ORIGINAL ARTICLE

Low Technological Competence as Barrier to Online Teaching and Its Impact on Anxiety Among Teachers During Movement Control Order in a Rural District in Terengganu, Malaysia

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ABSTRACT

Introduction: Teachers are among the occupation most affected due to COVID-19 pandemic in which they are forced to navigate through full online teaching and learning process due to the implementation of Movement Control Order (MCO). This study aims to determine the prevalence of psychological symptoms and its predictors during COVID-19 MCO among primary school teachers in rural Terengganu, Malaysia. **Methods:** A total of 239 teachers from 17 primary schools were recruited. Depression, Anxiety and Stress Scale (DASS) questionnaire was employed to measure to psychological problems. Online questionnaire was used and data were analysed using statistical software. **Results:** Majority of respondents was female (80%) with a mean (standard deviation) age of 43 (7.37). Approximately 14%, 20% and 8% of teachers reported depressive, anxiety and stress symptoms. The reporting of anxiety was contributed by low technological competence (Adjusted Odds Ratio, AOR) 4.46; 95% Confidence Interval, CI: 1.03-19.34). Other factors include not living with in-laws (AOR 0.12; 95% CI: 0.01-0.96) that were linked with depression and diagnosed with chronic diseases (AOR 4.54; 95% CI: 1.16-17.88) that were linked with stress. **Conclusion:** Low technological competence was a significant barrier to online teaching during MCO and is linked to anxiety among teachers. There is the need to ensure continuous provision of targeted upskilling programs specific for the current online learning landscape and support system to address mental health problems. This will entitle teachers to pursue work without detrimental impacts on mental health.

Keywords: Online education, Depression, Anxiety, stress, Lockdown, COVID-19

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INTRODUCTION

The COVID-19 pandemic has resulted in severe health impacts and has greatly affected the ecosystem of human life in many ways. Besides essential services, the economic sectors in most countries have been required to shut down in movement of control order (MCO) and working from home has taken precedence. In terms of the education sector, the learning process and traditional face-to-face teaching have been disrupted due to the closure of schools, colleges and universities. Globally, in 2020, schools were closed for the remainder of the academic year, and instructional activities, such as classroom teaching and scheduled assessments and examinations, were transitioned to online methods (1–4). Similarly in Malaysia, all schools including kindergartens, public, private, boarding schools, religious schools, international schools and institutions that cater for pre-university education were closed (5–7). However, to ensure the progression of education during the COVID-19 pandemic, e-learning plans were implemented, which included interactive and distance learning options, as applicable and appropriate (8). Teachers were obliged to navigate teaching and performing assessments through online methods (9) and it is expected that this transition may not be necessarily smooth because changing academic structure from in-person to online platform often leads to new challenges which may be overwhelming when underprepared and will bring anxiety and stress. Thus, teachers may be among the group that is most at risk for psychological impact due to this pandemic because of the sudden need to perform online teaching while

working remotely from home.

Countless teachers have been overwhelmed and underprepared regarding online teaching and assessments and this issue is not specific to Malaysia and is not restricted to the pandemic period (6, 10–12). A dated report highlighted that online teaching involves additional challenges and likely contributes to stress, particularly when there is a requirement to utilise technologies and online methods that are (10). A more recent study performed in England revealed that 54% of teachers found online teaching stressful (13). According to Gurung (14), lack of technical or software knowledge makes it difficult for teachers to conduct online teaching. Additionally, the author stated that the difficulties faced by teachers regarding online teaching during the pandemic include difficulties in contacting students in remote areas due to poor Internet connection or a lack of electricity. It has also been reported that virtual classes require lengthy preparations (15). All in all, challenges related to online learning have been succinctly stratified to broad groups related to technological, pedagogical and social challenges (16). On the contrary, arguments on the many benefits of online learning have also been reported (17).

In addition to teaching, certain teachers may also be involved in home-schooling their children and caring for elderly parents while attempting to maintain their own well-being and mental health (18). Teachers have also agreed that difficulties regarding the implementation of online learning are not limited to internet connection and other factors such as student gadget specifications and internet quotas, as well as a less-communicative learning process, are also involved (17). Conversely, recent research conducted by See and friends (13) demonstrated that the common concerns regarding the use of technology during online teaching included teachers not having the appropriate technological infrastructure and technical guidance. To effectively educate students, teachers must locate resources and digital infrastructure to support their delivery of classes. Activities such as content production and collaborative writing can be pursued using numerous applications available such as Google Classroom, Zoho and Dropbox Paper, quizzes, polls and surveys via Easypolls, SurveyMonkey and Typeform, and video chatting and conferencing via Microsoft Teams and Zoom (19) to name a few.

The implementation of online learning during the COVID-19 pandemic has most likely had a greater impact on the teachers who have been placed in rural or less developed areas compared to teachers who have been placed in urban areas (20). The lack of internet access is a barrier to online learning in rural areas, and several states in Malaysia experience extremely poor internet connections (21). Furthermore, the outbreak has uncovered disparities in Malaysia's digital structure and network operation, as there has been an increase in the number of inhabitants who are using the Internet. Moreover, this is not limited to the rural areas of the country. Based on recent report, Malaysia's Internet downloading speed averaged at 12.7 Mbps with the lowest speed being 10.5 Mbps (22). To match the 35 Mbps download speed benchmark through the National Fiberisation and Connectivity Plan 2 (23) delivery of internet service needs to improve by approximately three-fold (24).

In the state of Terengganu, in Peninsular Malaysia, the rural area is much greater as compared to the urban area. If the implementation of online education in rural areas during the MCO is not successful, the academic achievement gap between the urban and rural students will be affected. Moreover, if this issue is not addressed, it will lead to educational discrimination if alternative learning methods are not implemented for students who live far from areas with good Internet connectivity. Therefore, in addition to all the other responsibilities associated with their teaching position, it is the responsibility of the teachers to create solutions that will include all students.

The teaching profession has been linked to negative psychological impacts before the COVID-19 situations landed in Malaysia (25–28). With the changing of the education landscape, it is expected that the challenges and barriers that arise will cause more impact to a certain degree. How these new challenges and barriers affects the psychological well-being of teachers is extremely important. Furthermore, if mental health issues are not relieved in time, the well-being of the teacher and the teaching activities may be aggravated, affecting the students' academic achievements and mental health (29). Since the first MCO was implemented in Malaysia in March 2020, a series of other MCOs with varying levels of restrictions were introduced in tandem with risk assessments conducted by the government based on the fluctuations in the numbers of COVID-19 cases. Considering the trend of this epidemic, online teaching will continue to be the new normal in the unforeseeable future, not only in Malaysia but also globally and this is an important issue that must be assessed and addressed. To date, recorded period of school closures globally is reported to be between 11 to more than 41 weeks (30). Therefore, this study aimed to describe the prevalence of psychological impacts and its association with barriers to online teaching while working from home among primary school teachers in the rural Kemaman District, Terengganu during the COVID-19 MCO. Studies that determine the psychological issues associated with working from home (WFH) in general and regarding online teaching during the MCO are extremely important in the field of education and will facilitate continuous mental health management at a school level and elucidate significant barriers that must be resolved at a state or country level.

MATERIALS AND METHODS

Study design and participants

This was a cross-sectional study that was conducted among teachers who worked in primary schools throughout the district of Kemaman, Terengganu. There are approximately 11,518 primary school teachers in the state of Terengganu and 2,079 of those teachers work in the Kemaman district (31, 32). There is a total of 47 national primary schools in the district, and a total of 21 schools were randomly selected for this study from the list of primary schools provided by the Department of Education, Malaysia. Once approval was obtained from the Ministry of Education, Malaysia and the Terengganu State Education Office, invitation letters to participate in the study were e-mailed to the administrative offices of the respective schools. The data collection process took was conducted in the schools where permission was granted. Approximately 10 primary school teachers from each school were invited to participate in the study.

Online questionnaire

The data collection was conducted between March and April 2021, through an online methodology to ensure a timely process and considering the COVID-19 MCO, which forced most teachers to work from home. All questionnaires were disseminated to potential participants using a URL link included in an e-mail or telecommunication message via the school's representative that directed the participants to the information sheet for respondents, consent form and the questionnaire. The questionnaire was provided in the form of a Google Form. Self-administered bilingual English and Malay questionnaires were used as an instrument for data collection. The questionnaire consisted of three sections: Part A, Part B and Part C, which included socio-demographic and working information, psychological measurements associated with depression, anxiety and stress and barriers experienced during online teaching. The sections below provide a more detailed explanation of the questionnaire.

Socio-demographic information

Part A, or the socio-demographic and work information section, included information on the respondent's age, gender, ethnicity, education level, the experience of teaching in a school, participation in online teaching training, monthly income, marital status, number of children, the presence of a maid or helper (yes/no), staying with in-laws, number of people in the household, chronic disease, the house type and the type of school (rural, urban or semi-urban) they were currently teaching at.

Barriers experienced during online teaching

Part B consisted of questions regarding the barriers experienced during online teaching. A total of seven modified items obtained from a study by Klapproth et al. (33) were included in this section and were preceded by the following question: "How do challenges or barriers regarding conducting online teaching affect you"? The questions included points such as low housing conditions, low Internet connectivity, lack of motivation of students, lack of parental guidance, lack of guidance from school management, limited time for online classes and low technological competence. An additional five questions were asked, such as have a discussion with the school management concerning the appropriate way to conduct online teaching, school management to provide feedback questions regarding online teaching satisfaction, the provision of facilities and a medium to report mental health issues, the provision of resources to conduct online teaching (yes/no). These items were answered according to the Likert scale of 0 to 4, where 0 corresponded to "did not apply to me at all" and 4 corresponded to "totally applies to me". An additional question included indicating any other issues that were faced while conducting online teaching. For analysis purposes, the outcomes for these items were dichotomised to no (0) or yes (1–3).

Depression Anxiety and Stress Scale 21 items questionnaire (DASS 21)

Part C of the questionnaire consisted of items from the validated bilingual English and Malay Depression Anxiety Stress Scales (DASS) (34). This questionnaire was employed to measure the three psychological issues. The DASS questionnaire is widely used to measure the negative emotional states of depression, anxiety and stress and the questionnaire comprises of 21 items which were answered using a 4-point Likert scale. The responses for each item were provided in the range of 0 (did not apply to me at all) to 3 (applied to me very much and most of the time). The total score for each subscale was calculated by adding up the scores on the items per subscale and multiplying them by a factor of 2, and the severity ratings were classified as normal, mild, moderate, and severe to extremely severe.

Quality control

As a measure of quality control, the questionnaire was translated from English to Malay and back to English by two separate researchers who are native Malay speakers with a good command of English. This was to ensure that the meaning of the items in the Malay terms was an accurate representation of the English versions. Before the commencement of the study, the questionnaire was pre-tested using 12 primary school teachers from a separate state (Bahau, Negeri Sembilan) who were not included in the data collection process. This was to ensure the validity of the questionnaire and to estimate the time required for the respondents to answer the questionnaire. During the pre-test, to improve the understanding of the questionnaire, the teachers were asked to identify whether there were ambiguous terms that required amendments. The questionnaire was also tested for its reliability using the IBM Statistical Package for Social Science (SPSS) Version 26, whereby

the Cronbach's alpha value was obtained to indicate its internal consistency, and it was reported that the Cronbach's alpha value was 0.88.

Statistical analyses

Statistical analyses were performed using SPSS version 26. Descriptive analyses were used to describe socio-demographic information as well as the prevalence of psychological symptoms. To determine an association between depression, anxiety and stress, and socio-demographic factors, work-related factors and other factors, a chi-squared test was performed. To examine the association between psychological symptoms and risk factors, multi-level logistic regression analyses were used to obtain an Adjusted Odds Ratio (AOR) with a 95% Confidence Interval (CI). Significant independent variables were included in the cross-tabulation test and factors that have been shown to contribute to psychological symptoms in previous research were incorporated in the hierarchical logistic regression analysis. The regression analysis was made to identify the significant variables contributing to the reported psychological symptoms. The significance level was set at $p<0.05$.

RESULTS

Of a total of 21 schools that were invited, 17 schools agreed to participate in this study (response rate of 80.95%). A total of 239 responses were obtained from the dissemination of the online questionnaire.

Socio-demographic and work information

There were more female (n=189; 79.1%), married (n=213; 89.1%) and Malay (n=238; 99.6%) teachers among the respondents. Most of the teachers had an average monthly income between RM4500 and RM6499 (between USD 1083.09 and 1564.22) (n=182; 76.2%). In general, most teachers were educated to a degree level (n=206; 86.2%). Table I presents the socio-demographic and work distribution for the participants.

Table I: Socio demographic and barrier experienced during online teaching (N=239)

Variable (Unit)		Frequency	%	Mean	SD
Gender	Male	50	20.9		
	Female	189	79.1		
Age	20-35	35	14.6	43	7.37
	36-51	164	68.6		
	>51	40	16.7		
Marital status	Single	25	10.9		
	Married	213	89.1		
Race	Malay	238	99.6		
	Chinese	1	0.4		
School's status	Rural	151	63.2		
	Urban	88	36.8		

CONTINUE

Table I: Socio demographic and barrier experienced during online teaching (N=239) (CONT.)

Variable (Unit)		Frequency	%	Mean	SD
Educational status	A-levels/ diploma	28	11.7		
	Degree	206	86.2		
	Master	5	2.1		
Monthly income (RM)	RM2500 -RM4499	33	13.8	5399.70	902.70
	RM4500 -RM6499	182	76.2		
	>RM6500	24	10.0		
Number of children	0	24	10.0	3	1.82
	1-4	153	64.0		
	5-7	62	25.9		
Having chronic disease	Yes	57	23.8		
	No	182	76.2		
Having maid	Yes	4	1.7		
	No	235	98.3		
Live with in-laws	Yes	8	3.3		
	No	231	96.7		
Taking care of ailing parent	Yes	26	10.9		
	No	213	89.1		

Prevalence of depression, anxiety and stress

The prevalence of depression, anxiety and stress was 14.2% (n=34), 19.7% (47) and 7.9% (n=19), respectively. Approximately 0.8% (n=2) of the teachers suffered from severe depression. Approximately 37 (15.5%) teachers reported anxiety symptoms in the mild to moderate category and 10 (4.2%) reported anxiety symptoms in the severe to extremely severe category. Moreover, 16 (6.6%) teachers reported stress that was classified as mild to moderate. The remaining three (1.3%) teachers were classified as severely ill. Table II presents the psychological impact distributions for the participants.

Table II: Severity of DASS symptoms (%)

DASS Score	Depression		Anxiety		Stress	
	n	%	n	%	n	%
No	205	85.8	192	80.3	220	92.1
Yes	34	14.2	47	19.7	19	7.9
Mild	12	5.0	10	4.2	8	3.3
Moderate	20	8.4	27	11.3	8	3.3
Severe	2	0.8	4	1.7	3	1.3
Extremely severe	0	0	6	2.5	0	0

Table III: Cross-tabulation of barriers related to online learning across psychological impacts of depression, stress and anxiety

Work-related factors		Depression N (%)		X^2	P	Anxiety N (%)		X^2	p	Stress N (%)		X^2	p
		No (n=205)	Yes (n=34)			No (n=192)	Yes (n=47)			No (n=220)	Yes (n=19)		
Low motivation of students	No (30)	29 (96.7)	1 (3.3)	3.34	0.07	30 (100)	0 (0)	8.40	0.004*	30 (100)	0 (0)	2.96	0.09
	Yes (209)	176 (84.2)	33 (15.8)			162 (77.5)	47 (22.5)			190 (90.9)	19 (9.1)		
Lack of parental guidance	No (40)	38 (95.0)	2 (5.0)	3.35	0.07	39 (97.5)	1 (2.5)	8.96	0.003*	39 (97.5)	1 (2.5)	1.95	0.16
	Yes (199)	167 (83.9)	32 (16.1)			153 (76.9)	46 (23.1)			181 (91.0)	18 (9.0)		
Lack of guidance from school management	No (120)	111 (92.5)	9 (7.5)	8.94	0.003*	105 (87.5)	15 (12.5)	7.83	0.005*	116 (96.7)	4 (3.3)	7.02	0.008*
	Yes (119)	94 (79.0)	25 (21.0)			87 (73.1)	32 (26.9)			104 (87.4)	15 (12.6)		
Limited time for conducting online classes	No (85)	80 (94.1)	5 (5.9)	7.53	0.006*	79 (92.9)	6 (7.1)	13.27	<0.01*	84 (98.8)	1 (1.2)	8.27	0.004*
	Yes (154)	125 (81.2)	29 (18.8)			113 (73.4)	41 (26.6)			136 (88.3)	18 (11.7)		
Low technology competence	No (63)	61 (96.8)	2 (3.2)	8.56	0.003*	60 (95.2)	3 (4.8)	12.03	0.001*	62 (98.4)	1 (1.6)	4.73	0.03*
	Yes (176)	144 (81.8)	32 (18.2)			132 (75.0)	44 (25.0)			158 (89.8)	18 (10.2)		
Having specific space for online teaching	No (104)	98 (94.2)	6 (5.8)	10.79	0.001*	94 (90.4)	10 (9.6)	11.77	0.001*	102 (98.1)	2 (1.9)	9.14	0.003*
	Yes (135)	107 (79.3)	28 (20.7)			98 (72.6)	37 (27.4)			118 (87.4)	17 (12.6)		
Been given any digital resources to conduct online teaching	No (164)	141 (86.0)	23 (14.0)	0.017	0.895	129 (78.7)	35 (21.3)	0.929	0.335	148 (90.2)	16 (9.8)	2.330	0.127
	Yes (75)	64 (85.3)	11 (14.7)			63 (84.0)	12 (16.0)			72 (96.0)	3 (4.0)		
Participated in an online teaching training	No (115)	98 (85.2)	17 (14.8)	0.056	0.812	93 (80.9)	22 (19.1)	0.40	0.841	103 (89.6)	12 (10.4)	1.87	0.17
	Yes (124)	107 (86.3)	17 (13.7)			99 (79.8)	25 (20.2)			117 (94.4)	7 (5.6)		
Have a discussion with school management on the appropriate way in conducting online teaching	No (19)	13 (68.4)	6 (31.6)	5.094	0.024*	13 (68.4)	6 (31.6)	1.854	0.173	15 (78.9)	4 (21.1)	4.843	0.028*
	Yes (220)	192 (87.3)	28 (12.7)			179 (81.4)	41 (18.6)			205 (93.2)	15 (6.8)		
School management provide feedback questions related to online teaching satisfaction	No (87)	75 (86.2)	12 (13.8)	0.021	0.885	65 (74.7)	22 (25.3)	2.737	0.098	76 (87.4)	11 (12.6)	4.119	0.042*
	Yes (152)	130 (85.5)	22 (14.5)			127 (83.6)	25 (16.4)			144 (94.7)	8 (5.3)		
Been given the facilities & medium to report problems related to mental health condition	No (148)	124 (83.8)	24 (16.2)	1.262	0.261	113 (76.4)	35 (23.6)	3.904	0.048*	134 (90.5)	14 (9.5)	1.211	0.271
	Yes (91)	81 (89.0)	10 (11.0)			79 (86.8)	12 (13.2)			86 (94.5)	5 (5.5)		

Barriers experienced during online teaching

A total of 147 (61.5%) teachers reported that they had issues with Internet connectivity at home. The respondents also report that approximately 199 (83.3%) of their students had a lack of parental guidance while attending online classes. Approximately 154 (64.4%) of the respondents had limited time to participate in online classes at home, whereas 176 (73.6%) of the respondents reported that they had low technological competence and 209 (87.4%) teachers reported a lack of motivation among their students. When these factors were cross-tabulated with the psychological impacts of depression, anxiety and stress, significant associations were observed regarding a lack of guidance from school management, limited time for conducting online classes, low technological competence, having a specific space for conducting online teaching at home and having low internet connectivity. Caring for an ailing parent was significantly associated with anxiety and stress but not depression. Table III presents the cross-tabulation of the barriers associated with online learning in relation to the psychological impacts of depression, anxiety and stress.

Association between the reported psychological symptoms and risk factors

For each psychological symptom (depression, anxiety and stress), there was only one predictor that was significantly associated with the reporting of the symptoms in the hierarchical analysis when confounders were controlled for. Regarding barriers to online teaching while working from home, low technological competence was the only work-related predictor that was observed to significantly contribute to anxiety among teachers (AOR: 4.46; 95% CI: 1.03–19.34). Other non-work-related factors of working from home that were associated with psychological impacts included not living with in-laws (AOR: 0.12; 95% CI: 0.01–0.96) (which was negatively linked to depression) and being diagnosed with a chronic disease (AOR: 4.54; 95% CI: 1.16–17.88) (which was significantly linked to stress). Table IV, V and IV presents the results of the hierarchical logistic regression to identify the risk factors associated with the reporting of psychological symptoms.

Table IV: Multi-level logistic regression on risk factors of working from home and its relationship with depression among primary school teachers in Kemaman, Terengganu (N=239)

Variables		Depression			
		Adjusted Odds Ratio (AOR) (95% Confidence Interval, CI)	P value	Standard Error	Wald
BLOCK 1					
School status (Urban[b])	Rural	1.16 (0.47-2.85)	0.75	0.46	0.10
Income (>RM6500[b])	RM2500-RM4499	0.46 (0.08-2.77)	0.39	0.92	0.73

Table IV: Multi-level logistic regression on risk factors of working from home and its relationship with depression among primary school teachers in Kemaman, Terengganu (N=239) (CONT.)

Variables		Depression			
		Adjusted Odds Ratio (AOR) (95% CI)	P value	Standard Error	Wald
BLOCK 1					
Having maid (Yes[a])	No	0.22 (0.01-4.47)	0.33	1.53	1.53
Having specific space to conduct online teaching (Yes[a])	No	0.35 (0.10-1.25)	0.11	0.64	2.62
Low internet connectivity (No[b])	Yes	1.72 (0.52-5.72)	0.38	0.61	0.78
Taking care of ailing parents (No[b])	Yes	2.29 (0.66-8.01)	0.19	0.64	1.69
Low technology competence (No[b])	Yes	4.30 (0.75-24.61)	0.10	0.89	2.68
Live with in-laws (Yes[a])	No	0.12 (0.01-0.96)	0.045*	1.11	4.00
BLOCK 2					
Lack of guidance from school management (No[b])	Yes	1.24 (0.41-3.74)	0.70	0.56	0.15
Participated in an online teaching handling training throughout teaching period (Yes[a])	No	1.25 (0.48-3.29)	0.65	0.49	0.21
Have a discussion with the school management on the appropriate way or medium to use in conducting online teaching (Yes[a])	No	2.01 (0.46-8.72)	0.35	0.75	0.86
School management provide feedback questions related to online teaching satisfaction (Yes[a])	No	0.56 (0.19-1.65)	0.29	0.55	1.12
Been given the facilities and medium to report problems related to mental health while conduct lesson (Yes[a])	No	2.86 (0.96-8.49)	0.06	0.56	3.59
Been given any digital resources that ease to conduct online teaching (Yes[a])	No	0.82 (0.28-2.37)	0.71	0.54	0.13
Classification rate		87.4 (20.6-98.5)			
Cox & Snell R Square-Nagelkerke R Square		0.16-0.29			

*p<0.05; "multi-level logistic model (Other factors-work related factors) was applied with all factors related to depression were included in the model simultaneously. [a,b] Reference. OR: Odds Ratio. Controlled variables: Gender, marital status, age, number of children and education level

Table V: Multi-level logistic regression on risk factors of working from home and its relationship with anxiety among primary school teachers in Kemaman, Terengganu (N=239)

Variables		Anxiety			
		Adjusted Odds Ratio (AOR) (95% , CI)	P value	Standard Error	Wald
BLOCK 1					
School status (Urban[b])	Rural	0.57 (0.25-1.29)	0.18	0.41	1.81
Income (>RM6500[b])	RM2500-RM4499	0.81(0.16-4.05)	0.80	0.82	0.06
	RM4500-RM6499	0.83 (0.24-2.93)	0.77	0.64	0.08
Having maid (Yes[a])	No	0.31 (0.02-5.59)	0.43	1.48	0.63
Having specific space to conduct online teaching (Yes[a])	No	0.36 (0.12-1.05)	0.06	0.55	3.53
Low internet connectivity (No[b])	Yes	1.62 (0.54-4.89)	0.39	0.56	0.73
Taking care of ailing parents (No[b])	Yes	2.61 (0.85-7.97)	0.09	0.57	2.82
Low technology competence (No[b])	Yes	4.46 (1.03-19.34)	0.046*	0.75	3.98
Live with in-laws (Yes[a])	No	0.30 (0.03-2.76)	0.29	1.13	1.12
Having chronic disease (No[b])	Yes	1.56 (0.58-4.16)	0.38	0.50	0.78
BLOCK 2					
Participated in an online teaching handling training throughout teaching period (Yes[a])	No	0.68 (0.29-1.59)	0.37	0.44	0.80
School management provide feedback questions related to online teaching satisfaction (Yes[a])	No	1.66 (0.68-4.04)	0.26	0.45	1.25
Been given the facilities and medium to report problems related to mental health while conduct lesson (Yes[a])	No	2.18 (0.84-5.67)	0.11	0.49	2.53

Table V: Multi-level logistic regression on risk factors of working from home and its relationship with anxiety among primary school teachers in Kemaman, Terengganu (N=239) (CONT).

Variables		Anxiety			
		Adjusted Odds Ratio (AOR) (95% Confidence Interval, CI)	P value	Standard Error	Wald
BLOCK 2					
Been given any digital resources that ease to conduct online teaching (Yes[a])	No	1.73 (0.68-4.41)	0.25	0.48	1.31
Limited time for conducting online classes (No[b])	Yes	1.89 (0.63-5.68)	0.26	0.56	1.28
Lack of parental guidance (No[b])	Yes	3.34 (1.32-35.11)	0.31	1.20	1.01
Classification rate		82.0 (23.4/96.4)			
Cox & Snell R Square- Nagelkerke R Square		0.21-0.33			

*p<0.05; *multi-level logistic model (Other factors-work related factors) was applied with all factors related to anxiety were included in the model simultaneously. [a,b] Reference. OR: Odds Ratio. Controlled variables: Gender, marital status, age, number of children and education level

Table VI: Multi-level logistic regression on risk factors of working from home and its relationship with stress among primary school teachers in Kemaman, Terengganu (N=239)

Variables		Stress			
		Adjusted Odds Ratio (AOR) (95%, CI)	P value	Standard Error	Wald
BLOCK 1					
School status (Urban[b])	Rural	0.75 (0.23-2.53)	0.76	0.69	0.10
Income (>RM6500[b])	RM2500-RM4499	0.45 (0.04-5.67)	0.53	1.30	0.39
	RM4500-RM6499	0.80 (0.12-5.29)	0.82	0.96	0.05
Having specific space to conduct online teaching (Yes[a])	No	0.17 (0.02-1.60)	0.12	1.14	2.39
Low internet connectivity (No[b])	Yes	1.00 (0.16-6.11)	0.10	0.93	2.37
Taking care of ailing parents (No[b])	Yes	3.68 (0.70-19.42)	0.12	0.85	2.36

Table VI: Multi-level logistic regression on risk factors of working from home and its relationship with stress among primary school teachers in Kemaman, Terengganu (N=239) (CONT.)

Variables		Stress			
		Adjusted Odds Ratio (AOR) (95% CI)	P value	Standard Error	Wald
BLOCK 1					
Low technology competence (No[b])	Yes	2.38 (0.21-27.06)	0.49	1.24	0.49
Live with in-laws (Yes[a])	No	0.19 (0.01-3.50)	0.26	1.50	1.27
Having chronic disease (No[b])	Yes	4.54 (1.16-17.88)	0.03*	0.70	4.69
BLOCK 2					
Lack of guidance from school management (No[b])	Yes	1.58 (0.29-8.57)	0.50	0.70	0.45
Participated in an online teaching handling training throughout teaching period (Yes[a])	No	1.60 (0.41-6.29)	0.18	0.71	1.80
School management provide feedback questions related to online teaching satisfaction (Yes[a])	No	2.60 (0.64-10.52)	0.17	0.90	1.93
Been given any digital resources that ease to conduct online teaching (Yes[a])	No	3.51 (0.60-20.62)	0.21	1.20	1.58
Limited time for conducting online classes (No[b])	Yes	4.50 (0.43-47.12)	0.60	0.86	0.28
Classification rate		95.0 (36.8/100)			
Cox & Snell R Square- Nagelkerke R Square		0.18-0.42			

*p<0.05; [a]multi-level logistic model (Other factors-work related factors) was applied with all factors related to stress were included in the model simultaneously. [a,b] Reference. OR: Odds Ratio. Controlled variables: Gender, marital status, age, number of children and education level

DISCUSSION

In this study, an online methodology was used to disseminate questionnaires concerning the psychological impacts on mental health and the barriers experienced during online teaching among teachers who were working from home in the district of Kemaman, Terengganu, Malaysia. The study was conducted during a time when the MCO was lifted for a short time before it was reimplemented. This study included 17 national schools from a total of 21 schools that were initially invited. The study participants consisted of Malaysian primary school teachers who had worked for more than 1 year in the education sector. More participants were recruited than was originally intended because the online dissemination of the questionnaire meant that information about the study was distributed to most of the teachers by the person-in-charge who was in communication with the researcher due to convenience. The findings of this study showed that most of the teachers were females and were of the Malay ethnicity. This is in accordance with the breakdown of the general ethnic population in Kemaman, Terengganu where the majority of the population are Malays (99.6%) (32). There are 47 primary schools in Kemaman and 35 are located in rural areas and 12 are located in urban areas (31). Most of the schools included in this study were located in the rural areas of Kemaman. Additionally, 63.2% of the teachers taught at rural schools and the remaining teachers taught at urban schools. Regarding chronic diseases, several teachers reported metabolic conditions such as high blood pressure, diabetes or a high level of cholesterol; however, this was mostly observed among teachers who were 40 years and older. The results of the study also demonstrated that 1 out of 5 teachers had anxiety while 14.2% and 8% reported to have depression and stress respectively. Contrary to a previous study conducted by Othman and Sivasubramaniam (35) among 356 secondary school teachers in urban Klang, the levels reported in the present study were two- to threefold lower (depression 43%; anxiety 68%; stress 32.3%). Although the study was performed before the COVID-19 pandemic and the same Malay DASS21 was used to conduct the assessment, the study population differed as it consisted of secondary school teachers. Moreover, the study was conducted in urban Klang Valley, the teachers taught a large number of students and worked in high-performance schools, and they had different risk profiles such as pressure to maintain school performance. Similarly, the study by Ibrahim and his colleagues (36) reported very high levels of depression, anxiety and stress among secondary school teachers in Terengganu. The female teachers in the present study had a higher prevalence of psychological impacts (depression 11.6%; anxiety 17.5%; stress 7.4%) as compared to the male teachers (depression 24.0%; anxiety 28.0%; stress 10.0%). This suggests that the elevated work stress of the females was caused by gender differences in domains other than work, such as having a higher workload for teaching and upkeeping a household simultaneously. In other words, a conflict between the work and family roles (33) was more pronounced during the working from home phase. In a previous study by Othman and Sivasubramaniam (35), negative emotional states such as depression, anxiety, and stress were more common among female teachers and those who had one to three children.

In terms of work-related information, more than 60% of the respondents in the present study had issues with

internet connectivity at home. The Kemaman district is largely categorised as a rural area and, commonly, rural areas have lower coverage of broadband as compared to established urban areas such as Kuala Lumpur, Johor Bharu and Penang (37). Limited data exist regarding the bandwidth availability for the district of Kemaman; however, a previous report cited that the average internet download speed for Kuala Terengganu (the capital of Terengganu) was 11.7 Mbps which is lower than the national average of 12.7 Mbps (21). The average may not reflect the actual value for the district of Kemaman even though the same report cited that the lowest download speed for Kuala Terengganu was 3.6 Mbps. Issues with broadband connectivity have been reported in other studies. Another study in Malaysia by Yusuf and Jihan (6) have reported that a large number of students do not have access to appropriate learning environments. In Italy, Fernando et al. (16) reported that not all areas of the country were served by a broadband connection, highlights an existing structural gap that impedes online learning. In a separate study (12) it was found that many teachers were not provided with the high bandwidth or strong internet connection required for online courses, resulting in students falling behind in their virtual classes. In certain countries such as Croatia and Serbia, measures were taken by the government to reduce the impact of this issue by broadcasting online classes on television for primary school children as soon as the lockdown was initiated during the worldwide MCO. In Malaysia, similar steps were implemented through the introduction of Didik TV, a channel dedicated to education for primary and secondary school children (38). The channel could broadcast educational programmes on various school subjects and has been beneficial for students who do not have internet access. This measure was a timely interim initiative while the government endeavours to implement the National Fiberisation Plan in 2023, which will increase the minimum download speed to 35 Mbps (compared to the current average of 12.7 Mbps) (39).

The respondents in the present study reported that the barriers experienced during online teaching also included a lack of technological competence (74%), a lack of a designated space for conducting online teaching (56.5%) and having limited time at home to conduct online teaching due to the COVID-19 pandemic restrictions (64.4%). The lack of technological competence may have been associated with a lack of experience regarding conducting online teaching. According to Rasmitadila and her colleagues (40), even experienced or senior teachers may find online teaching difficult to implement due to a lack of online teaching experience, for example, teachers are required to master a wide range of applications such as Zoom, Google Classroom and PowToon. When teachers implement teaching, this condition becomes a burden, resulting in unsatisfactory learning. In terms of the occupation-related issues concerning low technological competence, the Ministry

of Education (MOE) Malaysia have provided guidelines to assist teachers with online education (41). These guidelines provide information to teachers on how to conduct online education using various methods that can be adapted to the existing resources, infrastructures, internet connectivity and abilities of the students. Since 2021, the MOE, in collaboration with UNICEF, has developed online resources and a training website to assist teachers to obtain the skills necessary to begin e-learning with students (30). The website provides step-by-step information for teachers on how to build learning resources using Google's educational products, and this was specifically provided to Malaysian teachers to add to their skillset so they can conduct online learning using the available technological facilities (30). It has been reported that the provided training was adequate for teachers to obtain the skills to manage online applications; however, Massari and her colleagues (5) discovered that technical challenges were commonly encountered by the teachers when conducting online education. Thus, teachers have reported that they took the initiative to equip themselves with the know-how of online teaching and learning (5). If resources permit, it is also recommended that an information technology technician be available to address these issues while online learning is being implemented.

Other work-related factors that were considered to be challenges that were associated with online teaching included a lack of motivation of students to join online classes (87.4%) and a lack of parental guidance for students to join online classes (83.3%). According to a study by Fernando and colleagues (16), distance learning for children often necessitates parental presence, making it difficult for the parent to manage work demands whilst encouraging their children throughout the online learning journey. Furthermore, not all parents possess the literacy skills required to support learning. Rasmitadila et al. (40) reported that in Indonesia, teachers have the added responsibility of finding ways to sustain the enthusiasm of their students. Several teachers stated that it was difficult to maintain the interest of the students during online classes. The students were enthusiastic about learning at the beginning of the online classes; however, after several months, they began to feel bored and were less interested in learning.

The hierarchical logistic regression analysis revealed that several factors were significant contributors to the reporting of psychological impacts among teachers. The likelihood of reporting anxiety was significantly higher among the teachers who categorised themselves to have low technological competence (AOR: 4.46; 95% CI: 1.03–19.34). This was the only work-related risk factor that was among the significant predictors in the advanced statistical analysis. In terms of other psychological symptoms, no other work-related factors were found to contribute significantly. The likelihood of the reporting of depression was significantly lower

among those who do not live with their in-laws (AOR: 0.12; 95% CI: 0.01–0.96), and teachers who were diagnosed with a chronic disease were 4.54 times more likely to report stress (AOR: 4.54; 95% CI: 1.16–17.88). It should be noted that several of the calculated AORs had a relatively larger confidence interval range. This implies a likely overestimation of the OR in the analysis. This may have occurred due to the relatively small sample size that was included in the analysis; however, this does not decrease the importance of the risk factors identified.

Regarding the issue of low technological competence among the teachers, even though guidelines for e-learning were available, many teachers may not have been prepared in 2020 due to the unprecedented COVID-19 situation. Before the pandemic begins, steps have been taken by the government to incorporate online learning in Malaysia; however, this may not have equipped teachers to conduct 100% of online education at such short notice. Nowadays, it is extremely likely that teachers are accustomed to using computers daily in comparison to 20 years ago (10) however, there may still be competence issues among teachers, particularly in rural areas. Goliong et al. (42) conducted a study on the computer skills of trainee teachers in Sabah, the Borneo part of Malaysia who taught in academic institutions and discovered that a moderate level of skills among the teachers. It has been suggested that a systematic training initiative should be implemented to improve the technical knowledge of teachers and learners regarding emerging models and approaches that encourage the effective use of online learning (36). As a result, teachers would be able to envision how technology can improve their educational programmes. The training initiative would also help teachers to retain their skills because they would have the opportunity to apply them in a real-world situation.

The results of the present study also demonstrated that during the MCO, the factor of living with in-laws was significantly associated with more depressive symptoms. A previous study highlighted that teachers who manage several roles such as home-schooling their children and caring for older parents are prone to experience high levels of psychological distress (32). A study by Othman and Sivasubramaniam (35) also reported that negative emotional states such as depression, anxiety and stress were more common among female teachers, those with the lowest educational status, those who had one to three children and those who lived with in-laws. The values of Asian individuals are extremely different to those of the inhabitants of Western countries, as natives of Asia care for their extended family including their parents, in-laws and even grandparents. According to a study conducted by Palos and Liu (43), the majority of Asians, including the elderly, do not live alone. These results were supported by the 2005 United Nations Population Division's Living Arrangements of Older Persons Around the World study, which reported that 74% of individuals aged 60 years and older lived with their children or grandchildren in Asia, compared to 26% of individuals in Europe.

The results of the present study revealed that teachers who had a chronic disease had a higher risk of reporting stress in addition to the burden of managing the workload of online teaching at home. Most of the teachers who reported a chronic illness were older than 40 years. Moreover, most of them stated that they had one type of chronic disease, while several teachers stated that they had a combination of chronic diseases. Hypertension was the most prevalent condition (14.64%), followed by diabetes (5.44%), heart issues (2.09%) and high cholesterol (0.84%). These findings were similar to those obtained by Amal et al. (44) in a study of chronic illnesses and health-seeking behaviour among the Malaysian population. The most-reported chronic illnesses in this study were hypertension (7.9%), diabetes mellitus (4.0%) and heart disease (1.2%). Furthermore, according to the National Health and Morbidity Survey 2019, the prevalence of hypertension, diabetes, and high cholesterol was 30%, 18.3% and 38.1%, respectively. Even though the percentages recorded in this study were relatively low, the results suggest that chronic illnesses place a significant burden on the stress levels of teachers.

This study had several limitations. Firstly, the participants consisted solely of primary school teachers. The Department of Education Terengganu prohibited studies involving secondary school teachers as study subjects because most of these teachers were preoccupied with students and were invigilating Malaysian Certificate of Education exams. Secondly, the risk factors concerning working from home were self-reported by the teachers and the data were collected during a short time when the MCO was lifted and some physical education sessions had commenced, and the responses given may have been influenced by a recall bias. Lastly, while the survey was being conducted, it was difficult to obtain all of the factors that greatly affected teachers. Not all of the schools that were invited to partake in the study agreed to participate because several of them were preoccupied with managing the facility and instruments required to conduct classes in person.

CONCLUSION

The results of this study revealed that working from home was significantly associated with the reporting of psychological symptoms among teachers in the rural district of Kemaman, Terengganu, Malaysia. The results also demonstrated that anxiety was more commonly reported compared to depression and stress. In terms of the work factor that contributed to psychological impacts, low technological competence was linked to an increased risk of reporting anxiety. For factors not

related to work, not living with in-laws was associated with a protective effect regarding the reporting of depression while having a chronic disease was linked to an increased risk of stress. Regarding the work-related risk factors, the MOE must address the mental health status of teachers during the current period of COVID-19 restrictions. Moreover, solutions must be developed to solve the issue of low technological competence that was reported.

Teachers cannot manage work-related stress on their own. The Mental Illness Awareness and Support Association (MIASA) Malaysia is a mental health advocacy and peer support organisation that assists patients with mental illness while promoting awareness concerning the importance of good mental health. There are other organisations and the like that offer such services and it may be that this is an opportunity for the MOE to address teachers who have mental health issues and encourage them to pursue assistance from psychiatrists or psychologists. To increase communication, support groups can be established to motivate teachers to share their journeys and best practices. This will be a platform to help teachers in addressing their stress as they steer the new normal in teaching and learning activities. Schools can also participate by organising regular seminars for teachers which provide a method for reflections to assist in mitigating stress levels and feelings of anxiety (12).

The government should provide systematic training to teachers to improve their technological competency (16). This would result in more effective online teaching and, thus, reduce feelings of anxiety. As suggested in a previous study, support services in the form of an information technology technician should be made available to provide answers and know-how for issues associated with online learning. The findings obtained in the present study can be used by the MOE as a baseline regarding the mental health conditions of teachers during the COVID-19 pandemic. The results can also be used as a reference to develop policies regarding the management of mental health issues among teachers in Malaysia. The Malaysian Education Blueprint (2013–2025) introduced by the MOE stipulates that every teacher must have access to facilities and technology in teaching to guarantee the future of their students (45). Blended learning model that leverages technology to enhance student learning has been implemented since 2013 and the diagnostic of teachers' content and pedagogical skills to enable the provision of targeted upskilling programs which are specific for the current online learning landscape will need to be continuous in the face of this epidemic. It is hoped that these actions will entitle teachers the opportunity to pursue teaching and learning activities (even if they are unable to attend school) without detrimental impacts on their mental health and this aspiration would support the implementation of the Sustainable Development Goals 4 (Education 2030).

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