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Abstract

The COVID-19 pandemic disrupts rabies control activities in the community. A new approach is needed to control rabies during the COVID-19 pandemic through digital health interventions by conducting digital surveillance and education. This study aimed to determine key attitude indicators in controlling rabies during the COVID-19 pandemic. A cross-sectional study on 166 participants in Denpasar City with a total of 31 indicators measuring five variables: perceptions of the benefits of rabies control (6 indicators), perceptions of rabies risk (6 indicators), perceptions of obstacles to rabies control (5 indicators), perceptions of the need for technology (7 indicators), and attitudes toward rabies control (7 indicators) were analyzed using partial least square-structural equation modeling. The results revealed that 80.7% of participants owned a dog, and sources of rabies information were from social media (45%), the internet (33.7%), and rabies volunteers (33.1%). The model explained that perception of the benefits of rabies control and the need for technology had a direct effect on attitudes toward rabies control (p -value < 0.001 and 0.015). In brief, perceived benefits and the need for technology influence attitudes toward rabies control during the COVID-19 pandemic.

Keywords: Bali, COVID-19 pandemic, rabies control

Introduction

Rabies has killed more than 59,000 people in 150 countries, with 95% of cases occurring in Africa and Asia.¹ Rabies is endemic in eight of 11 countries in the Southeast Asia.² According to World Health Organization (WHO) reports, more than 1.5 million people are at risk of being infected with rabies, and 26,000 people die yearly.² Rabies is the global burden of disease at 45%.² The death rate from rabies in Indonesia is still high, around 100-156 deaths per year.³ Based on case reports, dogs contribute up to 98% of rabies transmissions, followed by cats and monkeys (2%).³

Of 34 provinces in Indonesia, eight provinces are free of rabies (Riau Islands, Bangka Belitung, Papua, West Papua, Special Capital Region of Jakarta, Central Java, Special Region of Yogyakarta, and East Java).³ In the last five years (2015-2019), 404,306 cases of animal bites transmitting rabies were reported, with 544 deaths.³ The high mortality from rabies shows that rabies in Indonesia is still a serious public health problem.⁴ Bali Island has been a rabies-infected area since 2008, and vaccination efforts were still limited then, and the dog population

was high.⁵ Since then, the cases have continued to increase and become extraordinary events.⁵ The number of dog bite cases in 2018, 2019, and 2020 (up to the 43rd week) was 19,440, 25,440, and 13,370, respectively.⁶

Based on data from the Department of Agriculture and Food Security of Bali Province, the estimated dog population in Bali Province in 2022 is 619,846.⁷ The coronavirus disease 2019 (COVID-19) pandemic has reduced vaccination efforts. Many unvaccinated dogs increase the rabies risk transmission.⁸ Free-roaming dogs and not being vaccinated are risk factors for the spread of rabies in Bali.⁹ The risk factors that make Bali infected with rabies include free-roaming dogs; the presence of other rabid animals such as monkeys, cats, and bats; dogs that are kept but not being fed; puppies obtained from outside the territory; a flow of dogs in and out of the village, and many people that have not received adequate education on rabies.¹⁰

The Bali Provincial Government has been trying to control rabies, but these efforts are still not optimal. Rabies control must be supported by increasing public

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awareness, routine vaccination, dog registration, population management, and a quick response to dog bite cases.¹¹ For this reason, education on controlling rabies and sociocultural program in the local community are needed. The WHO recommends vaccinating at least 70% of the dog population for rabies control.² Vaccination can increase herd immunity, requiring integrated supervision and increasing public awareness to care for their dogs.²

During the COVID-19 pandemic, it has not been easy to vaccinate, and door-to-door education has become a challenge due to social distancing policies. A study of the leading indicators of attitude is needed in controlling rabies during the COVID-19 pandemic.^{12,13} Therefore, this study aimed to determine the indicators influencing attitudes toward rabies control with the variables of perceptions of the benefits of rabies control, perceptions of rabies risk, perceptions of obstacles to rabies control, and perceptions of the need for technology.

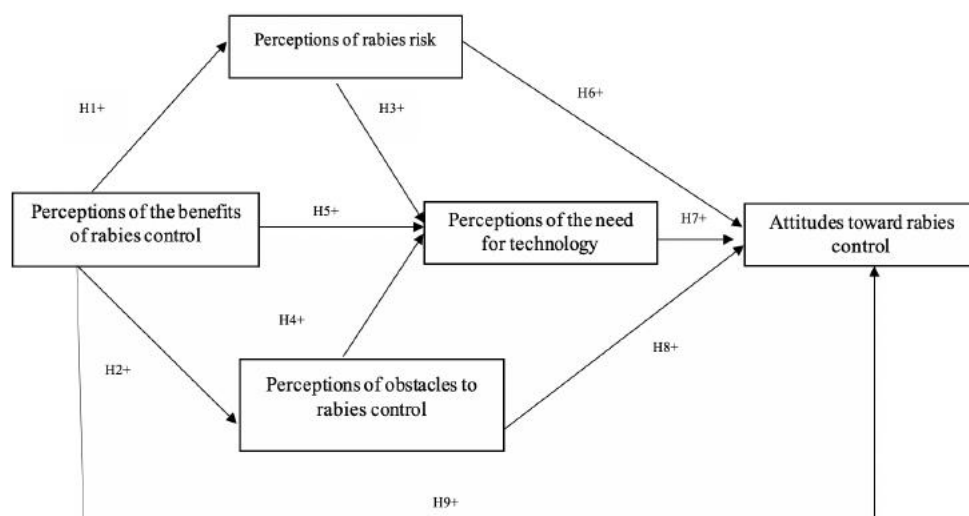
Method

This cross-sectional study was conducted in Denpasar City, Bali Province, from July to December 2021. This primary data was collected to assess indicators influencing attitudes toward rabies control. Data collection of an anonymous electronic survey used an online question-

naire with a Likert scale of 1-5—1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), and 5 (strongly agree) using Google Forms. The number of participants who were interviewed was 166 people in Denpasar City. Inclusion criteria included participants aged ≥17 years living in Denpasar City for over six months. Exclusion criteria were participants living outside the study area, aged <17 years, and could not answer the question.

The study permits were obtained from the Denpasar City Health Office and the Mayor. Thus, the data from the Civil Registry Office was provided. The questionnaires were sent via WhatsApp to the participants after completing a consent form and anonymous data. The theoretical model adopted a Health Belief Model (HBM) defining factors influencing health behavior, such as perceptions of health susceptibility, disease severity, health program benefits, perceptions of program constraints, and self-efficacy.^{14,15} Therefore, this study used five variables: perceptions of the benefits of rabies control, perceptions of rabies risk, perceptions of obstacles to rabies control, perceptions of the need for technology, and attitudes toward rabies control. Figure 1 describes the relationship between the direct and indirect hypotheses on attitudes toward rabies control.

The structural equation model was analyzed in a two-



Notes: The hypothesis from the structural model:

Hypothesis 1 (H1). Perceptions of the benefits of rabies control positively affect the perceptions of rabies risk.

Hypothesis 2 (H2). Perceptions of the benefits of rabies control positively affect the perceptions of obstacles to rabies control.

Hypothesis 3 (H3). Perceptions of rabies risk positively affect the perceptions of the need for technology.

Hypothesis 4 (H4). Perceptions of obstacles to rabies control positively affect the perceptions of the need for technology.

Hypothesis 5 (H5). Perceptions of the benefits of rabies control positively affect the perceptions of the need for technology.

Hypothesis 6 (H6). Perceptions of rabies risk positively affect the attitudes toward rabies control.

Hypothesis 7 (H7). Perceptions of the need for technology positively affect attitudes toward rabies control.

Hypothesis 8 (H8). Perceptions of obstacles to rabies control positively affect attitudes toward rabies control.

Hypothesis 9 (H9). Perceptions of the benefits of rabies control positively affect attitudes toward rabies control.

Figure 1. The Structural Hypothesis of Attitude towards Rabies Control

Table 1. Data Description Indicator

Composite	Indicator	Definition
Perceptions of the benefits of rabies control	Var1a	The rabies vaccination program is beneficial for villages
	Var1b	Dog registration is very useful for the village
	Var1c*	Sterilization can limit the breeding of dogs
	Var1d	Public education is very important
	Var1e*	Treatment of free-roaming dogs needs to be done
	Var1f*	The program helps reduce throwing away dogs
Perceptions of rabies risk	Var2a*	I am at risk of being infected with rabies
	Var2b*	Rabies is a deadly disease
	Var2c*	Rabies is a disease for which there is no cure
	Var2d*	Everyone is at rabies risk
	Var2e	My family is afraid of getting infected with rabies
	Var2f	Tourists are afraid of being infected with rabies
Perceptions of obstacles to rabies control	Var3a*	People do not want to take good care of dogs
	Var3b*	Not willing to vaccinate dogs
	Var3c	Limited program funding
	Var3d	Rabies volunteers are limited in number
	Var3e	Limited vaccine schedule
Perceptions of the need for technology	Var4a	Information technology is very helpful
	Var4b	Have an Android phone to support activities
	Var4c	Accustomed to using social media such as Facebook, Instagram, YouTube, and others
	Var4d	Accustomed to using WhatsApp to communicate
	Var4e*	Rabies information can be found on the internet
	Var4f*	Willing to fill in data via the internet or cellphone
	Var4g*	Willing to share rabies prevention information with family and environment
Attitudes toward rabies control	Var5a	Willing to vaccinate dogs
	Var5b*	Sterilizing free-roaming dogs
	Var5c*	Owners who do not take good care of dogs will be penalized
	Var5d	First aid when bitten by a dog is to wash the wound for 10-15 minutes with running water and soap
	Var5e	First aid when bitten by a dog is to seek immediate health care
	Var5f	There is a need for health education related to rabies
	Var5g	Supporting rabies control program activities

Note: *These indicators were not included in latent variables due to the multicollinearity criteria of PLS-SEM.

step process. The first step described the results of the measurement model. Determine the relationship between constructions and indicators related to the structural model containing the relationship between constructs or model hypotheses. This sequence ensured that the measurement scale was valid and reliable before trying to reach conclusions about the hypotheses included in the structural model. This study used the free version of Smart-PLS software version 3.

Table 1 describes the indicators tested using the partial least square-structural equation modeling (PLS-SEM). Total of 31 indicators measuring five variables: perceptions of the benefits of rabies control (6 indicators), perceptions of rabies risk (6 indicators), perceptions of obstacles to rabies control (5 indicators), perceptions of the need for technology (7 indicators), and attitudes toward rabies control (7 indicators).

Results

The characteristics of participants in this study were mostly aged 17-24 years (25.3%), male (57.8%), private employees (57.8%), and went to senior high school

(55.4%). Based on dog ownership, 80.7% of participants owned a dog. Based on the source of information, most participants obtained information through social media (45.2%), internet (33.7%), health workers (33.7%), rabies volunteers (33.1%), television (15.1%), newspaper (5.4%), and radio (3.6%) (Table 2).

The composite measurement model in mode A (attitude) was assessed regarding individual item reliability, construct reliability, convergent validity, and discriminant validity. First, the reliability of each item was analyzed through a loading factor. The total loading factor of 0.839 has exceeded the cut-off value. Second, Cronbach's alpha and composite reliability were used to evaluate construct reliability. The construct exceeded these three measurements' recommended cut-off value of 0.7. All three convergent validity was proved because the construct's extracted mean-variance (AVE) was higher than 0.50. The measurement model met the criteria. Presents discriminant validity results through the Heterotrait-Monotrait (HTMT) correlation ratio. All constructs reached discriminant validity because the confidence interval did not contain a zero value, meaning each variable

differed.

The composite measurement model in mode B was assessed regarding collinearity between indicators, significance, and relevance of the outer weights. First, removing the indicator was carried out when the indicator exceeded the value of the variance impact factor (VIF = 3). As a result of this process, only the indicators shown in Table 1 were without collinearity. Second, the relevance of the weights was analyzed. Figure 2 shows the relevance of indicators in construction for latent variables. Finally, to assess significance, it was possible to start a bootstrap with 10,000 sub-samples, whether the outer weights differed significantly from zero. Indicators with insignificant weights but significant loadings of 0.50 or higher were considered relevant (Table 3).

The path coefficients and their 10,000 resampling bootstrap significance levels are reported in Table 3 and Figure 2. In addition, Table 3 shows that the VIF constructs range from 1,000 to 1,700, indicating no collinearity between variables. In addition, this study also assessed the quality by examining the overall predictive relevance of the model with a Q2 value above zero, indicating a fit in the prediction model. The coefficient of determination (R2) also exceeded 0.1 for endogenous latent variables, so the construct had an acceptable predictive power quality.

Table 4 also shows that variables 1 (perceptions of the benefits of rabies control) and 4 (perceptions of the need for technology) have a direct effect on variable 5 (attitudes toward rabies control) (p-value<0.001 and 0.015). Variables 1 and 4 were positively related to variable 5. The indirect effect could be seen from the Variance Accounted For (VAF) value. The VAF value indicated that the mediated proportion from variables 1 to

variable 5 through variable 4 was 0.27 or 27% (see the indirect effect in Table 4).

Table 2. Sociodemographic Characteristics of Participants

Variable	Category	n	%
Age (years)	17-24	42	25.3
	25-29	17	10.2
	30-34	15	9
	35-39	16	9.6
	40-44	24	14.5
	45-49	26	15.7
	50-54	13	7.8
	55-59	9	5.4
>60 years	4	2.4	
Sex	Male	96	57.8
	Female	70	42.2
Education	Primary school	1	0.6
	Junior high school	11	6.6
	Senior high school	92	55.4
	Diploma	23	13.9
	Bachelor's degree	33	19.9
	Master's degree	6	3.6
Occupation	Unemployed	7	4.2
	Civil servant	8	4.8
	Private sector worker	96	57.8
	Housewife	12	7.2
	Student	6	3.6
	College student	7	4.2
	Entrepreneur	19	11.4
	Teacher	4	2.4
	Village head	3	1.8
	Farmer	3	1.8
	Veterinarian	1	0.6
Dog ownership	No	32	19.3
	Yes	134	80.7
Source of information	Social media	75	45.2
	Internet	56	33.7
	Newspaper	9	5.4
	Radio	6	3.6
	Television	25	15.1
	Rabies volunteers	55	33.1
Health workers	56	33.7	

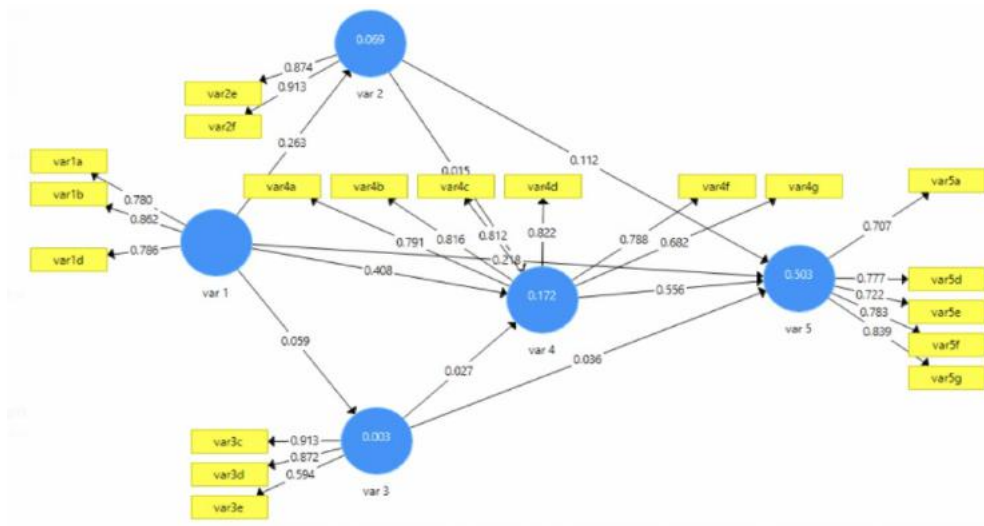


Figure 2. Model Results of Partial Least Square-Structural Equation Modeling

Discussion

This study was valuable as it developed an up-to-date instrument to measure attitudes toward rabies control by modifying the HBM. The indicators that made up the attitudes toward rabies control were being willing to vaccinate dogs, first aid when there was a bite wound, education on rabies, and supporting a particular program for rabies control. This study also found that the perceptions of the benefits of rabies control and the need for technology directly affected people's attitudes toward rabies control (p-value<0.001 and 0.015). Most participants agreed that the existence of information technology benefited them during COVID-19. The perceived benefits of implementing a digital system in controlling rabies were the speed of information, the ease of mapping dog density, the ease of recording data, and reducing data bias.

This study showed that 80.7% of participants owned a dog. Previous studies have shown that the relatively high population of dogs in Bali relates to cultural aspects—house guards and ritual facilities.¹⁶⁻¹⁸ Sources of rabies information mainly came from social media (45%), the internet (33.7%), health workers (33.7%), and rabies volunteers (33.1%). Social media and the internet are information media easily accessible today to get health or other news.¹⁹⁻²² Rabies volunteers and health workers are also essential in providing information to the public because they are an integral part of elevating public knowledge of rabies. Previous studies have found that outreach efforts to provide information are faster and more precise with volunteers and health workers in the field.²³

The concept of one health in the prevention and control of rabies is to combine the prevention of zoonotic diseases with animal welfare and public health approach-

es.²⁴⁻²⁶ It is essential to involve the community and other sectors in implementing rabies control and prevention independently. During the COVID-19 pandemic, many changes were made to all sectors, including the rabies program. Previous studies found that COVID-19 interfered with rabies surveillance and vaccination activities.^{8,27} Many studies have been conducted in the community to examine knowledge, attitudes, and practices regarding rabies prevention.^{15,16,28,29} During COVID-19, to know the attitude model for controlling rabies is

Table 3. Significance of Weights

Variable	Original Sample (O)*	t	Loading	Lo95	Hi95
Var1a	0.344	6.659	0.780	0.228	0.439
Var1b	0.405	8.885	0.862	0.326	0.500
Var1d	0.486	6.008	0.786	0.343	0.658
Var2e	0.510	4.479	0.874	0.262	0.651
Var2f	0.607	4.956	0.915	0.458	0.825
Var3c	0.572	1.407	0.915	-0.269	0.985
Var3d	0.448	1.152	0.872	-0.295	0.971
Var3e	0.146	0.363	0.594	-0.278	0.958
Var4a	0.301	9.716	0.791	0.244	0.362
Var4b	0.219	10.616	0.816	0.182	0.259
Var4c	0.166	8.341	0.812	0.123	0.202
Var4d	0.212	10.367	0.822	0.170	0.248
Var4f	0.179	7.394	0.788	0.132	0.225
Var4g	0.168	8.521	0.810	0.125	0.210
Var5a	0.249	8.296	0.707	0.198	0.312
Var5d	0.249	8.961	0.777	0.191	0.307
Var5e	0.243	6.796	0.722	0.173	0.311
Var5f	0.255	9.124	0.783	0.201	0.302
Var5g	0.305	9.892	0.839	0.244	0.367

Notes: T-statistic and 95% bias-corrected confidence interval performed by a bootstrapping procedure with 10,000 replications, Lo95 = Lower case of 95% CI, Hi95 = Higher case of 95% CI, Var 1 = Perceptions of the Benefits of Rabies Control, Var 2 = Perceptions of Rabies Risk, Var 3 = Perceptions of Obstacles to Rabies Control, Var 4 = Perceptions of the Need for Technology, Var 5 = Attitudes toward Rabies Control.

Table 4. Whole Sample Results

Effect	Path	t	p-value	Lo95	Hi95	f ²	VAF	VIF	R ²	Q ²
Direct effect	Var 1 → Var 2	0.263	2.749	0.006	0.107	0.473	0.074		1.000	0.069
	Var 1 → Var 3	0.059	0.671	0.502 ^{ns}	-0.151	0.195	0.003		1.000	0.003
	Var 1 → Var 4	0.408	5.556	<0.001	0.281	0.560	0.187		1.076	
	Var 2 → Var 4	0.015	0.208	0.835 ^{ns}	-0.122	0.172	0.000		1.076	
	Var 3 → Var 4	0.027	0.287	0.774 ^{ns}	-0.173	0.186	0.001		1.005	0.172
	Var 1 → Var 5	0.218	2.449	0.015	0.076	0.419	0.075		1.278	
	Var 2 → Var 5	0.112	1.673	0.095 ^{ns}	-0.043	0.221	0.023		1.076	
	Var 3 → Var 5	0.036	0.510	0.611 ^{ns}	-0.144	0.150	0.003		1.006	
	Var 4 → Var 5	0.556	7.215	<0.001	0.385	0.691	0.515		1.208	0.503
	0.083									
Indirect effect	Var 1 → Var 2 → Var 4	0.006	0.237	0.813 ^{ns}	-0.036	0.058	0.020	na		
	Var 1 → Var 3 → Var 4	0.006	0.237	0.813 ^{ns}	-0.036	0.058	0.070	na		
	Var 1 → Var 4 → Var 5	0.261	5.060	<0.001	0.171	0.365	0.270	na		
	Var 2 → Var 4 → Var 5	0.008	0.213	0.831 ^{ns}	-0.074	0.095	0.010	na		
	Var 3 → Var 4 → Var 5	0.015	0.290	0.772 ^{ns}	-0.092	0.108	0.030	na		

Notes: VIF = Variance Impact Factor, VAF = Variance Accounted for, Lo95 = Lower case of 95% CI, Hi95 = Higher case of 95% CI, ns = not significant, na = not applicable, Var 1 = Perceptions of the Benefits of Rabies Control, Var 2 = Perceptions of Rabies Risk, Var 3 = Perceptions of Obstacles to Rabies Control, Var 4 = Perceptions of the Need for Technology, Var 5 = Attitudes toward Rabies Control.

necessary. For effective education, attitude influences preventive and protective behavior.¹⁵ The HBM defines factors influencing health behavior, such as perceptions of health susceptibility, disease severity, health program benefits, program constraints, and self-efficacy.^{14,28,29}

This study found a modification of the HBM regarding attitudes toward rabies control. Model development used PLS-SEM, which could display in detail the factors that influence attitudes. During the COVID-19 pandemic, digital technology was needed to carry out rabies surveillance, and a structural model could demonstrate the community's attitude toward using digital technology. This study could also be a consideration for policymakers in controlling rabies using digital technology. The limitations of this study were the limited number and area of the participants; Denpasar City does not represent Bali Province. Participants were limited only to those with cell phones. However, this study demonstrated the role of factors influencing attitudes in controlling rabies.

Conclusion

During the COVID-19 pandemic, innovation is needed to make efforts to control rabies. The perception of the benefits of rabies control and the need for technology affect the community's attitude toward rabies control. The use of technology during the COVID-19 pandemic is needed to provide education and surveillance. Most people prefer information sources through social media and the internet because they are easier to access.

Abbreviations

WHO: World Health Organization; COVID-19: coronavirus disease 2019; HBM: Health Belief Model; PLS-SEM: Partial Least Square-Structural Equation Modeling; AVE: Extracted Mean-Variance; VAF: Variance Accounted for; VIF: Variance Impact Factor.

Ethics Approval and Consent to Participate

This study has received ethical clearance from the Faculty of Medicine, Udayana University (2448.UN.14.2.2.VII/14/LT/2021). This study was carried out following the Declaration of Helsinki and the recommendations of those committees with written informed consent from all participants.

Competing Interest

The authors declared that there is no significant competing financial, professional, or personal interest that might have affected the performance or presentation of the work described in this manuscript.

Availability of Data and Materials

The generated dataset is available to share from the corresponding author upon a reasonable request.

Authors' Contribution

SGP participated in conceptualizing, designing, analyzing, and revising

the manuscript. MS and AU participated in collecting the data, analyzing, and writing the manuscript. KA, IS participated in analyzing and writing the result in the manuscript. The authors discussed the results of the study. All authors read and approved the final manuscript.

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References

1. Hampson K, Coudeville L, Lembo T, Sambo M, Kieffer A, et al. Estimating the Global Burden of Endemic Canine Rabies. *PLoS Negl Trop Dis* 2015; 9 (4): e0003709. DOI: 10.1371/journal.pntd.0003709
2. World Health Organization. WHO Expert Consultation on rabies: third report. Geneva: World Health Organization; 2018.
3. Direktorat Jenderal Pencegahan dan Pengendalian Penyakit. Laporan Kinerja Direktorat Pencegahan dan Pengendalian Penyakit Tular Vektor dan Zoonotik Tahun 2020. Jakarta: Kementerian Kesehatan Republik Indonesia; 2021.
4. Dewi APM, Riono P, Farid MN. Effects of Rabies Elimination Program on Rabies Cases in Bali, 2008-2015. In: The 1st International Conference of Global Health. 2018. *KnE Life Sci.* p. 62-73. DOI: 10.18502/kl.v4i1.1367
5. Putra AAG, Hampson K, Girardi J, Hiby E, Knobel D, Mardiana IW, et al. Response to a rabies epidemic, Bali, Indonesia, 2008-2011. *Emerg Infect Dis.* 2013; 19 (4): 648-651. DOI: 10.3201/eid1904.120380
6. Dinas Kesehatan Provinsi Bali. Sistem Kewaspadaan Dini dan Respon (SKDR) Berbasis Puskesmas di Provinsi Bali. Denpasar: Dinas Kesehatan Provinsi Bali; 2020.
7. Dinas Pertanian dan Ketahanan Pangan Provinsi Bali. Laporan Akuntabilitas Kinerja Pemerintah (LKjIP). Denpasar: Dinas Pertanian dan Ketahanan Pangan Provinsi Bali; 2021.
8. Raynor B, Díaz EW, Shinnick J, Zeggara E, Monroy Y, Mena C, et al. The impact of the COVID-19 pandemic on rabies reemergence in Latin America: The case of Arequipa, Peru. *PLoS Negl Trop Dis.* 2021; 15 (5): e0009414. DOI: 10.1371/journal.pntd.0009414
9. Townsend SE, Sumantra IP, Pudjiatmoko, Bagus GN, Brum E, Cleaveland S, et al. Designing Programs for Eliminating Canine Rabies from Islands: Bali, Indonesia as a Case Study. *PLoS Negl Trop Dis.* 2013; 7 (8): e2372. DOI: 10.1371/journal.pntd.0002372
10. Batan IW, Suatha IK. Faktor-Faktor yang Mendorong Kejadian Rabies pada Anjing di Desa-Desa di Bali (Factors Encouraging the Incidence of Rabies in Dogs in Villages in Bali). *J Vet* 2016; 17 (2): 274-279.
11. Widyastuti MDW, Bardosh KL, Sunandar, Basri C, Basuno E, Jatikusumah A, et al. On dogs, people, and a rabies epidemic: Results from a sociocultural study in Bali, Indonesia. *Infect Dis Poverty.* 2015; 4: 30. DOI: 10.1186/s40249-015-0061-1
12. Jeon S, Cleaton J, Meltzer MI, Kahn EB, Pieracci EG, Blanton JD, et al. Determining the post-elimination level of vaccination needed to prevent re-establishment of dog rabies. *PLoS Negl Trop Dis.* 2019; 13

- (2): e0007869. DOI: 10.1371/journal.pntd.0007869
13. Wallace RM, Undurraga EA, Gibson A, Pieracci EG, Gamble L, Blanton JD, et al. Estimating the effectiveness of vaccine programs in dog populations. *Epidemiol Infect.* 2019; 147: e247. DOI: 10.1017/S0950268819001158
 14. Anuar H, Shah SA, Gafor AH, Mahmood MI, Ghazi HF. Usage of Health Belief Model (HBM) in health behavior: A systematic review. *Mal J Med Heal Sci.* 2020; 16 (Suppl 1): 201-209.
 15. Morowatisharifabad MA, Karimi M, Jannati M. Utility of the health belief model to assess predictors of rabies preventive measures. *J Educ Health Promot.* 2014; 3: 62. DOI: 10.4103/2277-9531.134770
 16. Suartha IN, Anthara MS, Dewi NMRK, Wirata IW, Mahardika IGNK, Dharmayudha AAGO, et al. Perhatian pemilik anjing dalam mendukung Bali bebas rabies. *Bul Vet Udayana.* 2014; 6 (1): 88–91.
 17. Subrata M, Purnama SG, Utami AW, Agustina KK, et al. Peranan pemangku kepentingan dalam pengendalian rabies dengan pendekatan One Health Terintegrasi di Bali. *J Kebijak Kesehat Indonesia.* 2020; 9 (1): 20–32. DOI: 10.22146/jkki.54246
 18. Kakang DM, Batan IW, Nindhia TS. Pemeliharaan Anjing oleh Masyarakat Kota Denpasar yang Berkaitan dengan Faktor Risiko Rabies. *Indonesia Med Veterinus.* 2017; 6 (2): 2477–6637.
 19. Villanti AC, Johnson AL, Ilakkuvan V, Jacobs MA, Graham AL, Rath JM. Social media use and access to digital technology in US Young Adults in 2016. *J Med Internet Res.* 2017; 19 (6): e196 DOI: 10.2196/jmir.7303
 20. Chen J, Wang Y. Social media use for health purposes: Systematic review. *J Med Internet Res.* 2021; 23 (5): e17917. DOI: 10.2196/17917
 21. Wijayanti RP, Handayani PW, Azzahro F. Intention to seek health information on social media in Indonesia. *Procedia Comput Sci.* 2021; 197: 118–125. DOI: 10.1016/j.procs.2021.12.125
 22. Huo J, Desai R, Hong YR, Turner K, Mainous AG, Bian J. Use of Social Media in Health Communication: Findings from the Health Information National Trends Survey 2013, 2014, and 2017. *Cancer Control.* 2019; 26 (1): 1073274819841442. DOI: 10.1177/1073274819841442
 23. Ferguson AW, Muloi D, Ngatia DK, Kiongo W, Kimuyu DM, Webala PW, et al. Volunteer based approach to dog vaccination campaigns to eliminate human rabies: Lessons from Laikipia County, Kenya. *PLoS Negl Trop Dis* 2020; 14 (7): e0008260. DOI: 10.1371/journal.pntd.0008260
 24. Xie T, Liu W, Anderson BD, Liu A, Gray GC. A system dynamics approach to understanding the One Health concept. *PLoS One.* 2017; 12 (9): e0184430. DOI: 10.1371/journal.pone.0184430
 25. Destoumieux-Garzón D, Mavingui P, Boetsch G, Boissier J, Darriet F, Duboz P, et al. The one health concept: 10 years old and a long road ahead. *Front Vet Sci.* 2018; 5: 14. DOI: 10.3389/fvets.2018.00014
 26. Mackenzie JS, Jeggo M. The one health approach-why is it so important? *Trop Med Infect Dis.* 2019; 4 (2): 88. DOI: 10.3390/tropicalmed4020088
 27. Nadal D, Beeching S, Cleaveland S, Cronin K, Hampson K, Steenson R, et al. Rabies and the pandemic: Lessons for One Health. *Trans R Soc Trop Med Hyg.* 2022; 116 (3): 197-200. DOI: 10.1093/trstmh/traab123
 28. Jones CL, Jensen JD, Scherr CL, Brown NR, Christy K, Weaver J. The Health Belief Model as an Explanatory Framework in Communication Research: Exploring Parallel, Serial, and Moderated Mediation. *Health Commun.* 2015; 30 (6): 566-576. DOI: 10.1080/10410236.2013.873363
 29. Sesagiri Raamkumar A, Tan SG, Wee HL. Use of health belief model-based deep learning classifiers for COVID-19 social media content to examine public perceptions of physical distancing: Model development and case study. *JMIR Public Heal Surveill.* 2020; 6 (5): e20493. DOI: 10.2196/20493