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Research Article

Awareness, knowledge, attitude, and practices (A-KAP) assessment of the One Health approach in health sciences education webinar series participants in select universities in the Philippines

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Background

A three-day One Health training program for undergraduate and graduate students, as well as professionals in One Health-related fields, was conducted by the Philippine One Health University Network (PhilOHUN), in collaboration with the Southeast Asia One Health University Network (SEAOHUN), through a webinar series. To measure the impact of the training on the awareness, knowledge, attitude, and practices (A-KAP) related to the topics covered in the program, this study was conducted.

Methods

A quasi-experimental design was employed to evaluate the effect of the One Health training program on the A-KAP of the participants. An online questionnaire developed based on the content of the training modules was administered to the participants before and after the training program. The attendees who accomplished both the pre- and post-training A-KAP assessment questionnaire were included as study participants; of the 225 attendees, 119 respondents qualified. The difference between the pre- and post-training mean A-KAP scores of participants was determined using paired t-test.

Results

Findings showed that the Awareness of the participants ($P<0.001$) across the topics discussed significantly increased after taking part in the training program. In the Knowledge aspect, however, there was no significant improvement in the general knowledge items score of the participants ($P=0.06$) but improvements were observed in all the modules included in the training ($P<0.05$). As for the Attitude and Practices scores of the participants, no significant improvements were observed ($P>0.05$) after taking part in the training.

Conclusions

The significant differences in awareness and knowledge suggest that the training modules contain relevant topics, which were effectively transmitted during the program. For Attitude and Practices, it may be premature to determine the impact of a single activity, although it is expected that these will change over time. Nevertheless, the training program can be used as a springboard for introducing One Health concepts to a wider audience and a continuing initiative to influence the development of appropriate attitudes and practices for current and future One Health practitioners.

Established by Food and Agriculture Organization (FAO), the World Organization for Animal Health (OIE), the United Nations Environment Programme (UNEP), and the World Health Organization (WHO) in May 2021, the One Health High-Level Expert Panel (OHHLEP) define One Health as "an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals, and ecosystems. It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and interdependent.

The approach mobilizes multiple sectors, disciplines, and communities at varying levels of society to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for healthy food, water, energy, and air, taking action on climate change, and contributing to sustainable development".[1]

While the term 'One Health' has been globally recognized in different scientific fields for many years now, particularly by medical and veterinary professionals,[2] the concept can be traced back more than two decades.[3-5] Furthermore, the current pandemic highlights the close connection between humans, animals, and the shared environment.[1] It demonstrated how crucial the One Health approach is in problems that have defied more conventional disciplinary or sectoral approaches.[4] It elicits transdisciplinary collaboration to find solutions at the local, national, regional, and global levels.[6] Given its role in addressing emerging public health threats, the One Health approach must be continually discussed.[5] To sum up, while One Health has gained recognition and importance in addressing complex health challenges, there are gaps in awareness, historical understanding, broader applicability, and transdisciplinary collaboration, which could be areas for further research, exploration, and development in the field.

In line with this, the Philippine One Health University Network (PhilOHUN) aims to create a regional network of universities in Southeast Asia that work together to provide socially meaningful academic excellence on One Health. In this effort, a One Health training program for undergraduate and graduate students, as well as professionals in One Health-related fields, was initiated by the Network, in collaboration with the Southeast Asia One Health University Network (SEAOHUN) and the United States Agency for International Development (USAID), and support from the Chevron U.S.A. Inc. The training program was designed to educate present and future generations of One Health practitioners by improving their ability to find solutions to the current public health challenges beyond their respective fields of expertise and to collaborate as part of a multi-disciplinary team of professionals. The topics/modules covered in the training program are *Fundamentals of Public Health*; *Epidemiology and Risk Analysis*; *Fundamentals of Infectious Diseases; Infectious Disease Management*; *One Health Concepts, and Knowledge: Focus on Technology Driven Approach*; and, *A Proposed ASEAN Public Health Leadership Model and Best Practices*. The program was piloted by selected Network's member universities that applied and received grants from SEAOHUN for its implementation through a webinar series titled "One Health Approach in Health Sciences Education". These universities were Central Luzon State University, West Visayas State University, University of the Philippines Los Baños, Pampanga State Agricultural University, and the University of the Philippines Manila.

To assess the effectiveness of the One Health training program, a survey was undertaken to measure its impact on the participants' awareness, knowledge, attitude, and practices (A-KAP) related to the topics covered. The A-KAP scores of the participants were assessed before and after the training as indicators for the effectiveness of the training program in improving the current and future One Health practitioners' ability to work together as a multidisciplinary team of professionals and to go beyond their respective fields of expertise for solutions to the current public health concerns. This study can provide valuable insights into the existing A-KAP of One Health stakeholders, identify barriers and facilitators to implementation of the PhilOHUN's training program, and inform the development and evaluation of interventions aimed at the overall promotion of the One Health Approach in the country.

METHODS

STUDY DESIGN

A quasi-experimental design was employed to evaluate the effect of the One Health training modules on the A-KAP of the participants. A pre-training A-KAP assessment questionnaire was administered before the conduct of the training. After the training, the same set of questions was given to the participants for post-training A-KAP assessment. The questionnaire was used to assess the A-KAP of the participants before and after the training as indicators of the effectiveness of One Health training modules in improving their ability to find solutions to the current public health challenges beyond their respective fields of expertise and to collaborate as part of a multi-disciplinary team of professionals.

STUDY PARTICIPANTS

The webinar was intended for undergraduate and graduate students as well as professionals in One Health-related fields. Students who were taking One Health-related courses in the selected Network's member universities were invited. This included students pursuing degrees in medicine, veterinary science, biology, medical technology, nursing, and computer science. The alumni of these universities who were working as One Health practitioners, such as medical technologists, nurses, veterinarians, agricultural and biological scientists, computer scientists, social science educators, foresters, economists, civil engineers, and agricultural engineers were also invited.

All webinar attendees were invited to participate in the survey. The attendees who accomplished both the pre- and post-training A-KAP assessment questionnaire within a set cut-off time were included in the study. Of the 225 webinar attendees, 119 (52.9%) respondents were eligible and included in the study data analysis.

STUDY VARIABLES

The A-KAP of the participants were measured in the study. The A-KAP is defined as the awareness, knowledge, attitude, and practices of the participants, respectively, related to the One Health topics covered in the webinar series.

DATA COLLECTION

The questionnaire was administered using an online platform (i.e., Google Forms). The questionnaire was developed based on the contents of the training modules. It contained 17 awareness, 50 knowledge, 28 attitude, and 17 practice items. The Awareness section included "Yes/No" and multiple select questions while the Knowledge included multiple choice questions. For the Attitude section, the participants were asked to rate their level of agreement with a given statement based on a five-point Likert scale: "strongly agree," "agree," "neutral," "disagree," and "strongly disagree". The participants were also asked to rate their frequency of practice of a given statement: "always," "often," "sometimes," "rarely," and "never". All constructs included general and concept-specific sets of questions. The general questions reflect the overarching connection or relationship of all the topics to One Health, while concept-specific questions were developed based on the content of each training module. The link to the online questionnaire was sent to the participants on the day before the webinar and immediately after its completion. The survey was conducted from August 30 to September 10, 2022.

DATA ANALYSIS

Scores were assigned to each option per item in the A-KAP questionnaire. In the Awareness section, 1 point was assigned for a response indicating awareness, and zero if otherwise. In the knowledge section, each option was scored as follows: zero scores for incorrect answers, and 1 score for true or correct answers. In the attitude section, 1-5 scores were assigned for each option, respectively, for each item depicting a desirable One Health-related attitude. Scoring was reversed for items depicting an undesirable attitude. Similarly, in the last section, 1-5 scores were assigned for each option, respectively, for items depicting good One Health-related practices. Scoring was reversed for items depicting poor practices. The general and per-module scores of the participants were computed.

Only participants who answered both the pre- and post-training A-KAP online survey forms were included in the analysis. The responses of those who were not able to meet the cut-off time per module for answering the pre-training assessment were not included in the analysis. Descriptive statistics such as frequencies and percentages were used to describe the socio-demographic profile of the participants. The mean scores ± SD for general items and per module A-KAP scores of the participants before and after the webinar series were also computed. Paired t-test was used to determine the difference between pre- and post-training A-KAP assessment scores. A one-tailed p-value <0.05 was used to determine statistical significance.

ETHICS CONSIDERATION

Only those who agreed to the Study Informed Consent Form were included. The form asked for information such as the purposes and objectives of the study, the data collection procedures, associated risks and benefits of participation, the confidentiality of data collected, compensation for the time rendered for the study, and the option to refuse/withdraw without penalty or consequences. Ethical approval was not sought for this study.

RESULTS

SOCIODEMOGRAPHIC CHARACTERISTICS

Table 1 summarizes the study participants' sociodemographic characteristics and health-seeking behaviors. Most of the participants were female (61.3%), 18-30 years old (89.9%), single (95.0%), undergraduate students (65.5%), from Central Luzon (66.4%), in the field of veterinary medicine (86.6%), and belonged to a household with an income of either Php 10,000 - 20,000 (19.3%) or Php >40,000 (19.3%). The majority of the participants get information from online sources on current events and public affairs (92.4%) and health-related topics (89.1%). Most participants also claimed that they would go to the nearest public clinic/hospital in case of health-related emergencies in their households (56.3%).

NUMBER OF ATTENDEES IN THE TRAINING MODULES

One hundred nineteen (119) study participants were not able to attend all the training modules. Modules 1 and 2 had the highest number of participants, while Module 6 had the least. **Table 2** summarizes the number of participants per training module.

A-KAP SCORES OF THE TRAINING PARTICIPANTS

The differences between the pre- and post-training mean A-KAP scores of participants were determined using paired t-tests. Awareness of the participants ($p<0.001$) across the topics discussed significantly increased after taking part in the training. In the Knowledge aspect, however, there was no significant improvement in the general knowledge items score of the participants ($p=0.06$) but improvements were observed in all the modules included in the training ($p<0.05$). As far as the Attitude and Practices scores of the participants, no significant improvements were observed ($p>0.05$) after taking part in the training **(Table 3).**

DISCUSSION

The findings suggest that the training module contents were able to help increase the Awareness and improve the Knowledge of the participants with respect to One Health concepts. On the other hand, while all modules showed trends for improvement of Practices and all modules, except Module 3, showed a trend for numerical improvement in the score for Attitudes, these were not statistically significant. This may be attributed to the way the training program was delivered, and the short duration between the webinar series and the evaluation. The alignment between module contents and the mode of implementation will require re-assessment and must be revisited and revised accordingly to address the possible shortcomings. Specifi-

Table 1. Sociodemographic information and health-seeking behaviors (n=119).

Variables		Frequency	Percentage
Gender			
	Male	46	38.7
	Female	73	61.3
Age			
	18-30 years old	107	89.9
	31-40 years old	9	7.6
	41-50 years old	1	0.8
	> 50 years old	2	1.7
Marital Status			
	Single	113	95
	Married	6	5
Highest Educational Attainment			
	Secondary	15	12.6
	Vocational	1	0.8
	Undergraduate	78	65.5
	Graduate	15	12.6
	Post-graduate	6	5
	I prefer not to answer	4	3.4
Region			
	National Capital Region (NCR)	14	11.8
	Cordillera Administrative Region (CAR)	4	3.4
	Ilocos Region (Region I)	4	3.4
	Cagayan Valley (Region II)	4	3.4
	Central Luzon (Region III)	79	66.4
	Calabarzon (Region IV-A)	8	6.7
	Eastern Visayas (Region VIII)	3	2.5
	Zamboanga Peninsula (Region IX)	1	0.8
	Northern Mindanao (Region X)	1	0.8
	Soccsksargen (Region XII)	1	0.8
Classification			
	Student	103	86.6
	Working Student	*13*	*10.9*
	Professional	17	14.3
Field/Area of expertise			
	Public Health or Human Health	6	5
	Veterinary Medicine	103	86.6
	Animal Science	1	0.8
	Environmental Science	1	0.8
	Life Sciences (Chemistry, Biology)	0	0
	Global One Health	5	4.2
	Social Sciences	1	0.8
	Medical Technology	1	0.8
Monthly Household Income			
	< Php 10,000.00	15	12.6
	Php 10,000 - 20,000	23	19.3
	Php >20,000 - 30,000	19	16
	Php >30,000 - 40,000	11	9.2

Variables	Frequency	Percentage
> Php 40,000	23	19.3
I don't know	12	10.1
I prefer not to answer	16	13.4
Sources of information about current events and public affairs		
Television shows	78	65.5
Radio broadcasts	35	29.4
Newspapers and other printed media	30	25.2
Social media apps (Facebook, Tiktok, Twitter, etc.)	110	92.4
Online sources (online news websites, Google search)	109	91.6
School/Workplace	81	68.1
Scholastic sources (e.g., books, journals)	41	34.5
Government offices	37	31.1
Local community organizations	29	24.4
Family members	78	65.5
Friends	72	60.5
Neighbors	22	18.5
Main sources of information regarding health-related topics		
Television shows	65	54.6
Radio broadcasts	27	22.7
Newspapers and other printed media	27	22.7
Social media apps (Facebook, Tiktok, Twitter, etc.)	104	87.4
Online sources (online news websites, Google search)	106	89.1
School/Workplace	81	68.1
Scholastic sources (e.g., books, journals)	54	45.4
Government offices	35	29.4
Local community organizations	25	21
Family members	65	54.6
Friends	63	52.9
Neighbors	18	15.1
Actions taken during health-related emergencies		
Go to the nearest private clinic/hospital	62	52.1
Go to the nearest public clinic/hospital	67	56.3
Go to the barangay health center	20	16.8
Look for a remedy online	18	15.1
Go to a local community healer	1	0.8
Self-medicate	12	10.1
I prefer not to answer	2	1.7

cally, the module contents must be aligned with the intended change or impact in terms of the attitude and practices of the participants. Moreover, it may also be that most of the participants' Attitudes and Practices are already aligned with the One Health approach as most of them were in One Health-related fields such as Veterinary Medicine and Public Health.

Despite the lack of evidence in creating an impact on the attitudes and practices, the increase in awareness and knowledge observed among the future and current One Health professionals brought about by the training program is an important step in promoting the One Health approach. A better understanding of the fundamental concepts is critical to creating better reception and application of this approach.[7,8] Bridging the gaps in the knowledge systems of different health professionals promotes collaboration and mutual learning between field experts.[9] However, while accurate knowledge and understanding of One Health concepts among health practitioners are important in their practice, they must also be equipped on how to practically incorporate these in their work settings.[10]

The impact of the training program on attitudes and practices may have been better if it was delivered differently and assessed through direct observation and/or practical examinations.[7,8,11] Demonstrations and experiential activities in a favorable learning environment could pro-

Table 2. The number of registered participants in One Health online training modules.

Module		Number of registered participants per module
Module 1	Fundamentals of Public Health/	107
Module 2	Epidemiology and Risk Analysis	
Module 3	Fundamentals of Infectious Diseases	73
Module 4	Infectious Disease Management	69
Module 5	One Health Concepts and Knowledge: Focus on a Technology-Driven Approach	62
Module 6	A Proposed ASEAN Public Health Leadership Model and Best Practices Model Based on the Life and Writings of Philippine National Hero Dr. Jose Rizal	60

Table 3. Mean A-KAP scores of the participants on general items and each module before and after attending the webinar series.

Construct	n	Highest Possible Score	Mean					p-value*
			Before	SD	After	SD	Difference	
Awareness								
General items	119	8	6.12	2.4	7.34	2.06	1.22	<0.001
Modules 1&2	107	5	4.21	0.92	4.6	0.65	0.39	<0.001
Module 3	73	3	2.01	0.77	2.71	0.54	0.7	<0.001
Module 4	69	2	1.16	0.71	1.59	0.67	0.43	<0.001
Module 5	62	3	2.27	1.03	2.85	0.56	0.58	<0.001
Module 6	60	3	1.97	0.98	2.83	0.41	0.86	<0.001
Knowledge								
General items	119	6	4.8	1.03	5	0.96	0.2	0.06
Modules 1&2	107	12	6.23	1.87	6.97	1.9	0.74	0.002
Module 3	73	7	4.88	1.27	5.32	1.27	0.44	0.004
Module 4	69	8	5.87	1.61	6.7	1.35	0.83	0.001
Module 5	62	9	4.77	1.41	5.32	1.25	0.55	0.012
Module 6	60	8	4.3	1.81	5.73	1.62	1.43	<0.001
Attitude								
General items	119	35	27.5	2.94	27.86	3	0.36	0.175
Modules 1&2	107	10	8.06	1.24	8.14	1.14	0.08	0.304
Module 3	73	15	13.47	1.5	13.45	1.38	-0.02	0.477
Module 4	69	15	13.12	1.65	13.13	1.53	0.01	0.479
Module 5	62	35	25.89	2.77	26.34	2.91	0.45	0.191
Module 6	60	30	25.17	3.1	26	2.96	0.83	0.069
Practices								
General items	119	30	27.86	3.35	28.47	3.47	0.61	0.084
Modules 1&2	107	15	9.78	1.71	10.02	1.66	0.24	0.148
Module 3	73	15	11.74	1.84	11.86	1.76	0.12	0.341
Module 4	69	20	14.46	2.05	14.84	1.92	0.38	0.135
Module 5	62	15	11.74	1.55	11.94	1.52	0.2	0.244
Module 6	60	20	12.78	1.8	13.33	2	0.55	0.059

Notes: SD – standard deviation.
*Paired t-test ($p<0.05$) for the difference in mean A-KAP scores.

mote positive attitudes.[12] On the other hand, practice collaboration also helps health practitioners to overcome professional hurdles, allay fears, and define roles and what collaboration entails.[13] Nevertheless, the improved knowledge, as observed in this study, can be used as a stepping stone for promoting positive attitudes and practices toward certain issues among health practitioners.[12]

Moreover, workshop activities may also be needed to ensure the development of specific One Health competencies. In India, a robust training model was developed to build the interdisciplinary leadership skills of health practitioners. The training included activities such as didactic sessions, group discussions, case studies, and role-playing.[14] Aside from experiential learning, one must also consider the different professionals' needs when building the One Health-related skills of health practitioners. For example, while there is a common understanding of cultural competence, it may be operationalized differently by profession as well as by health setting, locality, and years of experience.[15] Hence, training models for building One Health competencies must ensure that activities facilitating the learning of the target knowledge, values, and skills for the participants are included.

To our knowledge, this is the first A-KAP survey of current and future Filipino health practitioners on One Health-related topics. This paper provides insight into how training programs could impact the A-KAP of health practitioners in the country. It is hoped that the findings of this study will help develop or improve One Health training programs for health professionals, paraprofessionals, and the general public in the future, as well as in the development or integration of One Health concepts in the courses offered in universities for future health practitioners. However, this study has certain limitations. The participants for this study have limited diversity in terms of practice, location, gender, and age. For future studies, a more varied set of participants could be targeted, similar to the current workforce statistics in One Health-related fields in the country. Furthermore, only the individuals who responded to the survey were included in this study. This approach could have led to selection bias as the respondents may be those who already have prior knowledge about the topics. Moreover, the lack of statistically significant impact on attitudes and practices may be due to a mismatch between the training module contents and the intended change in terms of the attitudes and practices of the participants. It is important to revisit and revise the training program to ensure that the module contents are effectively aligned with the desired outcomes. A comprehensive and contextually relevant training program that includes practical components and workshop activities and promotes collaboration and mutual learning may result in better outcomes. By aligning the training contents with the intended outcomes and addressing the specific needs of the participants, the training program can effectively promote awareness, knowledge, positive attitudes, and improved practices related to One Health concepts.

CONCLUSIONS

These results indicate that the training module contents helped increase awareness and improve the knowledge of the participants with respect to One Health concepts. However, there was no significant difference in the scores of the participants regarding attitude and practices. The significant differences in awareness and knowledge suggest that the training modules contain relevant topics, which were effectively transmitted during the program. For attitude and practices, it is premature to determine the impact of a single activity, although it is expected that these will change over time. Nevertheless, the training program can be used as a springboard for introducing One Health concepts to a wider audience and a continuing initiative to influence the development of appropriate attitudes and practices for current and future One Health practitioners.

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AUTHORSHIP CONTRIBUTIONS

KRVM, JCPR, ADM, and RMJ contributed to the design and acquisition of data. All authors were involved in the data analysis, drafting of the manuscript, and final approval of the manuscript.

DISCLOSURE OF INTEREST

The authors completed the Unified Competing Interest form available upon request from the corresponding author and declare no conflicts of interest.

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