



(REVIEW ARTICLE)



## Results of professional interventions of gatekeeper training programs for college student suicide prevention: A systematic review

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### Abstract

**Background:** Suicide has been acknowledged as an extreme psychiatric emergency that must be treated with immediate prevention efforts. It is the second leading cause of death among college students aged 15-29. To this day, mental health issues decrease students' academic achievement—while less help and treatment are given. This review aims to identify the available literature regarding professional interventions for campus suicide prevention, and preferences for suicide crisis service support options among college students.

**Method:** Data were based on Scopus, Science Direct, Wiley, and EBSCO using some keywords such as intervention, suicide prevention, and college student. This review applied Preferred Items for Systematic Review and Meta-Analysis (PRISMA) to analyze 15 articles extracted from the database with a specific criterion published in the last five years (2018-2022).

**Results:** The results point out that an effective intervention to prevent suicide among college students is a gatekeeper training program. Gatekeeper training programs by providing mental health lectures and lectures, discussions, role plays, online open course modules, and messages via email or telephone involving lecturers, staff, campus security, and students provide positive results in efforts to prevent suicide. Students most frequently choose social assistance—that is, help from friends, parents, and lecturers—as well as counseling or psychiatric treatments for their mental health needs.

**Conclusion:** Providing mental health information to gatekeepers through lectures, discussions, role-play training, online open course modules, and messages via email or telephone involving lecturers, staff, campus security, and students has provided positive results in suicide prevention efforts.

**Keywords:** Intervention; Counseling; Gatekeeper; Suicide Prevention; College students

### 1. Introduction

Suicide has been acknowledged as an extreme psychiatric emergency that must be treated with immediate prevention efforts. Globally, the number of deaths due to suicide is approaching 800,000 cases per year, or one death every 40 seconds. Of one person who dies by suicide, it is estimated that there are 20 cases of suicide attempts. Suicide is the second leading cause of death in the 15-29 age group. 79% of cases occur in countries with low and secondary education (Ministry of Health of the Republic of Indonesia, 2019). Generally, suicide is done by ingesting pesticides, hanging oneself, and using firearms (WHO, 2021). College students are a group of young adults with certain opportunities for mental disorders and are at high risk of suicide (Poorolajal et al., 2017). The mental pressure experienced by students can disrupt their behaviour and reduce their learning motivation, resulting in negative consequences such as decreased

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academic performance. A study by Tessema et al. (2019). found that among the research participants, 59 individuals (22.30%) exhibited symptoms of mental disorders. It was also observed that female students were 2.09 times more likely to experience mental disorders compared to their male counterparts. Furthermore, students with a cumulative grade point average (GPA) below 60% were 4.69 times more likely to experience mental disorders.

Suicidal ideation has been associated with emotional disturbances and various factors, including heterosexual and homosexual relationships, smoking, substance abuse, mental disorders, lack of interest in the discipline, and hopelessness about the future. According to a study conducted by Poorolajal et al. (2017), out of 1254 surveyed students, 146 individuals (11.7%) reported suicidal ideation within the past year, while 63 individuals (5%) had attempted suicide at least once during the same period (Poorolajal et al., 2017).

Issues contributing to suicidal ideation among students include health issues, psychological disorders, family factors, sexual harassment, adolescent delinquency, friendship problems, economic challenges, academic difficulties, and personality factors. When these problems are not promptly and adequately addressed, coping strategies and barriers to seeking help plays a role in the emergence of suicidal ideation (Mukaromah, 2020). Findings of previous studies reveal that few at-risk students receive assistance or treatment. The most common barriers experienced by students in seeking mental health services are the perception that treatment is unnecessary (66%), lack of time (26.8%), preference for self-management (18%), and stigma (12%) (Cyz et al., 2013).

Many factors influence suicide prevention on campus. One alternative solution to prevent suicide on campus is through professional intervention with gatekeepers involving lecturers, staff, campus security, and students, providing positive results in suicide prevention efforts. Therefore, this systematic review purposes to identify the available literature regarding professional interventions for campus suicide prevention, and preferences for suicide crisis service support options among college students.

## 2. Methods

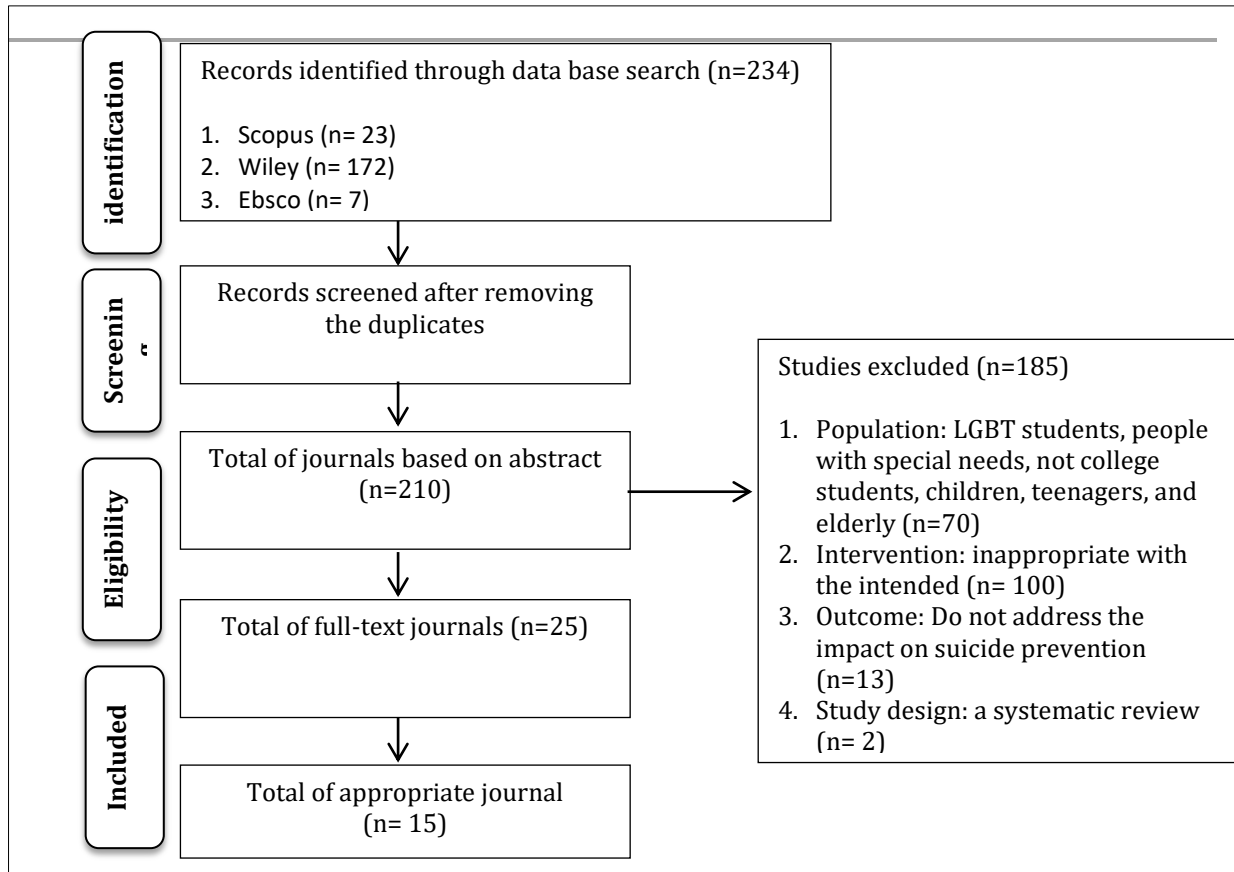
Researchers searched for electronic databases, study selection, data extraction, and systematic review of studies published in the last five years (2018-2022) through several online databases, namely Scopus, Science Direct, Wiley, and EBSCO. We restricted searching by using some keywords, namely intervention, suicide prevention, and college student. All selected studies are written in English.

### 2.1. Inclusion and exclusion criteria

We searched for previous studies with the following inclusion criteria; all studies with gatekeeper intervention as suicide prevention, college students, and young adults. The given interventions were all preventions with gatekeeper, with or without comparison. The outcome was suicide prevention with gatekeeper as intervention has positive and significant impact on suicide prevention. Numerous methods were examined, such as quantitative, namely cross-sectional, longitudinal design, pre-experiment one group post-test, pilot study, experiment, randomized controlled trial (RCT), exploratory pilot study, quasi-experimental and qualitative. Meanwhile, the exclusion criteria are LGBT (lesbian, gay, bisexual, transgender) students, people with special needs, not college students, children, teenagers, and elderly, interventions except gatekeeper, no exclusion for this intervention comparison, no gatekeeper discussion in the outcome, and study options are but in English.

### 2.2. Data extraction and quality assessment

The first reviewer did data extraction and later checked by the second reviewer. The researchers used the standard form to extract the data independently. Fifteen relevant studies were selected to meet the determined criteria. The extracted data added the respondents' characteristics, the intervention's characteristics, and the results ranking. Figure 1 illustrates searching and selecting studies under the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Polit & Beck, 2018). The authors searched for studies in databases and collected relevant literature based on topic and title identification, checked for duplicates, independently screened abstracts, obtained full-text articles, included studies in English, and analyzed the results of various interventions used in the literature. The authors used keywords for the databases, resulting in 15 studies from 23 Scopus that met the inclusion criteria 5 articles. Seven journals from Ebsco were included, which consisted of six articles. One hundred seventy-two articles from Wiley were reviewed, with two journals meeting the criteria. Additionally, 32 articles from Science Direct were considered, with two journals meeting the criteria. Therefore, a total of 15 journals were included for analysis in this systematic review. The search selection results are explained in Figure 1.



**Figure 1** Search and Study Selection Results

### 3. Results

The following studies were published in 2017-2022. The methods used varied: quasi-experiments, RCTs, exploratory pilot studies, cross-sectional, longitudinal, experimental, and qualitative. Meanwhile, the highest number of samples reached 1890 individuals, while the lowest number of respondents was 20. The general characteristics of the 15 eligible studies are summarized in Table 1.

**Table 1** Summary of analyzed literature review

NO	Judul dan Author	Population	Intervention	Comparison	Outcome Measure	Result	Study Design
1	A brief peer gatekeeper suicide prevention training: Results of an open pilot trial (Rallis et al.,2018)	n= 231 students recruited from diverse university campuses in the Central United States. The largest sample is female (70.6%)	Gatekeeper training was conducted in a 4-hour workshop delivered by a staff member of the University's counselling centre who developed the gatekeeper training program through didactic presentations and role-plays. A 3-month follow-up, by email, phone call, and/or text message, was sent to them with instructions to complete the assessment remotely.	-	14-item perceptual knowledge questionnaire for gatekeeper evaluation (Tompkins & Witt, 2009; Wyman et al., 2008) Scores can range from 0 to 140	This short-lived peer-to-peer suicide gatekeeper training program was associated with increased knowledge of suicide prevention. It was also linked to an increase in the number of students identifying suicidal youth and making mental health referrals and the number of referrals made over three months. It reported that Women showed greater improvement in suicide prevention skills and post-training knowledge than men.  The correlation between baseline and change scores of each outcome ranged from .50 to .85, and all were significant, using the McNemars chi-square test	Open pilot trial
2	Evaluation of a Brief Suicide Prevention Training Program for College Campuses (Zinzow et al., 2020)	n=517 students, staff, instructors/faculties, and campus admins	Gatekeeper training, role-playing, increasing knowledge and changing attitudes, and an experiential component that focuses on developing		Suicide Knowledge and Self-Efficacy assessment modified from the Suicide Intervention Training Assessment (SITA; Pasco et al., 2012).  Measures frequency of Suicide Prevention Behaviors. Eight items from Campus Version of Utilization of Training	ANOVA demonstrated knowledge, self-efficacy for discussing suicide and referring to resources, and gatekeeper behaviour increased from pre-test to post-test and upward follow-up.	Longitudinal design

			communication skills with potentially at-risk students. Participants were recruited through in-person presentations, pamphlets, and e-mails. Three months of follow-up & prizes for participation incentives.		and Preservation Survey (Garrett Lee Smith Memorial Campus Suicide Prevention Program; 2017)		
3	Evaluation of a Peer-Led Implementation of a Suicide Prevention Gatekeeper Training Program for College Students (Samuolis et al., 2020)	n=161 students	Support for peer-led implementation models as gatekeeper trainers and certified peers		Arthritis Impact Measurement Scale (AIMS) (Meenan) Short Portable Mental Status Questionnaire (SPMSQ) (Pfeiffer) Suicide Idea Questionnaire (SIQ) (Reynolds)	Paired sample t-tests showed significant improvement from the pre-test to the post-test on three interest outcomes – knowledge of suicide, self-efficacy for intervening with a suicidal individual, and the likelihood of intervening with a suicidal individual.	Quantitative
4	An Investigation of Gatekeeper Training and Self-Efficacy for Suicide Intervention Among College/University Faculty (Sylvara & Mandracchia, 2019)	n = 507 colleges of higher education across the US obtained through an online survey tool. Participants consisted mostly of professors, and all had completed some level of graduate school	Gatekeeper investigation		Arthritis Impact Measurement Scale (AIMS) (Meenan) Global Assessment of Functioning Scale (GAF)	The results of a survey of their institutions do not provide gatekeeper training. Participants who have received gatekeeper training are more confident in identifying and assisting at-risk students.	Cross-sectional

5	Using the PRECEDE-PROCEED model for an online peer-to-peer suicide prevention and awareness for depression (SPAD) intervention among African American college students: an experimental study (Bridges et al., 2018)	n=329 n=29 peer educators. Student behaviour, n=300 trained by peer educators.	Culturally appropriate online peer-to-peer PRECEDE-PROCEED model for students		Process evaluations are calculated based on program attendance, online platform reports, and peer educator satisfaction surveys. Module content, module design, module activities, facilitation by peer educators, course speed, learning from the course, and course usability were measured	There were statistically significant improvements in attitudes related to depression as a disease (P=0.003; $\eta^2=0.39$ ), attitudes about managing depression (P=0.0001; $\eta^2=0.30$ ), skills (P=0, 0001; $\eta^2=0.41$ ), reinforcing factors (P=0.018; $\eta^2=0.13$ ), supporting factors (P=0.0001; $\eta^2=0.31$ ), and behaviour (P =0.016; $\eta^2=0.14$ )	There are two designs: 1. Pre-experimental on peer educators (pre-test, post-test, and one-month follow-up.) 2. Pre-experiment One group post-test only (measures the knowledge of students who are trained peers)
6	Kognito's Avatar-Based Suicide Prevention Training for College Students: Results of a Randomized Controlled Trial and a Naturalistic Evaluation (Lumenthal, 2019)	Study 1 & 2 n=51 New and sophomore students (Bachelor's Students) Cognito group n=27, control group without intervention n=24 Majority of women	Cognito Study 1 Trainee interact with virtual peers and are presented with a menu of options for interaction and directed to identify associates who may be at risk by engaging peers in dialogue, deciding whether referral for mental health assistance is necessary, and making and facilitating	control group	Cognito evaluation and scale from the QPR study characterized by Wyman et al. (2008). Study 1 tested the cognitive efficacy of gatekeeper preparations measured with five items from the previous Cognito study and two items from Wyman et al. (2008) Study 2 Help-seeking behaviour of trainees Cognito/gatekeeper efficacy measured by four items from Wyman et al. (2008).	Study 1, the change between groups in the attitude of the large gatekeepers within two months. Cognito trainees referred more peers at the 2-month follow-up (Cohen's d = .56, p < .05) - training four students in Cognito resulted in 1 more referred peer. In Study 2, the help-seeking rate of Cognito trainees (14.4%) was double the rate (6.8%) of untrained students (p < .001); training 14 students in Cognito led to 1 self-referral back to the Counseling Center.	randomized controlled trial

			referrals for help. Studi 2: melacak perilaku mencari bantuan				
7	The Suicide Prevention for college student gatekeepers program (Ross et al., 2021)	n=65 students	Gatekeeper training, Suicide prevention decision making. Participants were presented with scenarios that described individuals who might be at risk for suicide and asked to choose the best response from three options: (1) encouraging positive self-care and coping skills; (2) asking him about suicidal thoughts, plans, access to means, and intentions; or (3) seek professional help immediately by calling emergency services.  The program includes lectures, discussions, and role plays and is presented in a live group format.		Gatekeeper skills. The Gatekeeper Behavior Scale (Albright, Davidson, Goldman, Shockley, & TimmonsMitchell, 2016) was included to assess feelings of self-efficacy related to gatekeeping skills.	There was a significant increase in suicide prevention self-efficacy in post-training compared to pre-training. Stigmatization of beliefs about suicide significantly changed in the desired direction post-training.  A significant increase in the percentage of items they answered correctly on information about suicide measures in the post-test  Students show increased knowledge about suicide and decreased stigma. Finally, students show a high program acceptance rate.	A pilot Study

8	Effectiveness of an online suicide prevention program for college faculty and students (Smith-Millman et al., 2020)	n=:310 170 students and 140 college staff from 24 universities	Cognito training is provided. Cognito, developed in 2010, is an online gatekeeper training with various modules for different populations.		The Gatekeeper Behavior Scale (Albright, Davidson, Goldman, Shockley, & Timmons-Mitchell, 2016).  To assess participants' self-reported readiness to help students in psychological distress, the likelihood that they would help those experiencing it, and their self-efficacy in helping those in it.	Both college staff and students showed significant increases in Preparedness, Likelihood, and Self-Reported Efficacy in gatekeeper attitudes. However, only students showed statistically significant behavioural impact as both were more likely to ask about suicide and refer peers for counselling.	Experiment
9	The effectiveness of QPR suicide prevention training (Aldrich et al., 2018)	n=79 participants; 28 undergraduate students, 21 as college faculty members (i.e. professors, instructors), 28 as staff members (i.e. administrative assistants, office employees), and 2 participants did not respond	QPR training with gatekeepers. The training includes PowerPoint presentations, videos, discussions and question-and-answer periods. The post-test was completed online after the training. A suicide hotline number was provided during the survey and training.		The Willingness to Intervene against Suicide questionnaire (WIS; Aldrich et al., 2014) was developed based on the TBP (Ajzen, 1985) and comprised four subscales measuring attitudes, subjective norms, PBC and intention to intervene.	QPR training significantly increased attitudes, subjective norms, and perceived behavioural control regarding suicide intervention and intention to intervene. It is also effective at increasing intent to enquire, persuade and refer (QPR's three core goals)	Experiment
10	Pilot study evaluation of suicide prevention gatekeeper training utilizing STORM in	n= 20 (students, counsellors, security staff, support service managers, lecturers)	The STORM® intervention (Skills Training on Risk Management) is		Filmed interview: Participants perform a 10-minute role-play with actors playing a potentially suicidal	Showed significant improvement in scores measuring skills, attitudes and confidence/confidence,	Exploratory pilot study



	a British university setting (Gask et al., 2017)		an example of gatekeeper training that incorporates didactic as well as interactive methods and behavioural rehearsal		'student'. Filmed interviews were then rated using the rating tool, which had been developed for previous research (Morriss et al., 1999); attitudes were assessed using the Attitudes for Suicide Prevention Scale (ASPS) (Herron, Ticehurst, Appleby, Perry, & Cordingley, &, 2001)	satisfaction on training, both immediately and three months after the intervention.	
11	Nursing students' extracurricular activity experiences of suicide prevention volunteering: A qualitative study (Yoo et al., 2021)	n= 36 students	Suicide prevention campaign, student gatekeeping experiences on suicide prevention.		Interviews, FGDs with audio recordings	Four sub-themes identified participants' experiences in the study 'Develop sensitivity to the problem of suicide', 'Increase confidence in suicide prevention', 'Gain interest in mental health nursing', and 'Learn basic practical nursing skills' derived from the themes' Prepared for nurses who are competent in mental health nursing.	Qualitative
12	Awareness and preferences about suicide crisis support service options among college students in India: A cross-sectional study (Cherian et al., 2022)	N=1890 students	Awareness of the choice of suicide support		Participants were asked about their preferred crisis support option, i.e. Responses to awareness of support services were dichotomous (yes/no) followed by an inquiry to elicit service options known to them (e.g., Are you aware of the support services available if you are having suicidal thoughts (If yes, what is	Most participants (n = 1633, 86.4%) were unaware of the suicide crisis support options. About 257 (13.6%) participants reported that they knew of some kind of suicide crisis support. In that order, the most frequently listed support options were support from family/relatives/teachers, peer groups, private	cross-sectional survey

					it?) The qualitative responses to this examination were manually coded into categories	counselling, and psychiatric consultation. This is the one they are most likely to use and most comfortable with.  The gatekeeper model was adapted to train teachers and peers to recognize key behavioural danger signs indicating an increased risk of suicide among students and refer them for appropriate professional assistance.	
13	Effectiveness of suicide prevention gatekeeper training for university teachers in Japan (Hashimoto et al., 2021)	N=81 lecturers from Hokkaido University's Sapporo Campus; 63 participants received mental health lectures (MHL), 18 participants received the GKT program	Gatekeeper training; consists of two parts: a 30-minute mental health lecture and a 2-hour role-play session.  In the role-play session, we gave didactic lectures on basic gatekeeper skills based on the Mental Health First Aid program, then presented videos showing good and bad gatekeeper behaviour, and small groups did the roles and	Get public mental health lectures (MHL)	The Suicide Intervention Response Inventory (SIRI) (Neimeyer & Bonnelle, 1997), specifically the shortened version of the Japanese version of SIRI (SIRIS-JS) (Kawashima & Kenji, 2012) was selected to measure competence in the management of students who commit suicide.  The questionnaire items were adopted from first aid guidelines for suicide in Japan (Fujisawa et al., 2013) to assess their level of adherence to recommended gatekeeper behaviour when dealing with suicidal students (10 items) as well as their confidence in the management of suicidal	There was a significant increase in competence in managing student suicide in the Gatekeeper Training (GKT) group compared to the Mental Health Lecture (MHL) group. We also found significant increases in self-confidence in managing student suicide and behavioural intention as gatekeepers in the GKT group. Program satisfaction scores were significantly higher in the GKT group than in the MH group.	Quasi experiment

			scenarios of what happened.		students and students with mental health problems (2 items).		
14	The “Talk-to-Me” MOOC intervention for suicide prevention and mental health education among tertiary students: Protocol of a multi-site cross-over randomized controlled trial (Milbourn et al., 2022)	N=80	Massive Online Open Courses, or 'MOOCs, where the course combines course material on the early detection of suicidal behaviour and strategies for suicide crisis intervention. “Talk-to-Me” is supported by a six-stage model for managing a suicide crisis, one of which is assigned a gatekeeper.		Suicide intervention response inventory (SIRI-2). SIRI-2 is a self-report assessment that evaluates participants' ability to recognize appropriate responses to suicide statements—perceived academic stress scale (PASS). PASS evaluates perceptions of academic stress and its sources. General Self-Efficacy Scale (GSE). The GSE is a 10-item self-report measure that assesses self-efficacy—attitudes toward seeking professional psychological assistance scale (ATSPPHS). The ATSPPHS is a 10-item self-report measure that evaluates attitudes toward seeking help for mental health problems.	This pragmatic RCT demonstrates the efficacy of "Talk-to-Me" MOOCs in improving students' ability to respond to suicide and mental health issues compared to a wait-list group.	RCT
15	I CARE Development and Evaluation of a Campus Gatekeeper Training Program for Mental Health Promotion and	N = 452 gatekeeper training workshops were conducted, 182 for students and 270 for staff/lecturers.	Gatekeepers training		The knowledge score is the sum of the correct responses, giving a total knowledge score of 0-3. Readiness to intervene. It was measured by asking participants to rate their agreement with the six statements using a Likert	Quantitative: Knowledge and readiness remained significantly higher than preworkshop for the entire follow-up evaluation period. Qualitative: The main themes regarding interactions with people in	quantitative and qualitative methodologies

	<p>Suicide Prevention (Reiff et al., 2018)</p>				<p>scale ranging from 1 (Strongly disagree) to 7 (Strongly agree), with higher scores indicating a higher level of readiness to intervene. Qualitative data. open-ended questions elicit qualitative information</p>	<p>distress or crisis are categorized as utilizing skills, making directions, emotional comfort and perceived barriers.</p>	
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## 4. Characteristics of respondents

In this study, all respondents were given gatekeeper training on campus. Of 15 studies, the training was given to students, university staff, counsellors/psychologists, security guards, and lecturers. The majority was offered to female students. The literature investigation results in 15 articles, which can be elaborated on two primary topics: gatekeeper intervention and gatekeeper training.

### 4.1. Gatekeeper

Gatekeeper training is conducted in various ways, and peer-to-peer gatekeeper training has shown greater improvement in suicide prevention skills, knowledge, and attitudes towards helping and referring individuals to mental health services (Bridges et al., 2018; Rallis et al., 2018); Samuolis et al., 2020). Additionally, gatekeeper training through extracurricular activities for university students has been qualitatively studied, revealing four sub-themes: "Developing sensitivity to suicide issues", "Increasing confidence in suicide prevention", "Developing an interest in mental health nursing", and "Learning basic practical nursing skills". These sub-themes contribute to the overarching theme of 'Preparedness for competent nurses in mental health nursing' (Yoo et al., 2021).

Gatekeeper training involves not only peers but also university faculty and staff, using the QPR approach, with significant improvements in attitudes, subjective norms, perceived behavioural control regarding suicide intervention, and intentions to intervene and refer (Aldrich et al., 2018). A brief 90-minute gatekeeper training, based on ANOVA results, showed an increase in knowledge, self-efficacy to discuss suicide and refer to resources, as well as gatekeeper behaviours from pre-test to post-test and follow-up (Zinzow et al., 2020). Another study on gatekeeper training using the KoQnito module showed significant improvements in Preparedness, Possibility, and Self-Efficacy among college staff and students (Smith-Millman et al., 2020; Lumenthal, 2019; Bridges et al., 2018). Another study designed gatekeeper training involving student leaders and licensed psychologists, resulting in a significant increase in suicide prevention self-efficacy post-training compared to pre-training (Ross et al., 2021).

Gatekeeper training with mental health lectures and role-playing demonstrated a significant increase in competence in attitudes and managing suicidal students in the Gatekeeper Training (GKT) group compared to the Mental Health Lecture (MHL) group (Hashimoto et al., 2021). Another study employed gatekeeper training through mental health lectures, combined with crisis intervention skills and Counseling and Psychological Services (CAPS), and quantitatively found higher knowledge and preparedness from pre-workshop to all follow-up evaluation periods. Qualitatively, the main themes regarding interactions with individuals in distress or crisis were categorized in terms of skill utilization, giving directions, emotional comfort, and perceived barriers (Reiff et al., 2018). Another study combining gatekeeper training with mental health lectures and Skills Training on Risk Management (STROM) demonstrated significant outcomes (Gask et al., 2017). Gatekeeper training through online open courses using the "talk-to-Me" Mass Open Online Course (MOOC), combining specific content and resources, yielded significant efficacy in enhancing students' ability to respond to suicide and mental health issues (Milbourn et al., 2022).

Based on the 13 studies, generally using presentation media, role-playing through video creation, and modules, gatekeeper training significantly enhances abilities in knowledge, skills, preparedness for assisting, and referral to professional mental health services in suicide prevention efforts (Rallis et al., 2018; Zinzow et al., 2020; Lumenthal, 2019; Aldrich et al., 2018; Gask et al., 2017; Milbourn et al., 2022). In another study, providing video examples of both good and poor gatekeeper behaviours significantly improved abilities (Hashimoto et al., 2021).

### 4.2. Preferences for suicide crisis support services

A survey on awareness and preferences for suicide crisis support services among university students found that the most frequently mentioned support options were supported by family/friends/teachers, peer groups, personal counselling, and psychiatric consultation, in that order. These options were deemed the most likely to be used and the most comfortable for the students. These findings highlight the significance of gatekeeper models in providing such services (Cherian et al., 2022). Another survey, conducted among 507 universities across the United States, investigated the participants, mainly professors. It found that those who received gatekeeper training felt more confident identifying and assisting at-risk students (Sylvava & Mandracchia, 2019).

Based on the interventions found and the survey results on gatekeeper interventions, positive outcomes were reported by respondents in suicide risk prevention efforts. The majority of interventions were delivered using gatekeepers through methods such as mental health lectures, discussions, role-playing, modules, and messages via email or telephone. Researchers are interested in exploring a Digital-Based Suicide Risk Prevention Program model in higher

education. This digital application includes modules, early detection instruments for suicide risk, chat and email functions, a helpline for inquiries, video role-playing, standard operating procedures for interviews, suicide risk management skills, and referral links to mental health services for suicide prevention efforts. The digital application is designed to be as engaging as possible to ensure the training program yields maximum results and to encourage enthusiastic participation from respondents who can help students at risk of suicide.

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## 5. Discussion

This systematic review synthesizes the literature on suicide prevention among college students from 15 studies. Six gatekeeper studies were conducted with students, staff, faculty members, security personnel, and psychologists (Zinzow et al., 2020; Sylvara & Mandracchia, 2019; Ross et al., 2021; Aldrich et al., 2018; Gask et al., 2017; Reiff et al., 2018). Nine gatekeeper studies specifically focused on students (Rallis et al., 2018; Samuolis et al., 2020; Bridges et al., 2018; Lumenthal, 2019; Ross et al., 2021; Yoo et al., 2021; Cherian et al., 2022); Hashimoto et al., 2021; Milbourn et al., 2022). Most gatekeeper training programs were provided to students because they have more extensive interactions with their peers who may be at risk of suicide. By interacting closely with fellow students, they can observe verbal and nonverbal changes in their mental health, particularly related to suicide risk. This is supported by the Schlagbaum et al. (2021) study, which emphasizes the significance of peer affiliation in identifying and preventing suicidal behaviours. Students are valuable gatekeepers in suicide prevention efforts among their peers. Furthermore, involving student gatekeepers aligns with the findings of Khadijah et al. (2021), who discovered that students prefer confiding in their peers rather than their parents or faculty members when faced with personal issues.

The followings are interventions of suicide prevention found in 15 studies:

### 5.1. Gatekeeper

Gatekeepers are individuals in a position to help during a crisis and recognize warning signs of suicide. Gatekeeper training is conducted in various ways, including using peers as educators who provide short training sessions to groups of 10 or more students, reaching up to 300 students. The training consists of four modules, with a task assigned at the end of each module. The training lasts for four weeks and is conducted online. Peer educators are given two weeks to deliver interventions to their ten peers (Bridges et al., 2018). This approach is similar to the study by Rallis et al. (2018), which utilized a brief four-hour gatekeeper training with peers using didactic presentations and role-playing, followed by a three-month follow-up period via email, telephone, and messages to assess progress. Peer-to-peer gatekeeper training employs the Question, Persuade, and Refer (QPR) method (Samuolis et al., 2020). Gatekeeper training involves peers, university lecturers, and staff using QPR. The training is conducted separately from the students. It is voluntary training for the faculty, staff, and students recruited through internal advertisements, announcements, and emails. QPR gatekeepers are trained to approach individuals they believe may be displaying signs and symptoms of suicide. They provide support, offer reassurance, and instil hope by encouraging them to seek professional help using the QPR approach. This involves asking about suicidal thoughts, using persuasive communication to encourage help-seeking, and providing referrals to connect individuals with professional services (Aldrich et al., 2018).

Another study demonstrates gatekeeper training that utilized the Koqnito modules, each taking approximately 45-60 minutes to complete. The Koqnito modules were designed for staff and students and implemented in a virtual environment. Participants were assigned to engage in conversations with a struggling student dealing with anxiety, depression, and suicidal ideation. They could complete the modules upon demonstrating appropriate responses and referring the student to the campus counselling centre. The counselling director and university administration distributed shared information throughout the campus using the Koqnito modules. The modules also provided suggestions for campus recruitment through email, health fairs, web postings, and bookmark development (Smith-Millman et al., 2020; Lumenthal, 2019; Bridges et al., 2018).

In another study, gatekeeper training was conducted using the Koqnito module. Each module had a duration of 45-60 minutes. The Koqnito module consisted of two versions—one for staff and one for students—and was implemented in a virtual environment. Participants were assigned to converse with a struggling student with anxiety, depression, and suicidal ideation. They could complete the module after responding appropriately to their peer and referring them to the campus counselling centre. The counselling director and university administration distributed the Koqnito module across the campus, sharing information and recommendations. The module also provided suggestions for campus recruitment through email, health exhibitions, web postings, and bookmark development (Smith-Millman et al., 2020; Lumenthal, 2019; Bridges et al., 2018).

Another study on gatekeeper training involved student leaders and licensed psychologists. They provided information to students about suicide warning signs and how to intervene when there is a risk of suicide. The method used was a lecture by the psychologist, which consisted of three phases: 1) the first phase focused on suicide statistics, debunking common myths about suicide with evidence-based literature, explaining suicide warning signs and risk factors, 2) teaching helping skills, and 3) role-playing exercises with alternating scenarios, acting as a gatekeeper and as a student contemplating suicide, for 90 minutes. This research emphasized discussion and role-playing to support student learning and engagement. The training was conducted over one semester (Ross et al., 2021).

Gatekeeper training through extracurricular activities for university students involves key interview questions to assess their experiences with suicide prevention as gatekeepers. These questions include inquiring about the gained knowledge from participating in extracurricular activities, the best parts of the activities, changes experienced through voluntary involvement, and whether it has altered awareness or thinking about suicide (Yoo et al., 2021). Gatekeeper training also includes lectures on mental health, providing basic gatekeeper skills based on the mental health first aid program, suicide intervention, and behavioural intentions as gatekeepers. Role-play videos are used as teaching materials (Hashimoto et al., 2021). Another study utilized a similar approach, incorporating mental health lectures, psychoeducation, crisis intervention skill learning, and introducing referrals to professional services through existing resources on campus, such as the Counseling and Psychological Services (CAPS) (Reiff et al., 2018). This gatekeeper training program, "I Care," is offered in two formats: a full-day, seven-hour training or a hybrid format comprising online modules followed by a three-day workshop.

Gatekeeper training is conducted through an online open course using the "talk-to-Me" Mass Open Online Course (MOOC), which combines specific materials and resources. This training consists of six stages, each with its module, resulting in six modules. The six modules contain various case studies, videos, quizzes, information, and basic techniques to enhance suicide prevention literacy. The sixth stage focuses on gatekeeper training, including recognizing suicide crisis risk factors, and statistics, debunking suicide myths, case studies of students in crisis, explaining strategies and alternatives for responding to mental crises and facilitating collaborative professional care (Milbourn et al., 2022).

In another study, gatekeeper training utilized the STROM model, which consists of two modules: understanding self-harm and suicide risk assessment and immediate risk management, planning, and safety. This training involved four stages: a brief lecture, discussions, role-playing, and mutual reflection and feedback among participants (Gask et al., 2017).

Based on the various gatekeeper interventions mentioned above, they have shown positive effects in suicide prevention among students. This is supported by systematic reviews conducted by Wolitzky-Taylor et al. (2019) and Yonemoto et al. (2019), which found significant improvements in knowledge, skills, and self-efficacy in universal suicide prevention interventions, particularly through gatekeeper training. The most widely implemented gatekeeper training program, QPR, has demonstrated positive outcomes in both short-term and long-term perspectives, including increased knowledge and confidence in utilizing QPR (Litteken & Sale, 2018).

Gatekeeper training provided to community facilitators such as teachers, professors, nurses, and social workers has resulted in increased knowledge about suicide, improved ability to identify individuals in distress, enhanced self-confidence in basic helping skills for suicide risk, and greater comfort in intervening and providing referrals to professional services (Coppens et al., 2014). Gatekeeper training within campus environments, involving faculty members, peers, university support staff, and designated counsellors, has shown similar benefits due to significant face-to-face interactions with at-risk students (Burnette et al., 2015).

## **5.2. Preferences for suicide crisis support services**

A cross-sectional survey was conducted, inviting students from three major universities in India, with 1,890 participants. The survey aimed to explore awareness and preferences regarding suicide crisis support services among students. It was found that the most preferred mental health services among students were counselling/psychiatry services and social support from faculty members, parents, and friends. These services were implemented with a gatekeeper model (Cherian et al., 2022). Another survey investigated 507 universities across the United States through an online survey tool. The participants, mostly professors, reported believing in the role of faculty members in identifying at-risk students for suicide. They expressed that with gatekeeper training, they would feel more confident in identifying and assisting at-risk students. However, many reported that their universities needed to provide gatekeeper training (Sylvava & Mandracchia, 2019).

The survey on suicide prevention services with gatekeepers is also supported by another study by Pullen, Gilje, & Tesar (2016). They found significant quantitative data ( $p < 0.000$ ) indicating a positive ranking of the overall gatekeeper training among undergraduate nursing students in their response to evidence-based suicide prevention programs. Qualitatively, the main theme identified was the ability to intervene with individuals at risk of suicide. The students responded very positively to the gatekeeper training program. The instructional activities discussed various national initiatives and strategies within the nursing curriculum, empowering students to engage in suicide prevention interventions.

### *Limitation*

Because all study designs were included, this literature evaluation was extremely diverse. Not every study uses the same definitions or timeframes for data analysis, nor do they all collect data in the same way.

## 6. Conclusion

Many factors influence suicide prevention on campus. Professional interventions to prevent suicide on campus are more fully described through a systematic literature review. Gatekeeper training programs should be used to increase knowledge, skills, and readiness for assisting and referring suicidal patients to professional mental health services. Providing mental health information to gatekeepers through lectures, discussions, role-play training, online open course modules, and messages via email or telephone involving lecturers, staff, campus security, and students has provided positive results in suicide prevention efforts. The mental health service support most often chosen by students is counseling/psychiatric services and social support from lecturers, parents, and friends.

## Compliance with ethical standards

### *Disclosure of conflict of interest*

The authors declare no conflict of interest.

### *Authors' Contributions*

**Martono Martono & Siti Khadijah:** conception, design, data collection, manuscript preparation, and critical revision.

**Koko Wahyu Tarnoto:** conception, design, and approval of publication, critical revision.

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