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Health literacy and mental well-being of school staff in times of crisis: A path analysis of sense of coherence, work-related stress, and health-protective behaviours

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ABSTRACT

Objectives: This paper examines the relationship between health literacy and mental well-being of school staff during distressful times. It examines the mediating roles of work-related stress, health-protective behaviours (i.e., attitudes about vaccination), and sense of coherence in the relationship between health literacy and mental well-being.

Study design: A cross-sectional survey.

Methods: Data were derived from 440 school staff who participated in a study on Health Literacy and Well-being of School Staff across all schools in Hong Kong. Structural Equation Modelling was used for path analysis.

Results: Most (64.9 %) of the school staff had limited health literacy (i.e. problematic or inadequate). The mean score of their mental well-being was 51.4 out of 100 (±20.8), with around 18 % of them at risk of depression. Health literacy was not directly associated with mental well-being. Instead, it predicted mental well-being through work-related stress ($B = 0.130$, $p = 0.036$) and adoption of health-protective behaviours ($B = 0.376$, $p = 0.021$).

Conclusion: While health literacy may not directly influence the mental well-being of school staff, it has a critical role in safeguarding mental well-being in times of distress by shaping positive attitudes towards protective health measures and managing sources of work stress.

1. Introduction

Many school staff (including, teachers, principals, support staff, administrators, and other management members) have poor mental well-being due, in part, to work-related stress even under "normal" conditions.[1–3] Challenging workloads, long working hours, inadequate autonomy, tedious bureaucracies, and rising student behavioural problems contribute to the stress.[1–3] Among most professional groups, school staff have one of the highest levels of work-related stress, which adversely affects their mental well-being.[2,4] Hence, efforts to chart the characteristics, determinants, and mechanisms of school staff's mental well-being have attracted the interest of researchers and practitioners.[5,6] The present study extends debates on promoting the mental well-being of school staff to contexts of crisis, such as the COVID-19 pandemic.

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The COVID-19 pandemic introduced significant disruptions and uncertainties in both personal and professional lives.[7,8] Hong Kong implemented one of the strictest and longest COVID-19 control measures (e.g., mandatory quarantines for individuals returning from overseas, extensive face mask mandate, and the closure of non-essential services.[9] During the Spring of 2020, schools were closed and transitioned to online learning formats, followed by a short re-opening phase in the summer with half-day teaching back at school before facing closure again due to the third wave pandemic wave in July 2020.[10] Schools resumed operations after the summer break, offering half-day classes, only to close again in early December 2020 due to the fourth wave.[10] Amidst these uncertainties that continued until early 2023, school staff in Hong Kong, had to take up new roles, learn new skills, and find innovative ways to support students' learning and health, while protecting themselves and their families from COVID-19.[11] Jung, Horta[12] argue that school staff "experienced heightened workloads, disrupted work routines, and job insecurity" during the pandemic, leading to additional burdens and causing significant job-related stress. According to the stress process theory, stressors (conditions that arouse the adaptive capacity of people) (e.g., the pandemic and its control measures) can adversely affect health-related well-being depending on the available moderating factors (e.g., sense of mastery, social support).[13,14] Work-related stress among school staff contributes to mental health problems such as depression and anxiety.[11] This explains why some school staff in Hong Kong considered leaving the profession during the peak of the pandemic.[15] Amid these challenges and looking to the future, understanding the factors that influence mental well-being has become crucial for public and social policy, particularly in places such as Hong Kong, where the government is actively seeking to attract and retain school workers in the aftermath of the pandemic.[16,17]

Health literacy emerged as a critical factor for promoting the well-being of various population groups during the pandemic.[8,18–20] Extant evidence indicates a positive impact and protective effect of health literacy on mental well-being among different population groups, including school staff globally.[21–24] Health literacy describes the skills and knowledge one possesses to access and effectively apply health information to improve decisions about health and well-being by way of promoting good health, preventing diseases, and sufficiently participating in health care.[25] However, knowledge and research on the different ways in which health literacy affects mental well-being among school staff is understudied. Additionally, research on health literacy and health-related well-being of school staff has primarily focused on teachers[11,26] and school principals,[27] leaving out other staff, including administrative and management team members. This study aims to explore some of those potential mechanisms, which are underexplored, such as health-protective behaviours,[28] sense of coherence,[29] and work-related stress[14] in Hong Kong.

1.1. *Health literacy and mental well-being: mediating role of health-protective measures*

The causal model of health literacy indicates that health literacy influences health outcomes by promoting positive attitudes and effective use of health services and resources (including vaccines).[30] For instance, during the pandemic, vaccine hesitancy was prevalent.[31] However, people with sufficient health literacy were more likely to comply with COVID-19 vaccine recommendations, which can lead to positive mental health.[28] Having adequate health literacy enhances willingness and effective use of available resources to promote health (e.g., up-taking COVID-19 vaccine hesitancy),[4,24,32] and empowers people to take charge of health.[33] Indeed, vaccinations and having positive views on their availability are associated with improvements in mental health.[34] However, other groups of people tend to develop mental health problems due to concerns about vaccine safety during the pandemic,[31] which calls for more research on determinants of such attitudes and their implications for mental well-being.

1.2. *Sense of coherence as mediator between health literacy and mental well-being*

Sense of coherence is another possible mediator between health literacy and mental well-being.[29] Sense of coherence describes one's perception of the extent to which one's life is considered comprehensible, manageable, and meaningful, enhancing the quality of and reducing the incidence of poor physical and mental health.[29,35] A sense of coherence can mediate the relationship between health literacy and anxiety among older persons,[36] but evidence among school staff is missing so far. As a health promotion and health education instrument, health literacy is considered a general resistance resource that enables people to utilise available support systems and services (e.g., health information) more effectively to develop a sense of coherence by making health stressors manageable and, in part, protect and protect health-related well-being.[29,37] Evidence shows that individuals endowed with a firm sense of coherence exhibit heightened capacities to navigate the uncertainties and disruptions precipitated by the COVID-19 crisis, potentially yielding superior mental well-being outcomes.[38] Having sufficient health literacy can boost such capacities as it offers people the skills to confront and manage difficult health situations.[29]

1.3. *Work-related stress as a possible explanation between health literacy and mental well-being*

Work-related stress can also explain how health literacy is associated with mental well-being.[39] Having sufficient health literacy offers knowledge and the ability to understand triggers of mental distress, such as work stress.[4] School staff experienced sudden changes in social dynamics and work arrangements, which were sources of stress for many of them.[11] However, people with sufficient health literacy are able to independently shape the conditions of their work, including avoiding hazards and managing stressful situations leading to better health outcomes.[40] They are also more likely to effectively adopt occupational health and safety prescriptions to promote and promote their well-being compared to those with inadequate health literacy.[39,40]

This study offers further empirical perspectives on the connection between health literacy and mental well-being based on data derived from the understudied population in Hong Kong; school staff, including school principals, teachers, management staff, and administrative staff. It explores the mediating role of work-related stress, vaccination attitudes (i.e., health protective behaviours), and sense of coherence in how health literacy affects their mental well-being, as diagrammatically presented in Fig. 1. It is hypothesised that health literacy will positively influence mental well-being. However, this relationship is expected to be mediated by work-related stress, attitudes about vaccination, and a sense of coherence. Therefore, the study examines the pandemic-era data to identify key determinants of the mental well-being of school staff, with the aim of improving preparedness for future crises.

2. Methods

Data were gathered through a cross-sectional survey among school staff in primary, secondary, and special schools in Hong Kong. The survey was conducted from April 2021 to February 2022 during the COVID-19 pandemic. The original survey was developed by the Global Health Literacy Research Network (https://www.globhl.org/), formerly COVID Health Literacy Network.[41] The survey was conducted in schools in over 11 countries/regions. Related studies from this project include Lau, Shum.[32] The questionnaire was administered using two language versions: English (the original version) and Traditional Chinese, which was back-translated (English to Chinese) and pretested.

2.1. *Sampling*

Participants were recruited through purposive and snowball

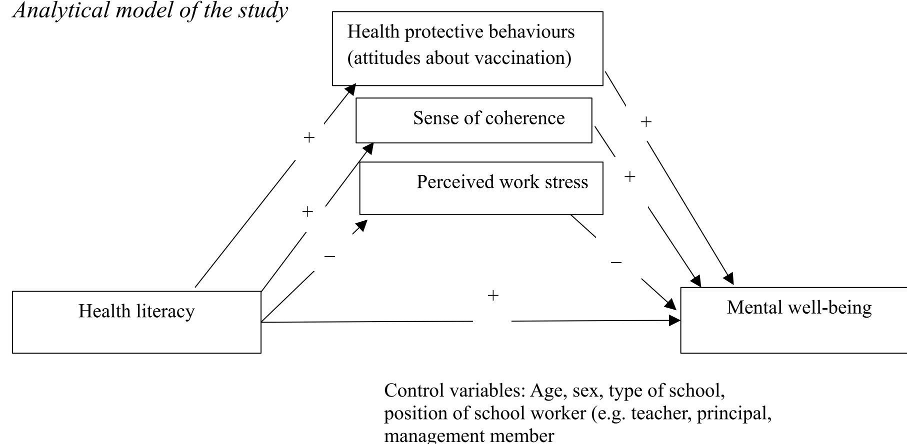

Fig. 1. Analytical model of the study.

techniques targeting all school staff in 1130 schools (comprising 561 primary schools, 477 secondary schools, and 36 special schools). The questionnaire was sent to all schools through email after initial contact. Hard copies of the questionnaire were also sent to identified school staff and leaders who agreed to support the survey. Personal networks of the research team were also used as a medium to recruit qualified personnel. The targeted individual respondents included school principals, teachers, vice principals, assistant principals, administrators, management committee members, admission officers, and directors of operations. After the quality check (e.g., removing incomplete responses), the final sample included 440 school staff. Ethics approval was obtained from both the Sub-Committee on Research Ethics and Safety of the Research Committee of Lingnan University, Hong Kong (EC077/2021) and the Research Ethics Committee of Hong Kong Baptist University (REC/ 20–21/0465).

2.2. Measures

2.2.1. Outcome variable

Our outcome variable was the mental well-being of school staff. It was measured using the World Health Organization Well-being Index.[42] The scale consists of five items that respondents rated on a six-point Likert scale, ranging from 'never' to 'always'. Participants rated the frequency of experiencing different feelings over the past two weeks, e. g., "I have felt cheerful and in good spirits" and "My daily life has been filled with things that interest me." The well-being score was calculated by summing the scores for the five items and multiplying the total by 4 (i.e., a total score of 100), with higher scores denoting a higher level of well-being. A score of ≤50 suggests poor well-being, while a score of ≤28 indicates symptoms indicative of depression.[42] The scale is highly reliable, with Cronbach's Alpha of 0.953.

2.2.2. Explanatory variable

Health literacy was the primary explanatory variable in this study. This was based on the self-reported 22-item corona-specific health literacy scale to offer a relevant measure of health literacy during the crisis.[19] The corona-specific health literacy questionnaire was developed based on the integrated conceptual model of health literacy, which underpinned the European Health Literacy Survey Questionnaire (HLS-EU-Q).[33] The HLS-EU is a self-reported instrument that measures how individuals access, understand, appraise, and apply health information across healthcare, health promotion, and disease prevention using a 4-point Likert scale from very easy, easy, difficult to very difficult.[43] Following the original scale recommendations of the corona-specific health literacy, a mean score below or equal to 2.5 indicates inadequate health literacy, a mean score above 2.5 but below 3 refers to problematic health literacy, and a mean score of 3 or above indicates sufficient health literacy see.[19] fordetails on the scale and itsapplication The scores were categorised as problematic, inadequate, and sufficient. The scale was highly reliable, with Cronbach's Alpha of 0.955.

2.2.3. Mediators

Perceived work stress was measured by a 10-item Perceived Stress Scale that measured the workers' level of work-related stress in the four weeks preceding the study.[44] They responded to a five-point Likert scale ("Never" to "very often"). Scoring high on this five-point Likert scale suggested higher perceived work stress, whereas a lower score indicated lower perceived work stress. The scale had adequate reliability with Cronbach's Alpha of 0.714. *Sense of coherence* was measured in the context of their work or feelings about it (e.g. manageable to unmanageable, unrewarding to rewarding) during the pandemic using a nine-item instrument. Participants responded on a seven-point semantical differential scale.[45] After reverse coding negative items, high scores indicated a sense of coherence and vice versa. The Cronbach's Alpha of this scale was 0.812. Health protective behaviours (i.e. *attitudes towards vaccination)* were measured using a four-item scale, in which participants responded on a 4-point Likert scale from "strongly disagree" to "strongly agree". The items included "Overall, I believe that vaccinations are safe" and "Overall, I believe that vaccinations are effective".[41] The Cronbach's Alpha of this scale was 0.916. For all mediators, the mean values were used in the analyses.

2.2.4. Covariates

Informed by previous literature and related studies,[32] the following sociodemographic factors were controlled for sex (i.e., male and female), age (chronological age), type of school (i.e., government primary school, aided primary school, private primary school, direct subsidy scheme primary school, international school-primary, government secondary school, aided secondary school, private secondary school, direct subsidy scheme secondary school, international school – secondary, and special school), and current position (e.g. teacher, principal) as shown in Fig. 1.

2.3. Statistical analysis

Both descriptive and inferential statistical analyses were carried out. Descriptive statistics such as mean, standard deviation, frequencies, and percentages were applied to describe the characteristics of the participants. We also performed correlation analysis to explore the initial relationship among the variables in the study. Path analysis in Structural Equation Modelling (using 2000 bootstraps) was used to analyse the data using SPSS AMOS.[46] To assess the fit of the proposed structural

equation model (SEM), multiple goodness-of-fit indices were employed. The model's fit was evaluated using the chi-square divided by degrees of freedom (CMIN/DF) as well as other indices including the goodness of fit index (GFI), incremental fit index (IFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA). Additionally, a Bollen-Stine bootstrap test was conducted to verify the adequacy of the model fit. Statistical significance was set at p-value <0.05.

3. Results

From Table 1, the mean age of the participants was 41.68 years, with 50.7 % male. Most were teachers (58.9 %) and worked in aided secondary school education (37.7 %). The results indicate that approximately 44.5 % of the school staff had limited health literacy (i.e., problematic [34.0 %] and inadequate health literacy [10.5 %]). The mean score for attitudes about vaccination was 3.04 (SD = 0.66); the mean score for perceived work stress was 3.13 (SD = 0.18). For a sense of coherence, the mean score was 4.7 (SD = 0.82), while that of well-being was 51.38/100 (SD = 20.84), indicating generally good mental health, although the low end of the criteria. However, about 18 % of them were at high risk of depression. Only the sense of coherence was correlated with well-being among the independent and mediating variables of interest, as shown in Table 2.

Table 1
Descriptive statistics of variables in the study.

Variable	Frequency (*n* = 440)	Percentage
Sex		
Male	223	50.7
Female	217	49.3
Age		
Mean/SD	41.68/10.78	
Minimum-Maximum	23–68	
Type of School		
Government Primary School	26	5.9
Aided Primary School	105	23.9
Private Primary School	7	1.6
Direct Subsidy Scheme Primary School	11	2.5
International School-Primary	1	0.2
Government Secondary School	12	2.7
Aided Secondary School	166	37.7
Private Secondary School	1	0.2
Direct Subsidy Scheme Secondary School	18	4.1
International School -Secondary	3	0.7
Special School	90	20.5
Current position in the school		
School principal/Head of School	78	17.7
School vice-principal/Deputy Head of School	52	11.8
School assistant principal	18	4.1
Member of the school management committee/ Incorporated Management Committee	8	1.8
Leadership team (e.g. Dean of Admissions, Director of Learning Support, Director of Operations)	25	5.7
Teacher	259	58.9
Health literacy		
Inadequate	46	10.5
Problematic	150	34.0
Sufficient	244	55.5
Attitudes about vaccination		
Mean/SD	3.04/0.66	
Minimum-Maximum	1–4	
Perceived work stress		
Mean/SD	3.13/0.18	
Minimum-Maximum	1–5	
Sense of coherence		
Mean/SD	4.7/0.82	
Minimum-Maximum	1–7	
Mental well-being		
Mean/SD (minimum-maximum score)	51.38/20.84 (00–100)	
Risk of depression (score ≤28)	79	18

As displayed in Fig. 2 and confirmed in Table 3, health literacy was positively associated with attitudes towards vaccination ($\beta = 0.295$, $p < 0.001$) and negatively with perceived work stress ($\beta = 0.111$, $p < 0.05$). Attitudes towards vaccination ($\beta = 0.104$, $p < 0.05$), sense of coherence ($\beta = 0.408$, $p < 0.01$), and perceived work stress ($\beta = -0.096$, $p < 0.05$) were associated with the well-being of school staff. Table 4 shows that attitudes towards vaccination ($\beta = 0.031$, $p = 0.021$) and perceived work stress ($\beta = 0.011$, $p = 0.036$) mediated the relationship between health literacy and well-being.

4. Discussion

This study explored the role of health literacy in the mental well-being of school staff during the COVID-19 crisis in Hong Kong and the extent to which work conditions, health-protective behaviours (especially vaccination attitudes), and a sense of coherence explained that relationship. The results show that a significant proportion of participants had limited health literacy. However, our findings differ quite from the study by Lau, Shum[47] who found that 53.7 % of school leaders had limited health literacy. It is possible that the novelty of COVID-19 made access and utilisation of health information problematic for many school staff. Notwithstanding, the situation is alarming, given its potentially adverse impact on the mental well-being of educators and their ability to provide adequate support to students.[23] Hence, promoting health literacy is imperative for people who work with young people in the post-pandemic era and must be a priority for schools and public health leaders. This view is also crucial given that the mental well-being of school staff was low, with many of them at serious risk of depression. Such a result reaffirms the tenets of the stress process theory[13] and indicates that uncertainties and crises, as was witnessed during the pandemic, can usher in a state of poor mental well-being.[11,48] In the post-pandemic era, strategies to promote health literacy (e.g., access to health information sources) in schools need to be strengthened, not only for students, as has often been the case so far,[49] but also with greater emphasis on the entire school staff.

In contrast to the existing literature that documented a significant association between health literacy and mental well-being among school staff,[50] we found no significant direct association between health literacy and the mental well-being of school staff in Hong Kong. Instead, we observed that higher levels of health literacy were associated with reduced work-related stress among school staff and positive attitudes towards the COVID-19 vaccine, leading to improved mental well-being. These results extend knowledge of the mechanisms involved in how health literacy aided in the mental well-being of school staff during the pandemic. Conceptually, it can be argued that health literacy enabled school staff to manage stressful conditions in their lives by effectively navigating and utilising health information, adopting healthier coping strategies to combat stress, and thereby, boosting mental well-being as suggested by several definitions and models of health literacy.[33,34] Additionally, sufficient health literacy may empower individuals to make informed decisions regarding their health, fostering a sense of control and resilience in the face of work-related stressors.[48] Indeed, the causal model of health literacy theorises that personal skills, motivation, and being well-informed of health resources/services are fundamental to how health literacy connects to health outcomes.[30]

Furthermore, our findings suggest that school staff with sufficient health literacy are more likely to have positive attitudes towards health protective resources such as vaccines, leading to positive mental well-being. These findings partly support the observations Pandey, Thurman[31] that, worries and misperceptions about vaccines (e.g. their authorisation process) can exacerbate mental health problems (e.g., anxiety). However, people with sufficient health literacy are said to be more accepting of vaccines due to better understanding, leading to positive attitudes.[28,51] This iterates the health-promoting effect of health literacy as embedded in its conception.[33] Therefore, the analytical framework explored in this study (Fig. 1) adds to existing attempts to

Table 2
Spearman correlation analysis of variables in the study.

		1.	2.	3.	4.	5.	6.	7.	8.	9.
1.	Mental well-being	1								
2.	Sense of coherence	0.419**	1							
3.	Health protective behaviours (attitudes towards vaccination)	0.068	0.047	1						
4.	Perceived work stress	−0.093	−0.020	0.002	1					
5.	Health literacy	0.044	0.034	0.334**	−0.103*	1				
6.	Type of School	−0.114*	−0.149**	0.050	0.047	0.232**	1			
7.	Sex	0.021	0.102*	−0.134**	0.112*	−0.046	0.072	1		
8.	Current position in the school	−0.014	−0.044	−0.318**	0.037	−0.166**	−0.252**	0.132**	1	
9.	Age	−0.037	0.012	0.323**	−0.097*	−0.176**	0.145**	−0.108*	−0.465**	1

**Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

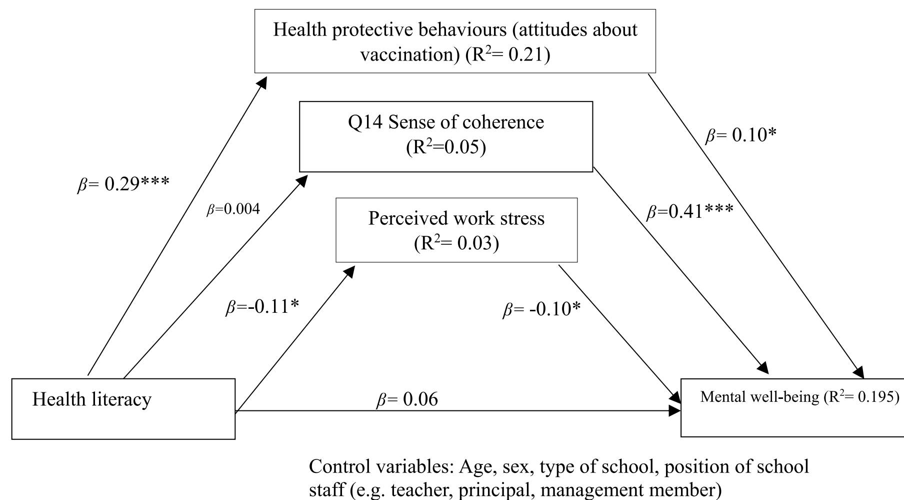

Fig. 2. Indirect effects of health literacy on well-being through sense of coherence, vaccination attitudes and perceived work stress.
Notes: CMIN/DF = 1.59, p = 0.177; GFI, 0.997; IFI = 0.99; CFI, 0.994; RMSEA = 0.036.
All regression coefficients are standardised values. * **p < 0.001; **p < 0.01; *p < 0.05.

Table 3
Direct and total effects paths examined in the study.

	Sense of coherence		Attitudes about vaccination		Perceived work stress		Health literacy	
	Total effect	*Direct Effect*	*Total effect*	*Direct Effect*	*Total effect*	*Direct Effect*	*Total effect*	*Direct Effect*
Sense of coherence							−0.004	−0.004
Attitudes about vaccination							0.295	0.295**
Perceived work stress							−0.111	−0.111*
Mental well-being	0.408	0.408**	0.104	0.104*	−0.096	−0.096*	−0.016	−0.056

**p < 0.01; *p < 0.05. All values are standardised estimates.

theorise how health literacy affects health, such as the causal pathway linking health literacy to health outcomes.[30] This study adds that the connection between health literacy and mental well-being can also be explained in terms of how people deal with adverse conditions (e.g., work stress in this study) and how they behave about resources that protect against poor health outcomes, such as vaccines. Thus, health literacy is pivotal in safeguarding mental well-being in times of distress by shaping positive attitudes towards protective health measures and managing sources of work stress.

Contrary to our expectations, a sense of coherence was not a significant mediator between health literacy and mental well-being. While there is no clear explanation for this observation, it must be understood that sense of coherence is typically a stable personality trait that develops over time[35] and may not be easily influenced by short-term changes in health literacy levels, particularly during a crisis like the COVID-19 pandemic. This period was characterized by heightened uncertainty and rapidly changing information,[52] which may have overwhelmed individuals' capacity to leverage health literacy to strengthen coherence. Instead, health literacy may have impacted mental well-being directly by providing immediate access to reliable health information, reducing anxiety related to health uncertainties without necessarily altering underlying perceptions of coherence. Future research can delve deeper into the relationship between health literacy and a sense of coherence in this population group to offer more insights.

4.1. Limitations

While this study has offered further evidence on the relationship between health literacy and mental well-being in times of distress, it is essential to note that the findings only add to existing studies and do not demonstrate causality as the analyses are based on cross-sectional data.

Table 4
Indirect effects of health literacy on well-being through sense of coherence, vaccination attitudes and perceived work stress.

	B	Beta	Confidence interval		P-value
			Lower	Upper	
Health literacy →Sense of coherence →mental well-being	−0.018	−0.001	−0.417	0.397	0.925
Health literacy →Vaccination attitudes →mental well-being	0.376	0.031	0.092	0.691	**0.021**
Health literacy →Perceived work stress →mental well-being	0.130	0.011	0.024	0.336	**0.036**

Interpretation of the findings should, therefore, be done with caution. Also, the use of purposive and snowballing sampling techniques and the absence of a representative sample limits the generalizability of the findings. The data were self-reported. Also, some important variables, such as educational attainment, were not included in the analysis, which could have affected the results. However, the respondents comprised a generally uniform group whose position requires tertiary education, which made its impact on their health literacy likely minimal. As such, there may have been some social desirability bias and recall bias.

4.2. Conclusion

This study has expanded knowledge on the mental well-being of school staff by demonstrating how health literacy affects it. While an alarming proportion of school staff exhibit problematic or inadequate health literacy, our findings reveal that higher levels of health literacy are associated with reduced work-related stress and more positive attitudes towards protective measures such as vaccines, which leads to positive mental health. Hence, interventions aimed at enhancing health literacy among school staff are recommended as they can be instrumental in fostering health-promoting behaviours, assuring a safer and healthier work environment, and ultimately promoting mental well-being. In particular, the findings can be instructive in the expansion of the Healthy School Policy in Hong Kong, which primarily focuses on basic health education for students.[53] Given the gaps in health literacy among school workers and its different ways of affecting their mental well-being, this study points to a need for health education programmes for school staff, equipping them with the skills to manage health information, navigate services, and adopt protective behaviors, thereby reducing work-related stress and enhancing mental well-being. To build stronger evidence, future studies must adopt longitudinal approaches to explore how health literacy impacts mental well-being over time, especially in dynamic environments where health literacy needs might fluctuate.

Author statements

Ethical approval

Ethics approval was obtained from both the Sub-Committee on Research Ethics and Safety of the Research Committee of Lingnan University, Hong Kong (EC077/2021) and the Research Ethics Committee of Hong Kong Baptist University (REC/20–21/0465).

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Competing interests

None declared.

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