EFFECT OF DEMOGRAPHIC ASPECTS ON THE PERFORMANCE RADIOGRAPHER DURING THE COVID-19 PANDEMIC IN BALI, INDONESIA: ROLE OF SELF-EFFICACY IN ONLINE TRAINING

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Abstract. Efforts to obtain education and training for health workers during the COVID-19 pandemic require innovation, one of which is by attending seminars or online training that utilizes information technology. Participating in seminars or online training is expected to be able to increase self-efficacy in making decisions regarding their ability to carry out health service activities needed to improve the performance of health workers. This study aimed to describe the influence of demographic aspects and decision-making self-efficacy on the performance of radiographers in Bali Province, Indonesia in providing online training education during the COVID-19 pandemic. The analysis used in this study was Partial Least Square (PLS) with a total of 104 respondents. The results of this study indicate that the sex of the health worker (p=0.041) and self-efficacy (p<0.001) directly impact the performance of the health worker. In addition, the level of education (p=0.049) can directly influence self-efficacy. In conclusion, female health workers performed better than their male counterparts during the pandemic. Higher the level of education is able to influence self-efficacy, and the efficacy in the workforce has a very significant effect on the performance of health workers.

Keywords: demographic aspects, performance, self-efficacy

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INTRODUCTION

Health workers are an important asset as human resources in health service institutions. The role of health workers is not only seen from their work productivity but also from the quality of work produced. With performance appraisals, leaders can use the results of these assessments as a basis for improving personnel decisions and providing feedback to health workers about their performance. One way to improve the performance of health workers is by providing opportunities to receive education and training by attending seminars or online training by utilizing information technology (van Beurden *et al*, 2015).

Advances in information technology have influenced and encouraged an increase in the competence of the health workers provided in order to meet the demands of society. Utilization of information technology is able to facilitate the task of health workers in providing health services, including obtaining the knowledge and other skills needed through training. Training is the process of increasing the knowledge and skills of health workers. Health workers need training because training can provide opportunities to develop their abilities to complete their jobs (Furutani *et al*, 2009).

The condition of coronavirus disease 2019 (COVID-19) has caused various kinds of health problems as well as impacting the training process

for health workers, one of which the radiographer. Radiographers are medical personnel who work in radiology units. The radiographer's job is to make X-rays to establish a diagnosis of a patient's disease. The existence of training is expected to be able to increase the knowledge and skills of radiographers so that it has an impact on the performance of radiographers in providing health services. However, the training that should have been carried out in person could not be carried out due to the COVID-19 pandemic. There is an appeal not to hold an activity that invites mass gathering is one of the obstacles faced in the world of health in accordance with the policy set by the Ministry of Health concerning the prevention and control of COVID-19 in workplaces in supporting business continuity in a pandemic situation (Ministry of Health Republic of Indonesia, 2020).

For the most part, this pandemic has made activities quite difficult to carry out face-to-face, so one form used is online. Currently online training is one of the solutions in this COVID-19 pandemic. Education and training activities using online training methods can significantly increase the knowledge, attitudes, and skills of alumni regarding surveillance methods during the COVID-19 pandemic (Pascawati *et al*, 2020). In fact, participants can remain active in every lesson given and the quality of assignments can help improve their understanding of the learning material. Apart from that, the delivery of material was easy to understand even though it was done online (Kowara *et al*, 2020). The effectiveness of online training is certainly different from classical or in-person training so that researchers are interested in examining how demographic aspects and self-efficacy decision-making influence the performance of radiographers in the Province of Bali in providing online training education during the COVID-19 pandemic.

MATERIALS AND METHODS

This research was conducted to describe the effect of providing online training education and decision-making self-efficacy on the performance of radiographers in the Province of Bali. This research was a quantitative research. The population of this study was 617 radiographers in Denpasar, Badung, Tabanan, Gianyar, Karangasem, Jembrana, Bangli, Klungkung and Singaraja districts of Bali Province. The inclusion criteria were (1) radiographers working in health services in Bali Province, (2) actively participating in training both online and face-to-face, (3) working for at least 1 year and (4) willing to be research respondents, while the exclusion criteria were (1) radiographers refusing to fill out the questionnaire. Sampling of the research participants followed the structural equation model based on partial least square (SEM-PLS) sampling approach by Hair *et al* (2022). The sampling was carried out by until the number of participants based on the result of sample size calculation met.

This study used an online questionnaire with 35 closed questions. All questionnaire items were measured using a four-point Likert scale, namely 'Strongly agreed' (SA), 'Agreed' (A), 'Disagreed' (D), and 'Strongly disagreed' (SD). The data collected were demographic data such as namely gender, age, length of work as a radiographer, marital status, and level of education, decision-making self-efficacy data and radiographer performance data. This online questionnaire was tested on 30 respondents not involved in the study. The validity of each question item was tested using the product-moment correlation test between the scores of each question item and the total score and reliability using Cronbach's alpha.

Before using SEM-PLS as a technique to get the significance among variables, the analysis begins with testing the validity of the construct

variable by looking at the average variance extracted (AVE) value in the construct. The reference criterion that a construct meets the validity discriminant test was when the AVE value is >0.5, while to strengthen the construct validity test a reliability test is carried out, by looking at the composite reliability value >0.6.

Testing of the structural model (inner model) was carried out in this study to determine the significance of the influence between exogenous and endogenous variables. This analysis was carried out after all indicators and variables were declared valid and reliable. Evaluation of the structural model or inner model is a stage for evaluating the goodness of fit which includes the coefficient of determination (R^2) and predictive relevance (Q^2) as well as hypothesis testing.

Partial least squares (PLS) is a model analysis to gather significance effect among variables by using established links between predictors and variables. The hypothesis was built in a two-tailed direction meaning that the result of the t-statistic value must be >1.96. The data analysis steps in this study were as follows: (1) check the correctness and reliability of the model; (2) test the relationship between variables in the model; (3) validate the training model. The research model developed in this study is shown in Fig 1.

This research has received ethical clearance from the Bali International University research ethics commission with number 01.029/UNBI/EC/VIII/2021.

RESULTS

The process of collecting data in this study was carried out by filling out a questionnaire that was distributed online with responses that

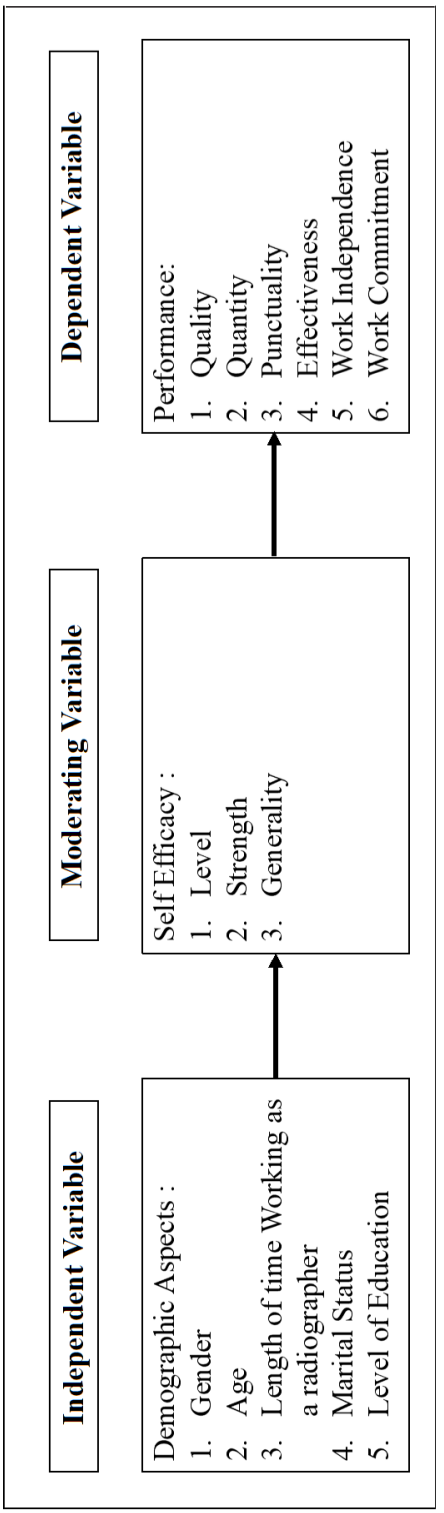

Fig 1 - Conceptual framework

had been received by 104 respondents. The frequency distribution data on the characteristics of respondents in this study can be seen in Table 1.

This research began with testing instruments developed for self-efficacy and performance variables. The results of testing the instrument with the validity and reliability tests showed that the instrument was valid (r_{min} = 0.388 with p-value = 0.034; r_{max} = 0.897 with p-value = 0.001), and reliable (α = 0.931).

Based on the analysis, the R^2 of efficacy is 0.063, indicating that only 6.3% of variance of efficacy can be described by respondent's characteristics. This shows the low contribution of the respondent's characteristics to efficacy. While the R^2 of performance is 0.614, indicating that 61.4% variance of performance can be described by efficacy and characteristics. This shows that variations in the efficacy and characteristics of the respondents can make a good contribution in predicting performance.

Table 1

Respondents' characteristics (N = 104)

Variable	Frequency *n* (%)
Gender	
Male	62 (59.6)
Female	42 (40.4)
Age	
22-30 years	67 (64.4)
31-40 years	21 (20.2)
41-60 years	16 (15.4)

Table 1 (cont)

Variable	Frequency *n* (%)
Marital status	
Married	58 (55.7)
Not Married	46 (44.3)
Work experience	
1-5 years	63 (60.5)
6-10 years	15 (14.4)
11-20 years	21 (20.1)
Number of times attending online training	
1-10 times	99 (95.2)
11-30 times	5 (4.8)
Level of education	
Diploma	57 (54.8)
Bachelor's degree	40 (38.5)
Postgraduate	7 (6.7)
Location of workplace	
Denpasar City	35 (33.7)
Badung Regency	20 (19.2)
Tabanan Regency	7 (6.7)
Gianyar Regency	8 (7.7)
Karangasem Regency	7 (6.7)
Jembrana Regency	6 (5.8)
Bangli Regency	5 (4.8)
Klungkung Regency	7 (6.7)
Singaraja Regency	9 (8.7)

Based on the visual model which can be seen in Fig 2, it is known that the complete estimation results can be obtained from the path coefficient Table directly.

Based on the results of the direct influence analysis Based on the results of the direct influence analysis (Table 2), the relationship pattern can be explained as follows:, the relationship pattern can be explained as follows:

1. The characteristics of the respondents are divided into gender, status, education level, and age. All these variables were evaluated for their effect on efficacy. Based on the results of the analysis,

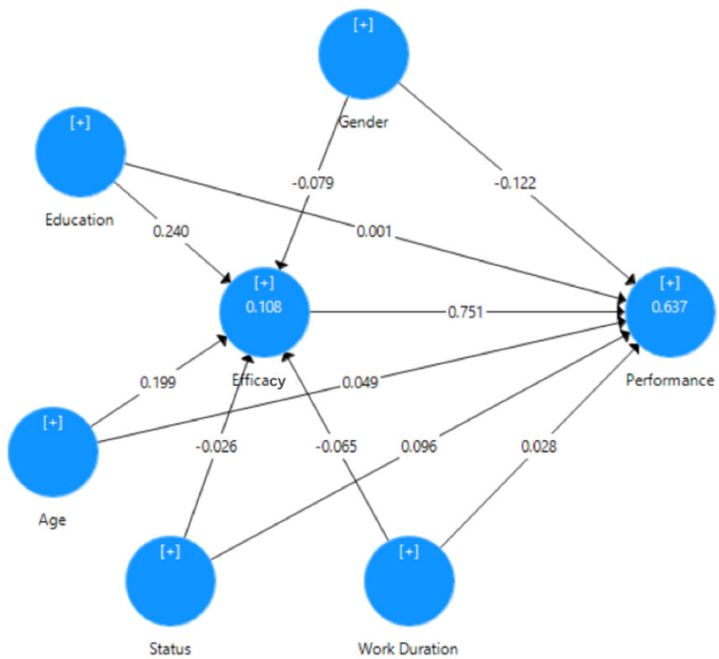

Fig 2 - Output from the PLS inner model path diagram regarding the performance of health workers during the COVID-19 pandemic

COVID-19: coronavirus disease 2019; PLS: partial least square

Table 2

Inner model path coefficient

Relationship	Loading factor	*p*-value
Self-efficacy → Performance	0.751	<0.001
Gender → Self-efficacy	-0.079	0.367
Gender → Performance	-0.122	0.029
Length of work → Self-efficacy	-0.065	0.715
Length of work → Performance	0.028	0.840
Marital status → Self-efficacy	-0.026	0.813
Marital status → Performance	0.096	0.164
Education → Self-efficacy	0.240	0.059
Education → Performance	0.001	0.994
Age → Self-efficacy	0.199	0.267
Age → Performance	0.049	0.730

it was found that gender had a significant effect with a parameter coefficient of -0.122 with *p*-value of 0.029. Because the gender variable is a discrete variable, the interpretation of the coefficient is to compare men and women. In conclusion, the female sex has a better performance than the male.

2. The level of education gives a parameter coefficient value of 0.240 with a *p*-value of 0.059. The level of education is a variable on an ordinal scale, so the interpretation shows that the higher the level of education, the higher the efficacy of health workers.

3. Variable characteristics of health workers such as gender, age, status, and length of service, do not show a significant effect on efficacy with *p*-values of 0.367, 0.267, 0.813, and 0.715, respectively.

4. Variable characteristics of health workers such as age, status, length of service, and level of education do not show a significant effect on performance with *p*-values of 0.730, 0.164, 0.840, and 0.994 respectively.

Furthermore, the results of the assessment are indirect, where the effect of mediation can be seen from the evaluation of the indirect effect. Efficacy as a mediating variable can be a variable that has the potential to affect the relationship of exogenous variables to endogenous variables. The results of the indirect effect analysis can be seen in Table 3.

Based on Table 3, it is known that the effect of efficacy as a significant mediating variable influences the level of education on performance, indicated by the value of the specific indirect effect with *p*-value of 0.046.

DISCUSSION

During the COVID-19 pandemic, the role of self-efficacy became a crucial factor influencing the performance of health workers in this

Table 3
Indirect path coefficient

Relationship path among variables	Coefficient	*p*-value
Gender → Self-efficacy → Performance	-0.059	0.375
Length of work → Self-efficacy → Performance	-0.048	0.720
Marital Status → Self-efficacy → Performance	-0.019	0.814
Education → Self-efficacy → Performance	0.280	0.046
Age → Self-efficacy → Performance	0.149	0.271

study, namely radiographers, in their efforts to carry out their duties in making diagnoses. Self-efficacy, or self-confidence in the ability to perform required tasks, has formed a strong mental foundation for medical personnel to face this unprecedented challenge. A high level of self-efficacy allows health workers, especially radiographers, to remain focused, adaptive, and innovative in overcoming various challenges that have arisen throughout the course of this pandemic. Effective use of online training and seminars conducted to seek information and increase competence as a radiographer can support an increase in individual confidence or self-efficacy. This is in line with research conducted by Huang and Zhang (2020) who stated that the use of online media to search for information was positively correlated with self-efficacy possessed by individuals. Furthermore, research conducted by Valkenburg *et al* (2016) found that material using online media can unconsciously change the behavior and beliefs of individuals. In addition, research by Furutani *et al* (2009) found that internet use has a positive effect on self-efficacy.

The use of online seminars allows a person to be able to interact and exchange information with one another even though they have different backgrounds and places. This becomes an assessment that online media has a positive effect on self-efficacy. Radiographers in the Bali can educate themselves on topics related to training in radiology during a pandemic by utilizing training media and online seminars, receiving social support and advice from other people who have the same situation so by using online media so that radiographers are able to influence efficacy himself in carrying out health service actions after receiving training or online seminars.

Self-efficacy is able to influence a person's thinking ability to make a plan and strategy to achieve the desired goals and try to pursue

and solve all challenges (Sarafino and Smith, 2014). The importance of self-efficacy in the performance of health workers can be seen in various aspects. First, efficacy has an impact on their mental toughness. The belief that they are able to perform services in establishing patient diagnoses despite participating in training and seminars related to online radiology services effectively provides encouragement to remain committed to treating patients and dealing with stressful and high-risk situations. Furthermore, self-efficacy also influences the ability of health workers, especially radiographers, to collaborate and adapt. Believing that by participating in online training or seminars, they can contribute significantly to diagnostic services during and after the pandemic, medical personnel are more inclined to work closely with their colleagues in designing creative and efficient solutions in performing diagnostic imaging techniques.

However, the challenges faced by health workers, especially radiographers, during this pandemic can also shake their level of self-efficacy. Overwork, fatigue, risk of infection, and emotional stress can undermine their self-confidence. Therefore, it is important for health service agencies and the government to provide appropriate support in the form of training, protection, facilities, and psychological support both online and in person. By maintaining and strengthening the self-efficacy of radiographers, we can ensure that they remain resilient and able to play an important role in providing services during and after the COVID-19 pandemic in an effective and professional manner. In addition, other findings are significant from the demographic aspect, including the role of gender on radiographer performance during a pandemic. During the COVID-19 pandemic, the impact of gender on the efficacy and performance of health workers has become an increasing concern. Studies show that gender differences can affect how health workers respond and deal with

the challenges that exist in this crisis. Although both men and women in radiology services play an important role in providing services in establishing a diagnosis, there are different nuances in the impact felt.

For example, several studies have shown that women tend to have better empathy and communication skills, so they can be more effective in providing caring care to patients and providing emotional support to them. On the other hand, female health workers may face a higher risk of stress and fatigue due to their dual roles as workers and family responsibilities (Simonetti *et al*, 2021). This psychosocial impact can affect their mental well-being and, in turn, their performance in providing services to patients. Meanwhile, male health workers may face challenges in expressing feelings and seeking emotional support in an environment that may tend to emphasize masculinity and resilience. However, this study also shows that men in the health profession, especially radiographers, tend to take higher risks and have a strong level of self-confidence, which can help them face difficult situations with determination and decisiveness. Overall, the impact of gender on health worker efficacy and performance during the COVID-19 pandemic is a complex mix of social, psychological, and cultural factors. Understanding these differences can assist in designing a more holistic and responsive approach to the needs of health workers in carrying out their critical tasks in emergencies such as these. Furthermore, the results of the analysis show that there is a mediating role for self-efficacy (p-value = 0.046), from the effect of education on the performance of health workers during a pandemic. During the COVID-19 pandemic, the role of efficacy emerged as a significant mediator in linking educational level with the performance of health workers. Self-efficacy refers to an individual's belief in their ability to succeed in certain tasks. Health workers who have a higher level of education tend to have more extensive knowledge

about medical protocols and technical expertise in handling COVID-19 patients after receiving online training or seminars. However, without strong self-efficacy, these knowledge and skills may not be able to be implemented effectively in stressful and challenging situations like this pandemic (van Beurden *et al*, 2015).

In this context, self-efficacy functions as a mediator linking educational level with the performance of health workers. Radiographers who are confident in their abilities after receiving online training and seminars to deal with difficult situations and adapt to rapid changes will tend to be more motivated to carry out their tasks effectively and efficiently. While education level provides a solid foundation, self-efficacy will help overcome the insecurities and fears that may arise in dealing with medical and logistical challenges during a pandemic. With high confidence, health workers can more easily cope with the physical and mental fatigue that may occur due to an increased workload (Abun *et al*, 2021). Thus, self-efficacy acts as a bridge that fills the gap between knowledge and action and helps turn education into tangible performance in service delivery, especially regarding diagnostic imaging during or after the COVID-19 pandemic. The importance of self-efficacy in mediating the relationship between education level and health worker performance emphasizes the need for psychological and motivational support during a global health crisis like this. Efforts to strengthen efficacy through effective training, mentoring and communication will have a positive impact on the ability of health workers to provide the best care for patients and maintain the health of society.

In summary, female radiographers performed better than their male counterparts during the COVID-19 pandemic. In addition, the higher the level of education can influence self-efficacy and the efficacy

in the workforce has a very significant effect on the performance of radiographers. Strengthening self-efficacy can be done with training, mentoring and effective communication. These three activities will have a positive impact on the ability of health workers to provide the best care to patients.

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