

Exploring the Role of Theory of Planned Behavior on Covid-19 Vaccination Intention

Zaid*

Master of Law, Universitas
Muhammadiyah Yogyakarta
zaidrusdianto@gmail.com

Arundati Shinta

Faculty of Psychology, Universitas
Proklamasi 45 Yogyakarta
arundatishinta@yahoo.com

Mahbub Pasca Al Bahy**

Azərbaycan Turizm və
Menecment Universiteti
mahbubpasca@gmail.com

Abstract

This study focuses more on identifying the role of the Theory of Planned Behavior (TPB) in predicting public intentions to get the Covid-19 vaccine in Special Region of Yogyakarta. Three hypotheses were then put forward in the form of attitude (H1), subjective norms (H2) and perceived behavioral control have a positive and significant effect on Covid-19 vaccination intention (H3). By using a quantitative method through a cross-sectional survey approach involving 426 respondents, the results of this study ultimately concluded that Covid-19 vaccination intention was determined by attitudes towards the Covid-19 vaccine ($\beta = 0.447$, T-Value = 8,079, p-value = 0.000), subjective norm ($\beta = 0.176$, T-Value = 3.271, p-value = 0.001) and perceived behavioral control ($\beta = 0.263$, T-Value = 6.348, p-value 0.000). And among the three, attitudes were found to be the strongest and most significant predictor of Covid-19 vaccination intention. Several limitations and suggestions were also proposed in this research.

Keywords: covid-19, theory of planned behaviour, vaccination intention

Received 2 March 2022/Accepted 30 August 2022 ©Author all rights reserved

Introduction

Currently, the World is experiencing a Pandemic that will be remembered forever as a global crisis (Pereira et al., 2021). This pandemic is, as experts call it, “the novel coronavirus disease (COVID-19)” caused by SARS-CoV-2 that emerged in Wuhan, China in late December 2019 (Pratondo & Zaid, 2021; Zaid & Al Bahy, 2022). This virus, shortly thereafter, has spread rapidly throughout the world so that it has caused large-scale epidemics around the world (Wong et al., 2021), including in Indonesia.

As the COVID-19 outbreak continues to blister across much of the world, the victim in consequence of the encumbrance of disease and death worldwide continues to increase (Lucia et al., 2021). In this situation, population immunity is required to be achieved after the disease spreads into a pandemic. However, waiting for natural population immunity through viral infection to achieve herd immunity is unethical and unacceptable (Omeish et al., 2021). Accordingly, it is required to be achieved to develop an endowed vaccine to cease the spread of Covid-19, and vaccinating the population has been considered to be one solution that is regarded as rationally compelling (Matrajt, Eaton, Leung, & Brown, 2021; Matrajt, Eaton, Leung, Dimitrov, et al., 2021). Although several vaccines were developed and made available fairly quickly, less than a year, after the outbreak of the global Covid-19 pandemic (Kotta et al., 2021), unfortunately, other treatment options are limited (Guaracha-Basáñez et al., 2021), vaccination rollouts are also still low in many countries (Lo et al., 2021). Not to mention the vaccine hesitancy that is starting to emerge. This is a problem because it is one of the ten most severe threats to global health (Kabir et al., 2021). This could lead to rejection or at least low acceptance of Covid-19 vaccinations, which, according to Abdulah (2021), will further hamper vaccination coverage in every health system. As a result, one of the most essential following stages in the battle against the new coronavirus illness through herd immunity will be broad acceptance of the COVID-19 vaccine (Irfan et al., 2022).

Vaccination against infectious illnesses plays a vital role and has shown to be a successful practical strategy for avoiding infection and lowering fatalities from a variety of infectious diseases (Huang & Kuan, 2022; Kwok et al., 2021; Zaid et al., 2022). As a result, immunization against the Covid-19 is projected to halt the outbreak; achieving this aim will need a high level of coverage (Matrajt, Eaton, Leung, Dimitrov, et al., 2021; Yu et al., 2021). The fundamental goal is to instill "herd immunity" (Boon-itt et al., 2021; Megha et al., 2022).

Herd immunity is believed to be adequate once a significant portion of the population has been vaccinated (Sotiriou et al., 2021) and, therefore, makes the spread of the coronavirus highly unlikely, depending on the individual's willingness to be vaccinated (Erawan et al., 2021; Fernandes et al., 2021). Consequently, once a Covid-19 vaccine is considerably available, the focus would turn to community immunization in order to build population-wide protection (Al-

Amer et al., 2022). Regardless of how long the vaccination gives protection, one thing that can be sure is that clinical trials show that vaccination effectively reduces the rate of disease spread (Palamenghi et al., 2020; Ullah et al., 2021). The sooner the vaccine is spread, the sooner the pandemic can be brought under control (Bolatov et al., 2021).

To sensibly reckon with the Covid-19 outbreak, determining the factors that might influence vaccination intentions is very important (Lo et al., 2021). Not only that, understanding vaccine intent, which includes willingness, desire, and positive attitude to be vaccinated, is essential (Dowdle et al., 2021; Gates et al., 2021; Jiang et al., 2021). Because existing literature before has shown that vaccination intention has a substantial impact on the efficacy of national immunization efforts (Wang et al., 2021).

Concerning vaccination interest, recent studies have attempted to trace the factors that help understand and increase uptake of Covid-19 vaccination interest (Thaker & Ganchoudhuri, 2021). While other previous studies only focused on roles, norms, and social influences (Zaid et al., 2021), public perceptions of the risks and benefits of vaccines (Zaid & Pratondo, 2021), to health belief models (Erawan et al., 2021), this study will instead focus more on identifying how the role of TPB is in predicting the public's intention to obtain a COVID-19 vaccine in Special Region of Yogyakarta.

This research involves the theory of TPB because, according to Husain, Shahnawaz, Khan, Parveen, & Savani (2021), the main construction of TPB is in the form of attitudes, subjective norms, and perceived behavioral control, which is believed to be a strong predictor of intention to get a COVID-19 vaccine, which is essential. To develop intervention measures to guarantee that mass immunization initiatives are effective (An et al., 2021). However, unfortunately, research on predictors of intention to be vaccinated with the COVID-19 vaccine is still very little researched, even in Indonesia, as far as the author's observations are still missing (no one has yet) explored.

Based on this, three hypotheses are offered in this study in the form of:

- Attitude has a positive and significant effect on Covid-19 vaccination intention (H_1);

- Subjective norms have a positive and significant effect on Covid-19 vaccination intention (H_2);
- Perceived behavioral control has a positive and significant effect on Covid-19 vaccination intention (H_3).

Method

Design

This is cross-sectional survey-based quantitative research. Three exogenous variables “attitudes, subjective norms, and perceived behavioral control” were projected to influence one endogenous variable in this study “Covid-19 vaccination intention”.

Respondents

The respondents involved in this study were those who lived in D.I. Yogyakarta was selected by the purposive sampling technique method. All respondents were then asked to fill in their data on the questionnaire. In the survey process and data collection from respondents, respondents are allowed to read the terms and criteria of the study. After the respondent reads it, the respondent has agreed to agree to each of the terms and criteria. Then, respondents were freed to fill out a questionnaire according to what they perceived to be the variables of this study. They were under absolutely no pressure to fill out the questionnaire form.

After collecting it, it was found that the total number of respondents who participated was 437. Only 11 had to be eliminated and were not further involved in this study because they did not fill in the personal data and the questionnaire correctly complete. So that the data received and processed further are 426 respondents.

A self-administrative questionnaire was given relating to their attitudes, subjective norms, perceived behavioral control, and their desire to be vaccinated with the Covid-19 vaccine as measured using a "5-point Likert scale". The overall indicator variables in this study follow from previous studies (Ullah et al., 2021), which were later developed (adapted) to the context of this research.

Data analysis

The data was processed and analyzed using the partial least squares structural equation modeling (PLS-SEM) approach once all of the surveys were gathered. PLS-SEM analysis is used in this paper since it models and estimates parameters for correlations between theoretical components as well as for evaluating whole behavioral science notions (Henseler, 2017). In addition to social and business research, PLS-SEM is also frequently and commonly used in psychological research (Riou et al., 2016). In the process of analysis, this research utilizes the SmartPLS 3.0 software.

Result

This is a cross-sectional survey-based quantitative research involving 426 respondents with the PLS-SEM approach. In the PLS-SEM analysis, the first thing to do is to analyze the descriptive of the respondents to find out the respondent's profiles. Afterward, followed by the measurement and structural model analysis. After all that, then the last is the hypothesis analysis.

Table 1.
Respondent profiles

Respondent Identities	Categories	Frequencies	%
Sex	Male	219	51.41%
	Female	207	48.59%
	Total	426	100.00%
Age	≤ 17 years	20	4.69%
	18 - 23 years	184	43.19%
	24-29 years	155	36.38%
	30 - 35 years	39	9.15%
	≥ 36 years	28	6.57%
Domicile	Kota Yogyakarta	130	30.52%
	Sleman	161	37.79%
	Bantul	85	19.95%
	Gunung Kidul	22	5.16%
	Wates	16	3.76%
	Kulon Progo	12	2.82%
Employment	Students	197	46.24%
	Private employees	145	34.04%
	Public employees	38	8.92%
	Housewife	42	9.86%
	Unemployment	4	0.94%
	Total	426	100.00%

Table 1 exhibits the results of the description or profile of respondents who voluntarily participated in this study by sex category. Most respondents were male (219/51.41%) than female (207/48.59%). In terms of age category, it appears that the age group of 18-23 years dominates the number of respondents in this study (166/38.97%) which is then followed by the age group of 24-29 years (135/31.69%), while respondents aged ≤ 17 years are the fewest respondents in this study (20/4.69%). Based on the domicile category, the majority of respondents in this study live in the Sleman area (161/37.79%), and the least are domiciled in Wates (and Kulon Progo (12/2.82%). While the last category relates to the work of the respondents, the majority of them have the status as students (197/46.24%) and Private Employees (145/34.04%), only very few of them are unemployed (4/0.94%).

Table 2.

Measurement Model Analysis Results

Variables	Loading	CR	AVE
Attitude (A)		0.922	0.665
I dwell it is excellent to vaccinate myself with the Covid-19 vaccine	0.832		
I dwell that uptaking the Covid-19 vaccination would be so covetable for me	0.836		
I dwell that uptaking the Covid-19 vaccination for myself is extremely necessary for the current situation	0.798		
I dwell that uptaking the Covid-19 vaccination would be truly worthwhile for me	0.813		
I dwell that uptaking the Covid-19 vaccination would be exceptionally favorable for me	0.788		
I dwell it is so advantageous to vaccinate myself with the Covid-19 vaccine	0.825		
Subjective Norms (SN)		0.894	0.808
Most people who are closer to me would expect me to uptake COVID-19 vaccination	0.894		
Most people who are closer to me would support me to uptake COVID-19 vaccination	0.903		
Perceived behavioral control (PBC)		0.891	0.803
I realized that vaccinating myself against COVID-19 was entirely up to me	0.897		
I think I have enough resources, time, and opportunity to uptake vaccinated against COVID-19	0.895		
Covid-19 Vaccination Intention (CVI)		0.881	0.787
I am disposed to uptake COVID-19 vaccination for myself	0.886		
I am very desired to uptake COVID-19 vaccination for myself	0.888		

Table 3.

Discriminant Validity Results (Fornell-Larcker Criterion)

Variables	A	SN	PBC	CVI
Attitude	0.815			
Subjective Norms	0.746	0.899		
Perceived behavioral control	0.741	0.695	0.896	
Covid-19 Vaccination Intention	0.773	0.692	0.717	0.887

Table 2 describes the measurement model test results. Based on the loading value shown, it may well be stated that all indicators in this study have an excellent standard of reliability based on the standards set by (Yazdi et al., 2017), where a loading value > 0.70 indicates a high-reliability value while 0.40 to 0.70 indicates a satisfactory value. While the reliability of each variable in this study also clearly meets the suggested threshold of 0.80 (Dash & Paul, 2021), where each variable has a CR value of > 0.80 . After testing the reliability of the indicators and variables in this study, It's also necessary to check each variable's validity. The AVE value is used as a benchmark standard for assessment, wherein Convergent Validity, an AVE value > 5.0 , is considered sufficient to justify that the research variable is indeed valid (Joseph F. Hair et al., 2021). Whereas in Discriminant Validity, the Fornell Lecker criterion is usually used, the determination is when the burden of the indicator variable value on the latent variable is greater than the indicator load on other latent variables, discriminant validity is considered good (Yazdi et al., 2017). And if referred to Tables 2 and 3, it is clear that all the variables in this study can be considered, apart from being reliable and valid.

Table 4.

Structural Model Analysis Result

Structural Model				
	A	SN	PBC	CVI
R ²				0.656
F ²	0.202	0.036	0.082	
Q ²				0.505

Table 4 exhibits the results of the “Structural Model Analysis”. And based on the results presented, it appears that TPB contributed 65.6% in predicting Covid-19 vaccination intention, which is quite close to the substantial level indicated by the R^2 value of 0.656. In comparison, 34.4% is influenced by other variables not examined in this study. In contrast, the amount of influence varies. Some variables have a moderate effect, namely the attitude variable, which is worth 0.202. There are also variables that are still classified as having a low influence because they have a value (Subjective Norms = 0.202, perceived behavioral control = 0.036) between 0.02 and 0.15 according to the standards of (Joe F. Hair et al., 2014; Henseler et al., 2016). And lastly, Table 3 also shows the endogenous results in this study showing the predictive relevance of the path model because the Q^2 value shows $0.505 > 0.0$.

Finally, Table 5 exhibits the core results of this study in the form of hypothesis testing results. Of the three hypotheses offered in this study, all of them seem to be accepted. The acceptance of H_1 in this study can be proven by the bootstrapping results of the SmartPLS 3.0 application, which shows the value of $\beta = 0.447$, T-Value = 8.079 with a significance level (P-value) = 0.000. At the same time, the proof of the acceptance of H_2 in this study is indicated by the value of $\beta = 0.176$, T-Value = 3.271, and P-value = 0.001. And the last is the proof of the acceptance of H_3 , which is shown by the value of $\beta = 0.263$, T-Value = 6.348, and P-value 0.000.

Table 5.

Hypothesis Analysis Results

Variables	β	T-Value	p-value
Attitude → Covid-19 Vaccination Intention	0.447	8.079	0.000
Subjective Norms → Covid-19 Vaccination Intention	0.176	3.271	0.001
Perceived Behaviour Control → Covid-19 Vaccination Intention	0.263	6.348	0.000

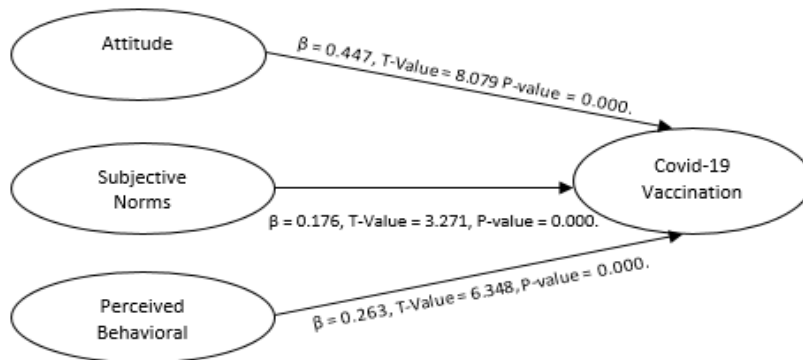


Figure 1. “Summarized result of direct and total effect path among the variables tested”

Discussion

Vaccination is without a doubt one of the most successful ways for limiting the COVID-19 outbreak (Patwary et al., 2021). Therefore, the intensification of vaccine use is considered necessary in the betimes insizing daily sum of COVID-19 cases worldwide, especially in Southeast Asia. Currently, vaccines are considered the critical control to stop the pandemic (An et al., 2021). However, the community's success in receiving Covid-19 vaccines depends on their willing in being immunized by Covid-19 vaccines (Erawan et al., 2021; Zaid et al., 2021).

The goal of recent research is to determine the frequency of Covid-19 vaccination intention and analyze its determinants among Indonesians, particularly in the Special Region of Yogyakarta, due to a paucity of research on behavioral intention to Covid-19 immunization in Indonesia.

As far as author's knowledge, this is the first large-scale study that explores the intention of the community, especially the societies of the Special Region of Yogyakarta, to take part in COVID-19 frontline countermeasures in the form of the Covid-19 vaccine and related factors in Special Region of Yogyakarta, Indonesia, based on the TPB. TPB was chosen as the theoretical base because it is already utilized successfully in many countries by now to analyze health-related

behavior and other conduct (Tran et al., 2021). Unfortunately, it has not been used in Indonesia, especially in the Special Region of Yogyakarta.

Theoretically, under the theory of planned behavior (TPB), an individual's conduct is typically motivated by the goal of doing the activity, which is ultimately determined by the person's "belief system" (Hossain et al., 2021; Joshi et al., 2021). As applied to the context of the COVID-19 vaccine in this study, the belief structure consisted of attitudes toward the COVID-19 vaccine, subjective norms, and perceived behavioral control. And the findings reveal that there is a positive intention from the people of Yogyakarta to participate in Covid-19 vaccination activities through TPB. The results are pretty good where the three main components of TPB as a whole explain 65.6% of the variance in the construction of Covid-19 vaccination intention.

In terms of attitude, this study did find that attitude had a direct, positive, and significant effect on Covid-19 vaccination intention. In fact, these results also indicate that attitudes are the strongest and most significant predictor, followed by subjective norms and perceived behavioral control predicting the slightest intention to get the vaccine. Thus, these results are very much parallel with the research results from (Drażkowski & Trepanowski, 2021; Husain et al., 2021; Zhou et al., 2018). In fact, not only from the TPB side, but the influence of attitudes towards Covid-19 vaccination intention was also confirmed in the theory of reasonable action (TRA) (Knobel et al., 2021).

Thus it is very obvious that positive attitudes towards Covid-19 vaccines are undoubtedly a strong determinant of Covid-19 vaccination intentions, and vice versa, negative attitudes towards vaccines serve as a significant barrier to Covid-19 vaccination intentions (Schmid et al., 2017).

In terms of subjective norms, Winter, Pummerer, Hornsey, & Sassenberg (2021) provides an explanation that humans are social creatures, heavily impacted by their impressions of close individuals' (e.g., closer relatives) opinions and attitudes. This perception is often shaped as the "subjective norm." Many decision-making theories rely heavily on the concept of subjective norms. Thus, the results of this study confirm that When these closer relatives and family members express the notion that uptaking immunization is what they believe a individual should

do (“i.e., the norm”), it creates a behavior of desire for individuals to get immunization with Covid-19 vaccinations (Winter et al., 2021).

As a comparison, in contrast to this study, other previous studies found that those who had the most considerable and most significant influence on interest were not from attitudes nor perceived behavioral control but rather from subjective norms (Tran et al., 2021). So that the part of subjective norms in influencing Covid-19 vaccination intention cannot be doubted as in other dimensions of TPB.

Concerning this results, Gerend and Shepherd (2012) concluded that subjective norms emerged as no less significant predictors of behavior and underlined the social nature of health decision making. Individuals seek assistance from others or whoever they trust when dealing with tough health decisions. When the "correct" option is ambiguous, subjective norms play a crucial impact (Gerend & Shepherd, 2012), frequently the case with effective preventive related health activities like (Covid-19) immunization.

Finally, perceived behavioral control, which is the degree to which an individual feels he or she has control over their behaviors, was identified as a TPB component in this study (Rosental & Shmueli, 2021), which has significantly positive influence on Covid-19 vaccination intention.

As a comparison, in contrast to this study, other previous studies found that those who had the largest and most significant influence on interest were not from attitudes, nor subjective norms, but from perceived behavioral control (Ko et al., 2004; Lee & Kang, 2020). So that the role of perceived behavioral control in influencing Covid-19 immunization intention cannot be doubted as in other dimensions of TPB.

the results of this study support the application of the Theory of Planned Behavior to elucidate the desire to vaccinate against COVID-19. This is in line with the WHO belief factor as the main predictor of behavioral intention to Covid-19 vaccination, in addition to supporting previous research (Breslin et al., 2021; Ratanasiripong et al., 2018), The findings of this study back upf Murphy et al. (2021)’s claim that psychological factors should take precedence when forecasting vaccine uptake and expand the case for using the Theory of Planned Behavior as a framework for

understanding vaccination hesitation and uptake. As a consequence, the TPB may be regarded as a sound theoretical framework capable of influencing effective vaccine acceptance strategies (Hayashi et al., 2022).

Conclusion

Intensification of vaccine use is considered necessary in the betimes insizing daily sum of COVID-19 cases worldwide, especially in Southeast Asia or Indonesia. Vaccines are now thought to be the spanner to controlling and halting the epidemic. However, the community's success in receiving Covid-19 vaccines depends on how interested they are in being vaccinated by Covid-19 vaccines. The TPB proposes that behavior is determined by behavioral intentions and perceived control. This study finally confirmed by proving that Covid-19 vaccination intention was determined by attitudes towards the Covid-19 vaccine, subjective norms, and perceived behavioral control. And among the three, attitudes were found to be the most prominent and most essential predictor of Covid-19 vaccination intention.

References

- Abdulah, D. M. (2021). Prevalence and correlates of COVID-19 vaccine hesitancy in the general public in Iraqi Kurdistan: A cross-sectional study. *Journal of Medical Virology*, 93(12), 6722–6731. <https://doi.org/10.1002/JMV.27255>
- Al-Amer, R., Maneze, D., Everett, B., Montayre, J., Villarosa, A. R., Dwekat, E., & Salamonson, Y. (2022). COVID-19 vaccination intention in the first year of the pandemic: A systematic review. *Journal of Clinical Nursing*, 31(1–2), 62–86. <https://doi.org/10.1111/JOCN.15951>
- An, P. Le, Nguyen, H. T. N., Dang, H. T. B., Huynh, Q. N. H., Pham, B. D. U., & Huynh, G. (2021). Integrating Health Behavior Theories to Predict Intention to Get a COVID-19 Vaccine: *Health Services Insights*, 14, 117863292110601. <https://doi.org/10.1177/11786329211060130>
- Bolatov, A. K., Seisembekov, T. Z., Askarova, A. Z., & Pavalkis, D. (2021). Barriers to COVID-19 vaccination among medical students in Kazakhstan: development, validation, and use of a new COVID-19 Vaccine Hesitancy Scale. *Human Vaccines & Immunotherapeutics*, 1–12. <https://doi.org/10.1080/21645515.2021.1982280>
- Boon-itt, S., Rompho, N., Jiarnkamolchurn, S., & Skunkan, Y. (2021). Interaction between age and health conditions in the intention to be vaccinated against COVID-19 in Thailand. *Human Vaccines & Immunotherapeutics*, 1–8. <https://doi.org/10.1080/21645515.2021.1979378>
- Breslin, G., Dempster, M., Berry, E., Cavanagh, M., & Armstrong, N. C. (2021). COVID-19 vaccine uptake and hesitancy survey in Northern Ireland and Republic of Ireland: Applying the theory

- of planned behaviour. *PloS One*, 16(11), e0259381. <https://doi.org/10.1371/JOURNAL.PONE.0259381>
- Dash, G., & Paul, J. (2021). CB-SEM vs PLS-SEM methods for research in social sciences and technology forecasting. *Technological Forecasting and Social Change*, 173, 121092. <https://doi.org/10.1016/j.TECHFORE.2021.121092>
- Dowdle, T. S., Dennis, J., Nugent, K. M., & Byrd, T. (2021). Intention to Receive COVID-19 Vaccine by U.S. Health Sciences University Employees. *Journal of Primary Care and Community Health*, 12. <https://doi.org/10.1177/21501327211036611>
- Drażkowski, D., & Trepanowski, R. (2021). Reactance and perceived disease severity as determinants of COVID-19 vaccination intention: an application of the theory of planned behavior. *Psychology, Health & Medicine*, 1–8. <https://doi.org/10.1080/13548506.2021.2014060>
- Erawan, M. A. S. P., Zaid, Z., Pratondo, K., & Lestari, A. Y. (2021). Predicting Covid-19 Vaccination Intention: The Role of Health Belief Model of Muslim Societies in Yogyakarta. *Al-Sihah: The Public Health Science Journal*, 13(1), 36–50. <https://doi.org/10.24252/AL-SIHAH.V13I1.20647>
- Fernandes, N., Costa, D., Costa, D., Keating, J., & Arantes, J. (2021). Predicting COVID-19 Vaccination Intention: The Determinants of Vaccine Hesitancy. *Vaccines*, 9(10), 1177. <https://doi.org/10.3390/VACCINES9101161>
- Gates, A., Gates, M., Rahman, S., Guitard, S., MacGregor, T., Pillay, J., Ismail, S. J., Tunis, M. C., Young, K., Hardy, K., Featherstone, R., & Hartling, L. (2021). A systematic review of factors that influence the acceptability of vaccines among Canadians. *Vaccine*, 39(2), 222–236. <https://doi.org/10.1016/j.VACCINE.2020.10.038>
- Gerend, M. A., & Shepherd, J. E. (2012). Predicting human papillomavirus vaccine uptake in young adult women: Comparing the health belief model and theory of planned behavior. *Annals of Behavioral Medicine*, 44(2), 171–180. <https://doi.org/10.1007/s12160-012-9366-5>
- Guaracha-Basáñez, G., Contreras-Yáñez, I., Álvarez-Hernández, E., Román-Montes, C. M., Meza-López y Olguín, G., Morales-Graciano, M. J., Valverde-Hernández, S. S., Peláez-Ballestas, I., & Pascual-Ramos, V. (2021). COVID-19 vaccine hesitancy among Mexican outpatients with rheumatic diseases. *Human Vaccines & Immunotherapeutics*, 1–10. https://doi.org/10.1080/21645515.2021.2003649/SUPPL_FILE/KHVI_A_2003649_SM2274.PDF
- Hair, Joe F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *European Business Review*, 26(2), 106–121. <https://doi.org/10.1108/EBR-10-2013-0128>
- Hair, Joseph F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). *Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R*. Springer International Publishing. <https://doi.org/10.1007/978-3-030-80519-7>
- Hayashi, Y., Romanowich, P., & Hantula, D. A. (2022). Predicting Intention to Take a COVID-19 Vaccine in the United States: Application and Extension of Theory of Planned Behavior: *American Journal of Health Promotion*, 089011712110625.

<https://doi.org/10.1177/08901171211062584>

- Henseler, J. (2017). Bridging Design and Behavioral Research With Variance-Based Structural Equation Modeling. *Journal of Advertising*, 46(1), 178–192. <https://doi.org/10.1080/00913367.2017.1281780>
- Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modeling in new technology research: Updated guidelines. *Industrial Management and Data Systems*, 116(1), 2–20. <https://doi.org/10.1108/IMDS-09-2015-0382>
- Hossain, M. B., Alam, M. Z., Islam, M. S., Sultan, S., Faysal, M. M., Rima, S., Hossain, M. A., & Mamun, A. Al. (2021). Health Belief Model, Theory of Planned Behavior, or Psychological Antecedents: What Predicts COVID-19 Vaccine Hesitancy Better Among the Bangladeshi Adults? *Frontiers in Public Health*, 9, 1181. <https://doi.org/10.3389/FPUBH.2021.711066/BIBTEX>
- Huang, Y. Z., & Kuan, C. C. (2022). Vaccination to reduce severe COVID-19 and mortality in COVID-19 patients: a systematic review and meta-analysis. *European Review for Medical and Pharmacological Sciences*, 26(5), 1770–1776. https://doi.org/10.26355/EURREV_202203_28248
- Husain, F., Shahnawaz, M. G., Khan, N. H., Parveen, H., & Savani, K. (2021). Intention to get COVID-19 vaccines: Exploring the role of attitudes, subjective norms, perceived behavioral control, belief in COVID-19 misinformation, and vaccine confidence in Northern India. *Human Vaccines & Immunotherapeutics*, 17(11), 3941–3953. <https://doi.org/10.1080/21645515.2021.1967039>
- Irfan, M., Shahid, A. L., Ahmad, M., Iqbal, W., Elavarasan, R. M., Ren, S., & Hussain, A. (2022). Assessment of public intention to get vaccination against COVID-19: Evidence from a developing country. *Journal of Evaluation in Clinical Practice*, 28(1), 63–73. <https://doi.org/10.1111/JEP.13611>
- Jiang, T., Zhou, X., Wang, H., Dong, S., Wang, M., Akezhuoli, H., & Zhu, H. (2021). COVID-19 vaccination intention and influencing factors among different occupational risk groups: a cross-sectional study. *Human Vaccines & Immunotherapeutics*, 17(10), 3433–3440. <https://doi.org/10.1080/21645515.2021.1930473>
- Joshi, A., Kaur, M., Kaur, R., Grover, A., Nash, D., & El-Mohandes, A. (2021). Predictors of COVID-19 Vaccine Acceptance, Intention, and Hesitancy: A Scoping Review. *Frontiers in Public Health*, 9, 698111. <https://doi.org/10.3389/FPUBH.2021.698111/FULL>
- Kabir, R., Mahmud, I., Chowdhury, M. T. H., Vinnakota, D., Jahan, S. S., Siddika, N., Isha, S. N., Nath, S. K., & Apu, E. H. (2021). COVID-19 Vaccination Intent and Willingness to Pay in Bangladesh: A Cross-Sectional Study. *Vaccines*, 9(5), 429. <https://doi.org/10.3390/VACCINES9050416>
- Knobel, P., Zhao, X., & White, K. M. (2021). Do conspiracy theory and mistrust undermine people's intention to receive the COVID-19 vaccine in Austria? *Journal of Community Psychology*, 1–13. <https://doi.org/10.1002/JCOP.22714>
- Ko, N. Y., Feng, M. C., Chiu, D. Y., Wu, M. H., Feng, J. Y., & Pan, S. M. (2004). Applying theory of

- planned behavior to predict nurses' intention and volunteering to care for SARS patients in southern Taiwan. *The Kaohsiung Journal of Medical Sciences*, 20(8), 389–398. [https://doi.org/10.1016/S1607-551X\(09\)70175-5](https://doi.org/10.1016/S1607-551X(09)70175-5)
- Kotta, I., Kalcza-Janosi, K., Szabo, K., & Marschalko, E. E. (2021). Development and Validation of the Multidimensional COVID-19 Vaccine Hesitancy Scale. *Human Vaccines & Immunotherapeutics*, 1–10. <https://doi.org/10.1080/21645515.2021.2007708>
- Kwok, K. O., Li, K. K., WEI, W. I., Tang, A., Wong, S. Y. S., & Lee, S. S. (2021). Influenza vaccine uptake, COVID-19 vaccination intention and vaccine hesitancy among nurses: A survey. *International Journal of Nursing Studies*, 114, 103854. <https://doi.org/10.1016/j.ijnurstu.2020.103854>
- Lee, J., & Kang, S. J. (2020). Factors influencing nurses' intention to care for patients with emerging infectious diseases: Application of the theory of planned behavior. *Nursing & Health Sciences*, 22(1), 82–90. <https://doi.org/10.1111/NHS.12652>
- Lo, S. Y., Li, S. C. S., & Wu, T. Y. (2021). Exploring psychological factors for COVID-19 vaccination intention in taiwan. *Vaccines*, 9(7), 773. <https://doi.org/10.3390/VACCINES9070764/S1>
- Lucia, V. C., Kelekar, A., & Afonso, N. M. (2021). COVID-19 vaccine hesitancy among medical students. *Journal of Public Health (Oxford, England)*, 43(3), 445–449. <https://doi.org/10.1093/PUBMED/FDAA230>
- Matrajt, L., Eaton, J., Leung, T., & Brown, E. R. (2021). Vaccine optimization for COVID-19: Who to vaccinate first? *Science Advances*, 7(6). <https://doi.org/10.1126/SCIADV.ABF1374>
- Matrajt, L., Eaton, J., Leung, T., Dimitrov, D., Schiffer, J. T., Swan, D. A., & Janes, H. (2021). Optimizing vaccine allocation for COVID-19 vaccines: potential role of single-dose vaccination. *MedRxiv*. <https://doi.org/10.1101/2020.12.31.20249099>
- Megha, K. B., Nayar, S. A., & Mohanan, P. V. (2022). Vaccine and vaccination as a part of human life: In view of COVID-19. *Biotechnology Journal*, 17(1), 2100188. <https://doi.org/10.1002/BIOT.202100188>
- Murphy, J., Vallières, F., Bentall, R. P., Shevlin, M., McBride, O., Hartman, T. K., McKay, R., Bennett, K., Mason, L., Gibson-Miller, J., Levita, L., Martinez, A. P., Stocks, T. V. A., Karatzias, T., & Hyland, P. (2021). Psychological characteristics associated with COVID-19 vaccine hesitancy and resistance in Ireland and the United Kingdom. *Nature Communications* 2021 12:1, 12(1), 1–15. <https://doi.org/10.1038/s41467-020-20226-9>
- Omeish, H., Najadat, A., Al-Azzam, S., Tarabin, N., Abu Hameed, A., Al-Gallab, N., Abbas, H., Rababah, L., Rabadi, M., Karasneh, R., & Aldeyab, M. A. (2021). Reported COVID-19 vaccines side effects among Jordanian population: a cross sectional study. *Human Vaccines and Immunotherapeutics*, 1–9. https://doi.org/10.1080/21645515.2021.1981086/SUPPL_FILE/KHVI_A_1981086_SM5775.DOCX
- Palamenghi, L., Barello, S., Boccia, S., & Graffigna, G. (2020). Mistrust in biomedical research and vaccine hesitancy: the forefront challenge in the battle against COVID-19 in Italy. *European Journal of Epidemiology*, 35(8), 785–788. <https://doi.org/10.1007/S10654-020-00675-8>

- Patwary, M. M., Bardhan, M., Disha, A. S., Hasan, M., Haque, M. Z., Sultana, R., Hossain, M. R., Browning, M. H. E. M., Alam, M. A., & Sallam, M. (2021). Determinants of COVID-19 Vaccine Acceptance among the Adult Population of Bangladesh Using the Health Belief Model and the Theory of Planned Behavior Model. *Vaccines* 2021, 9(12), 1411. <https://doi.org/10.3390/VACCINES9121393>
- Pereira, B., Fehl, A. G., Finkelstein, S. R., Jiga-Boy, G. M., & Caserotti, M. (2021). Scarcity in COVID-19 vaccine supplies reduces perceived vaccination priority and increases vaccine hesitancy. *Psychology & Marketing*. <https://doi.org/10.1002/MAR.21629>
- Pratondo, K., & Zaid, Z. (2021). Customer Loyalty During Pandemic: Understanding Loyalty Through the Lens of Online Ride Hailing Service Quality. *International Journal of Social Science and Business*, 5(1), 69–75. <https://doi.org/10.23887/IJSSB.V5I1.30933>
- Ratanasiripong, N. T., Sri-Umporn, S., Kathalae, D., Hanklang, S., & Ratanasiripong, P. (2018). Human papillomavirus (HPV) vaccination and factors related to intention to obtain the vaccine among young college women in Thailand Article information. *Journal of Health Research*, 32(2), 142–151. <https://doi.org/10.1108/JHR-01-2018-018>
- Riou, J., Guyon, H., & Falissard, B. (2016). An introduction to the partial least squares approach to structural equation modelling: a method for exploratory psychiatric research. *International Journal of Methods in Psychiatric Research*, 25(3), 220–231. <https://doi.org/10.1002/mpr.1497>
- Rosental, H., & Shmueli, L. (2021). Integrating Health Behavior Theories to Predict COVID-19 Vaccine Acceptance: Differences between Medical Students and Nursing Students. *Vaccines*, 9(7), 795. <https://doi.org/10.3390/VACCINES9070783>
- Schmid, P., Rauber, D., Betsch, C., Lidolt, G., & Denker, M. L. (2017). Barriers of Influenza Vaccination Intention and Behavior – A Systematic Review of Influenza Vaccine Hesitancy, 2005 – 2016. *PLOS ONE*, 12(1), e0170550. <https://doi.org/10.1371/JOURNAL.PONE.0170550>
- Sotiriou, E., Bakirtzi, K., Papadimitriou, I., Paschou, E., Vakirlis, E., Lallas, A., & Ioannides, D. (2021). COVID-19 vaccination intention among patients with psoriasis compared with immunosuppressed patients with other skin diseases and factors influencing their decision. *British Journal of Dermatology*, 185(1), 209–210. <https://doi.org/10.1111/BJD.19882>
- Thaker, J., & Ganchoudhuri, S. (2021). The role of attitudes, norms, and efficacy on shifting covid-19 vaccine intentions: A longitudinal study of covid-19 vaccination intentions in New Zealand. *Vaccines*, 9(10), 1142. <https://doi.org/10.3390/VACCINES9101132/S1>
- Tran, Q. A., Nguyen, H. T. T., Bui, T. Van, Tran, N. T., Nguyen, N. T., Nguyen, T. T., Nguyen, H. T., & Nguyen, S. H. (2021). Factors Associated With the Intention to Participate in Coronavirus Disease 2019 Frontline Prevention Activities Among Nursing Students in Vietnam: An Application of the Theory of Planned Behavior. *Frontiers in Public Health*, 9, 889. <https://doi.org/10.3389/FPUBH.2021.699079/BIBTEX>
- Ullah, I., Lin, C. Y., Malik, N. I., Wu, T. Y., Araban, M., Griffiths, M. D., & Pakpour, A. H. (2021). Factors affecting Pakistani young adults' intentions to uptake COVID-19 vaccination: An extension of the theory of planned behavior. *Brain and Behavior*, 11(11), e2370.

<https://doi.org/10.1002/BRB3.2370>

- Wang, H., Zhou, X., Jiang, T., Wang, X., Lu, J., & Li, J. (2021). Factors influencing COVID-19 vaccination intention among overseas and domestic Chinese university students: a cross-sectional survey. *Human Vaccines & Immunotherapeutics*. <https://doi.org/10.1080/21645515.2021.1989914>
- Winter, K., Pummerer, L., Hornsey, M. J., & Sassenberg, K. (2021). Pro-vaccination subjective norms moderate the relationship between conspiracy mentality and vaccination intentions. *British Journal of Health Psychology*. <https://doi.org/10.1111/BJHP.12550>
- Wong, L. P., Alias, H., Tan, Y. R., & Tan, K. M. (2021). Older people and responses to COVID-19: A cross-sectional study of prevention practices and vaccination intention. *International Journal of Older People Nursing*, e12436. <https://doi.org/10.1111/OPN.12436>
- Yazdi, M. T., Motallebzadeh, K., Ashraf, H., & Baghaei, P. (2017). A latent variable analysis of continuing professional development constructs using PLS-SEM modeling. *Cogent Education*, 4(1), 1355610. <https://doi.org/10.1080/2331186X.2017.1355610>
- Yu, Y., Luo, S., Mo, P. K., Wang, S., Zhao, J., Zhang, G., Li, L., Li, L., & Lau, J. T. (2021). Prosociality and Social Responsibility Were Associated With Intention of COVID-19 Vaccination Among University Students in China. *International Journal of Health Policy and Management*, 0. <https://doi.org/10.34172/IJHPM.2021.64>
- Zaid, Z., & Al Bahy, M. P. (2022). EXAMINING FACTORS INFLUENCING HALAL COVID-19 VACCINATION INTENTION AMONG THE MUSLIM COMMUNITIES. *Psikis: Jurnal Psikologi Islami*, 8(1), 40–53. <https://doi.org/10.19109/PSIKIS.V8I1.11913>
- Zaid, Z., Hernowo, W. S., & Prasetyoningsih, N. (2022). Mandatory COVID-19 vaccination in human rights and utilitarianism perspectives. *International Journal of Public Health Science (IJPHS)*, 11(3), 967. <https://doi.org/10.11591/ijphs.v11i3.21412>
- Zaid, Z., & Pratondo, K. (2021). Public Perception On COVID-19 Vaccination Intention. *International Journal of Public Health Science (IJPHS)*, 10(4), 906–913. <https://doi.org/10.11591/IJPHS.V10I4.20914>
- Zaid, Z., Shinta, A., Aufa, M. F., & Pratondo, K. (2021). Norma Sosial dan Pengaruh Sosial terhadap Minat Vaksin Covid-19. *JURNAL KESEHATAN PERINTIS*, 8(2), 91–99. <https://doi.org/10.33653/JKP.V8I2.682>
- Zhou, M., Zhao, L., Kong, N., Campy, K. S., Wang, S., & Qu, S. (2018). Predicting behavioral intentions to children vaccination among Chinese parents: an extended TPB model. *Human Vaccines & Immunotherapeutics*, 14(11), 2748–2754. <https://doi.org/10.1080/21645515.2018.1496765>