

Original article

AI or Human Support for Suicide Prevention? Examining Help-Seeking Intention in Suicidal Crisis

Daisuke Nakamura^{1,2)}, Hajime Sueki³⁾, Jiro Ito¹⁾

Abstract

Background: Chat-based crisis support is a common strategy for suicide prevention, and artificial intelligence (AI) chatbots may improve low response rates. Although AI chatbots are technically feasible for crisis support, it remains unclear whether individuals experiencing suicidal ideation intend to use them. This study aimed to examine the intentions of adults with severe psychological distress to use chat-based crisis support (human vs AI) when feeling suicidal.

Method: A cross-sectional web-based survey was performed, recruiting participants aged 18–69 years with a Kessler-6 score ≥ 13 who were registered as monitors with an internet research company in Japan. They completed a questionnaire on their intention to use chat-based crisis support when feeling suicidal. Participants were categorized into four groups: (1) both human and AI chat, (2) AI chat only, (3) human chat only, and (4) neither.

Results: Overall, 1,024 participants completed the survey; 19.5% intended to use AI-based chat and 21.3% intended to use human-based chat. The proportions of participants who intended to use both human and AI chat, AI chat only, human chat only, and neither option were 15.6%, 3.9%, 5.7%, and 74.8%, respectively. Significant differences were observed in gender ($p = 0.028$), history of crisis support use ($p < 0.001$), and current issues (financial problems [$p = 0.002$] and sexuality-related concerns [$p = 0.006$]) across the groups.

Conclusion: In this web-based survey, 74.8% of individuals with severe psychological distress did not intend to use either human- or AI-based chat support when feeling suicidal, whereas 19.5% intended to use AI-based chat and 21.3% intended to use human-based chat.

Keywords: Suicide, Suicidal ideation, Artificial intelligence, Crisis intervention, Help-seeking behaviour

1. Introduction

Suicide is a serious social issue, and preventing it is a global priority. Annually, over 700,000 people die by suicide¹. The World Health Organization (WHO) has set a goal to achieve a one-third reduction in the suicide rate by 2030² and recommends utilizing technology for suicide

prevention³.

One type of crisis support is a technology-based suicide prevention method that uses chat and text messages. Chat-based crisis support has shown positive experiences⁴ and effects on mental health outcomes⁵ and suicidal ideation⁶ among users. Text-based crisis support has a

¹⁾ Specified Nonprofit Corporation OVA, Tokyo, Japan

²⁾ Department of Health Informatics, School of Public Health, Graduate School of Medicine, Kyoto University, Kyoto, Japan

³⁾ Department of Psychology and Education, Faculty of Human Sciences, Wako University, Tokyo, Japan

promising impact on users' suicidal ideation 1 month following consultation⁷. However, low response rates from counselors remain a serious problem, at 30% for chat-based support and 56% for text-based support⁸.

Artificial intelligence (AI) chatbots have emerged as a promising solution for overcoming the limitations of text- and chat-based crisis support. A meta-analysis showed that AI chatbots, such as Woebot and Wysa, reduced depressive and anxiety symptoms⁹. Counseling through AI chatbots has the potential to contribute to suicide prevention among internet users at risk of suicide¹⁰. Furthermore, AI has been reported to help counselors provide crisis support in Hong Kong¹¹, and a meta-analysis depicted good accuracy in predicting suicide risk behavior¹². In addition, ChatGPT-4 has a higher social intelligence score than psychologists with doctoral degrees¹³. A systematic review demonstrated that large language models achieved higher empathy scores than humans¹⁴. Thus, AI chatbots may have the advantage of accurately predicting suicide risk and delivering empathetic responses, while having a high social intelligence 24 hours a day.

Although an AI chatbot may improve the response rate to crisis support, it remains unclear whether citizens will choose to use AI-based crisis support. Among crisis support users and the general public, approximately one-third opposed using AI and automation to personalize crisis support, and over half avoided the service if such technology was implemented¹⁵. People prefer human counselors to AI¹⁶, and human responses are preferred to AI-generated responses for sensitive discussions, such as suicidal thoughts¹⁷. However, considering the rapid pace of technological developments in AI, these trends may evolve over time.

Furthermore, intentions to use AI chatbots vary according to demographic factors; for instance, younger individuals¹⁸ and men¹⁶ tend to accept AI, as they reduce barriers related to cost, time¹⁶, and stigma¹⁹ compared to traditional services. Additionally, in situations where individuals experience suicidal ideation, they may seek help from any available source,

including an AI chatbot.

This study aimed to investigate the intention of adults with severe psychological distress to use chat-based crisis support provided by humans or AI when feeling suicidal. Clarifying these intentions is crucial when designing crisis support that reflects help seekers' perspectives. Furthermore, we explored the associations between these intentions and background characteristics to determine which types of individuals intend to use chat-based crisis support.

2. Methods

2.1. Study design and settings

This study was a cross-sectional web-based survey conducted through an internet research company (Cross Marketing Inc.) in Japan. Participants were recruited from the general internet users registered as monitors with the research company from November 7 to 10, 2023, approximately 1 year following ChatGPT's release.

2.2. Study participants

This study aimed to recruit 1,000 men and women aged 18 to 69 years. The research company randomly distributed questionnaires to potential respondents via a secure website that they accessed with unique IDs and passwords. Respondents who met all inclusion criteria and none of the exclusion criteria were included as study participants. The inclusion criteria were: (1) men and women aged 18–69 years who were registered with the research company and (2) individuals who scored ≥ 13 on the Kessler-6 (K6). The K6 is a six-item questionnaire that screens for psychological distress, and its Japanese version has established reliability and validity²⁰. In a Japanese study, a cut-off of 13 or higher had high specificity for mood and anxiety disorders²¹. The exclusion criteria were (1) incomplete questionnaire responses and (2) failure to pass the attention check item (e.g., “mark the third option to this question”). Participants were equally divided into 10 groups categorized by gender (men and women) and age (18–29, 30–39, 40–49, 50–59, and 60–69), with

100 adults per group. Following research company regulations, incentives were provided to the participants.

2.3. Measurements (outcome)

The primary outcome was the intention to use the chat-based crisis support provided by a human (professional counselor) and AI in three situations: feeling suicidal, experiencing an immediate personal crisis, and having difficulty coping with events in daily life. As no standardized measures exist for evaluating the intention to use chat-based crisis support, we adapted and modified questions from previous studies^{15,22}. These questions were further developed through discussions with a crisis support professional and a suicide researcher to suit the context of this study. Participants responded to binary questions for this measure (Supplementary Material 1). Human-based chat was described as a free service in which well-trained professionals, such as clinical psychologists, accurately assessed users' risk levels and manually provided empathetic responses and referrals to relevant medical institutions or local government services. AI-based chat was described as a free service in which AI accurately assessed users' risk levels based on data from real consultations handled by professionals, such as clinical psychologists, and automatically provided empathetic responses and referrals to relevant medical institutions or local government services. The human- and AI-based chats were completely idealized services. The description of the AI-based service focused on its functions and did not specify the underlying technology, such as a rule-based system or a large language model. To avoid order effects, the presentation order of the questions about human- and AI-based chats was randomized.

2.4. Measurements (exposures)

The participants were asked about their history of suicide attempts, crisis support usage, suicidal ideation, current concerns and issues, and sociodemographic characteristics (age, gender, marital status, household income, and employment status). Suicidal ideation was assessed using a suicidal ideation scale that

confirmed internal consistency, test-retest reliability, and validity in the Japanese population²³. Current concerns and issues were selected from a multiple-choice list of suicide-related factors (i.e., financial problems/multiple debts, unemployment/job dismissal, drug addiction, alcohol addiction, gambling addiction, sexual violence, domestic violence, sexuality-related concerns, and others). This list was adapted and modified from previous studies^{22,24} through discussions with a crisis-support professional and suicide researcher.

2.5. Statistical analysis

The proportion of intentions for using AI chat and human chat was calculated respectively.

Participants were categorized into four groups based on their intention to use chat-based crisis support: (1) Both options: participants who intended to use both human- and AI-based chats; (2) AI chat only: participants who intended to use only AI-based chat; (3) Human chat only: participants who intended to use only human-based chat; and (4) Neither option: participants who did not intend to use either human- or AI-based chat. The proportion of participants in each group was calculated.

Chi-square tests were used to compare the proportions of categorical variables (e.g., sex), and the Kruskal–Wallis test was used to compare continuous variables (e.g., age) that did not follow a normal distribution across the groups. Adjusted residuals were calculated for categorical variables to identify specific differences between groups. Analyses about gender were restricted to male and female participants due to zero frequencies in the "other" category. Current concerns and issues were analyzed using Fisher's exact test when cells had zero frequencies or >20% had five or fewer expected frequencies. A p-value of <.05 was considered significant in all statistical tests. This study was exploratory. We reported p-values in addition to adjusted residuals. Caution was warranted in the interpretation of the results. All statistical analyses were performed using R version 4.4.2.

2.6. Ethics

The Ethics Committee of Wako University (2023_0926) approved this study. Informed consent was obtained from all participants before the survey.

3. Results

3.1. Study participants selection

Figure 1 illustrates the participant selection process. The research company chose 159,970 potential respondents, and 17,793 responses were obtained. Among these respondents, 15,992 did not meet the inclusion criterion of K6 score ≥ 13 . Of the 1,801 respondents, 616 were excluded for failing an attention check, and 161 were excluded for providing incomplete responses. Overall, 1,024 participants completed the survey.

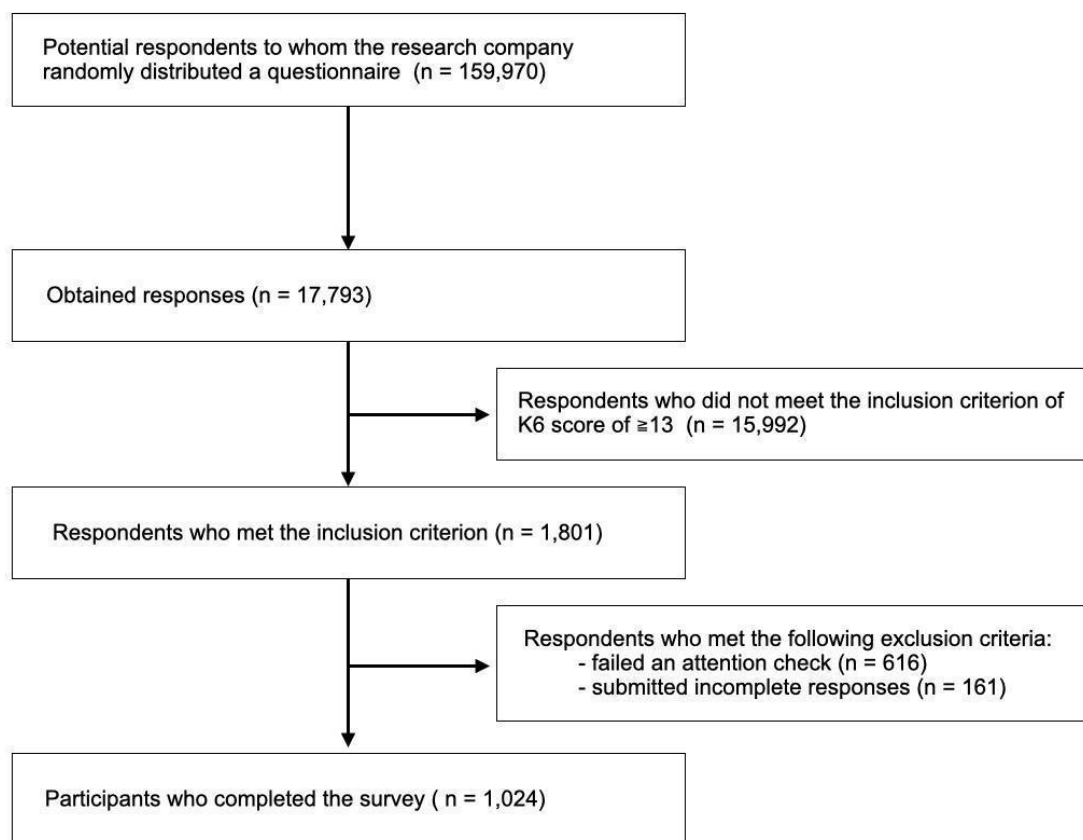


Figure 1 Participant selection process

3.2. Intention to use chat-based crisis support

Table 1 presents the distribution of intentions to use chat-based crisis support when feeling suicidal: 19.5% intended to use AI-based chat, and 21.3% intended to use human-based chat.

Table 2 lists the distribution of intentions to use chat-based crisis support across three situations. When feeling suicidal, the proportions of

participants were 15.6%, 3.9%, 5.7%, and 74.8% for both options, AI chat only, human chat only, and neither, respectively.

3.3. Comparison of sociodemographic and suicide-related characteristics among the four groups

Table 3 presents a comparison of sociodemographic and suicide-related

characteristics among the four groups when feeling suicidal. The Kruskal–Wallis tests showed no significant differences among the four groups in age, K6 score, and suicidal ideation. The chi-square tests showed no significant differences in marital status, employment status, household income, and history of suicide attempts. Women were significantly more likely to be in the human chat only group, and men were significantly less likely to be in that group (adjusted residuals = 1.993 and -2.008 , respectively; $p = 0.028$). Participants with a history of crisis support use were significantly more likely to be in the groups of both options or human chat only and significantly less likely to have no intention for either option (adjusted residuals = 5.084, 4.942, and -3.334 ; $p < 0.001$).

Table 4 lists a comparison of current concerns and issues among the four groups when feeling suicidal. Significant differences were found among the four groups in terms of financial problems/multiple debts ($p = 0.002$), sexuality-related concerns ($p = 0.006$), and others ($p =$

0.015). Participants with financial problems/multiple debts were more likely to have no intention for either option (65.2%) or intention for both options (26.7%) compared to AI chat only (2.2%) or human chat only (5.9%). Those with sexuality-related concerns also showed higher proportions of no intention for either option (60.9%) and for both (34.8%) than in the AI chat only (0%) or human chat only (4.3%). For “others,” which included various uncategorized issues, fewer participants were in the AI chat only (4.9%) compared to the neither option (68.0%), both options (17.2%), or human chat only (9.9%). Although not significant ($p = 0.087$), more participants with unemployment/job dismissal had no intention for the neither (67.3%) or both options (19.9%) than for the AI (4.7%) or human chat only (8.2%). Supplementary material 2 shows a comparison of sociodemographic and suicide-related characteristics among the four groups that experienced an immediate personal crisis and had difficulty coping with events in their daily lives.

Table 1. Distribution of intentions to use chat-based crisis support when feeling suicidal

	Yes	No
AI chat	200 (19.5%)	824 (80.5%)
Human chat	218 (21.3%)	806 (78.7%)

Table 2. Distribution of intentions to use chat-based crisis support

	Intention for both Options	AI Chat only	Human Chat only	No Intention for either option
When feeling suicidal	160 (15.6%)	40 (3.9%)	58 (5.7%)	766 (74.8%)
When experiencing an immediate personal crisis	176 (17.2%)	32 (3.1%)	71 (6.9%)	745 (72.8%)
When having difficulty coping with events in daily life	176 (17.2%)	47 (4.6%)	61 (6.0%)	740 (72.3%)

Table 3. Comparison of sociodemographic and suicide-related characteristics among groups when feeling suicidal (1/2)

	Intention for both Options	AI Chat only	Human Chat only	No Intention for either Option	p-value
Age	48.0 ^a [33.0–59.0] ^b	41.0 [28.0–56.3]	48.5 [35.5–59.5]	45.0 [32.0–55.0]	.338
Gender					
Women (n = 513)	82 ^c (16.0) ^d	21 (4.1)	40 (7.8)	370 (72.1)	.028
Adjusted residuals	0.209	0.188	1.993	-0.689	
Men (n = 505)	77 (15.2)	19 (3.8)	18 (3.6)	391 (77.4)	
Adjusted residuals	-0.211	-0.189	-2.008	0.694	
Other (n = 6)	1 (16.7)	0 (0)	0 (0)	5 (83.3)	.*
Marital status					
Married (n = 349)	60 (17.2)	11 (3.2)	20 (5.7)	258 (73.9)	.107
Adjusted residuals	0.741	-0.713	0.052	-0.190	
Separated, Widowed (n = 120)	27 (22.5)	3 (2.5)	9 (7.5)	81 (67.5)	
Adjusted residuals	1.905	-0.779	0.845	-0.925	
Unmarried (n = 555)	73 (13.2)	26 (4.7)	29 (5.2)	427 (76.9)	.133
Adjusted residuals	-1.473	0.928	-0.435	0.581	
Employment status					
Regular employment (n = 364)	62 (17.0)	15 (4.1)	14 (3.8)	273 (75.0)	.133
Adjusted residuals	0.680	0.207	-1.457	0.043	
Non-regular employment (n = 207)	41 (19.8)	6 (2.9)	15 (7.2)	145 (70.0)	
Adjusted residuals	1.522	-0.734	0.957	-0.791	
Self-employment (n = 57)	10 (17.5)	3 (5.3)	2 (3.5)	42 (73.7)	.133
Adjusted residuals	0.366	0.518	-0.684	-0.098	
Unemployment (n = 223)	28 (12.6)	6 (2.7)	12 (5.4)	177 (79.4)	
Adjusted residuals	-1.159	-0.919	-0.178	0.789	
Other (n = 173)	19 (11.0)	10 (5.8)	15 (8.7)	129 (74.6)	.133
Adjusted residuals	-1.545	1.247	1.662	-0.036	

Table 3. Comparison of sociodemographic and suicide-related characteristics among groups when feeling suicidal (2/2)

	Intention for both Options	AI Chat only	Human Chat only	No Intention for either Option	p-value
Household income					
< 4 million yen ^c (n = 603)	86 (14.3)	27 (4.5)	34 (5.6)	456 (75.6)	
Adjusted residuals	-0.847	0.710	-0.026	0.232	
4-6 million yen (n = 228)	42 (18.4)	8 (3.5)	14 (6.1)	164 (71.9)	.688
Adjusted residuals	1.068	-0.304	0.302	-0.502	
≥ 6 million yen (n = 193)	32 (16.6)	5 (2.6)	10 (5.2)	146 (75.6)	
Adjusted residuals	0.336	-0.925	-0.282	0.336	
History of crisis support use					
Yes (n = 105)	37 (35.2)	1 (1.0)	18 (17.1)	49 (46.7)	
Adjusted residuals	5.084	-1.531	4.942	-3.334	<.001
No (n = 919)	123 (13.4)	39 (4.2)	40 (4.4)	717 (78.0)	
Adjusted residuals	-1.719	0.518	-1.671	1.127	
History of suicide attempts					
Yes (n = 213)	39 (18.3)	12 (5.6)	11 (5.2)	151 (70.9)	
Adjusted residuals	0.991	1.276	-0.306	-0.660	.265
No (n = 811)	121 (14.9)	28 (3.5)	47 (5.8)	615 (75.8)	
Adjusted residuals	-0.508	-0.654	0.157	0.338	
K6	16.0 [14.0–19.0]	16.5 [14.0–19.3]	17.0 [15.0–20.8]	17.0 [14.0–20.0]	.636
Suicidal ideation scale	5.0 [2.0–7.0]	7.0 [3.8–9.3]	5.0 [3.0–6.0]	5.0 [2.0–8.0]	.160

a Median.

b Interquartile range.

c Number of participants.

d Proportion.

e One US dollar is roughly equivalent to 150 yen.

*Cells with a frequency of zero were excluded from the analysis.

Table 4. Comparison of current concerns and issues among groups when feeling suicidal

	Intention for both Options	AI Chat only	Human Chat only	No Intention for either Option	p-value
Financial problems / Multiple debts (n = 135)	36 ^a (26.7) ^b	3 (2.2)	8 (5.9)	88 (65.2)	.002
Unemployment / Job dismissal (n = 171)	34 (19.9)	8 (4.7)	14 (8.2)	115 (67.3)	.087
Drug addiction (n = 18)	5 (27.8)	0 (0.0)	0 (0.0)	13 (72.2)	.458
Alcohol addiction (n = 38)	9 (23.7)	2 (5.3)	1 (2.6)	26 (68.4)	.391
Gambling addiction (n = 27)	7 (25.9)	1 (3.7)	0 (0.0)	19 (70.4)	.321
Sexual violence (n = 18)	4 (22.2)	1 (5.6)	0 (0.0)	13 (72.2)	.564
Domestic violence (n = 25)	5 (20.0)	0 (0.0)	4 (16.0)	16 (64.0)	.102
Sexuality-related concerns (n = 46)	16 (34.8)	0 (0.0)	2 (4.3)	28 (60.9)	.006
Others (n = 203)	35 (17.2)	10 (4.9)	20 (9.9)	138 (68.0)	.015
None (n = 561)	68 (12.1)	19 (3.4)	23 (4.1)	451 (80.4)	<.001

^a Number of participants.^b Proportion.

4. Discussion

4.1. Main findings

This online survey examined the intentions of adults with severe psychological distress to use chat-based crisis support provided by either humans or AI. Of the participants, 74.8% did not intend to use either option when feeling suicidal. The proportions intending to use AI-based and human-based chat were 19.5% and 21.3%, respectively. Men (3.6%) were less likely than women (7.8%) to intend to use only human-based chat. Intentions to use human- or AI-provided chat-based crisis support differed according to participants' current concerns and issues.

Of the participants, 766 (74.8%) did not intend to use chat-based crisis support provided by either humans or AI when feeling suicidal.

People prefer different sources of support when facing a suicidal or mental health crisis, such as crisis lines, mental health professionals, and friends or family²⁵. Therefore, some participants may have preferred other sources or non-chat forms of crisis support. Systematic reviews have also shown that stigma is a barrier to help-seeking²⁶ and that privacy concerns are a barrier to engagement with digital mental health interventions²⁷. Future studies could explore why participants chose neither option and whether they preferred other forms of crisis support.

4.2. Implications

Of the participants, 40 (3.9%) intended to use only AI-based chat when feeling suicidal. Men (3.6%) were less likely than women (7.8%) to intend to use only human-based chat when feeling suicidal. Despite their high risk of suicide,

men are less likely to use crisis support⁵. Traditional masculine norms²⁸ and stigma²⁹ may contribute to lower help-seeking among men. A judgment-free AI chatbot may help reduce these psychological barriers³⁰, as demonstrated in a previous study showing that implementing a self-referral AI chatbot increased referrals to mental healthcare services, with particularly pronounced increases among minority groups experiencing high stigma³¹. These findings imply that diversifying communication channels for crisis support, including AI chatbots, might expand opportunities for help-seeking, especially among men.

Depending on the concerns and issues experienced by individuals, intentions to use chat-based crisis support differed between human- and AI-provided services. These findings suggest that the issues people face may be related to whether they intend to use human- or AI-provided chat-based crisis support. However, these analyses were exploratory and hypothesis-generating. Future studies could directly assess the reasons for participants' responses and conduct prespecified subgroup analyses using multivariable models to examine associations between intentions and sociodemographic characteristics, suicide-related characteristics, and types of concerns.

The WHO has published warnings regarding the ethical concerns and risks of inadequate support when using AI in crises, citing a case in Belgium wherein an individual died by suicide after interacting with an AI chatbot³². AI-based mental health interventions can trigger past traumatic experiences and lead to symptom exacerbation³³ in addition to generating inappropriate responses³⁴. Organizations deploying AI-based crisis support must assess potential user issues and understand the associated risks in advance.

4.3. Limitations

The present study had several limitations. First, this study assessed intentions rather than actual behaviors. The items measuring "intention to use chat-based crisis support" were adapted from previous research but they are not standardized

scales. In addition, the binary response format could not distinguish between participants who strongly intended to use chat-based crisis support and those who were hesitant. Second, all data were self-reported, limiting response accuracy, and we conducted an attention check to improve data quality. Third, participants were recruited from a single internet survey company in Japan. Their suicidal ideation scores were lower than those of actual crisis support users³⁵, suggesting that their help-seeking intentions may have been underestimated. Thus, it is unclear whether these findings apply to people in more severe suicidal crises or at imminent risk of suicide. Fourth, this survey was conducted in November 2023. Public attitudes toward AI may change quickly as the technology rapidly evolves. The intentions reported in this study reflect the situation at that time. Finally, it is unclear how broadly the present findings can be generalized to populations other than the Japanese participants in this study, considering the cultural differences in help-seeking³⁶.

5. Conclusion

Our web-based survey suggests that 74.8% of individuals with severe psychological distress did not intend to use chat-based crisis support when feeling suicidal, whether provided by a human or an AI. The proportions intending to use AI-based and human-based chat were 19.5% and 21.3%, respectively. Therefore, diversifying communication channels for crisis support may expand opportunities for help-seeking.

Declarations

Acknowledgements

We would like to thank Editage (www.editage.jp) and ChatGPT for English language editing.

Conflict of interests

Hajime Sueki declares honoraria from Specified Nonprofit Corporation OVA related to the subject matter of this manuscript. The other authors declare no conflict of interest.

Funding

No funding was received to assist with the preparation of this manuscript.

Ethics approval

The Ethics Committee of Wako University (2023_0926) approved this study.

Consent to participate

Informed consent was obtained from all individual participants included in the study.

Data availability

All data produced in the present study are available upon reasonable request to the corresponding author.

Authors' contributions

Daisuke Nakamura: conceptualization, data curation, formal analysis, project administration, validation, visualization, writing – original draft, writing – review & editing.

Hajime Sueki: conceptualization, formal analysis, supervision, writing – review & editing.

Jiro Ito: conceptualization, project administration, writing – review & editing. All authors approved the final version of the article.

References

- World Health Organization. Suicide worldwide in 2019 [online], <https://www.who.int/publications/i/item/9789240026643> (2021, accessed 31 January 2025).
- World Health Organization. Comprehensive Mental Health Action Plan 2013-2030 [online], <https://www.who.int/publications/i/item/9789240031029> (2021, accessed 31 January 2025).
- World Health Organization. Preventing suicide: A global imperative [online], <https://www.who.int/publications/i/item/9789241564779> (2014, accessed 30 January 2025).
- McClellan SR, Hunt M, Olsho LEW, et al. Satisfaction and mental health outcomes associated with a large regional helpline. *Community Ment Health J* 2022; 58: 1214–1224.
- Brody C, Star A, Tran J. Chat-based hotlines for health promotion: a systematic review. *MHealth* 2020; 6: 36.
- Gould MS, Chowdhury S, Lake AM, et al. National Suicide Prevention Lifeline crisis chat interventions: Evaluation of chatters' perceptions of effectiveness. *Suicide Life Threat Behav* 2021; 51: 1126–1137.
- Sueki H, Takahashi A, Ito J. Changes in Suicide Ideation Among Users of Online Gatekeeping Using Search-Based Advertising. *Arch Suicide Res* 2023; 27: 1339–1350.
- The Substance Abuse and Mental Health Services Administration. 988 APPROPRIATIONS REPORT [online], <https://www.samhsa.gov/sites/default/files/988-appropriations-report.pdf> (2021, accessed 31 January 2025).
- Zhong W, Luo J, Zhang H. The therapeutic effectiveness of artificial intelligence-based chatbots in alleviation of depressive and anxiety symptoms in short-course treatments: A systematic review and meta-analysis. *J Affect Disord* 2024; 356: 459–469.
- Maples B, Cerit M, Vishwanath A, et al. Loneliness and suicide mitigation for students using GPT3-enabled chatbots. *npj Mental Health Research* 2024; 3: 4.
- Yip PSF, Chan W-L, Chan CS, et al. The Opportunities and Challenges of the First Three Years of Open Up, an Online Text-Based Counselling Service for Youth and Young Adults. *Int J Environ Res Public Health*; 2021; 18: 13194.
- Hopkins D, Rickwood DJ, Hallford DJ, et al. Structured data vs. unstructured data in machine learning prediction models for suicidal behaviors: A systematic review and meta-analysis. *Front Digit Health* 2022; 4: 945006.
- Sufyan NS, Fadhel FH, Alkhathami SS, et al. Artificial intelligence and social intelligence: preliminary comparison study between AI models and psychologists. *Front Psychol* 2024; 15: 1353022.
- Sorin V, Brin D, Barash Y, et al. Large language models and empathy: Systematic

- review. *J Med Internet Res* 2024; 26: e52597.
15. Ma JS, O’Riordan M, Mazzer K, et al. Consumer Perspectives on the Use of Artificial Intelligence Technology and Automation in Crisis Support Services: Mixed Methods Study. *JMIR Hum Factors* 2022; 9: e34514.
 16. Jagemann I, Stegemann M, von Brachel R, et al. Gender differences in preferences for mental health apps in the general population - a choice-based conjoint analysis from Germany. *BMC Psychiatry* 2024; 24: 682.
 17. Young J, Jawara LM, Nguyen DN, et al. The role of AI in peer support for young people: A study of preferences for human- and AI-generated responses. In: *Proceedings of the CHI Conference on Human Factors in Computing Systems*. New York, NY, USA: ACM, 2024, pp. 1–18.
 18. Alanzi T, Alsalem AA, Alzahrani H, et al. AI-powered mental health virtual assistants’ acceptance: An empirical study on influencing factors among generations X, Y, and Z. *Cureus* 2023; 15: e49486.
 19. Rackoff GN, Zhang ZZ, Newman MG. Chatbot-delivered mental health support: Attitudes and utilization in a sample of U.S. college students. *Digit Health* 2025; 11: 20552076241313401.
 20. Furukawa TA, Kawakami N, Saitoh M, et al. The performance of the Japanese version of the K6 and K10 in the World Mental Health Survey Japan. *Int J Methods Psychiatr Res* 2008; 17: 152–158.
 21. Sakurai K, Nishi A, Kondo K, Yanagida K, Kawakami N. Screening performance of K6/K10 and other screening instruments for mood and anxiety disorders in Japan. *Psychiatry Clin Neurosci* 2011; 65: 434–441.
 22. Ma JS, Batterham PJ, Kølves K, et al. Community expectations and anticipated outcomes for crisis support services-Lifeline Australia. *Health Soc Care Community* 2022; 30: 1775–1788.
 23. Sueki H. Development of a short form of the suicidal ideation scale. *Suicide Prevention and Crisis Intervention* 2019; 39: 94–101.
 24. Ono S, Sueki H, Nakahara T, et al. Upstream approaches for suicide prevention using search-based advertising: A pilot study. *Jpn Psychol Res* 2025; 67: 208–227.
 25. Purtle J, Mauri AI, McSorley AMM, et al. Demographic variation in preferred sources for suicide prevention and mental health crisis services among U.S. adults. *Prev Med Rep* 2024; 47: 102914.
 26. Clement S, Schauman O, Graham T, et al. What is the impact of mental health-related stigma on help-seeking? A systematic review of quantitative and qualitative studies. *Psychol Med* 2015; 45: 11–27.
 27. Borghouts J, Eikley E, Mark G, et al. Barriers to and facilitators of user engagement with digital mental health interventions: Systematic review. *J Med Internet Res* 2021; 23: e24387.
 28. Seidler ZE, Dawes AJ, Rice SM, et al. The role of masculinity in men’s help-seeking for depression: A systematic review. *Clin Psychol Rev* 2016; 49: 106–118.
 29. Wahto R, Swift JK. Labels, gender-role conflict, stigma, and attitudes toward seeking psychological help in men. *Am J Mens Health* 2016; 10: 181–191.
 30. Haque MDR, Rubya S. An Overview of Chatbot-Based Mobile Mental Health Apps: Insights From App Description and User Reviews. *JMIR Mhealth Uhealth* 2023; 11: e44838.
 31. Habicht J, Viswanathan S, Carrington B, et al. Closing the accessibility gap to mental health treatment with a personalized self-referral chatbot. *Nat Med* 2024; 30: 595–602.
 32. World Health Organization. Ethics and governance of artificial intelligence for health. Guidance on large multi-modal models, <https://iris.who.int/bitstream/handle/10665/375579/9789240084759-eng.pdf> (2024, accessed 31 January 2025).
 33. Abdulai A-F. Is generative AI increasing the risk for technology-mediated trauma among vulnerable populations? *Nurs Inq* 2025; 32: e12686.
 34. De Freitas J, Cohen IG. The health risks of

- generative AI-based wellness apps. *Nat Med* 2024; 30: 1269–1275.
35. Ono S, Sueki H, Sakai A, Ito J. Does the suicidal ideation scale predict the incidence of alluding to suicide and/or declaring suicide attempts? *Suicide Prevention and Crisis Intervention* 2024; 44: 90–97.
36. Mojaverian T, Hashimoto T, Kim HS. Cultural differences in professional help seeking: a comparison of Japan and the U.S. *Front Psychol* 2012; 3: 615.
- (Received March 30, 2026; accepted August 28, 2026)