Gender Differences in the Relationships between Meaning in Life, Mental Health Status and Digital Media Use during Covid-19

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Abstract

Background

The COVID-19 pandemic has had a significant impact on individuals' social lives, mental health status, and meaning in life (MIL). Globally, the use of different types of digital media has become a proxy for pre-COVID social lives for many people. This study investigated gender differences in the relationship between use of digital media, mental health status and MIL, during COVID-19 in Hong Kong.

Methods

This cross-sectional study surveyed 1,488 young people recruited via city-wide random sampling in 2021. Respondents completed a phone survey on digital media use, Patient Health Questionnaire (PHQ-2), Generalized Anxiety Disorder (GAD-2), COVID-19 impact, meaning in life, and demographics. Gender differences in MIL were tested with an independent sample t-test. Gender-specific multiple linear regression models tested associations between MIL and explanatory variables of age, educational level, history of diagnosis, digital media use, and mental health status.

Results

There was a significant gender difference in MIL (males (M = 12.90, SD = 4.12); females (M = 13.45, SD = 3.96); t (1485) = -2.656, p = .008). For males, all predictor variables significantly contributed to MIL (F (9, 759) = 15.731, p < .000, R^2 = .157). However, for females, while the overall model for MIL was significant (F (9, 709) = 12.105, p < .001, R^2 = .133), the only significant predictor variable was mental health status.

Conclusion

Females had significantly better MIL under COVID-19 than males. Digital media use contributed to MIL in males but not females, and there were gender-specific predictors of MIL.

1. Introduction

As COVID-19 continues to spread in Hong Kong, many new policies, including reduction of dine-in services, closure of schools, implementation of work-from-home arrangements, etc have been implemented to restrict social activities and limit spread of infection. Most people now stay at home, with a much-restricted social life, and consequently, many have become disconnected or isolated from others (1, 2). Laufer and Shechory Bitton found that females in particular experienced higher levels of anxiety, depression, and somatization due to isolation during COVID-19 (3).

Mental health status is an important predictor of meaning in life (MIL) (4–6). MIL refers to the manner in which individuals feel their lives have purpose (7). Steger et al. reported significant gender differences in MIL, with females having higher levels of the presence of, and searching for, MIL than males (8). Pre-COVID-19, depression and anxiety were reported as negatively-correlated with MIL (7), and these findings hold true in the context of COVID-19 (9).

Moreover, recent findings suggested a negative relationship between interpersonal alienation and MIL during COVID-19 (10). Interpersonal relationships have been widely regarded as a source of MIL (11–13). The meaning maintenance model suggested that when there is a large discrepancy between actual and expected interpersonal relationships, people will experience an elevated level of interpersonal alienation that leads to a sense of meaninglessness (14). In other words, social isolation experienced during the pandemic may produce adverse effects on people's development of MIL. One possible implication is that improving interpersonal connections may also improve people's level of MIL. One feasible way during pandemic restrictions to alleviate social isolation is to increase the usage of virtual communication via digital media (15, 16).

According to the study *Digital 2021 Hong Kong*, average total daily time spent on the internet by people in Hong Kong increased from 6 hours 16 minutes in 2019 to 7 hours 15 minutes in 2020 (17). This report also indicated that Hongkongers aged from 16 to 64 years spend an average of two hours a day on social media in 2021 (17). It is suggested that individuals have increasingly relied on digital media for social connection during the COVID-19 pandemic (18). Nguyen et al. found that females were more likely to increase the amount of virtual communication by video calls and text messages, while males were more likely to do so over online games (19).

The growing body of research in this area suggest that mental health status is an important predictor of MIL (7, 20–24) However, little attention has been paid to the effect of digital media use on MIL during COVID-19, when it was often the only viable way to communicate with friends and family because of social contact restrictions. We identified only one study in the United States on social media use and MIL during the pandemic, which found no significant relationship (25). No study has examined whether MIL is associated with digital media such as video communication apps (Zoom, Skype, Facetime, Microsoft Teams), or whether males and females use these apps differently.

This study aims to investigate gender differences in the relationship between use of digital media, mental health status and MIL, during COVID-19 in Hong Kong. The findings will contribute to better design and usage of media platforms during this, and subsequent pandemics.

2. Method

2.1. Study design

This study is a cross-sectional study and was approved by the Human Research Ethics Committee for Non-Clinical Faculties of HKU (Research Ethics Approval ID: EA1709039).

2.2. Participants

Permanent residents of Hong Kong aged between 18 to 35 years of age, were eligible to participate.

2.3. Sample generation and Procedures

Our data was a subset of the Hong Kong Mobile Phone Survey on Youth Mental Health and Internet Usage, initiated by the Hong Kong Jockey Club Centre for Suicide Research and Prevention (CSRP). From 2 August 2021 to 17 December 2021, a random sample of mobile phone numbers was generated using mobile number prefixes published by the Office of the Communications Authority (OFCA). For our study, a random sample of 125,746 mobile phone numbers was extracted. Potential respondents were contacted using the Computer-Assisted Telephone Interviewing (CATI) System, calling from 6:30pm to 10:30pm on weekdays. If the respondent was in the included age bracket, the study aim was described to potential participants as research to gain insights into the younger generation's general well-being and usage of the internet. Participants gave informed consent before completing the survey, and they understood that they could withdraw anytime. Should they experience distress during the survey, they were encouraged to seek help from emotional support services and hotlines, whose contact information was provided at the end of the survey.

2.4. Measures

Demographics. Participants answered questions about age, gender and educational level, and a binary-response mental health question: *"Have you been diagnosed with major depressive disorder, schizophrenia, social phobia, or avoidant personality disorder?"*

Digital media use. This was measured as use of social media platforms (i.e., Facebook, Instagram, Twitter, Weibo, WeChat Moment) and video communication Apps (i.e., Zoom, Skype, Facetime, Microsoft Teams). The two binary-response questions were *"Have you ever used social media platforms to update personal status?"* and *"Have you ever used video communication apps to make video phone calls?"*

PHQ-2. This is an ultra-brief self-report instrument for depression that contains the first two items of the PHQ-9 (26). Each item in PHQ-2 asked about the frequency of a depressive symptom experienced in the last two weeks. The score for each item ranges from 0 (*never*) to 3 (*almost every day*), with a total score of 6. A cut off score of 3 is suggested as indicating a possible diagnosis of depressive disorder. Items were *"Little interest or pleasure in doing things"* and *"Feeling down, depressed or hopeless".* In our current sample, Cronbach's alpha of PHQ-2 was acceptable (0.61).

GAD-2. It is an ultra-short screening tool that includes the first two items of GAD-7. Its scores are the same as the PHQ-2. Items were *"Feeling nervous, anxious or on edge"* and *"Not being able to stop or control worrying".* A cut-off of 3 or greater is recommended in the general population to screen for GAD (26). In our current sample, Cronbach's alpha of GAD-2 was acceptable (.75).

Impact of COVID-19. Emotional distress under COVID-19 was assessed by one question *"Have you been emotionally distressed by the COVID-19 pandemic?"* using a five-point scale ranging from 1 (*not at all*) to 5 (*very serious*).

Meaning in Life Questionnaire – Short Form (MLQ-SF). Three items from the MLQ presence subscale were included in the study (27), *"My life has a clear meaning or purpose"*, *"I have found a satisfactory meaning in life"* and *"I have a clear sense of what gives meaning to my life."* Items were rated from 1 (*Absolutely untrue*) to 7 (*Absolutely true*). The MLQ-SF was used in national health surveillance research in the United States, revealing good reliability and validity (28). In our current sample, the Cronbach's alpha of MLQ-SF was good (.85).

2.5. Statistical Analysis

All analyses were conducted in IBM SPSS v. 25. An independent sample t-test compared the level of MIL between males and females. Gender-specific multiple linear regression models were constructed, with MIL as the dependent variable, and explanatory variables age, gender, educational level, history of diagnosis, digital media use (social media platform, chat application, video communication Apps), and mental health status (PHQ-2, GAD-2, emotional distress under COVID-19).

3. Results

A total of 1501 participants completed a community based mobile survey on digital media use and general well-being. Data with missing values or from those who could not complete the questionnaire were excluded. The final sample consisted of 1488 respondents. Of these, 51.7% (*n* = 769) were male and the mean age was 27.19 years (SD = 3.88). The majority had an educational level of post-secondary or above (91.3%). Over 80% participants had used social media platforms while over 60% had used video communication apps. The mean MIL score was 13.16 (SD = 4.05). The sociodemographic data is summarised in Table 1.

Table 1
Sociodemographic Characteristics of Participants

Variables	*n*	%	*M*	*SD*
Gender	769	51.7%		
Male	719	48.3%		
Female				
Education level	1358	91.3%		
Post-secondary or above	128	8.6%		
Secondary School	2	0.1%		
Primary School				
History of Diagnosis	104	7.0%		
Yes	1384	93.0%		
No				
Social Media Platform	1213	81.5%		
Used	275	18.5%		
Never Use				
Video Communication Apps	939	63.1%		
Used	549	36.9%		
Never Use				
Meaning in Life			13.16	4.05
Age			27.19	3.88
PHQ-2			1.31	1.36
GAD-2			1.41	1.37
Emotional Distress under COVID-19			2.83	1.21
Note. N = 1488.				

There was a significant gender difference in levels of MIL $t(1485)$ = -2.656, p = .008. Young males had significantly lower MIL scores than young females (males M = 12.90, SD = 4.12; females (M = 13.45, SD = 3.96).

For young males, the model explained a significant amount (15.7%) of the variance in MIL ($F(9, 759)$ = 15.731, p < .000, R^2 = .157). All predictor variables contributed significantly to the model (Table 2). For

young females, the model also explained a significant amount of variance (13.3%) in MIL ($F_{(9, 709)}$ = 12.105, $p < .001$, $R^2 = .133$) (Table 3), however only PHQ-2 ($B = - .775$, $p < .000$), GAD-2 ($B = - .318$, $p = .013$) and emotional distress under COVID-19 ($B = - .258$, $p = .037$) contributed significantly to the model.

Table 2
Regression Coefficients for Predicting Meaning in Life under COVID-19 (Male samples)

Predictors	B	SE	β	95% CI		p
				Lower	Upper	
Social Media Platform	.902	.332	.094	.250	1.554	.007
Video Communication App	.692	.285	.083	.133	1.251	.015
PHQ-2	− .546	.118	− .192	− .778	− .315	.000
GAD-2	− .305	.120	− .107	− .541	− .069	.011
Emotional Distress (COVID-19)	− .363	.111	− .111	− .580	− .146	.001
History of Diagnosis	-1.229	.604	− .071	-2.415	− .043	.042
Age	.109	.035	.104	.040	.178	.002
Educational Level	1.483	.434	.115	.630	2.336	.001

Note. N = 769. Constant = 9.073, $F_{(8, 760)}$ = 17.642, $p < .000$, $R^2 = .157$.

CI = confidence interval for *B.*

Table 3
Regression Coefficients for Predicting Meaning in Life under COVID-19 (Female samples)

Predictors	B	SE	β	95% CI		p
				Lower	Upper	
Social Media Platform	.314	.424	.026	− .519	1.147	.459
Video Communication App	.472	.300	.056	− .117	1.060	.116
PHQ-2	− .769	.131	− .246	-1.027	− .511	.000
GAD-2	− .321	.128	− .106	− .573	− .070	.012
Emotional Distress (COVID-19)	− .265	.123	− .077	− .507	− .023	.032
History of Diagnosis	− .568	.524	− .039	-1.596	.460	.278
Age	.049	.037	.048	− .023	.121	.183
Educational Level	− .209	.479	− .015	-1.149	.731	.662

Note. N = 719. Constant = 13.802, F (8, 710) = 13.551, p < .000, R^2 = .132.

CI = confidence interval for B.

4. Discussion

This paper reports the first known information on how digital media use contributed to MIL in young Hong Kong residents during Covid-19. Gender differences in MIL indicated that gender-specific predictor models were required. In males, usage of social media platforms, usage of video communication Apps, older age, and higher educational level positively affected MIL, whilst higher levels of depression and anxiety, higher levels of emotional distress under COVID-19, and previously-diagnosed mental health disorder negatively affected MIL. Two of the predictors (use of social media platforms and video communication Apps), indicated that males who used them had higher MIL than males who did not. For females, the model explained slightly less of the MIL variance (13.3%) than for males, although similar to males, higher levels of depression and anxiety, and higher levels of emotional distress under COVID-19 negatively affected MIL. However, no predictor variable positively affected MIL for females, and no form of digital media use impacted MIL under COVID-19.

While mental health outcomes were significant predictors of MIL in both genders, only males benefited from digital media use, given that higher level of MIL correlated with lower state anxiety and lower COVID-19 stress (9). As well, our result may corroborate the finding that females were more prone to overusing digital media during COVID-19 (29), compared to males. One of the plausible explanations may be that the overuse of social media could produce negative effects that outweigh the beneficial effects of digital media use. A recent study found that cyberbullying, lack of sleep, and lower physical activity mediated

the link between digital media use and mental health among females but not among males (30). Females may be more likely to engage in relational aggression and males in physical aggression, a difference seemingly exacerbated by media exposure (31–33). These gender differences suggest that digital media use might have a more negative impact on females' well-being than males.

This study found significant gender differences in MIL. Digital media use was positively associated with MIL only for males, although MIL was associated with mental health for both genders. Future studies should attempt to measure and model more factors to increase understanding of the predictors of MIL, particularly under pandemic conditions. Factors of interest could include life satisfaction, sense of purpose, intrinsic and extrinsic aspirations (20, 34).

The cross-sectional study design precludes investigation of causal relationships between media use and MIL. Future studies should aim to test this using randomized controlled trials to compare the effects on MIL of different types of digital media. In addition, the use of digital media as an intervention to increase MIL should be explored. This study only targets young adults. During the pandemic, increased use of digital media became more common, even for elderly (35), thus further research is warranted to examine the use of digital media in different age groups, and its effect on MIL.

Abbreviations

CSRP
Centre for Suicide Research and Prevention
CATI
Computer-Assisted Telephone Interviewing
GAD-2
Generalized Anxiety Disorder 2-item
MIL
Meaning in Life
MIQ-SF
Meaning in Life Questionnaire – Short Form
OFCA
Office of the Communications Authority
PHQ-2
Patient Health Questionnaire 2-item
SPSS
Statistical Package for the Social Sciences

Declarations

Ethics approval and consent to participate

This study was approved by the Human Research Ethics Committee for Non-Clinical Faculties of the University of Hong Kong (Research Ethics Approval ID: EA1709039). Participants gave informed consent before completing the survey, and they understood that they could withdraw anytime. All experiments were performed in accordance with relevant guidelines and regulations.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

WS, BW and PY contributed substantially to the conception and design of the study. WS, BW and CW were involved in the acquisition and analysis of the data. WS and BW participated in the interpretation of the data. WS and BW drafted the paper. All authors critically revised the manuscript and gave final approval for the submission.

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