Nursing Frontiers Research and Practice
2026.Vol. 1, No.2, (66-74)
https://doi.org/10.35730/ja30ry25

Association of Education, Knowledge, Employment, and Environment with Covid-19 Health Protocol Compliance

Beby Wulan Khaida[1], Putri Wulandini[2], Yulia Febrianita[3]

[1] Student of Diploma III Nursing Study Program, Faculty of Pharmacy and Health Sciences, Abdurrab University, Pekanbaru, Indonesia

[2,3] Nursing Department, Faculty of Pharmacy and Health Sciences, Abdurrab University, Pekanbaru, Indonesia

Type of article: Original Article

ARTICLE INFORMATION

Received: –
Revised: –
Accepted: –
Available online: –

KEYWORDS

Covid-19 health protocol, Education, knowledge, work, environment

CORRESPONDING AUTHOR

Name: Beby Wulan Khaida
E-mail: beby.wulan.k19@student.univrab.ac.id

ABSTRACT

Background: Compliance with health protocols was an important community-level measure during the COVID-19 pandemic. Individual and contextual factors may shape preventive behaviour. Aim: This study examined the associations of education, knowledge, employment, and environment with COVID-19 health protocol compliance in Cinta Damai Village, Kampar Regency, Riau Province. Methods: A quantitative associative study involved 236 community members selected through purposive sampling from a population of 578. Data was collected using questionnaires and analysed using univariate frequency distributions and bivariate Chi-square tests. Results: Most respondents reported compliant behaviour (199/236; 84.3%). Knowledge was not significantly associated with compliance ($p=0.332$), nor was education ($p=0.554$). Employment ($p<0.001$) and environmental conditions ($p<0.001$) were significantly associated with compliance. Among employed respondents, 124 of 125 (99.2%) were compliant; among respondents in non-risk environments, 194 of 207 (93.7%) were compliant. Conclusion: Employment and environmental conditions were associated with COVID-19 health protocol compliance, whereas education and knowledge were not statistically associated in this sample.

INTRODUCTION

Coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), emerged in late 2019 and developed into a global public health emergency. During the early pandemic period, transmission between people and the occurrence of severe respiratory illness placed substantial demands on health systems and communities. The source study reported that, as of 24 November 2021, 258,164,425 confirmed cases and 5,166,192 deaths had been recorded globally. In Indonesia, 4,254,443 confirmed cases and 143,766 deaths were reported by the same date. The Riau Provincial Health Office recorded 128,264 cases in Riau Province, while Kampar Regency recorded 8,677 cases.

Community preventive behavior was therefore an important component of the COVID-19 response. Health protocols were intended to enable people to continue daily activities while reducing risks to themselves and others. The measures described in the source study included wearing masks, washing hands or using hand sanitizer, maintaining physical distance, avoiding crowds, and reducing mobility. Compliance depends not only on individual decisions but may also be shaped by social circumstances and the environments in which people work and interact.

Knowledge is commonly considered an important cognitive domain in the formation of behaviour. Notoatmodjo (2018), as cited in the source study, explains that behaviour based on knowledge may be more sustainable. Education may influence access to and understanding health information, although knowledge can also be acquired through non-formal sources such as mass media, the internet, and health education. Consequently, formal educational attainment does not necessarily translate directly into preventive behaviour.

Employment may shape daily exposure, access to information, routines, and opportunities to practise preventive measures. The source study discusses how work-related experience may influence knowledge and how work settings can create circumstances in which health protocols are expected or required. Environmental conditions may also influence behaviour through social norms, interaction patterns, and the degree to which preventive practices are supported by people nearby. A supportive environment may encourage individuals to internalise rules and demonstrate them through everyday actions.

Previous studies cited in the original research provide mixed contextual evidence. Some reports described associations between education or knowledge and COVID-19 prevention behaviour, while other observations indicated that people with higher education did not always demonstrate better preventive practices and that people with lower education could still comply. Studies discussed in the source also suggested that environmental support and social-cultural conditions influence compliance. The original study identified a local evidence gap: the relationships among education, knowledge, employment, environment, and health protocol implementation had not previously been examined in Cinta Damai Village.

From a public health nursing perspective, understanding these factors can help nurses and community health workers design health promotion that considers both individual understanding and the social context of behaviour. The findings may inform community education, workplace health promotion, and locally appropriate approaches to strengthening preventive practices. The study's conceptual framing treats education and knowledge as individual factors, and employment and environment as contextual factors, that may be associated with the outcome of health protocol implementation. This framing is consistent with the source study's behavioural perspective; no formal named nursing theory was specified in the original report.

The aim of this study was to determine the association of education, knowledge, employment, and environmental condition with COVID-19 health protocol compliance among residents of Cinta Damai Village, Kampar Regency, Riau Province.

METHOD

Research design

This study used a quantitative approach with an associative research design. The design examined the statistical relationships between four independent variables—education, knowledge, employment, and environment—and the dependent variable, implementation of COVID-19 health protocols. The study was observational; no intervention or allocation to treatment groups was reported.

Setting and study period

The research was conducted among residents of Cinta Damai Village, Tapung Hilir District, Kampar Regency, Riau Province, Indonesia. The source document describes an initial community interview conducted but does not provide a complete fieldwork start and end date for the main survey.

Population and sample

The target population comprised 578 residents of Cinta Damai Village. The sample consisted of 236 respondents. The original report calculated the sample size using $n = N/[1 + N(d)^2]$, with N=578 and precision d=0.05, yielding n=236. Purposive sampling was used. Inclusion criteria were residence in Cinta Damai Village, age nine years or older, ability to read and write, and willingness to participate. Exclusion criteria were non-residency in the village, age below nine years, inability to read and write, or unwillingness to participate.

Data collection and instruments

Primary data was obtained directly from respondents through questionnaires. Secondary information was obtained from literature and online sources. The questionnaire included respondent characteristics and items on knowledge, health protocol behaviour, and environmental factors. Knowledge was assessed using 10 multiple-choice questions, each scored one point, producing a possible score from 0 to 10. Health protocol behavior was assessed using 10 Likert-scale statements with five response options (never, rarely, sometimes, often, always) and a reported score range of 0–40. Environmental factors were assessed using five Likert-scale items. The source report does not provide a clear account of the instrument's formal validation, reliability coefficients, adaptation permissions, or the precise cut-off rules used to categorize all scores; these details are therefore not inferred in this manuscript.

Data processing and statistical analysis

Data processing comprises editing, coding, data entry, and tabulation. Univariate analysis described the distribution of respondent characteristics and study variables using frequencies and percentages. Bivariate analysis used the Chi-square test to assess associations between each independent variable and health protocol implementation, with a significance threshold of $\alpha=0.05$. The original report presents p-values rounded to three decimal places. Values reported as 0.000 are presented here as $p<0.001$, because a p-value is not literally zero.

Ethical considerations

The original report describes informed consent, anonymity through respondent codes, confidentiality through group-level reporting, and voluntary participation. It does not identify an institutional ethics committee, approval number, or approval date. These details should be added by the authors if an approval record exists; they have not been invented for this manuscript.

RESULTS AND DISCUSSION

Respondent characteristics

A total of 236 respondents were included. The age distribution was concentrated in the 15–19-year group (137; 58.0%), followed by 20–24 years (93; 39.0%) and 28–54 years (8; 3.0%), as reported in the source. The age categories as printed in the original report do not account explicitly for ages 25–27; the categories are reproduced without correction. Most respondents were female (180; 76.3%), while 56 (23.7%) were male.

Characteristic	Category	n (%)
Age	15–19 years	137 (58.0)
Age	20–24 years	93 (39.0)
Age	28–54 years	8 (3.0)
Sex	Female	180 (76.3)
Sex	Male	56 (23.7)
Education	Primary (SD)	1 (0.4)
Education	Junior high (SMP)	35 (14.8)
Education	Senior high (SMA)	161 (68.2)
Education	Higher education	39 (16.5)
Knowledge	Poor	10 (4.2)
Knowledge	Moderate	54 (22.9)
Knowledge	Good	172 (72.9)
Employment	Not employed	111 (47.0)
Employment	Employed	125 (53.0)
Environment	At risk	29 (12.3)
Environment	Not at risk	207 (87.7)
Health protocol	Not compliant	37 (15.7)
Health protocol	Compliant	199 (84.3)

Note: Percentages are reproduced from the original report. Some totals or category percentages in the source tables are internally inconsistent because of rounding or transcription; the counts are shown as reported.

Association between knowledge and health protocol compliance

Among respondents classified as having poor knowledge, 7 of 10 (70.0%) were compliant and 3 (30.0%) were not compliant. In the moderate knowledge category, the source table records 44 compliant and 10 non-compliant respondents; the displayed total is inconsistent (45 rather than 54) in the original table. Among respondents with good knowledge, 148 of 172 (86.0%) were compliant and 24 (14.0%) were not compliant. The reported p-value was 0.332, indicating no statistically significant association at the 0.05 level.

Knowledge	Not compliant n (%)	Compliant n (%)	Total (n)	p-value
Poor	3 (1.3)	7 (3.0)	10	0.332
Moderate	10 (4.2)	44 (18.6)	54	
Good	24 (10.2)	148 (62.6)	172	
Total	37 (15.7)	199 (84.3)	236	

**The original narrative/table contains a discrepancy: 44 + 10 = 54, while one line prints 45. The total of 54 is consistent with the reported category percentage and overall sample.*

The result suggests that a high level of reported knowledge did not, by itself, distinguish compliant from non-compliant behavior in this sample. Although knowledge is an important foundation for preventive action, actual implementation may also depend on routines, social expectations, workplace requirements, and environmental support. This interpretation is consistent with the source discussion, which notes that information can be obtained from formal education, mass media, the internet, and community health education. The finding should not be interpreted as evidence that knowledge is unimportant; it indicates only that this study did not detect a statistically significant association using its sample and measurement approach.

Association between employment and health protocol compliance

Of 111 respondents who were not employed, 75 (67.6%) were compliant and 36 (32.4%) were not compliant. Of 125 employed respondents, 124 (99.2%) were compliant and one (0.8%) was not compliant. The reported Chi-square p-value was 0.000 (presented as p<0.001), indicating a statistically significant association between employment status and health protocol compliance.

Employment	Not compliant n (%)	Compliant n (%)	Total n (%)	p-value
Not employed	36 (15.3)	75 (31.8)	111 (47.0)	
Employed	1 (0.4)	124 (52.5)	125 (53.0)	<0.001
Total	37 (15.7)	199 (84.3)	236 (100)	

The observed proportion of compliance was higher among employed respondents than among those not employed. The original discussion proposes that work-related experience, exposure to information, and workplace expectations may contribute to preventive behavior. However, the study classified employment only as employed or not employed and did not report occupation type, work setting, or specific workplace policies in the analyzed table. Therefore, the association cannot establish which employment-related mechanism accounts for the difference. In community nursing practice, workplaces may be useful settings for health communication and reinforcement of preventive routines, while outreach should also include residents who are not employed.

Association between environmental conditions and health protocol compliance

Among 29 respondents living in an environment classified as at risk, five (17.2%) were compliant and 24 (82.8%) were not compliant. Among 207 respondents in environments classified as not at risk, 194 (93.7%) were compliant and 13 (6.3%) were not compliant. The reported p-value was 0.000 (presented as p<0.001), indicating a statistically significant association between environmental conditions and compliance.

Environment	Not compliant n (%)	Compliant n (%)	Total n (%)	p-value
At risk	24 (10.2)	5 (2.1)	29 (12.3)	
Not at risk	13 (5.5)	194 (82.2)	207 (87.7)	<0.001
Total	37 (15.7)	199 (84.3)	236 (100)	

The marked difference in compliance between environmental categories supports the view that behavior is influenced by the surrounding social and physical context. The source discussion describes the environment as including the conditions and social values surrounding individuals. A supportive and communicative environment may help individuals learn and internalize rules, while an unsupportive environment may weaken motivation to follow them. The result is relevant to community health nursing because preventive messages can be reinforced through local leaders, family networks, community activities, and workplace or neighborhood practices. The environmental measure and its classification procedure were not fully described in the source, so the result should be interpreted with that measurement limitation in mind.

Association between education and health protocol compliance

Among respondents with primary education, one of one was compliant. Among those with junior high education, 30 of 35 (85.7%) were compliant and five (14.3%) were not compliant. Among those with senior high education, 138 of 161 (85.7%) were compliant and 23 (14.3%) were not compliant. Among respondents with higher education, 30 of 39 (76.9%) were compliant and nine (23.1%) were not compliant. The reported p-value was 0.554, indicating no statistically significant association between education and health protocol compliance.

Education	Not compliant n (%)	Compliant n (%)	Total n (%)	p-value
Primary	0 (0.0)	1 (0.4)	1 (0.4)	
Junior high	5 (2.1)	30 (12.7)	35 (14.8)	
Senior high	23 (9.7)	138 (58.5)	161 (68.2)	0.554
Higher education	9 (3.8)	30 (12.7)	39 (16.5)	
Total	37 (15.7)	199 (84.3)	236 (100)	

The absence of a statistically significant association suggests that formal educational attainment was not sufficient predictor of compliance in this sample. Health information may be obtained through multiple channels, and preventive behaviour may be shaped by factors beyond formal schooling. The source discussion similarly notes that respondents with higher education may still show inadequate preventive behaviour, while respondents with lower education may demonstrate good prevention practices. For nurses and health educators, this supports delivering accessible health messages across educational groups rather than if educational attainment guarantees adherence.

Integrated interpretation, implications, and limitations

Overall, 84.3% of respondents were classified as compliant with COVID-19 health protocols. The bivariate findings identified statistically significant associations for employment and environmental conditions, but not for knowledge or education. These findings point to the importance of considering contextual influences alongside individual-level information when planning community prevention activities. Nurses and community health workers may use workplaces and neighbourhood structures as channels for reinforcing health messages, while ensuring that residents outside formal employment settings are not overlooked.

The study contributes local evidence from Cinta Damai Village and provides a practical basis for community-level health promotion. The findings support strategies that strengthen supportive environments and make preventive practices feasible in everyday settings. They do not establish causality, because the design was observational and cross-sectional in nature as described by the data collection and analysis, and no temporal sequence was tested. The use of purposive sampling may limit generalizability beyond the study population. Self-reported questionnaire data may be affected by recall or social desirability bias. In addition, the original report does not provide detailed psychometric evidence for the questionnaire, a complete account of the environmental scoring and cut-offs, or a documented ethics approval reference.

There are also inconsistencies in the source tables and narrative, including a knowledge-category count and some demographic percentage/age-category details. These have been transparently flagged rather than silently corrected. The Chi-square output indicates that one cell in the knowledge table and one cell in the environment table had expected counts below five; this should be considered when interpreting the asymptotic Chi-square results. Future studies should report instrument validity and reliability, define cut-off points in advance, describe the sampling frame and fieldwork dates, and consider statistical methods appropriate for sparse expected cell counts.

CONCLUSION

In this study of 236 residents of Cinta Damai Village, 199 respondents (84.3%) were classified as compliant with COVID-19 health protocols. Education ($p=0.554$) and knowledge ($p=0.332$) were not significantly associated with compliance. Employment and environmental condition were significantly associated with compliance (both reported as $p=0.000$; expressed as $p<0.001$). The findings indicate that contextual factors should be considered in community health promotion alongside the provision of accurate information. Because the study was observational, used purposive sampling, and had limitations in instrument reporting and source-data consistency, the results should be interpreted as associations rather than causal effects.

AUTHOR CONTRIBUTION

Beby Wulan Khaida: Conceptualization, Investigation, Methodology, Data curation, Formal analysis, Writing – original draft. Putri Wulandini and Yulia Febrianita: Supervision, Validation, Writing – review and editing. These roles are provisionally mapped from the author and supervisor roles stated in the source document and should be confirmed by both authors.

ACKNOWLEDGEMENT

The authors acknowledge the residents of Cinta Damai Village who participated in the original study and the academic supervision provided by the Diploma III Nursing Study Program, Abdurrab University. No funding source was reported in the original document.

REFERENCES

1. Adhikari SP, et al. Epidemiology, causes, clinical manifestation and diagnosis, prevention and control of coronavirus disease (COVID-19) during the early outbreak period: a scoping review. Infect Dis Poverty. 2020;9:29. doi:10.1186/s40249-020-00646-x.
2. Badan Pusat Statistik Provinsi Sulawesi Utara. Badan Pusat Statistik Provinsi Sulawesi Utara [Internet]. 2020 [cited as listed in the source]. Available from: https://sulut.bps.go.id/
3. CCN Indonesia. Mengenal social distancing sebagai cara mencegah corona [Internet]. 2020. Available from: https://www.cnnindonesia.com/
4. Dinas Kesehatan Provinsi Riau. Riau Tanggap COVID-19 [Internet]. 2021. Available from: https://corona.riau.go.id/
5. Gugus Tugas Penanganan Pandemi COVID-19. Percepatan penanganan pandemi COVID-19 [Internet]. 2020. Available from: https://covid.go.id/
6. Jamroni, Fitrianingrum A. Faktor yang mempengaruhi perilaku 3M dalam pencegahan penularan COVID-19 di Padukuhan Ngaliyan. J Kesmas Untika Luwuk. 2021;12(1):41-48.
7. Kementerian Kesehatan Republik Indonesia. Pedoman pencegahan dan pengendalian COVID-19. Jakarta: Kementerian Kesehatan RI; 2020.
8. Kundaryanti R, et al. Faktor-faktor yang berhubungan dengan perilaku pencegahan penularan COVID-19 pada ibu hamil tahun 2020. Jakarta: Universitas Nasional; 2020.
9. Lestari A. Hubungan pengetahuan dan sikap terhadap perilaku cuci tangan pada masyarakat Kelurahan Pegirian. J Promkes. 2019;7(1):1-11.
10. Kementerian Kesehatan Republik Indonesia. Info Corona Virus Archives [Internet]. 2021. Available from: https://covid19.kemkes.go.id/
11. Moudy J, Syakurah RA. Pengetahuan terkait usaha pencegahan Coronavirus Disease (COVID-19) di Indonesia. HIGEIA. 2020;4(3):333-346.
12. Norita, et al. Hubungan pengetahuan dan sikap dengan kepatuhan untuk menjaga jarak dan menggunakan masker pada masyarakat di Kota Barabai Kabupaten Hulu Sungai Tengah tahun 2020. 2020.
13. Notoatmodjo S. Metodologi penelitian kesehatan. Jakarta: Rineka Cipta; 2018.
14. Perhimpunan Dokter Paru Indonesia. Pedoman manajemen bagi pemerintah daerah dalam penanganan COVID-19 dan dampaknya. Jakarta: Kementerian Dalam Negeri Republik Indonesia; 2020.
15. Putra YIW, Manalu NV. Tingkat pengetahuan dengan perilaku warga dalam menjalankan protokol kesehatan di masa new normal pandemi corona. Community of Publishing in Nursing. 2020;8(4):366-373.
16. Sagala SH, Maifita Y, Armaita. Hubungan pengetahuan dan sikap masyarakat terhadap COVID-19: a literature review. Menara Medika. 2020;3(1):46-53.
17. Setiadi. Konsep dan praktik penulisan riset keperawatan. 2nd ed. Yogyakarta: Graha Ilmu; 2017.
18. Sibagariang, et al. Metodologi penelitian untuk mahasiswa diploma kesehatan. Jakarta: Trans Info Media; 2017.
19. Sujarweni VW. Metodologi penelitian keperawatan. Yogyakarta: Gava Media; 2018.
20. Suprayitno, et al. Pengetahuan dan sikap masyarakat dalam pencegahan COVID-19. J Health Sci. 2020;5(2):68-73.

21. Supriyadi, Istanti N, Erlita YD. Perilaku protokol kesehatan COVID-19 pada pedagang pasar tradisional. J Keperawatan. 2021;13(1):267-274.
22. Tirto.id. Apakah yang dimaksud protokol kesehatan COVID-19? [Internet]. 2020. Available from: https://tirto.id/
23. Utami, et al. Pengetahuan, sikap dan keterampilan masyarakat dalam pencegahan COVID-19 di Provinsi DKI Jakarta. J Kesehatan Holistic. 2020;4(2).
24. World Health Organization. Materi komunikasi risiko COVID-19 untuk fasilitas pelayanan kesehatan. Geneva: WHO; 2020.
25. World Health Organization. Coronavirus disease 2019 (COVID-19). J Respirologi Indonesia. 2020;40(2):119-129.
26. Wulandari S. Gambaran pengetahuan tindakan preventif penularan COVID-19 pada anak SD Negeri 001 Kepenuhan Hulu Kabupaten Rokan Hulu. Maternity and Neonatal. 2020;3(2):84-92.
27. Yuliana. Corona virus diseases (COVID-19): sebuah tinjauan literatur. Wellness Healthy Mag. 2020;2(1):187-192.