Evaluation of Hong Kong Medical Students' Knowledge, Attitude, and Intention towards the use of Telemedicine

Ka Chun Fung

Jockey Club School of Public Health and Primary Care

The Chinese University of Hong Kong

Contact Email: 1155163664@link.cuhk.edu.hk

IARIA

香港中文大學
The Chinese University of Hong Kong

About The Presenter

- Mr. Ka Chun Fung received Master of Public Health degree from the Chinese University of Hong Kong in 2023. He is currently a lecturer at Hong Kong Metropolitan University.

- His research interests lie in evidence-based health practice, healthcare management, public health, accounting and finance, marketing and management, education, and psychology.

Background

- The World Medical Association (2009) defines telemedicine as
  "*the practice of medicine over a distance including the diagnostic judgment, therapeutic treatment*"

- Debut of telemedicine in HK: 1998 (Geriatric patient management)

- Healthcare reforms and advancement of technology
  → More utilization in healthcare technology + big data

- Examples:
  - Private Hospital – Teleradiology, Teleconsultation, Electronic Health Record
  - Public Hospital – Telemonitoring, Electronic Health Record

- MCHK revised the guideline in 2019 to introduce recommended ethical requirements for doctors to practice telemedicine

- Yet, the usage of telemedicine did not improve much because doctors tend to be confused about the requirement that teleconsultations must provide a standard of care equivalent to in-person medical practice, which is not an absolute parameter to assess the level of care needed to uphold professionalism

Background

- HA: Design mobile apps in patient management (e.g. booking for follow-up consultations) and health education

    - 2019 "HA Go" was launched → 13,000 patient consultations and health education initiatives have been done remotely since the launch of teleconsultations in Hong Kong public healthcare institutions (HKSAR Government, 2022)

- 2022: HA adopted teleconsultation to relieve the burden of the public healthcare institutions while handling the fifth wave of COVID-19 pandemic

- Hong Kong government is keen on promoting other uses of telemedicine, such as health education, rehabilitation programs

→ Telemedicine is one of the main directions that the healthcare system tries to pursue in Hong Kong

Problem Statement

- Adopting telemedicine is a global trend for health systems

- Medical curriculum in Hong Kong also tries to incorporate the telemedicine, in particular during the COVID-19 pandemic

  - Teaching development in progress to develop telemedical applications in clinical teaching and learning around specialties

- With a growing demand in medical services due to aging population, flexible supply with the incorporation of technology is needed to meet the surge
  - → Telemedicine plays a role in diversifying the demand with technology
  - → Important to understand whether the future doctors are ready for the new trend in health system

Significance

- The current medical students in clinical years will soon graduate and become practitioners in the private and public healthcare settings

- This study is the first study of understanding the attitude, belief and intention towards the use of telemedicine among medical students in Hong Kong

- Provide insights on how to promote the idea of telemedicine in Hong Kong medical profession given that the health system gradually adopts the new mode of practice

Research Questions

▶ Throughout the study, there are two main research questions:

1. How does the knowledge of medical students about telemedicine contribute to the attitude and belief towards telemedicine?

2. How does the attitude of medical students about telemedicine contribute to the belief and intention towards adopting telemedicine?

Hypothesis

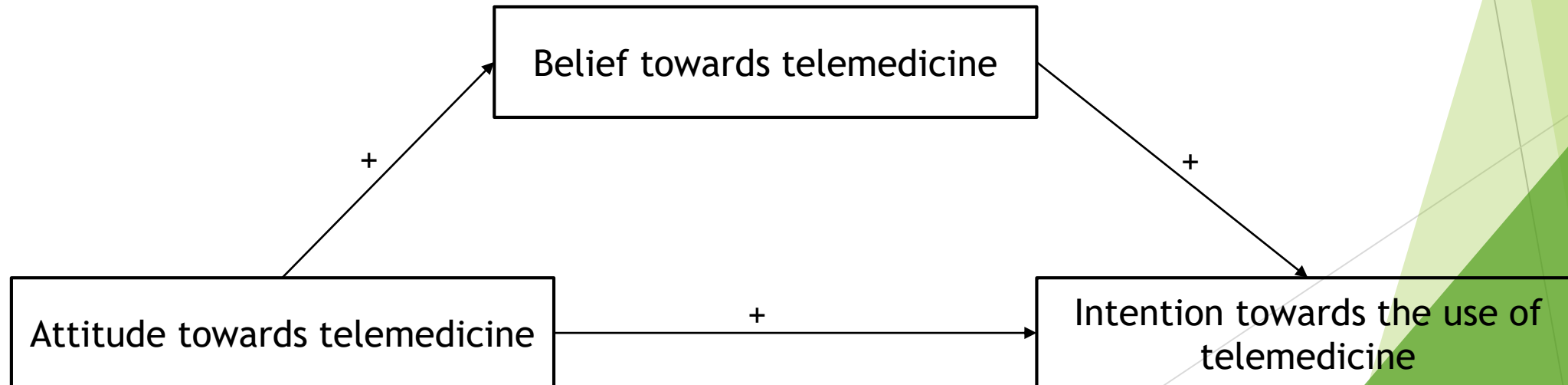Two mediation hypotheses are established:

H1:

Attitude towards telemedicine

Knowledge of telemedicine

Belief towards telemedicine

+ + +

H2:

Belief towards telemedicine

Attitude towards telemedicine

Intention towards the use of telemedicine

+ + +
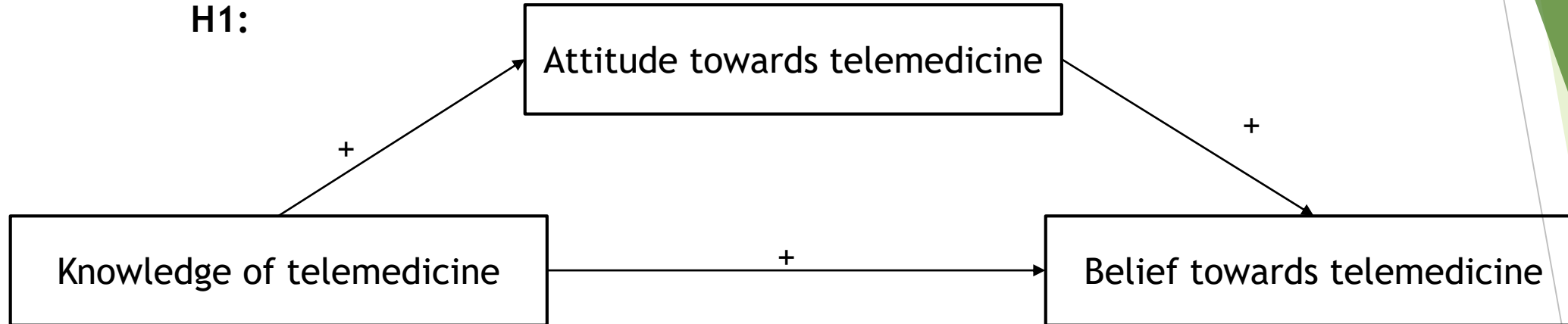
Methodology

- Cross-sectional observational study

- Online questionnaire at Qualtrics distributed to all the medical students studying Years 4-6 in the two Hong Kong medical schools (CUHK and HKU) in February to April 2023

  - 47 Close-ended questions covering four dimensions:

    - Knowledge (Practical knowledge and Overall understanding)

    - Attitude

    - Belief

    - Intention

- Convenience sampling method

- Number of questionnaire invitation distributed: 135

- Number of responses received: 83

Methodology

▶ SPSS Version 26 is used for analysis

  ▶ Bivariate analysis for each variable

  ▶ Multivariate Linear Equation model

  ▶ Mediation Analysis

▶ Reliability test for variables:

Measured variables	Cronbach's alpha
Knowledge	0.90
Attitude	0.79
Belief	0.81
Intention	0.85

Demographic characteristics of sample

Respondents (*N*=83)	
Gender	
Male	79.5%
Female	20.5%
Age (years)	
21-22	16.9%
23-24	53.0%
25-26	26.6%
27-28	3.6%
Education Level	
Secondary school	42.2%
Associate Degree	3.6%
Bachelor's Degree	38.6%
Master's Degree	15.7%
Medical Year	
Year 4	32.5%
Year 5	30.1%
Year 6	37.3%
Medical School	
The Chinese University of Hong Kong	34.9%
The University of Hong Kong	65.1%

Results – Bivariate analysis

		Mean	SD	1	2	3	4	5	6	7	8	9
1.	Gender	1.20	.41	--								
2.	Age	23.83	1.46	.20	--							
3.	Educational level	2.28	1.17	.14	.44**	--						
4.	Medical Year	2.05	.84	.078	.36**	-.001	--					
5.	Medical School	1.65	.48	-.129	-.29**	-.54**	-.018	--				
6.	Overall Understanding	4.12	.85	.078	.13	.26*	.24*	-1.74	--			
7.	Attitude towards telemedicine	4.84	1.45	.070	.34**	.47**	.17	-3.23**	.62**	--		
8.	Intention to use telemedicine	5.05	1.57	.061	.28*	.44**	.05	-.46**	.47**	.74**	--	
9.	Belief towards telemedicine	4.70	1.10	.008	.28*	.43**	.20	-.40**	.57**	.76**	.62**	--

Bivariate correlation analysis

N = 83 (listwised), $*p < .05$. $**p < .01$.
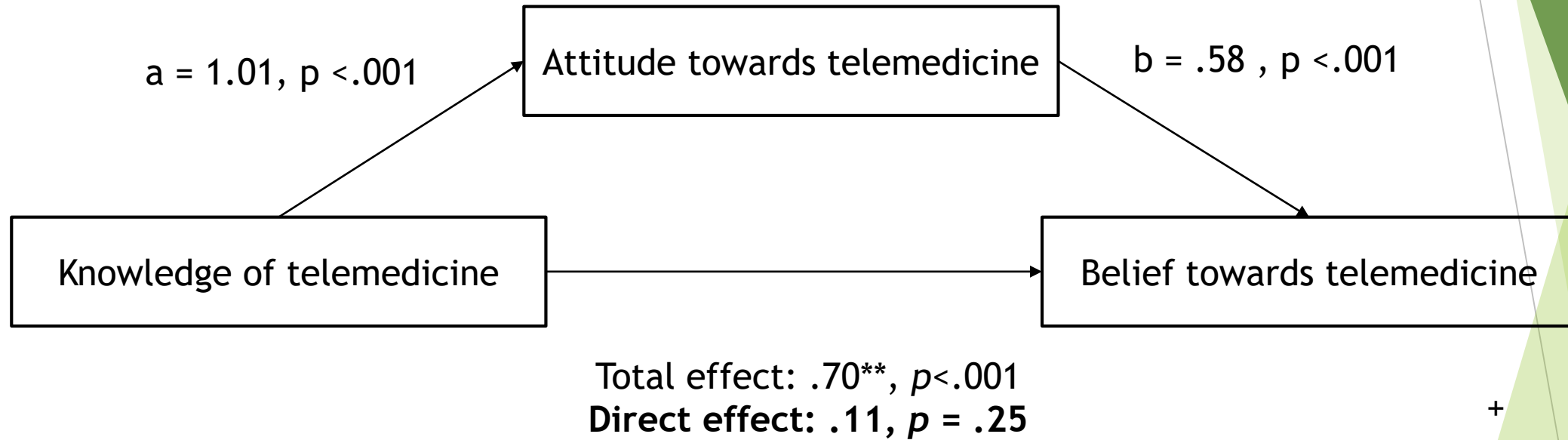
Results – Mediation Analysis (H1)

Regression Analysis for Mediation of medical students' attitude between knowledge and belief towards telemedicine

Variables	B	CI95%	SEB	β	R^2	ΔR^2
Step 1					.64	.41**
Constant	1.11	[-2.34, 5.07]	.69			
Knowledge of telemedicine	1.01**	[.38, .85]	.15	.59**		
Step 2					.85	.72**
Constant	1.57**	[.27, 5.54]	.37			
Knowledge of telemedicine	.11	[-.10, .03]	.10	.09		
Attitude towards telemedicine	.58**	[.44, .70]	.06	.76**		

$N = 83$ (Medical students who learnt telemedicine through medical curriculum); $*p < .05$, $**p < .00$

Results – Mediation Analysis (H1)

a = 1.01, p <.001

Attitude towards telemedicine

b = .58 , p <.001

Knowledge of telemedicine

Belief towards telemedicine

Total effect: .70**, *p*<.001
Direct effect: .11, *p* = .25

+

The direct effect became non-significant when the mediator is controlled.

Therefore, H1 is supported with a full mediation effect.

Discussion – Mediation Analysis (H1)

► Full mediation is achieved in the model, suggesting attitude is a necessary step in developing the connection between knowledge (overall understanding) and belief towards telemedicine

► Telemedicine is a professional and technical product
→ Involve a lot of cognitive process from learners to understand the new technology → Start with knowledge as IV

► Consistent with other research findings:

   ► Kong et al. (2020) identified the following relationship among medical students in the US:

      ► Higher level of exposure of telemedicine → Enhance awareness and opinion formation of telemedicine → High interest in the use of telemedicine for the specialties clinical management

   ► Moser (2003) also found out that 75% of medical students had a positive attitude towards telemedicine while they had knowledge of telemedicine from media and lectures

Discussion – Mediation Analysis (H1)

- Type of belief demonstrated: Evaluative belief

- Bramble (2018) defined evaluative belief as:

    "a belief that a particular thing is good (or has value) simpliciter. The good simpliciter is that which makes the world go better rather than worse, impersonally considered."

- Evaluation derives from the value and attitude towards the object to be discussed (i.e. telemedicine)

- If medical students have a good knowledge and be positive towards the telemedicine, they tend to develop positive belief towards telemedicine.

    - Evidenced by the positive coefficients of the regression model

Results – Mediation Analysis (H1)
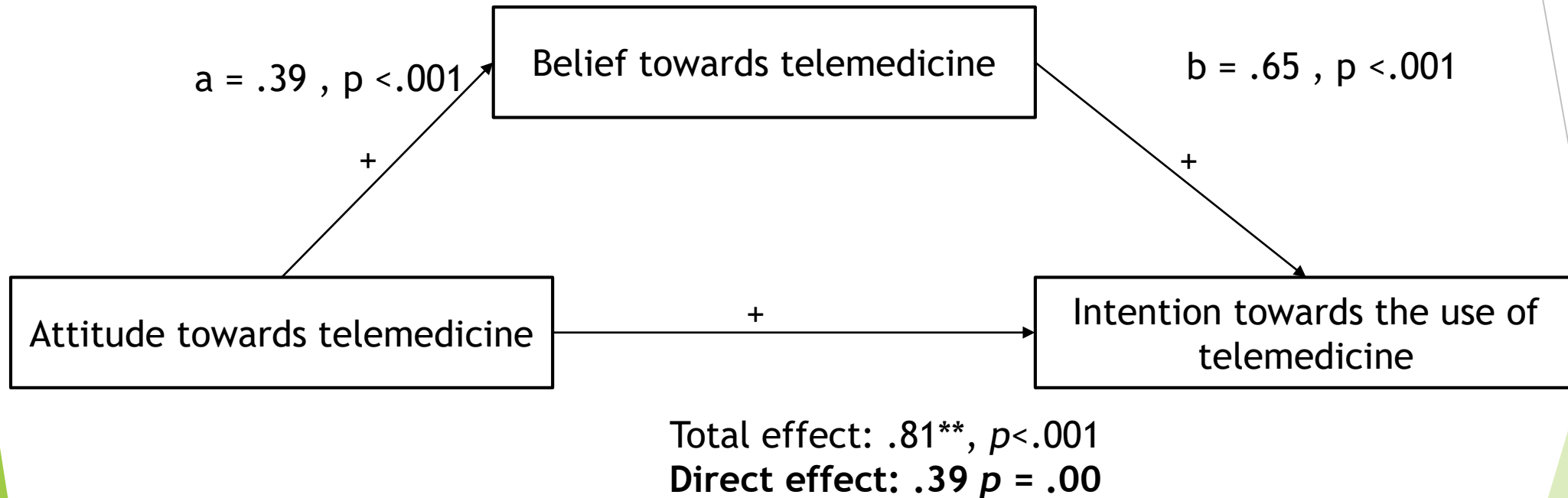
- Filters of practical knowledge (exposure to what types of telemedicine) is applied

- Among the six sources of telemedicine exposure to participants (social media, peers, family members, mass media, medical curriculum, printed material):

  - Medical curriculum has the strongest effect in leading to full mediation

  - Family members do not have statistical significance

  - Mass media only leads to partial mediation

Results – Mediation Analysis (H2)

Regression Analysis for Mediation of medical students' belief between attitude and the intention to use telemedicine

Variables	B	CI95%	SEB	β	R^2	ΔR^2
Step 1					.74	**.55****
Constant	1.13	[-1.52, -.26]	.41			
Attitude towards telemedicine	**.81****	[.56, .92]	.08	**.74****		
Step 2					.84	**.71****
Constant	**.84****	[.27, 5.54]	.23			
Attitude towards telemedicine	**.39****	[.11, .68]	.14	**.36****		
Belief towards telemedicine	**.65****	[.20, .95]	.18	**.76****		

N = 83; *p* < .05, **p< .00

Results – Mediation Analysis (H2)

a = .39 , p <.001

b = .65 , p <.001

Belief towards telemedicine

+

+

Attitude towards telemedicine

+

Intention towards the use of telemedicine

Total effect: .81**, *p*<.001
Direct effect: .39 *p* = .00

The direct effect remains significant even the mediator is controlled.
Indirect effect: 2.21, *p* = .03

H2 is partially supported

Discussion

- Partial mediation is achieved in the model, suggesting belief is not the only factor in developing the connection between attitude and intention towards the use of telemedicine

- Chen et al. (2017) studied the attitude, intention and behavior of medical students towards telemedicine, in which they found out that there are other external and objective factors that would contribute to the determination of the association.

- Hsieh et al. (2022) examined the attitude, intention of medical students towards the use of telemedicine with the integration of Theory of Planned Behavior, Self-determination theory and technology acceptance model

  - Attitude and perceived control leads to the intention towards the use of telemedicine

  - Subjective norm does not have statistical significance on the intention

Implication

- Even though the newer generations of professionals are willing to include telemedicine as part of their practices, the protocols and regulations are not updated well enough to accommodate the trend.

- Medical lawmakers and managers have to ensure that a timely, complete, and practical protocol, as well as a set of rules, are produced in the foreseeable future to protect the rights of medical professionals in adopting telemedicine.

- Existing practitioners should also equip themselves with the knowledge and skills of using telemedicine in clinical settings, so that their application experience can serve as practical information for the mentees to pay attention to.

Future study directions

- Integrative Clinical Management → Involve the study of other allied health students (e.g., students in pharmacy, nursing, physiotherapy)

- Study on recently graduated doctors and compare the findings with the existing study to identify the potential trend of change in attitude, belief and intention

References

The World Medical Association. *WMA - The World Medical Association-WMA statement on Digital Health*. [Online]. 2009 [retrieved Apr. 2024]. Available from: https://www.wma.net/policies-post/wma-statement-on-guiding-principles-for-the-use-of-telehealth-for-the-provision-of-health-care/

Legislative Council of the Hong Kong Special Administrative Region. *Development of telehealth services*. [Online]. 2021 [cited Apr. 2024]. Available from: https://www.legco.gov.hk/research-publications/english/essentials-2021ise14-development-of-telehealth-services.htm

The Medical Society of Hong Kong. *Ethical Guidelines on Practice of Telemedicine*. [Online]. 2019 [cited Apr. 2024]. Available from: https://www.mchk.org.hk/files/PDF_File_Ethical_Guidelines_on_Telemedicine.pdf

The Government of the Hong Kong Special Administrative Region. *LCQ3: Telemedicine services*. [Online]. Feb. 2023 [retrieved May. 2024]. Available from: https://www.info.gov.hk/gia/general/202302/15/P2023021500631.htm

The Government of the Hong Kong Special Administrative Region. *LCQ7: Promoting development of telemedicine*. [Online]. Jul. 2022 [retrieved Apr. 2024]. Available from: https://www.info.gov.hk/gia/general/202207/06/P2022070600446.htm

G. Cheng, F. Wu, and D. Huang. *How COVID-19 is accelerating telemedicine adoption in Asia Pacific*. [Online]. May 2020. [retrieved Apr. 2024]. Available from: https://healthadvancesblog.com/2020/05/08/how-covid-19-is-accelerating-telemedicine-adoption-in-asia-pacific/

S. Kazmi et al., "Nationwide Assessment of Knowledge and Perception in Reinforcing Telemedicine in the Age of COVID-19 Among Medical Students From Pakistan," Frontiers in Public Health, vol. 10, Mar. 2022, doi:10.3389/fpubh.2022.845415

S. S. Kong, A. Azarfar, A. Ashour, C. Atkins, and N. Bhanusali, "Awareness and Attitudes Towards Telemedicine Among Medical Students in the United States," Cureus, vol. 12, pp. e11574, Nov. 2020, doi:10.7759/cureus.11574

B. Kunwar, A. Dhungana, B. Aryal, A. Gaire, A. B. Adhikari, and R. Ojha, "Cross-sectional study on knowledge and attitude of telemedicine in medical students of Nepal," Health Science Reports, vol. 5, pp. e532, Jan. 2022, doi:10.1002/hsr2.532

References

P. Chen, L. Xiao, Z. Gou, L. Xiang, X. Zhang, and P. Feng, "Telehealth attitudes and use among medical professionals, medical students and patients in China: A cross-sectional survey," International Journal of Medical Informatics, vol. 108, pp. 13-21, Sep. 2017, doi:10.1016/j.ijmedinf.2017.09.009

C. Dockweiler and C. Hornberg, "Knowledge and Attitudes as Influencing Factors For Adopting Health Care Technology Among Medical Students in Germany," Journal of the International Society for Telemedicine and E-health, vol. 2, pp. 64-70, Dec. 2014. [Online]. Available from: https://journals.ukzn.ac.za/index.php/JISfTeH/article/view/78

S. Yaghobian et al. "Knowledge, attitudes and practices of telemedicine education and training of French medical students and residents," Journal of Telemedicine and Telecare, vol 28, pp. 248-257, Jun. 2020, doi:10.1177/1357633x20926829

The University of Hong Kong. *Teaching and Learning, Rising to the Challenge*. [Online]. 2020 [cited May. 2024]. Available from: https://review.hku.hk/teaching-and-learning/

X. Lin, "Review of Knowledge and Knowledge Management Research," American Journal of Industrial and Business Management, vol. 9, pp. 1753-1760, Sep. 2019, doi:10.4236/ajibm.2019.99114

Ministry of Business, Innovation & Employment. *Personal beliefs, values, attitudes and behaviour*. [Online]. [cited Apr. 2024]. Available from : https://www.iaa.govt.nz/for-advisers/adviser-tools/ethics-toolkit/personal-beliefs-values-attitudes-and-behaviour/

K. Park, Textbook of Preventive and Social Medicine. 21st Edition. [Online]. 2011. Available from: http://www.goodreads.com/book/show/16247589-park-s-textbook-of-preventive-and-social-medicine2011

Merriam-Webster. *intention*. [Online]. [cited Apr. 2024]. Available from: https://www.merriam-webster.com/dictionary/intention

C. Nunez, "Requirements of intention in light of belief," Philosphical Studies, vol. 177, pp. 2471-2492, Jun. 2019, doi:10.1007/s11098-019-01321-0

H. N. Abraham et al., "Engaging third-year medical students on their internal medicine clerkship in telehealth during COVID-19," Cureus, vol. 12, pp. e8791, Jun. 2020, doi:10.7759/cureus.8791

P. Malhotra, A. Ramachandran, R. Chauhan, D. Soni, and N. Garg, "Assessment of Knowledge, Perception, and Willingness of using Telemedicine among Medical and Allied Healthcare Students Studying in Private Institutions," Telehealth and Medicine Today, vol. 5, Nov. 2020. [Online]. Available from: https://telehealthandmedicinetoday.com/index.php/journal/article/view/228

References

Hayes Process Macro - Model 4 - mediation analysis. [Online]. 2022 [retrieved Apr. 2024]. Available from: https://researchwithfawad.com/index.php/lp-courses/hayes-process-macro-lecture-series/hayes-process-macro-model-4-mediation-analysis/

P. L. Moser et al., "Acceptance of telemedicine and new media: A survey of austrian medical students," Journal of Telemedicine and Telecare, vol. 9, pp. 273-277, Sep. 2003. doi:10.1258/135763303769211283

B. Bramble, "Evaluative beliefs first," in Oxford Studies in Normative Ethics, vol. 8, M. C. Timmons, Ed. USA: Oxford University Press, pp. 258-273, Nov. 2018, doi:10.1093/oso/9780198828310.003.0013

H. L. Hsieh, J. M. Lai, B. K. Chuang, and C. H. Tsai, "Determinants of Telehealth Continuance Intention: A Multi-Perspective Framework," Healthcare, vol. 10, pp. 2038, Oct. 2022, doi:10.3390/healthcare10102038

G. Franklin et al., "How the COVID-19 pandemic impacted medical education during the last year of medical school: a class survey," Life, vol. 11, Article 294, Mar. 2021, doi:10.3390/life11040294

M. Fishbein and I. Ajzen, Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research. Addison-Wesley, Reading, MA, 1975.

R. J. Holden and B. Karsh, "The Technology Acceptance Model: Its past and its future in health care," Journal of Biomedical Informatics, vol. 43, pp. 159-172, Feb. 2010, doi:10.1016/j.jbi.2009.07.002