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HUBUNGAN STATUS VAKSINASI TENAGA KESEHATAN PENYINTAS COVID-19 DENGAN HASIL LUARAN RAWATAN COVID-19 DI RSU SE-KOTA PADANG

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Abstrak ← **Arial 10pt, bold, italic, justify**

Latar belakang: *Tenaga kesehatan (nakes) merupakan tenaga medis garis terdepan untuk mengobati dan melawan pandemi penyakit COVID-19. Pekerjaan membuat nakes berhadapan langsung dengan penderita COVID-19, apabila tidak terlindungi dengan baik, risiko terpapar virus SAR-CoV-2 akan sangat besar. Peningkatan risiko pada nakes dapat disebabkan karena kontak dengan pasien tanpa alat perlindungan diri (APD) yang tersandar serta permukaan yang terkontaminasi virus. Nakes yang tertular dapat menginfeksi orang lain disekitarnya serta akan meningkatkan beban kerja nakes lain. Salah satu upaya yang dilakukan untuk menekan risiko penularan terhadap nakes adalah dengan vaksinasi. Vaksin terhadap COVID-19 dianggap sangat penting untuk mencegah dan mengendalikan COVID-19. Penelitian ini bertujuan untuk mengetahui hubungan status vaksin COVID-19 terhadap luaran rawatan nakes yang dirawat terkonfirmasi COVID-19 di RSU se-kota Padang.*

Metode: *Penelitian ini merupakan penelitian analitik observasional dengan metode cohort retrospektif. Penelitian dilakukan di rumah sakit se-kota Padang selama bulan Agustus 2021 hingga Mei 2022 dengan mengisi kuisioner dalam bentuk link googleform.*

Hasil: *Status vaksinasi nakes penyintas COVID-19 yang dirawat di RSU Se- Kota Padang (66,97%) tidak divaksinasi, usia 26–35 years old (57,80%), perempuan (80,73%), bekerja sebagai paramedis (63,55%), onset gejala 3 sampai 7 hari (44,95%), jumlah gejala ≥ 3 (55,96%), terbanyak demam (24,68%), jumlah komorbid 1 hingga 2 (66,06%), obesitas (66,67%), lama rawatan <21 hari (84,40%), dan klinis ringan (55,96%) dan sembuh (92,66%).*

Kesimpulan: *Status vaksinasi pada nakes penyintas COVID-19 berhubungan dengan derajat klinis, lama rawatan dan status akhir rawatan.*

Kata kunci: *tenaga kesehatan, vaksinasi, luaran rawatan, COVID19*

ASSOCIATION OF THE VACCINATION STATUS OF HEALTH WORKERS OF COVID-19 SURVIVOR WITH THE OUTCOMES OF TREATMENT OF COVID-19 AT GENERAL HOSPITAL IN PADANG CITY

Abstract

Background: *Health workers are the front line medical personnel to treat and fight the COVID-19 pandemic. Work makes health workers face to face with people with COVID-19, if they are not properly protected, the risk of being exposed to the SAR-CoV-2 virus will be very large. The increased risk for health workers can be caused by contact with patients without propped up personal protective equipment (PPE) and surfaces contaminated with viruses. Health workers who are infected can infect other people around them and will increase the workload of other health workers. One of the efforts made to reduce the risk of transmission to health workers is by vaccination. Vaccines against COVID-19 are considered very important to prevent and control COVID-19. This study aims to determine the relationship between the status of the COVID-19 vaccine and the outcomes of health care workers who are treated for confirmed COVID-19 at RSUs throughout the city of Padang.*

Methods: *This study is an observational analytic study with a retrospective cohort method. The research was conducted at hospitals throughout the city of Padang during August 2021 to May 2022 by filling out a questionnaire in the form of a google form link.*

Results: *Vaccination status of health workers who survived COVID-19 who were treated at Padang City General Hospital (66.97%) were not vaccinated, aged 26–35 years (57.80%), female (80.73%), worked as paramedics (63, 55%), symptom onset 3 to 7 days (44.95%), number of symptoms 3 (55.96%), most fever (24.68%), number of comorbid 1 to 2 (66.06%), obesity (66.67%), length of stay <21 days (84.40%), and mild clinical (55.96%) and recovered (92.66%).*

Conclusion: *Vaccination status of health workers who have survived COVID-19 is related to clinical degree, length of stay and outpatient of treatment.*

Keywords: *health workers, vaccination, outcome hospitalization, COVID19*

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INTRODUCTION

Health workers are the front line medical personnel to treat and fight the COVID-19 pandemic.[1] Itodo's research states that there is an increased risk of SARS-CoV-2 infection for health workers who treat COVID-19 compared to the general public.[2] This potential is because health workers work in long-term exposures. failure to apply effective personal protection, PPE either does not meet standards or is reused, lack of training, infection control and monitoring, prevention and control mechanisms.[3]

The COVID-19 vaccine is useful for protecting the body from falling ill due to COVID-19 by generating or stimulating specific immunity in the body. This process causes the vaccine to reduce the viral load in the infection process, thereby suppressing further transmission. This reduction in viral load implies a lower transmission potential, which in turn contributes to the vaccine's effect on virus spread.[4]

Bernal's study found that there were differences between vaccinated and unvaccinated patients. Of those who were not vaccinated, 543 (56%) had symptoms of COVID-19 and 140 (14%) were asymptomatic on or 14 days before the date of a positive PCR test, compared with 29 (36%) with typical COVID-19 symptoms and 15 (19%) were asymptomatic in the vaccinated group.[5] The Redmon study found 80 (5.7%) of 1,408 unvaccinated patients had COVID-19 and 12 (0.3%) of 4,222 vaccinated. Patients who were vaccinated had mild symptoms and none required hospitalization.[6] Baz's research was found from 7240 COVID-19 patients, there were 260 (18.8%) people who had been vaccinated, but only 161 people (11.7%) had symptoms. and treated only 11 people (0.8%). These data show that vaccination can reduce the symptoms and treatment of COVID-19.[7] Hyams research stated that by vaccinating the elderly > 70 years of age to 180 COVID-19 patients, there was a decrease in care from 72% to 57% after the second vaccination and more treatment. shorter than unvaccinated.[8]

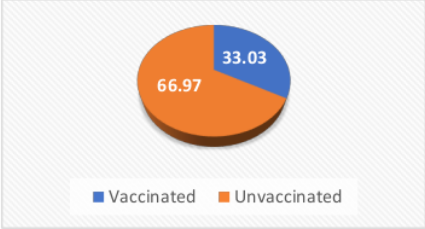
METHODS

This study is an observational analytic study with a retrospective cohort method. The research was conducted in hospitals throughout the city of Padang, namely Regional General Hospital Dr. M. Djamil, Padang City, Andalas University Hospital, Semen Padang Hospital, BMC Hospital, Hermina Hospital, Yos Sudarso Hospital,, Ibnu Sina Hospital, Reksowidiryo Army Hospital, Bhayangkara Hospital, Naili DBS Hospital, Selaguri Hospital, RS Aisyiyah. The research was carried out during August 2021 to May 2022.

The sampling technique of the inclusion criteria in this study was health workers who were confirmed to have COVID-19 from the results of the *Reverse Transcriptase – Polymerase Chain Reaction* (RT-PCR) serology examination, hospitalized, willing to participate in this study and filled out the questionnaire. The exclusion criteria for this research is an incomplete *Google form*. The characteristics of the data are presented in tabular form and processed statistically.

RESULT

The total number of survivors of COVID-19 health workers in COVID-19 treatment based on vaccine status consisted of 36 health workers who had been vaccinated (33.03%) and 73 health workers who were not vaccinated (66.97%), as shown in graph 1.



Graph 1. COVID19 vaccine status in hospitalized health workers

Health workers suffering from COVID-19 who were treated at RSUs throughout the city of Padang were generally 26-35 years old (57.80%), followed by the 36-45 year age group (19.27%). Females (80.73%) were treated more than males (19.27%). The most occupations are paramedics (63.55%) followed by medical personnel (23.36%). The onset of symptoms when infected was highest at a distance of 3 to 7 days (45%) followed by < 3 days (28.44%). The duration of time for confirmed COVID-19 health workers who have been vaccinated and treated at general hospital throughout the city of Padang is more than 28 days after vaccination (86.11%). The most common symptom was fever (24.68%) and followed by headache (20.8%) with the most complaints 3 symptoms (55.96%). The highest number of comorbids is 1 to 2 types (66.06%) with the most comorbidities in health workers being treated, namely obesity (66.67%), as shown in table 1.

Table.1 Characteristics of Health Workers suffering from COVID-19 being treated at General Hospital throughout the city of Padang

Characteristic	Total subject (N = 109)	Vaccine (N = 36)	Unvaccine (N = 73)	p-value
Aged (years)				
17-25	16 (14,68)	8	8	
26-35	63 (57,80)	19	44	
36-45	21 (19,27)	6	15	0,399[b]
46-55	6 (5,50)	2	4	
> 56	3 (2,75)	1	2	
Gender				
Male	21 (19,27)	6	15	0,629[a]
Female	88 (80,73)	30	58	
Occupation				
Medical personnel	25 (23,36)	13	14	
Paramedic	68 (63,55)	21	47	0,414[b]
Supporting Personnel	8 (7,48)	2	6	
Administration staff	6 (5,61)	0	6	
Onset of Symptoms (days)				
< 3	31 (28,44)	14	17	
3 sampai 7	49 (44,95)	14	35	0,000[a]
>7	29 (26,61)	8	21	
Symptoms				
Fever	76 (24,68)	29	47	0,084[a]
Cough	51 (16,56)	19	32	0,379[a]
Breathlessness	27 (8,77)	8	19	0,665[a]
Gastrointestinal disorders	23 (7,47)	5	18	0,195[a]
Anosmia	49 (15,91)	20	29	0,118[a]
Augesia	18 (5,84)	12	6	0,001[a]
Headache	64 (20,78)	26	38	0,044[a]
Number of symptoms				
No symptoms	13 (11,93)	2	11	
1-2	35 (32,11)	8	27	0,009[b]
≥ 3	61 (55,96)	26	35	
Number of comorbids				
No comorbids	36 (33,03)	15	21	
1-2	72 (66,06)	21	51	0,546[b]
≥3	1 (0,92)	0	1	
Comorbids				
Hypertension	10 (9,80)	2	8	0,016[a]
Diabetes mellitus	2 (1,96)	0	2	0,316[a]
Cerebrovascular	2 (1,96)	1	1	0,153[a]
Cardiovascular	7 (6,86)	2	5	0,734[a]
Kidney illness	2 (1,96)	1	1	0,153[a]
Asthma/ COPD	9 (8,82)	3	6	0,363[a]
Obesity	68 (66,67)	18	50	0,544[a]
Autoimmune	2 (1,96)	0	2	0,316[a]

a, uji Chi-Square ; b, uji pearson chi square ; p < 0.05 significant;

Health workers suffering from COVID-19 who were not vaccinated with mild clinical grade followed by moderate clinical and severe clinical - critical, different from those who had been vaccinated. Health workers who had been vaccinated did not find any clinical severity critical. The clinical degree of mild after vaccination was 94.44% and moderate clinical 5.56%. Health workers who were confirmed to have COVID-19 after vaccination were found to be mostly at a mild clinical degree, while the highest number was not vaccinated at a moderate clinical degree, as shown in table 2. Statistics show that there is a significant relationship with the Pearson chi square test between the status of the COVID-19 vaccine and the clinical degree of health workers suffering from COVID-19 who are treated at hospitals throughout the city of Padang, with a p value of 0.000, as shown in table 2.

Table 2. The Relationship between COVID-19 Vaccine Status and the Clinical Degree of Padang City Health Workers

Vaccine Status	Clinical Degree			*p-value*
	Mild N = 61	Moderate N = 44	Severe N = 4	
Unvaccine	27 (36,99 %)	42 (57,53 %)	4 (5,48 %)	0,000
Vaccine	34 (94,44 %)	2 (5,56 %)	0 (0 %)	

Health workers suffering from COVID-19 who were neither vaccinated nor vaccinated were the most in length of stay < 21 days (78.08% and 97.22%). We can see different data in this table that the percentage of length of stay for health workers suffering from COVID-19 who were treated at RSUs throughout the city of Padang for those who were not vaccinated was higher than those who were vaccinated (21.92% vs. 2.78%). The relationship between vaccine status and length of stay for health workers suffering from COVID-19 who were treated at RSUs throughout the city of Padang in a statistical test showed a p value of 0.021 (p value <0.05), so there was a significant relationship between the status of the COVID-19 vaccine and the duration of the vaccine. the care of health workers in the city of Padang. The length of stay for COVID-19 in those vaccinated for <21 days was greater than that in those vaccinated because the clinical symptoms in health workers who were vaccinated were mostly mild clinical (94.44%), as shown in table 3.

Tabel 3. The Relationship between the Status of the COVID-19 Vaccine and the Length of Hospitalization of Padang City Health Workers

Vaccine Status	Duration of Treatment		*p-value*
	< 21 days N = 92	≥ 21 days N = 17	
Unvaccine	57 (78,08 %)	16 (21,92%)	0.021
Vaccine	35 (97,22 %)	1 (2,78 %)	

Health workers suffering from COVID-19 who were not vaccinated and vaccinated against the outpatient of health care treatment were recovered (94.52% and 88.89%) followed by recovery with residual symptoms (5.48% and 11.11%). The relationship between vaccine status and the outpatient of health care workers suffering from COVID-19 who were treated at RSUs throughout the city of Padang with a statistical test, the results obtained p value of 0.289 so that there was no significant relationship between the status of the COVID-19 vaccine and the outpatient of COVID-19 treatment in health workers who are being treated at RSUs throughout the city of Padang.

Table 4. Relationship between COVID-19 Vaccine Status and outpatient of COVID19 Treatment at Padang City Health Workers

Vaccine Status	End of Treatment Status		*p-value*
	Healed N = 101	Recover with residual symptoms N = 8	
Unvaccine	69 (94,52 %)	4 (5,48 %)	0,289
Vaccine	32 (88,89 %)	4 (11,11 %)	

DISCUSSION

Characteristics of Health Workers Survivor COVID-19

This study shows that the most COVID-19 health workers who are hospitalized are in the 26-35 year age group (57.80%), followed by the 36-45 year age group (19.27%). The results of this study are in line with those of Soebandrio et al., who got the most age at <39 years.[9] Nguyen's study is slightly different from this study, Most health workers are aged 35–44 years (23.30%) followed by 25-34 years (21.95%).[2] The majority of this study was at the age of 26-35 years because in that age range the active productive age group worked in the COVID-19 isolation room, causing increased exposure to the SARS-COV-2 virus.

The highest gender in this study was female (80.73%). This result is the same as that of Antonelli's study, mostly women (62.50%) and Nguyen's study (81%).[2] Different results were obtained in Husen's study of health workers in Ethiopia, 55.30% male.[10] This study was mostly female because most health workers in Padang City were female and women were more prone to suffering from stress fatigue, depression, and anxiety, usually related to with longer shifts, poor working conditions and lack of recognition, thereby lowering immunity and increasing the risk of COVID-19 infection.[11]

Most of this research is paramedics (62.40%) followed by medical personnel (24.80%). This result is in line with Bergwerk's study where the highest number of paramedics (46%) and Manglano (33.90%).[12] This result is different from Soebandrio's study in Jakarta where the highest number of medical personnel (48.40%) followed by paramedics (44.20%).[9] The population in this study was also dominated by paramedics so that the incidence of paramedics was more than medical personnel. In theory, high exposure is not only paramedics, but also medical personnel.

This study showed the most symptom onset before confirmed COVID-19 at 3 to 7 days (44.95%) followed by < 3 days (28.44%) and > 7 days (26.61%) and statistically significant (p = 0.000). The incubation period for COVID-19 is the time interval between when a person is infected and the likelihood of developing COVID-19 disease or symptoms in a confirmed case. The time between the occurrence of exposure to the onset of symptoms or called the incubation period, usually occurs within two to 14 days.

This study found that the distance between confirmed COVID-19 with the second vaccine was more than 28 days (86.11%) followed by 15-27 days (8.33%) and 14 days (5.56%). This result is in line with the study of Bergwerk et al in the breakthrough case of COVID-19 in health workers where the average interval from the second vaccine dose to the detection of SARS-CoV-2 was 39 days.[72] Different results from the Cucunawangsih study in Indonesia, obtained from 1,040 health workers who had received two doses of the COVID-19 vaccine, 13 (1.25%) tested positive for SARS-CoV-2 RNA with a mean between 2 and 11 days (median 5 days) after the second vaccination.[13] This study was mostly in >28 days where according to the theory of SARS-CoV2 antibodies will decrease over time.

Most of the clinical symptoms in this study were fever (24.68%), followed by headache (20.78%) and cough (16.56%). The same study in Loon's study in Belgium on COVID-19 health workers most of which was cough (82%), headache (78%) and fever (76%).[14] It is different in Magnavita's study where the most common symptoms of infected COVID-19 health workers are muscle pain (52.40%) and fatigue (47.60%). anosmia (42.70%) and dysgeusia (37.80%).[15] Symptoms of fever, headache and cough in this study were the main complaints of patients to be treated.

Health workers who were treated in this study were the most with symptoms 3 (55.96%) followed by 1-2 symptoms (32.11%) and no symptoms (11.93%). Vahey's study in 128 treated patients found that the most symptoms were 3 symptoms with the most symptoms being cough, but symptoms of vomiting, dyspnea, changes in mental status, dehydration, and shortness of breath were significantly associated with hospitalization, while rhinorrhea, headache, sore throat, and anosmia or ageusia were significantly associated with non-hospitalization.[16] The Magnavita study found that health workers affected by COVID-19 were most affected by 2 symptoms followed by 3 symptoms.[15] The number of these symptoms will be directly proportional and significantly to the severity of the disease.

The most comorbidities in this study were obesity (66.67%) followed by hypertension (9.80%) and asthma/COPD (8.82%). This study is in line with the Kambhampati study with the most obesity (72.50%).[17] This is slightly different from Bennasrallah's (2020) study on 265 COVID-19 patients, it was found that obesity was the third most comorbid (15.40%) after diabetes (16, 80%) and hypertension (15.60%).18 Healthcare workers with obesity are associated with reduced oxygen in the lungs and low-grade inflammation associated with obesity, such as impaired secretion of abnormal cytokines, adipokines, and interferon consequences in the immune response.[19] Obese patients also there will be an increase in acute phase reactants that are related to the severity of inflammation, namely CRP, serum ferritin, D-dimer, Erythrocyte sedimentation rate (ESR), and LDH.[20] Obesity is associated with an increased risk of diabetes mellitus, hypertension and cardiovascular disease. The greater the number of co-morbidities in obese patients, the greater the severity of COVID-19. The respiratory system is also altered in obesity. Changes in the respiratory mechanism, increased airway resistance and decreased lung volume can impair gas exchange.[15]

This study is mostly with comorbid 1 to 2 types (66.06%). This result is in line with the study by Giannouchous et al., found that in patients treated based on the highest number of comorbidities, one comorbid (26.85%) was followed by two comorbids (12.65%).[96] The same result also occurred in Richardson's study, most of which had more than one comorbid (88%) followed by 1 comorbid (6.30%) and no comorbid (6.10%).[97] The number of comorbids has a close relationship with poor outcomes, this is because multiple comorbidities will contribute to the complexity of the disease so that it has an impact on disease progression.[101]

The Relationship between COVID-19 Vaccine Status and the Clinical Degree of Padang City Health Workers

Health workers who did not vaccinate the highest at moderate clinical degree 57.53% and vaccinated at 94.44%. Mild clinical degrees in the unvaccinated and vaccinated were 36.99% and 94.44%, respectively. Moderate clinical degrees in the unvaccinated and vaccinated were 57.53% and 5.56%, respectively. Critical severity (2.7%) was only found in health workers who were not vaccinated. This study found a significant relationship between the status of the COVID-19 vaccine and the clinical degree of health workers treated at the Padang City Hospital (p = 0.000). In the Tenforde et al study, mortality within 28 days was related to vaccination status (8.6% not vaccinated vs. 6.3% vaccinated).[55] Some unvaccinated individuals with COVID-19 had a longer duration of illness.[21] The World Health Organization in its Clinical Progression Scale states that the highest severity was significantly lower in the breakthrough case than in the unvaccinated. COVID-19 patients who have been vaccinated with the highest degree of severity, namely mild 14 patients (42.4%) followed by severe severity 9 patients (30.3%).[57] Ramakrishnan's study of 3301 unvaccinated patients found 291 patients (8.8%) required an ICU and this was significantly less (p=0.03) than among the vaccinated 31 of 519 patients (6%).[22] Patients who were not vaccinated were more likely to be hospitalized (2.8%), admitted

to the ICU (0.5%), and required intubation for mechanical ventilation (0.2%); these results were less common in people who were fully vaccinated with a booster (0.7%, 0.08%, and 0.03%, respectively) and people who were completely vaccinated without a booster (1.0%, 0. 12%, and 0.05%) (p<0.001) . Death was also more likely among people who were not vaccinated (0.3%) than among those who were fully vaccinated with a booster (0.07%) or without (0.08%) (p<0.001).[23]

The Relationship between COVID-19 Vaccine Status and Length of Hospitalization for Health Workers in Padang City

In this study, 35 patients (97.22%) were hospitalized with confirmed COVID-19 health care workers (97.22%) while 1 patient (2.78%). Health workers who were not vaccinated also had length of stay < 21 days more than length of stay > 21 days (78.08% vs 21.92%). Statistical test obtained significant results (p = 0.02). This study found that the length of stay < 21 days was highest in those who were vaccinated because health workers who were vaccinated were mostly in mild clinical cases. The results obtained in the Tenforde study for COVID-19 treatment, 1197 patients who received hospitalization (< 28 days) were higher in patients who were vaccinated than those who were not vaccinated (88% vs 77.20%) and statistically significant (p=0.003).[55] Sing's study found a statistically significant value for the length of stay for COVID-19 on vaccination and unvaccinated (10 days vs 12 days; pValue = 0.034).[57] Vaccination can protect against the SARS-CoV2 virus and is associated with length of stay for COVID-19 and provides a protective barrier against re-infection.[110] Some individuals who are not vaccinated against COVID-19 have a longer duration of illness.[84] Other factors contributing to length of hospitalization in addition to vaccination are comorbid. Jang's research in Korea found that the more comorbidities, the longer the length of stay.[24]

The Relationship between COVID-19 Vaccine Status and Outpatient of COVID-19 Treatment at Padang City Health Workers

Health workers suffering from COVID-19 who were not vaccinated and vaccinated against the final status of COVID-19 treatment recovered (94.52% and 88.89%) followed by recovery with residual symptoms (5.48% and 11.11%). The statistical test found that there was no significant relationship with the P Value of 0.289. The results were the same in Sing's study where the percentage of cure was 81.80% for those who were vaccinated and 71.80% for those who were not vaccinated but the mortality rate was higher for those who were not vaccinated (28.20% vs. 18.20%).[57] Research Johnson et al. conducted on 22,305 COVID-19 patients based on vaccination status, the mortality rate in unvaccinated patients was 7.8% (16,527 patients) and the mortality rate was lower in fully vaccinated patients by 0.6% (5,493 patients).[25] In a multivariable analysis , vaccination reduced mortality by 60 days (p < 0.001).[22] The Washington study found higher mortality at age 65 based on vaccination status.[108]

CONCLUSION

The vaccination status of health workers who survived COVID-19 who were treated at the Padang City Hospital consisted of 66.97% unvaccinated and 33.03% vaccinated. Characteristics of health workers who survived SSCOVID-19 aged 26-35 years, female, working as a paramedic, onset of symptoms 3 to 7 days, number of symptoms 3, highest fever, number of co-morbidities 1 to 2, obesity, length of stay <21 day, and clinical light. The vaccination status of health workers for COVID-19 survivors is related to the clinical degree and length of hospitalization. The vaccination status of health workers who survived COVID-19 was not related to the outpatient.

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