prayers, and the attended mosques had inadequate facilitation for COVID-19 prevention. Nevertheless, mosques are important settings for health promotion programs, whose religious leaders can be partners in delivering health related messages to their attending members.

Keywords Praying activities · Preventive measures · COVID-19 · Muslim · Indonesia

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Introduction

All countries fight and handle the Corona-Virus Disease 2019 (COVID-19) pandemic as a global threat. COVID-19 can spread through getting into contact with infected droplets and surfaces, whereas its basic reproduction rate ranges from 2.24 to 3.58 (Zhao et al., 2020). The disease may cause complications ranging from mild to severe illnesses (including death). This outbreak is a Public Health Emergency of International Concern (PHEIC) that has provided important lessons regarding health crisis management; due to its overwhelming global influence caused by the high human mobility levels (Stein & Ometa, 2020).

In times of crisis, religion could play a role in lowering death anxiety (Jackson et al., 2018; Saleem & Saleem, 2020). An earlier research in Poland found faith to have been an important aspect that conveyed the sense of hope and security to the population during devastating pandemics that caused anxiety and fear for death (Kowalczyk et al., 2020). Religiosity also played a role in the choice of coping strategies toward the pandemic (Braun et al., 2021). A study in Poland found religious practices to have increased during the lockdown (Boguszewski et al., 2020), whereas a different research performed among Catholics in the Department of Nariño, Colombia, observed changes in the worship patterns before and during the pandemic (Meza, 2020).

Although religion played an important role in coping up with the pandemic, religious activities that involved mass gatherings during pandemic should be avoided since it increases contact risks and thereby increasing the COVID-19 incidences (James et al., 2020). This is due to the nature of the virus that can spread from person to person through droplets, where the risk of transmission appears to be proportional to the closeness of individuals at less than 1-m distance. The main global strategy relies on minimizing physical distance between individuals and their movement (World Health Organization, 2020). Therefore, authorities in many countries have therefore restricted religious activities that involving mass gatherings. Saudi Arabian authorities, aware of the risks associated with the Hajj pilgrimage (annual Islamic ritual) gatherings; restricted and reduced the number of pilgrims who participated in the 2020 pilgrimage season (Jokhdar et al., 2020; Memish et al., 2020).

Indonesia is the largest Muslim country with an estimated 229 million Muslims resident (World Population Review, 2022). The form of worship in Islam contains large gatherings. Muslims have various religious rituals among which are the five daily prayers, Tarawih prayers, *Eid al-Fitr* and *Eid al-Adha* that are usually done in congregation. During the COVID-19 pandemic, the Indonesian government issued a large-scale social restriction (*Pembatasan Sosial Berskala Besar*—PSBB) policy whose aim was to restrict mobility and social activities in a bid to reduce the spread of the virus, including the restrictions on religious activities involving mass gatherings (Ministry of Health of Indonesia, 2020). PSBB was only implemented in a few, but not all regions of Indonesia, whose implementation criteria were based on the number of cases and/or deaths related to the increase and spread of the virus in those specific regions. A province or city

imposed PSBB after obtaining approval from the Indonesian Minister of Health. Its implementation took a period of 14 days, during which development of new incidences of COVID-19 led to an extended PSBB duration of more 14 days from the date of the last observed infected case. Regions that implemented the PSBB policy could not therefore carry out congregational prayers in the places of worship, whereas areas not implementing the PSBB policy, on the other hand, carried out congregational prayers.

As the COVID-19 cases started to reduce, most of local governments in Indonesia started easing the COVID-19 pandemic restrictions including the re-opening of worship places. Furthermore, the Indonesian government through the Ministry of Religion, together with the largest religious organizations in Indonesia such as the Indonesian Ulema Council, *Nahdlatul Ulama* and *Muhammadiyah*, issued health protocol guidelines for Muslims to comply with and follow during mosque congregational prayers throughout the pandemic season. These health protocols whose aim was to minimize COVID-19 transition among worshippers included: the wearing of a mask during prayers, bringing of personal worship equipment, maintenance of a safe distance and washing of hands after prayers. The implementation of these health protocols is the responsibility of both the congregation and the worship place management, who must follow the regulations governing Health Protocols for the Community in Public Places and Facilities stipulated by the Indonesian Ministry of Health. The regulation stated that the managers of places of worship had to pay attention about the latest COVID-19-related information and government appeals, carry out cleaning and disinfection of places of worship regularly, provide hand washing facilities, install COVID-19-related information and educational media; and check the body temperature of congregants.

In order to minimize the risk of COVID-19 transmission among Muslim congregational worshippers, worship in areas with high risks of COVID-19 transmission should be limited and various precautions taken in areas where congregational worship is permitted. However, studies related to the carrying out congregational worship in relation to the standard operating procedures to curb the spread of COVID-19 remain less. This research aims at exploring: (1) Muslims' behavioral conduct in congregational prayers during the pandemic, (2) the adequacy of COVID-19 prevention facilities at mosques during worship (based on respondents' perception) and (3) implementation of COVID-19 preventative conduct during congregational worship among Indonesian Muslims.

Material and Methods

Study Design

This quantitative study used a cross-sectional study design. Data collection was done from July 18 to 25, 2020. The responding participants of this study were Muhammadiyah chairs, members and followers from the 32 different provinces of Indonesia. Muhammadiyah is a socio-religious organization in Indonesia established in 1912 at Yogyakarta, which aimed at adapting the modern Indonesian life

to Islam. Muhammadiyah has established schools, orphanages, hospitals and other social services across Indonesia (Britannica, 2019). By the early twenty-first century, its membership had increased to about 28 million with 3221 branches and 8107 sub-branches spread across all regions in Indonesia (Britannica, 2019; Lembaga Pengembangan Cabang dan Ranting PP Muhammadiyah, 1997). The chair is someone who holds position in the Muhammadiyah autonomous organizations. These included: the *Aisyiyah* (women organization), Muhammadiyah Youth (youth organization), *Nasyiyatul Aisyiyah* (young women organization), Muhammadiyah Student Association (student organization), Muhammadiyah Student Association (university student) organization, *Tapak Suci Putra Muhammadiyah* (martial art) and *Hizbul Wathan* (boy scout) both at the local, regional and central levels (Muhammadiyah, 2020). A Muhammadiyah member is someone registered with a member number, whereas a follower is someone who is neither a leader nor has a member number but has a close relationship with the Muhammadiyah. Sample size was calculated based on the hypothesis test formula for two population proportions using the sample size software released by the World Health Organization, with a value of 5% level of significance and 90% power, thereby getting minimum 1032 respondents (Tim BPS Covid-19 Statistical Task Force, 2020). The sample size was chosen using non-probability sampling namely convenience sampling in which we recruited the participants who were eligible (part of Muhammadiyah and have reached an adult age) and easily accessible (Setia, 2016).

Data Collection and Procedures

Data collection through an online self-administered questionnaire was obtained. Letters from the Muhammadiyah Central Board regarding the filling out of online questionnaires were distributed through the Regional Branch and Sub-district Leaders to their members. Before filling out the online questionnaire, prospective respondents were first informed the objectives and purposes of the research through the explanatory text handed to them with the written informed consent. Respondents who were willing to fill out the questionnaire agreed to the research's informed consent. There was neither forced consent nor no sanctions against respondents who declined to participate during data collection.

The data collection instrument consisted of five parts. The first part identified the socio-demographic characteristics of the respondents which included gender, age, residence, latest education, and status in Muhammadiyah. Data on the number of COVID-19 cases based on the respondent's residence were obtained from the Ministry of Health's COVID-19 case data on July 17, 2020 (Kementerian Kesehatan, 2020). The second part of the questionnaire that contained data about the regions implementing the PSBB policy was obtained from the Indonesian Ministry of Health, through the Information Data Center's official website. The research also studies the manners in which respondents at the mosque performed the Tarawih, Eid prayers and the five daily prayers during Ramadan 2020, as well as the five daily prayers in the last 7 days on data collection. Answers for the question about Tarawih prayer and the five daily prayers at the mosque consisted of 4 Likert scales, i.e.,

never, seldom, often, and very often; whereas questions about Eid prayers were identified as whether the respondent prayed Eid at home, in the mosque/field or did not pray Eid. The third part contained questions related to COVID-19 preventative behavior during the five daily prayers (such as wearing masks, washing hands, keeping safe distance and bringing own prayer equipment), with four answers on a Likert scale (never, seldom, often and very often). The section that followed contained questions about the respondents' perceptions about the adequacy of the COVID-19 prevention facilities provided at mosques where the five daily prayers were conducted. These facilities included whether the mosque had written regulations regarding COVID-19 prevention, educative literature related to the prevention of COVID-19 on posters and banners on the mosques, hand sanitizers' availability, and provision of hand washing facilities, demarcating safe prayer lines/*Shaf* for physical distances, provision of free masks, spraying disinfectants regularly and measuring body temperature.

Data Management and Analysis

Data analysis was done by carrying out univariate and bivariate tests. Univariate analysis for descriptive analysis of the socio-demographic characteristics of respondents, worship behavior, COVID-19 preventative behavior during worship and respondents' perceptions regarding the adequacy of COVID-19 prevention facilities at the mosques was done. Bivariate analysis using chi-square test was conducted to determine differences in the respondent's behavior during the five daily prayers in mosques and COVID-19 preventative behavior during worship based on socio-demographic characteristics. Statistical software was used to analyze the data.

Results

Data from 1105 respondents were collected with their consent. After the data cleaning process, 1097 responds with their data were included in the analysis. Table 1 shows that majority of respondents were aged 46–60 years with an average age of 45 years (age range; 17–78 years old). 79.6% of the respondents were men, while the highest attained level of education being university (84.0%). Most of respondents lived in regions that did not implement the PSBB policy ($n=1014$, 92.4%). Respondents also consisted of Muhammadiyah chairs, members and participants, with the majority of respondents being the chairs of the Muhammadiyah (51.8%). About three quarters of respondents came from areas with more than 1000 cases of COVID-19 ($n=780$, 71.1%), whereas more than half of respondents came from areas with less than 300 COVID-19-related deaths ($n=593$, 54.1%). Respondents came from various islands in Indonesia, namely Sumatra, Java, Bali and Nusa Tenggara, Kalimantan, Sulawesi and Papua. Most of respondents lived in provinces located at Java Island ($n=732$, 66.7%) and at Sumatra Island ($n=127$, 11.6%).

Table 1 also shows that most of respondents performed *Eid al-Fitr* prayers at their homes ($n=739$, 67.4%) during year 2020, while 313 respondents (28.5%)

Table 1 Respondent characteristics and prayer activities

Characteristic	N	%	Prayer activities	n	%
<i>Age (in years)</i>					
<31	155	14.1	<i>Eid prayer activities</i>	45	4.1
31–45	375	34.2	Not praying Eid	739	67.4
46–60	473	43.1	Praying Eid at home	313	28.5
> 60	94	8.6	Praying Eid at Field or Mosque		
Sex			<i>Tarawith prayer at Mosque</i>		
Male	873	79.6	Very often	118	10.8
Female	224	20.4	Often	80	7.3
<i>Education</i>			Seldom	167	15.2
Primary and High School	175	16.0	Never	732	66.7
University	922	84.0	<i>Five daily prayer activities</i>		
<i>Muhammadiyah' status</i>			Very often	251	22.9
Leader	568	51.8	Often	220	20.1
Member	413	37.6	Seldom	344	31.3
Follower	116	10.6	Never	282	25.7
<i>Respondent's domicile based on implementation of PSBB' Policy</i>					
Not implemented	1014	92.4			
Implemented	83	7.6			
<i>Respondent's domicile based on COVID-19 case number</i>					
<300	117	10.7			
300–1000	200	18.2			
> 1000	780	71.1			
<i>Respondent's domicile based on COVID-19 death number</i>					
<300	593	54.1			
300–1000	271	24.7			
> 1000	233	21.2			
<i>Region</i>					
Sumatera	127	11.6			

Table 1 (continued)

Characteristic	N	%	Prayer activities	n	%
Java	732	66.7			
Bali & Nusa Tenggara	43	3.9			
Kalimantan	107	9.8			
Sulawesi	64	5.8			
Maluku and Papua	24	2.2			

Table 2 COVID-19 preventive behavior during prayers in Mosque

	Never		Seldom		Often		Very often	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Wearing mask during prayers in Mosque	79	7.2	170	15.5	316	28.8	250	22.8
Washing hand after praying at Mosque	76	6.9	133	12.1	379	34.5	227	20.7
Applying physical distancing in the prayer rug	137	12.5	146	13.3	294	26.8	238	21.7
Bring prayer equipment when praying at the mosque	101	9.2	93	8.5	346	31.5	275	25.1
Applying physical distancing before/after praying	387	35.3	319	29.1	79	7.2	30	2.7

Table 3 COVID-19 preventive measures related regulation and facilities availability at Mosque

The attended Mosque has	Available		Available but Inadequate		Not available	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Regulation related to COVID-19 preventive measures	85	10.4	128	15.7	602	73.9
Education material related to COVID-19	401	36.6	131	12.0	562	51.4
Hand sanitizer for congregants	134	16.4	90	11.0	591	72.5
Hand washing facilities including soap with running water	35	4.3	63	7.7	717	88.0
Shaf (Demarcated lines) settings with physical distancing	156	19.1	97	11.9	562	69.0
Free mask for congregants	377	46.3	160	19.6	278	34.1
Spraying disinfectant in mosque regularly	95	11.7	225	27.6	495	60.7
Taking congregants' Body temperature measurement	396	48.6	143	17.5	276	33.9

performed Eid prayers in congregation at the mosque or in the field. Most of the respondents also performed tarawih prayers at home during the month of Ramadan ($n=732$, 66.7%), while more than half of the respondents rarely or never performed the five daily prayers at the mosque during the COVID-19 pandemic (57.0%).

The COVID-19 preventive behavior during the five daily prayers at the mosque for respondents who attended mosque congregational prayers during the pandemic is presented in Table 2. The worst observed preventive behavior among the congregations was maintaining the safe distance (35.3%) before and after prayers. In addition, 137 (12.5%) respondents did not keep their safe distance in the prayer line/Shaf, whereas only 25% of respondents brought their own prayer equipment when praying at the mosque. Similarly, only about half of the respondents wore a mask when praying at the mosque.

Table 3 shows the various precautions taken by mosques that were frequently visited by congregants during the five daily prayers. 46.3% of respondents stated that mosques they visited gave free masks to the congregants, whereas 36.6% of respondents reported to observed educational media such as banners and posters related to COVID-19 in mosques they visited. However, more than a half of the

mosques visited did not have specific written rules regarding the prevention of COVID-19 (73.9%), hand sanitizers (72.5%) and washing facilities with running water and soap (88.0%).

Comparison of the COVID-19 preventive behavior during the five daily prayers in mosques between groups is presented in Table 4. There were significant differences between age groups in carrying out the five daily prayers in congregation during the pandemic ($p=0.000$), with respondents above 60 years of age having a higher five daily prayers attendance frequency (50%) at mosques compared to other age groups. The male congregants attended the five daily prayers at the mosque more than the female congregants ($p=0.000$). Respondents (51.3%) from areas with less than 300 COVID-19 cases attended the five daily prayers at mosques more often compared to both congregants (47.0%) in areas with 300–1000 COVID-19 cases and in areas

Table 4 Comparison of the five daily prayer activities at the mosque among respondents

	Daily prayers in mosque				<i>p</i> -value
	Very often/ often		Seldom/ never		
	<i>n</i>	%	<i>n</i>	%	
<i>Age (in years)</i>					
< 31	44	28.4	111	71.6	0.000
31–45	145	38.7	230	61.3	
46–60	235	49.7	238	50.3	
> 60	47	50.0	47	50.0	
<i>Sex</i>					
Male	440	50.4	433	49.6	0.000
Female	31	13.8	193	86.2	
<i>Education</i>					
Primary and High School	71	40.6	104	59.4	0.545
University	400	43.4	522	56.6	
<i>Muhammadiyah' status</i>					
Chair	228	40.1	340	59.9	0.151
Member	189	45.8	224	54.2	
Follower	54	46.6	62	53.4	
<i>PSBB Policy</i>					
Not implemented	33	39.8	50	60.2	0.622
Implemented	438	43.2	576	56.8	
<i>COVID-19 case number</i>					
< 300	60	51.3	57	48.7	0.042
300–1000	94	47.0	106	53.0	
> 1000	317	40.6	463	59.4	
<i>COVID-19 death number</i>					
< 300	263	44.4	330	55.6	0.035
300–1000	125	46.1	146	53.9	
> 1000	83	35.6	150	64.4	

with more than 1000 cases (40.6%). However, there was no significant difference in carrying out the five daily prayers at the mosque during the pandemic based on education level, status in socio-religious organizations and the existence of the PSBB policy in the area of origin of the respondents.

Table 5 presents the comparison between groups of respondents in implementing preventive measures during the five daily prayers at the mosque. There were significant differences among age groups in the usage of masks during prayers, washing hands after prayers, keeping prayer rugs apart; and bringing your own prayer equipment when praying in congregation at the mosque. This could be due to the obedience of the over 60 age group in observing COVID-19 prevention behaviors during congregational prayers in mosques compared to the other age groups. In addition, significant differences were found between groups of respondents based on the number of cases and deaths due to COVID-19 in their home regions in regard to their carrying out of COVID-19 preventative standard operating procedures during congregational prayers at the mosque. Respondents from areas with high COVID-19 cases and deaths tended to make various efforts to prevent COVID-19 during their attendance of the five daily prayers at mosques compared to respondents from areas with low COVID-19 cases and deaths.

Discussion

As stated by Koenig in his paper that religion can influence health behavior or indirectly affect a person's health condition (Koenig, 2012), in this study we found a reverse relationship in where the public health conditions have an influence on the pattern and behavior of praying (worshiping) activities. This study found more than half of respondents to have not prayed tarawih at mosques, neither have prayed Eid at fields nor mosques; and seldom/never attended the five daily prayers at Mosques in the time of pandemic. This study shows that the COVID-19 pandemic changed the behavioral patterns and standard operating procedures when observing prayers among Muslims compared to the pre-pandemic era where Indonesian Muslim communities freely performed tarawih and Eid prayers (in mosques/fields) in congregations. The large number of Muslims who prayed tarawih and Eid at home was mostly encouraged by policies and influence of the government and Islamic religious organizations (Kuipers et al., 2020). In addition, the restriction promoted the online performance of various religious activities through different digital platforms (Galang et al., 2021; Lee et al., 2022).

In response to the COVID-19 pandemic, the Indonesian Government implemented a policy called large-scale social restrictions that aimed at restricting the internal movement of people in a bid to reduce the spread of the virus. Among the targeted activities in the large-scale social restrictions was the regulation and restrictions on religious activities that involved mass gatherings. Also, the Indonesian Ulema Council issued *fatwa number 14 of 2020* concerning the implementation of worship in situations of COVID-19-like pandemic outbreaks states; that stated that everyone was obliged to make efforts in maintaining and preserving health and refraining from anything could cause disease. This is because doing so was part of

Table 5 Comparison of preventive behavior during prayers at the mosque among respondents

	Wore a mask during Prayers				Washed hands after Prayers				Physical distancing at Praying Shaf				Bringing own prayer equipment							
	No		Yes		No		Yes		No		Yes		No		Yes					
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%				
<i>Age (in years)</i>																				
<31	43	43.0	57	57.0	0.000	28	28.0	72	72.0	0.022	42	42.0	58	58.0	0.000	31	31.0	69	69.0	0.002
31–45	107	38.9	168	61.1		85	30.9	190	69.1		118	42.9	157	57.1		80	29.1	195	70.9	
46–60	87	23.6	281	76.4		85	23.1	283	76.9		101	27.4	267	72.6		74	20.1	294	79.9	
>60	12	16.7	60	83.3		11	15.3	61	84.7		22	30.6	50	69.4		9	12.5	63	87.5	
<i>Sex</i>																				
Male	226	30.7	510	69.29	0.870	193	26.2	543	73.8	0.308	261	35.5	475	64.5	0.220	186	25.3	550	74.7	0.004
Female	23	29.1	56	70.9		16	20.3	63	79.7		22	27.8	57	72.2		8	10.1	71	89.9	
<i>Education</i>																				
Primary and High School	35	28.7	87	71.3	0.705	30	24.6	92	75.4	0.860	43	35.2	79	64.8	0.977	20	16.4	102	83.6	0.049
University	214	30.9	479	69.1		179	25.8	514	74.2		240	34.6	453	65.4		174	25.1	519	74.9	
<i>Muhammadiyah' status</i>																				
Chair	131	31.6	284	68.4	0.433	116	28.0	299	72.0	0.241	148	35.7	267	64.3	0.845	94	22.7	321	77.3	0.505
Member	89	28.2	227	71.8		71	22.5	245	77.5		107	33.9	209	66.1		82	25.9	234	74.1	
Follower	29	34.5	55	65.5		22	26.2	62	73.8		28	33.3	56	66.7		18	21.4	66	78.6	
<i>PSBB Policy</i>																				
Not implemented	231	30.6	525	69.4	1.000	191	25.3	565	74.7	0.463	271	35.8	485	64.2	0.023	180	23.8	576	76.2	1.000
Implemented	18	30.5	41	69.5		18	30.5	41	69.5		12	20.3	47	79.7		14	23.7	45	76.3	
<i>COVID-19 case number</i>																				
<300	42	43.3	55	56.7	0.003	34	35.1	63	64.9	0.012	52	53.6	45	46.4	0.000	32	33.0	65	67.0	0.021
300–1000	34	23.0	114	77.0		27	18.2	121	81.8		34	23.0	114	77.0		26	17.6	122	82.4	
>1000	173	30.4	397	69.6		148	26.0	422	74.0		197	34.6	373	65.4		136	23.9	434	76.1	
<i>COVID-19 death number</i>																				
<300	145	32.7	298	67.3	0.014	125	28.2	318	71.8	0.026	157	35.4	286	64.6	0.134	111	25.1	332	74.9	0.518
300–1000	69	33.3	138	66.7		55	26.6	152	73.4		79	38.2	128	61.8		49	23.7	158	76.3	

Table 5 (continued)

	Wore a mask during Prayers		Washed hands after Prayers		Physical distancing at Praying Shaf		Bringing own prayer equipment									
	n	%	n	%	n	%	n	%								
>1000	35	21.2	130	78.8	29	17.6	136	82.4	47	28.5	118	71.5	34	20.6	131	79.4

maintaining one of the main goals of religion (*Dharuriyat al-Khams*). In the event that people in the location with a high transmissibility potential as determined by the relevant authorities, Muslims may not attend Friday prayers in congregation, but replace it with *Zuhr* prayer, the five daily prayers “*rawatib*”, Tarawih and Eid at their residences instead of congregating at mosques or other public places (Indonesian Ulema Council, 2020). The Muhammadiyah also issued a letter of instruction for guidance regarding prayers during the COVID-19 pandemic. These encouraged people to prioritize health, benefit, safety and security considerations in accordance with the aims of the Islamic jurisprudence “*maqāṣid al-syarī’ah*” to avoid spoilers/evil “*mafsadat*” and reduce transmission of COVID-19, thereby encouraging people in areas with higher risks of COVID-19 transmission to do the worshiping at their homes (Central Board of Muhammadiyah, 2020).

Based on the socio-demographic characteristics of respondents, it was observed that the older age group prayed more frequently at the mosque than its counterparts. This showed that although it was known that older people are more prone to and are at a higher risk of COVID-19 mortality (Ho et al., 2020), it did not deter the old aged from performing prayers in mosques. It also indicated that there was a tendency of older people having a higher level of religiosity in comparison with the young people. Research conducted in Turkey also showed that young people’s participation in religious activities far less compared to the older generations in terms of performing daily prayers, congregation prayers at mosques and daily Quran recitation (Sari, 2017). The perception and feeling that the younger people were not closer to death compared to the elderly was among the major reasons leading to this way of life and conduct (Sari, 2017). However, another study showed that the vulnerability of the elderly toward acute COVID-19 infection has led to a decrease in visits by groups of older pilgrims (60+) to Catholic shrines in Europe (Mróz, 2021).

The results of our study showed that there was a significant difference among the patterns of performing the five daily prayers in comparison with respondents depending on the number of COVID-19 cases and COVID-19 deaths in the respondents’ places of residence. Respondents who resided in areas with low COVID-19 cases prayed at mosques the five daily prayers more often compared to respondents who lived in areas with higher COVID-19 cases. This showed that there was a difference in concern between respondents who lived in areas with high COVID-19 cases and deaths and respondents from low COVID-19 numbers for their health and lives. The Indonesian Ulema Council and Muhammadiyah through their fatwa/instruction in a bid to control the exposure to and spread of COVID-19 among worshipers, gave directives to observe and maintain preventative self-care practices while holding Friday, the five daily prayers “*rawatib*”, Tarawih and Eid prayers in mosques or other public places in congregations (Central Board of Muhammadiyah, 2020; Indonesian Ulema Council, 2020). The provision of information (or guidelines) from community organizations plays a vital role, considering that a study which found that community organizations were more trusted sources of information related to COVID-19 than the government or the news media (Weinberger-Litman et al., 2020). The large number of members of socio-religious organizations in Indonesia, such as Muhammadiyah and *Nahdlatul Ulama*, who also tend to obey the directions of their leaders of these organizations is one of the strengths in being able to create

community compliance in implementing COVID-19 preventive behavioral measures especially during prayers (Rachmawati et al., 2022).

The results of this study showed no significant difference between respondents who lived in the PSBB ratified areas and non-PSBB ratified areas regarding the performance of the five daily prayers at the mosque. One of the aims of the PSBB policy was to limit religious activities that converged mass gatherings. Although there were people who complied with the PSBB policy, various studies have stated the existence of some people who did not comply with the policy, thereby leading to the continued significant rise in the COVID-19 cases in areas that implemented the policy (Saidah, 2020; Suraya et al., 2020; Wiranti et al., 2020). However, no significance related to the performance of the five daily prayers at the mosque in this study could be happened because this research was conducted at the end of July 2020, at which time, PSBB had been completed in several areas and only Jakarta province and Bogor City, Depok City and Bekasi City (Bodebek area), Tangerang Raya area and Ambon City implemented PSBB with PSBB provisions that changed from the previous policy. DKI Jakarta, at the time this survey was conducted, implemented a transitional PSBB, while Bodebek area implemented a proportional PSBB, where in this policy, congregational worship in places of worship has been allowed while still implementing the COVID-19 prevention health protocol.

A previous study by Sukamto and Parulian which examined religious community response to the public policy in Indonesia showed there was a small group of fanatic Muslims who initially opposed the government policy related to the restriction of religious activities which involved mass gatherings (Sukamto & Panca Parulian, 2020). During the COVID-19 pandemic, belief in false conspiracy theory was one of factors that associated with the weaken of individual actions to minimize harm to the population (Freeman et al., 2020). A previous study in England showed that coronavirus conspiracy thinking was negatively associated with the adherence to all government guidelines (Freeman et al., 2020). Unfortunately, there were several conspiracy thinking that grew at the start period of the pandemic in Indonesia which can affect the individual preventive behavioral measures. For example, there was a thinking that COVID-19 was created by Communism, Jews and Christian for destroying Muslims (Ministry of Communication and Information Technology of the Republic of Indonesia, 2020).

This study indicates the importance of effective communication from the government in revealing the progress of COVID-19 responses by revealing the number of infection cases. The government should deliver reports on the progress and the updates on case numbers in a bid to build awareness and caution for people's compliance with the protocols and preventive standard operating procedural behavior. It is also important to make sure that people are aware that everybody has the same risk of being infected and experiencing a severe case of COVID-19. This finding also suggests targeting all age groups for more awareness of the risks and consequences involved. This approach is already done by various countries in response to the COVID-19 pandemic (Muis, 2020). Government transparency is instrumental in keeping people's trust and increasing their participation in complying with various preventive policies. Besides transparency, clear messages and effective communication are also important in increasing people's knowledge of gravity of the situation

and responding adequately to the crisis. Studies from Indonesia and other places showed that people's knowledge and trust in the government was one of the major factors that could support and encourage compliance to various preventive measures (Bargain & Aminjonov, 2020; Hafandi & Ariyanti, 2020; Painter & Qiu, 2021; Sari et al., 2020; Wiranti et al., 2020). Revealing the progress of cases could also limit the biases and the wrong perceptions people might have toward the risk of exposure to the infection and hence enhancing compliance (Banerjee et al., 2021). Many behavioral psychology and economic studies have documented how inappropriate risk perceptions were influenced by various kinds of behavioral biases such as optimism and overconfidence among others (Banerjee et al., 2021).

This study showed that respondents that attended mosques had inadequate COVID-19 education material, regulations, prevention measures and facilities. Although almost half of the mosques distributed free masks, they still lacked written regulations and educational materials such as posters or banners on COVID-19, hand sanitizer and basic hand washing facilities, and absence of well-demarcated praying lines for safe distances. A study by UNICEF observed that people in least developed and developing countries lacked basic handwashing facilities which could in turn increase the risk of COVID-19 transmission (UNICEF, 2020). The availability of such facilities was significant in maintaining the preventive measures among the worshipers, since they act as the enabling factors in influencing COVID-19 preventive behaviors (Ghodsai et al., 2019). The low implementation of social distancing in religious settings is a great public health concern since it is among the most effective non-pharmaceutical interventions to decreasing the increased rates of COVID-19 cases (Min et al., 2020). Therefore, health promotion by involvement of various religious leaders and religious groups as well as the implementation of health promotion based on places of worship that had proven to be effective should be continuously implemented (Mustafa et al., 2017).

Apart from the role by government, religious leaders and mosque managements have a critical role in encouraging worshipers in the compliance toward the health protocol implementation. A different Indonesian study revealed that the role of religious leaders and worship institutions could outperform the influence by government authority (Hanafi et al., 2020). Another study in Malawi showed that although government policies are obeyed, the government should be perceived as having expertise, able to handle high health risks, and backed by healthcare and public health experts as well as providing non-costly compliance (Kao et al., 2021). Another study from Indonesia revealed that there was no consistent evidence regarding the effectiveness of public health communication, and that the effectiveness of public campaigns depended more on the respondents than the source of information (Kuipers et al., 2020). The study also indicated that public health messages from the government were more effective on the supporters of current sitting president and less effective on Muslim groups that offered less support to current government (Kuipers et al., 2020).

In this study, we also measured the implementation of COVID-19 prevention during prayers in mosques. Although majority of the respondents had implemented various COVID-19 prevention measures such as Wearing masks during prayers in the Mosques, washing hands after praying at the Mosques, applying physical distancing

in the prayer lines/Shaf and Bring own prayer equipment to the mosque, there were about 20% of respondents that did not implement preventive behavior during prayers at the mosques. Inconsistent and inefficient application of health protocols by the community during congregational worship could make these worship activities risks in the transmission of COVID-19. The religious congregation is anticipated to be vulnerable in mediating the spread of novel pathogens and that suspension of the communal gatherings is a strategic preventive policy to contain the spread of COVID-19 (Quadri, 2020). Moreover, the Indonesian COVID-19 Response Task Force stated that religious events were among the clusters involved in the spread of COVID-19 (Adisasmito, 2020).

Maintaining a safe distance and avoiding crowds before or after prayer was the least thing the respondents of this study did. A previous study by the Indonesian statistics Agency revealed a similar finding that maintaining a minimum distance of 1-m was the least obedient behavioral measure done compared to other preventive behaviors (Tim BPS Covid-19 Statistical Task Force, 2020). The existence of social norms such as not being comfortable keeping distances from other people since it could be seen as a sign of disrespect and the perception that other people also do not keep their distance are the reasons why physical distancing was difficult to implement (COVID-19 Response Acceleration Task Force, 2020).

In addition, there were still differences in perception regarding the use of masks during prayers where some Muslim leaders see it as *makruh* (*reprehensible*) to use masks during prayers, thereby affecting the behavior of wearing masks by congregants during prayers. There were also significant differences in the application of COVID-19 prevention behavioral measures between age groups, with the older people tending to be more obedient in implementing COVID-19 prevention. This was in accordance with a survey conducted by Indonesian Statistics Agency where older people were more compliant in terms of COVID-19 prevention behavior observation than younger age groups (Tim BPS Covid-19 Statistical Task Force, 2020). Elderly participants who perceived greater personal vulnerability had relatively high anticipated compliance with the behavior guidelines (Tang & Wong, 2005).

Based on the area where the respondents reside, respondents who lived in areas with low COVID-19 cases were less obedient in implementing the COVID-19 prevention protocols compared to their counterparts. Lower cases tended to occur more in rural areas than urban areas, which observation was related to difference in population density between the two areas (Wirawan & Januraga, 2021). A previous study performed in China also found that rural residents were less likely to perform preventive behaviors against the pandemic (Chen & Chen, 2020).

Limitation of the study

This study only involved respondents who were members or followers of Muhammadiyah organizations, so this could not represent all Muslim groups in Indonesia. Since this study used an online method for collecting data, the respondents tended to come from among those who were literate and had access to the internet (Andrade, 2020). Therefore, this study is more representative of the Muhammadiyah member

from middle to up class group. On the other hand, this study was among the first to explore religious activity among Muslims in the presence of the pandemic. The next study is expected to explore more broadly about the behavioral measures during worship in various Indonesian Islamic organizations and groups, since Indonesia is known to have numerous religious groups. In addition, more studies are needed to identify the various religious understandings and beliefs related to the COVID-19 pandemic preventive measures conducted during worship.

Conclusion

The pandemic has changed the pattern of congregational worship among Muslims in Indonesia. This study found more than half of the respondents to have performed their tarawih, *Eid al-Fitr* and five daily prayers at home. Respondents carried out various basic COVID-19 prevention behavioral measures during worship such as wearing masks, washing hands and maintaining a safe distance when worshipping. However, Mosques should be assisted to provide health promotion facilities such as the making of written regulations related to the pandemic preventive behavior in mosques, distribution of educational materials in mosques, provision of free masks, presence of hand sanitizers or hand washing equipment and presence of demarcated lines that allow safe distances among worshippers. Efforts to improve COVID-19 prevention behavioral measures while praying must be done to not only reduce the transmission of COVID-19 but also other infectious respiratory diseases. Mosques are considered to be important settings for health promotion programs, where religious leaders should be included as significant partners in the deliverance of health messages to the congregant members.

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Declarations

Conflict of interest The authors report no conflicts of interest.

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References

- Adisasmito, W. (2020). *Ulama dan Umat Islam: Penggerak Kemenangan Melawan Covid-19 [Ulema and Muslim: Forcing of Victory against Covid-19]*. <https://covid19.go.id/edukasi/masyarakat-umum/ulama-dan-umat-islam-penggerak-kemenangan-melawan-covid-19>
- Andrade, C. (2020). The limitations of online surveys. *Indian Journal of Psychological Medicine*, 42(6), 575–576. <https://doi.org/10.1177/0253717620957496>

- Banerjee, R., Bhattacharya, J., & Majumdar, P. (2021). Exponential-growth prediction bias and compliance with safety measures related to COVID-19. *Social Science & Medicine (1982)*, 268, 113473. <https://doi.org/10.1016/j.socscimed.2020.113473>
- Bargain, O., & Aminjonov, U. (2020). Trust and compliance to public health policies in times of COVID-19. *Journal of Public Economics*, 192, 104316. <https://doi.org/10.1016/j.jpubeco.2020.104316>
- Boguszewski, R., Makowska, M., Bożewicz, M., & Podkowińska, M. (2020). The covid-19 pandemic's impact on religiosity in Poland. *Religions*, 11(12), 1–14. <https://doi.org/10.3390/rel11120646>
- Braun, A., Evdokimov, D., Frank, J., Pauli, P., Wabel, T., Üçeyler, N., & Sommer, C. (2021). Relevance of religiosity for coping strategies and disability in patients with fibromyalgia syndrome. *Journal of Religion and Health*. <https://doi.org/10.1007/s10943-020-01177-3>
- Britannica. (2019). *Muhammadiyah*. Encyclopedia Britannica. <https://www.britannica.com/topic/Muhammadiyah>
- Central Board of Muhammadiyah. (2020). *Tuntunan dan Panduan Menghadapi Pandemi dan Dampak Covid-19 [Guidance for dealing with Covid-19 and its impact]*. Central Board of Muhammadiyah.
- Chen, X., & Chen, H. (2020). Differences in preventive behaviors of COVID-19 between urban and rural Residents: Lessons learned from a cross-sectional study in China. *International Journal of Environmental Research and Public Health*, 17(12), 4437. <https://doi.org/10.3390/ijerph17124437>
- COVID-19 Response Acceleration Task Force. (2020). *Memahami Perilaku dan Informasi Tepat untuk Mencegah Penularan COVID-19 [Understanding Behavior and Information for Preventing Covid-19]*. <https://covid19.go.id/p/berita/memahami-perilaku-dan-informasi-tepat-untuk-mencegah-penularan-covid-19>
- Freeman, D., Waite, F., Rosebrock, L., Petit, A., Causier, C., East, A., Jenner, L., Teale, A.-L., Carr, L., Mulhall, S., Bold, E., & Lambe, S. (2020). Coronavirus conspiracy beliefs, mistrust, and compliance with government guidelines in England. *Psychological Medicine*. <https://doi.org/10.1017/S0033291720001890>
- Galang, J. R. F., Gopez, J. M. W., Gozum, I. E. A., & Sarmiento, P. J. D. (2021). Social distancing as a recontextualization of filipino values and catholic religious practices: A response to the COVID-19 pandemic. *Journal of Religion and Health*, 60(5), 3245–3264. <https://doi.org/10.1007/s10943-021-01361-z>
- Ghodsi, M., Maheri, M., Joveini, H., Rakhshani, M. H., & Mehri, A. (2019). Designing and evaluating educational intervention to improve preventive behavior against cutaneous Leishmaniasis in endemic areas in Iran. *Osong Public Health and Research Perspectives*, 10(4), 253–262. <https://doi.org/10.24171/j.phrp.2019.10.4.09>
- Hafandi, Z., & Ariyanti, R. (2020). Hubungan pengetahuan tentang Covid-19 dengan kepatuhan physical distancing di Tarakan. *Jurnal Kebidanan Mutiara Mahakam*, 8(2), 102–111. <https://doi.org/10.36998/jkmm.v8i2.102>
- Hanafi, Y., Taufiq, A., Saefi, M., Ikhsan, M. A., Diyana, T. N., Hadiyanto, A., Purwanto, Y., & Mawardi, A. I. (2020). *Indonesian Ulema Council Fatwa On Religious Practices During Covid-19 Pandemic: An Investigation Of Muslim Compliance*. Research Square, Preprint, 1–23. <https://doi.org/10.21203/rs.3.rs-33784/v1>
- Ho, F. K., Petermann-Rocha, F., Gray, S. R., Jani, B. D., Katikireddi, S. V., Niedzwiedz, C. L., Foster, H., Hastie, C. E., Mackay, D. F., Gill, J. M. R., O'Donnell, C., Welsh, P., Mair, F., Sattar, N., Celis-Morales, C. A., & Pell, J. P. (2020). Is older age associated with COVID-19 mortality in the absence of other risk factors? General population cohort study of 470,034 participants. *PLoS ONE*, 15(11), e0241824. <https://doi.org/10.1371/journal.pone.0241824>
- Indonesian Ulema Council. (2020). *Penyelenggaraan Ibadah dalam Situasi Terjadi Wabah Covid-19 [Praying during Covid-19 Pandemic]*. Indonesian Ulema Council.
- Jackson, J. C., Jong, J., Bluemke, M., Poulter, P., Morgenroth, L., & Halberstadt, J. (2018). Testing the causal relationship between religious belief and death anxiety. *Religion, Brain & Behavior*, 8(1), 57–68. <https://doi.org/10.1080/2153599X.2016.1238842>
- James, A., Eagle, L., Phillips, C., Hedges, D. S., Bodenhamer, C., Brown, R., Wheeler, J. G., & Kirking, H. (2020). High COVID-19 attack rate among attendees at events at a Church — Arkansas, March 2020. *MMWR. Morbidity and Mortality Weekly Report*, 69(20), 632–635. <https://doi.org/10.15585/mmwr.mm6920e2>
- Jokhdar, H., Khan, A., Asiri, S., Motair, W., Assiri, A., & Alabdulaali, M. (2020). COVID-19 mitigation plans during Hajj 2020: A success story of zero cases. *Health Security*. <https://doi.org/10.1089/hs.2020.0144>

- Kao, K., Lust, E., Dulani, B., Ferree, K. E., Harris, A. S., & Metheney, E. (2021). The ABCs of Covid-19 prevention in Malawi: Authority, benefits, and costs of compliance. *World Development*, 137, 105167. <https://doi.org/10.1016/j.worlddev.2020.105167>
- Kementerian Kesehatan. (2020). *Situasi Terkini Perkembangan Novel Coronavirus (COVID-19)*. <https://covid19.kemkes.go.id/situasi-infeksi-emerging/info-corona-virus/situasi-terkini-perkembangan-coronavirus-disease-covid-19-17-juni-2020/#.XvBzx-e-nIV>.
- Koenig, H. G. (2012). Religion, spirituality, and health: The research and clinical implications. *ISRN Psychiatry*. <https://doi.org/10.5402/2012/278730>
- Kowalczyk, O., Roszkowski, K., Montane, X., Pawliszak, W., Tylkowski, B., & Bajek, A. (2020). Religion and faith perception in a pandemic of COVID-19. *Journal of Religion and Health*, 59(6), 2671–2677. <https://doi.org/10.1007/s10943-020-01088-3>
- Kuipers, N., Mujani, S., & Pepinsky, T. (2020). Encouraging Indonesians to pray from home during the COVID-19 pandemic. *Journal of Experimental Political Science*. <https://doi.org/10.1017/XPS.2020.26>
- Lee, M., Lim, H., Xavier, M. S., & Lee, E. Y. (2022). A divine infection: A systematic review on the roles of religious communities during the early stage of COVID-19. *Journal of Religion and Health*, 61(1), 866–919. <https://doi.org/10.1007/s10943-021-01364-w>
- Lembaga Pengembangan Cabang dan Ranting PP Muhammadiyah. (1997). *Sejarah Lembaga Pengembangan Cabang dan Ranting*. <http://lpcr.muhammadiyah.or.id/content-3-sdet-sejarah.html>
- Memish, Z. A., Ahmed, Y., Alqahtani, S. A., & Ebrahim, S. H. (2020). Pausing superspreader events for COVID-19 mitigation: International Hajj pilgrimage cancellation. *Travel Medicine and Infectious Disease*, 36, 101817. <https://doi.org/10.1016/j.tmaid.2020.101817>
- Meza, D. (2020). In a pandemic are we more religious? Traditional practices of Catholics and the COVID-19 in Southwestern Colombia. *International Journal of Latin American Religions*, 4(2), 218–234. <https://doi.org/10.1007/s41603-020-00108-0>
- Min, K. D., Kang, H., Lee, J. Y., Jeon, S., & Cho, S. I. (2020). Estimating the effectiveness of non-pharmaceutical interventions on COVID-19 control in Korea. *Journal of Korean Medical Science*, 35(35), e321. <https://doi.org/10.3346/jkms.2020.35.e321>
- Ministry of Communication and Information Tehcnology of the Republic of Indonesia. (2020). *[HOAX] Conspiracy of Communist, Jews and Christian by using COVID-19 for destroying Muslims ([HOAKS] Konspirasi Komunis, Yahudi dan Nasrani Manfaatkan COVID-19 untuk Menghancurkan Islam)*. <https://id.linkedin.com/company/ministry-of-communication-and-information-technology-of-the-republic-of-indonesia>
- Ministry of Health of Indonesia. (2020). *Guidelines for Large-Scale Restrictions in the Context of Accelerating Handling of Corona Virus Disease 2019 (COVID-19) [Pedoman Pembatasan Berskala Besar dalam Rangka Percepatan Penanganan Corona Virus Disease 2019 (COVID-19)]*. <https://setkab.go.id/menkes-teken-permenkes-nomor-9-tahun-2020-soal-tata-cara-usulan-psbb/>
- Mróz, F. (2021). The impact of COVID-19 on pilgrimages and religious tourism in Europe during the first six months of the pandemic. *Journal of Religion and Health*, 60(2), 625–645. <https://doi.org/10.1007/s10943-021-01201-0>
- Muhammadiyah. (2020). *Autonomous Organization of Muhammadiyah*. <https://muhammadiyah.or.id/en/organisasi-otonom/>
- Muis, A. R. C. (2020). Transparansi kebijakan publik sebagai strategi nasional dalam menanggulangi pandemi Covid-19. *SALAM: Jurnal Sosial Dan Budaya Syar-I*. <https://doi.org/10.15408/sjsbs.v7i5.15317>
- Mustafa, Y., Baker, D., Puligari, P., Melody, T., Yeung, J., & Gao-Smith, F. (2017). The role of imams and mosques in health promotion in Western societies—a systematic review protocol. *Systematic Reviews*, 6(1), 25. <https://doi.org/10.1186/s13643-016-0404-4>
- Painter, M., & Qiu, T. (2021). Political beliefs affect compliance with government mandates. *Journal of Economic Behavior and Organization*. <https://doi.org/10.2139/ssrn.3569098>
- Quadri, S. A. (2020). COVID-19 and religious congregations: Implications for spread of novel pathogens. *International Journal of Infectious Diseases: IJID: Official Publication of the International Society for Infectious Diseases*, 96, 219–221. <https://doi.org/10.1016/j.ijid.2020.05.007>
- Rachmawati, E., Umniyatun, Y., Rosyidi, M., & Nurmansyah, M. I. (2022). The roles of Islamic faith-based organizations on countermeasures against the COVID-19 pandemic in Indonesia. *Heliyon*, 8(2), e08928. <https://doi.org/10.1016/j.heliyon.2022.e08928>
- Saidah, D. (2020). analisis pelaksanaan kebijakan penangan wabah Covid 19 di DKI Jakarta. *Jurnal Ilmiah Administrasi Pemerintahan Daerah*, 12(2), 20–30.

- Saleem, T., & Saleem, S. (2020). Religiosity and death anxiety: A study of Muslim dars attendees. *Journal of Religion and Health*, 59(1), 309–317. <https://doi.org/10.1007/s10943-019-00783-0>
- Sari, M. (2017). The impacts of the age factor on religiosity. *Firat Üniversitesi Sosyal Bilimler Dergisi*, 27(2), 257–264. <https://doi.org/10.18069/firsbed.346704>
- Sari, D. P., Sholihah, N., & Atiqoh. (2020). The relationship between public knowledge and compliance with the use of masks as an effort to prevent COVID-19 in Ngronggah. *INFOKES Journal*, 10(1), 52–55.
- Setia, M. (2016). Methodology series module 5: Sampling strategies. *Indian Journal of Dermatology*, 61(5), 505–509. <https://doi.org/10.4103/0019-5154.190118>
- Stein, R. A., & Ometa, O. (2020). When public health crises collide: Social disparities and COVID-19. *International Journal of Clinical Practice*, 74(9), 35–37. <https://doi.org/10.1111/ijcp.13524>
- Sukanto, A., & Panca Parulian, S. (2020). Religious community responses to the public policy of the Indonesian government related to the covid-19 pandemic. *Journal of Law, Religion and State*, 8(2–3), 273–283. <https://doi.org/10.1163/22124810-2020006>
- Suraya, I., Nurmansyah, M. I., Rachmawati, E., Al Aufa, B., & Koire, I. I. (2020). The impact of large-scale social restrictions on the incidence of covid-19: A case study of four provinces in Indonesia. *Kesmas*, 15(2), 49–53. <https://doi.org/10.21109/KESMAS.V15I2.3990>
- Tang, C.S.-K., & Wong, C.-Y. (2005). Psychosocial factors influencing the practice of preventive behaviors against the severe acute respiratory syndrome among older Chinese in Hong Kong. *Journal of Aging and Health*, 17(4), 490–506. <https://doi.org/10.1177/0898264305277966>
- Tim BPS Covid-19 Statistical Task Force. (2020). Results of the Community Behavior Survey During the Covid-19 Pandemic (7–14 September 2020) [Hasil Survei Perilaku Masyarakat Di Masa Pandemi Covid-19 (7–14 September 2020)]. In *Perilaku Masyarakat di Masa Pandemi Covid-19 BPS RI*. <https://www.bps.go.id/publication/2020/09/28/f376dc33cfdeec4a514f09c/perilaku-masyarakat-di-masa-pandemi-covid-19.html>
- UNICEF. (2020). *FACT SHEET: Lack of handwashing with soap puts millions at increased risk to COVID-19 and other infectious diseases*. <https://www.unicef.org/press-releases/fact-sheet-lack-handwashing-soap-puts-millions-increased-risk-covid-19-and-other>
- Weinberger-Litman, S. L., Litman, L., Rosen, Z., Rosmarin, D. H., & Rosenzweig, C. (2020). A look at the first quarantined community in the USA: Response of religious communal organizations and implications for public health during the COVID-19 pandemic. *Journal of Religion and Health*, 59(5), 2269–2282. <https://doi.org/10.1007/s10943-020-01064-x>
- Wiranti, W., Sriatmi, A., & Kusumastuti, W. (2020). Determinan kepatuhan masyarakat Kota Depok terhadap kebijakan pembatasan sosial berskala besar dalam pencegahan COVID-19. *Jurnal Kebijakan Kesehatan Indonesia*, 09(03), 117–124.
- Wirawan, G. B. S., & Januraga, P. P. (2021). Correlation of demographics, healthcare availability, and COVID-19 outcome: Indonesian ecological study. *Frontiers in Public Health*, 9, 605290. <https://doi.org/10.3389/fpubh.2021.605290>
- World Health Organization. (2020). *Overview of public health and social measures in the context of COVID-19: Interim guidance, 18 May 2020*. World Health Organization. <https://apps.who.int/iris/handle/10665/332115>
- World Population Review. (2022). *Muslim population by country 2022*. <https://worldpopulationreview.com/countryrankings/muslim-population-by-country>
- Zhao, S., Lin, Q., Ran, J., Musa, S. S., Yang, G., Wang, W., Lou, Y., Gao, D., Yang, L., He, D., & Wang, M. H. (2020). Preliminary estimation of the basic reproduction number of novel coronavirus (2019-nCoV) in China, from 2019 to 2020: A data-driven analysis in the early phase of the outbreak. *International Journal of Infectious Diseases: IJID: Official Publication of the International Society for Infectious Diseases*, 92, 214–217. <https://doi.org/10.1016/j.ijid.2020.01.050>

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