



## STUDY PROTOCOL

# REVISED Suicide prevention program (SPP) in South Asian Countries: A protocol for systematic review [version 2; peer review: 2 approved, 1 approved with reservations]

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## Abstract






**Introduction:** Every year, over 700,000 individuals lose their life by suicide and many individuals attempt suicide. Suicide occurs in all age groups and is the fourth major cause of death among 15–29-year-olds globally in 2019. A suicide prevention program (SPP) is a capacity-building program that helps gatekeepers to identify the risk of suicide. The objective of the review is to determine the effectiveness of SPP on the improvement of knowledge, attitude, and gatekeeper behaviour among gatekeepers in South Asian countries so that the number of suicide cases will be reduced among college students in South Asia countries.



**Methods:** The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) will be followed in this review. This review will include all interventional studies (controlled and uncontrolled) that provided a suicide prevention program to the gatekeepers as an intervention. The full-text articles will be included from the following databases, Scopus, PubMed (MEDLINE), Cochrane, PsycINFO, Web of Science, and CINAHL, published in peer-reviewed, and indexed journals from the date of inception to 2022. A grey literature search and hand-search of reference lists of the included studies will also be done. A search strategy will be developed using keywords and MeSH terms for each database. Cochrane ROB-2 tool, JBI Critical Appraisal Checklist will be used to evaluate the quality of individual studies. Analysis of the data will be done using narrative synthesis.

**Conclusions:** This review will provide information on knowledge, attitude, and gatekeeper behaviour toward suicide prevention in college students and will be helpful for the prevention of suicide. Therefore, the authors plan to publish the review outcome through a peer-reviewed journal.

## Open Peer Review

Approval Status   

	1	2	3
<b>version 2</b> (revision) 30 May 2023		 view	 view
<b>version 1</b> 20 Apr 2023	 view	  view	

1. **Sheela Pavithran** , Amrita Institute of Medical Sciences, Kochi, India
2. **Stuart Leske**, The University of Queensland, Toowong, Australia
3. **Katerina Kavalidou** , University College Cork, Cork, Ireland

Any reports and responses or comments on the article can be found at the end of the article.

**Registration :** The review is registered in PROSPERO (CRD42023387020).

### Keywords

systematic review, South Asian countries, college students, suicide prevention, suicide prevention program.



This article is included in the **Manipal Academy of Higher Education gateway.**

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**Author roles:** **Borah K:** Conceptualization, Formal Analysis, Methodology, Supervision, Validation, Writing – Original Draft Preparation, Writing – Review & Editing; **Jose TT:** Conceptualization, Formal Analysis, Methodology, Supervision, Validation, Visualization, Writing – Original Draft Preparation, Writing – Review & Editing; **Mysore Nagaraj AK:** Conceptualization, Formal Analysis, Methodology, Supervision, Validation, Visualization, Writing – Review & Editing; **Moxham L:** Conceptualization, Methodology, Supervision, Validation, Visualization, Writing – Review & Editing

**Competing interests:** No competing interests were disclosed.

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**REVISED Amendments from Version 1**

The authors have modified the abstract, introduction, methods, data synthesis, and discussion based on the reviewer's suggestions in the revised manuscript.

**Any further responses from the reviewers can be found at the end of the article**

**Introduction**

Suicide is a global public health problem in today's world. Worldwide, suicide is the major cause of death in adolescents.<sup>1</sup> Several factors such as biological, psychological, and environmental factors are associated with youth suicide, varying from family issues to rapid urbanization.<sup>2</sup> Childhood abuse (physical, emotional, and sexual) also plays a role in future suicidal ideation among youth.<sup>3,4</sup>

The World Health Organization (WHO) reported that one individual dies by suicide every 40 seconds. Worldwide, every year more than 700,000 individuals take their life by suicide, and many individuals attempt suicide.<sup>5</sup> The UN's Sustainable Development Goal (SDG) 3 is "Ensure healthy lives and promote well-being for all at all ages" and the target SDG 3.4 explains "By 2030, reduce by one-third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being" under which one indicator (SDG3.4.2) is the suicide mortality rate.<sup>6</sup> A total of 77% of the world's suicide occurred in low and middle-income countries.<sup>7</sup> Worldwide, a total of 1.4% of all deaths are associated with suicide among those aged 15-24 years in 2012.<sup>8</sup> Suicide is the fourth major cause of death among those aged 15 to 29 for both sexes.<sup>7</sup> The calculated age-standardized suicide rate among those aged 15 years or more was 22.0 per 100,000.<sup>9</sup>

India and Sri Lanka have the highest suicide rate (12.9%) in the Southeast Asia region.<sup>7</sup> According to a WHO report (Sep 9, 2019), the rate of suicide in India is 16.5 per 100,000 people.<sup>10</sup> In India (2021) out of 13,089 students who died by suicide, 7,396 were male and 5,693 were female.<sup>11</sup> A review reported that compared to other high-income countries, Asia has higher average suicide rates.<sup>12</sup> Very few reviews are available on suicide in South Asia, and only India and Sri Lanka have been included in most of the reviews.<sup>13</sup>

The National Crime Records Bureau (2017) reported that one student dies by suicide every hour, and one of the major causes of suicide is a failure in examinations.<sup>14,15</sup> The other causes that lead to suicide among students are depression, relationship issues, psychiatric problems requiring medical attention, a history of psychiatric hospitalization, and academic obstacles.<sup>16</sup>

A gatekeeper can be anyone (*e.g.*, teachers, parents, hostel wardens, community leaders, police, layperson, counsellors, among others) who is ready to give time and effort to prevent suicide at the community level.<sup>17</sup> A gatekeeper training program is a capacity-building suicide prevention program recommended by WHO that aims to assist individuals with the skills and knowledge required to be first responders to someone who is in psychological distress and potentially suicidal and helps them to get better services as needed. As suicide is a growing problem among adolescents, suicide prevention program will help the gatekeepers identify the risk of suicide at the grass root level. Therefore, this review is intended to determine the effect of suicide prevention programs among gatekeepers on the prevention of suicide among college students in South Asia (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka)<sup>18</sup> and to improve their knowledge, attitude, and gatekeeper behaviour through suicide prevention program.

**Objective**

The objective of the review is to determine the effectiveness of suicide prevention programs (SPP) on the improvement of knowledge, attitude, and gatekeeper behaviour among gatekeepers so that the number of suicide cases will be reduced among college students in South Asia countries.

**Review question**

- Are suicide prevention programs effective among gatekeepers in the prevention of suicide among college students?
- What types of suicide prevention programs are effective in the prevention of suicide among college students?
- What are the components that make suicide prevention programs effective?

- Does the suicide prevention program help in the improvement of knowledge, attitude, and gatekeeper behaviour among gatekeepers?

## Methods

### Eligibility criteria

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)<sup>19</sup> will be used to report systematic reviews. The PICO (Population, Intervention, Comparison, Outcome) format will be adopted to define the methods of the review. The protocol was registered on PROSPERO (CRD42023387020).

### *Types of studies*

All interventional studies that provide suicide prevention programs to the gatekeepers as an intervention to prevent suicide in college students, and published in indexed and peer-reviewed, and English, Hindi, Malayalam, Kannada languages journals from the date of inception to 2022 in South Asia will be included. A grey literature search and hand-search of reference lists of included studies will be done. The conference proceedings, reports, review papers, letters to the editor, or responses to articles will not be included.

### *Participants*

Gatekeepers who have undergone any suicide prevention program as an intervention will be the participants in the present review.

### *Intervention*

We will include studies that provide suicide prevention programs as an intervention in the form of a workshop, different methods of teaching, and a module/booklet.

### *Comparison*

We will include studies that compare the intervention group (receiving any intervention in suicide prevention) and the control group (not receiving any intervention in suicide prevention).

### *Outcome measures*

The outcome measures will be suicide prevention, knowledge, attitude, and gatekeeper behaviour.

Outcome measures will include that after receiving the suicide prevention program improvement in the gatekeeper's knowledge on suicide prevention, positive attitude towards suicide prevention, and recognition of suicidal symptoms among college students at the beginning and counsel them and if necessary, refer the students to mental health personnel for better intervention.

### Information sources

Primary studies will be searched by two independent authors through electronic databases: Scopus, PubMed (MEDLINE), PsycINFO, Cochrane, Web of Science, and CINAHL using MeSH terms, Emtree and synonyms of keywords of a suicide prevention program, South Asia, gatekeepers, and college students. Boolean operators (AND, OR) will be used to create specific search strategies for each database.

### *Additional searches*

- Hand searching:* To find out additional studies, authors will hand-search reference lists of all included studies and review articles.
- Grey literature:* Authors will conduct a grey literature search to find out the studies not indexed in the above-listed databases.

### *Search strategy*

We include the search strategy in Figshare (*Extended data*).<sup>20</sup>

### Study records

#### *Data management*

RevMan 5 software<sup>21</sup> will be used for the screening and data extraction of the review. The collected search results from the databases will be kept in one folder and will be imported into EndNote<sup>22</sup> and will be arranged by databases, inclusion criteria, and exclusion criteria.

#### *Selection process*

A stepwise approach will be followed by the authors to identify the eligibility of the studies for inclusion in this review. To identify eligibility and remove duplicates, titles and abstracts of the studies will be screened by two authors independently. The full-text article screening will be done for the potentially eligible studies. The full-text studies will be retrieved and assessed for inclusion in the review by two reviewers. A third reviewer or an independent opinion may be requested if the first two reviewers are unsure about the study's eligibility in the analysis. The results from independent reviewers will be sent to a third reviewer, who will compare the results and compile a list of included studies. Discrepancies between the results from both reviewers will be discussed with the third reviewer until an agreement is reached. If the full-text study is not accessible through institutional membership, then the study authors will be contacted to retrieve the manuscript. The study will be included based on inclusion criteria. After eliminating the duplicate studies, a final list of included studies will be made. The reason for the excluded study and the study selection procedure will be recorded in the PRISMA flow diagram.

#### *Data collection process*

Following the study selection process, the extraction of the data will be completed independently by two authors. To ensure consistency in the data extraction, the authors will first pilot the data extraction tool and the extraction process on the first ten articles. Outcome data and characteristics of the study will be included if reported within the individual studies (study authors will be contacted to collect missing information relevant to this review). A data extraction form will be used to extract the data by two independent authors.

### Data items

Bibliometric information such as authors' names, titles, journal names, publication year, and settings will be collected along with included study characteristics such as type of study, research question, objective, observation, duration, intervention, outcome variables, and key findings.

### Outcome and prioritization

The evidence generated through this review will be presented in the form of tables and figures and based on the study objectives narrative synthesis will be done.

The primary outcome will be improvement in the gatekeeper's knowledge on suicide prevention, positive attitude towards suicide prevention, and positive changes in gatekeeper behaviour.

The secondary outcome will be to reduce the number of suicide cases among college students.

### Risk of bias in individual studies

The Cochrane ROB-2 tool will be used to assess the risk of bias in individual studies.<sup>23</sup> Quality assessment will be performed by two authors to conclude inconsistency by consulting with a third author.

### *Quantitative studies*

The Joanna Briggs Institute (JBI) Critical Appraisal Checklist<sup>24</sup> will be used to assess the risk of bias and selection bias.

### Data synthesis

Collected data will be described and synthesized according to the type of sources, context, and key themes. The authors will perform a meta-analysis where feasible. A summary table will be used to depict the most important aspects of the selected studies, such as the research area, and how the suicide prevention program is effective in suicide prevention.

Factors gleaned from quantitative investigations will be presented in a narrative study. The data will be coded, and subthemes will be developed after that. All analysis will be done using RevMan 5 software.<sup>21</sup>

#### *Sensitivity analysis*

To determine the low impact of quality studies on the review findings sensitivity analyses will be performed. A high or unclear risk of bias studies as identified by the ROB-2 tool will be excluded.

#### *Reporting bias assessment*

Reporting bias will not be assessed due to a lack of sensitive statistical methods.

#### *Meta bias*

Not applicable.

#### Confidence in cumulative evidence

The Grading of Recommendations Assessment, Development, and Evaluation (GRADE) guidance<sup>25</sup> will be used by two reviewers independently to assess the quality of evidence and it will be classified as high, moderate, low, or very low.

#### Discussion

This review will include the studies which focus on suicide prevention in college students. Few reviews have been done to estimate the prevalence of suicide, and factors associated with suicide among students in South Asia. The present review will be done to determine the effectiveness of suicide prevention program on the improvement of knowledge, attitude, and gatekeeper behaviour towards suicide prevention in college students in South Asia countries. Previous literature resulted that the suicide prevention program helps the gatekeepers to improve their knowledge and lower their judgmental attitude towards suicide prevention.<sup>26</sup> Previous studies also revealed that gatekeeper training (GKT) improves the teachers' competency and confidence in managing suicide-risk students.<sup>27,28</sup> The study also reported that GKT brushed up the self-perceptions of college staff in working with suicidal students and improved their skills for providing intervention.<sup>29</sup>

#### Ethics and dissemination

Ethical clearance is not applicable as the present review will include only published articles from different databases and no human will participate in this review. A manuscript will be prepared for publication in a Scopus-indexed, peer-reviewed journal and the results will be presented at a national and international conference after the completion of the analysis.

#### Strengths and limitations

The present systematic review will include interventional studies which provide suicide prevention program to the gatekeepers as an intervention. This review will focus on suicide prevention among college students. Only studies published in South Asian countries will be included.

#### Study status

Formal search has not been started.

#### Author contributions

Kallabi Borah: Conceptualization, analysis, methodology, supervision, validation, writing- original draft preparation, writing- review & editing.

Tessy Treesa Jose: Conceptualization, analysis, methodology, supervision, validation, visualization, writing- review & editing.

Anil Kumar Mysore Nagaraj: Conceptualization, analysis, methodology, supervision, validation, visualization, writing- review & editing.

Lorna Moxham: Conceptualization, methodology, supervision validation, visualization, writing- review & editing.

Guarantor of the review: Corresponding author.

## Data availability

### Underlying data

No data are associated with this article.

### Extended data

Figshare: Supplementary material 3, <https://doi.org/10.6084/m9.figshare.22253254.v1>.<sup>20</sup>

This project contains the following extended data:

- Search strategy for “Suicide prevention program (SPP) in South Asian Countries: A protocol for the systematic review”

### Reporting guidelines

Figshare: PRISMA-P checklist for, “Suicide prevention program (SPP) in South Asian Countries: A protocol for systematic review, <https://doi.org/10.6084/m9.figshare.22252309>.<sup>30</sup>

Data are available under the terms of the [Creative Commons Attribution 4.0 International license](https://creativecommons.org/licenses/by/4.0/) (CC-BY 4.0)

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[Publisher Full Text](#)

# Open Peer Review

Current Peer Review Status:   

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## Version 2

Reviewer Report 24 July 2023

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### Stuart Leske

UQ Poche Centre for Indigenous Health, The University of Queensland, Toowong, Queensland, Australia

Thank you. I have reviewed the revised further and I have no further comments to make.

**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** Suicide prevention research and systematic reviews.

**I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.**

Reviewer Report 21 July 2023

<https://doi.org/10.5256/f1000research.148672.r182645>

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### Katerina Kavalidou

National Suicide Research Foundation, University College Cork, Cork, County Cork, Ireland

Thank you for this well written protocol which will be helpful for mapping the evidence of suicide prevention programmes focused on college students in South Asian countries. It will be good if the authors can consider that suicide prevention programmes are not only helpful for preventing suicide deaths but also to support people who are experiencing suicidal thoughts and behaviours. So, beside the few minor issues that I am suggesting below, I would suggest to add the effectiveness of SPP for further outcomes, such as self-harm or suicidal ideation if possible. You



could do this as secondary outcomes that you will focus on.

Best of luck with your work and looking forward to reading your systematic review results when they will be published.

**Abstract:**

As per my general comment above - In the Introduction you state '...so that the number of suicide cases will be reduced among college students...'. SPP can help reduce not only suicide deaths but behaviours, so I would not restrict your introduction and overall paper objective only on suicide deaths, which are rare in comparison to the suicidal behaviours.

**Methods:**

*Outcome measures:* the authors should mention how these measures will be assessed. Are they focusing on pre-post papers only and what type of analyses are they looking for, quantitative or qualitative or both?

*Data synthesis:* '...and how the suicide prevention program is effective in suicide prevention'. Better to rephrase this and maybe just say 'and the effectiveness of suicide prevention programmes'.

**Discussion:** 'Previous literature resulted that the suicide prevention program..', better to have 'presented' or 'highlighted' instead of resulted.

**Is the rationale for, and objectives of, the study clearly described?**

Yes

**Is the study design appropriate for the research question?**

Yes

**Are sufficient details of the methods provided to allow replication by others?**

Partly

**Are the datasets clearly presented in a useable and accessible format?**

Not applicable

**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** Suicide prevention, multimorbidity and hospital presented self-harm and suicide-related ideation.

**I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.**

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Version 1

Reviewer Report 10 May 2023

<https://doi.org/10.5256/f1000research.145123.r170503>

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### Stuart Leske

UQ Poche Centre for Indigenous Health, The University of Queensland, Toowong, Queensland, Australia

Thank you for the opportunity to review this systematic review protocol. The review plans to examine the effectiveness of gatekeeper training for suicide prevention in college students in South Asian countries.

Abstract, introduction: If the 703,000 figure is taken from WHO's suicide estimates worldwide in 2019, it's just 703,000 (not more), or you could say 'over 700,000'.

Abstract, introduction: What would be the reason for calling the intervention a suicide prevention program (SPP), rather than using the term 'gatekeeper training'? Note that all of the previous reviews in this field use the latter term:

- Yonemoto, N., Kawashima, Y., Endo, K., & Yamada, M. (2019). Implementation of gatekeeper training programs for suicide prevention in Japan: a systematic review. *International journal of mental health systems*, 13, 1-6.
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Prevention Team (12 members) 8. (2009). Gatekeeper training as a preventative intervention for suicide: a systematic review. *The Canadian Journal of Psychiatry*, 54(4), 260-268.

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Perhaps you could say 'gatekeeper training for suicide prevention'?

Abstract, methods: I think you don't need to mention PICO here, as it is within PRISMA-P.

Abstract, methods: When mentioning 'interventional studies', you may need to specify study designs. Would these be any intervention study design, controlled or uncontrolled?

Abstract, methods: If looking purely at effectiveness, the authors may not need all these study quality assessment tools. For example, the MMAT may not be needed if the authors don't plan to synthesise qualitative data.

Introduction, first paragraph: You could probably say that suicide is a global public health issue, as it's typically considered to be, rather than just a problem for psychiatry.

Introduction, first paragraph: Who does 'today's youth' refer to? Is this in India or globally? Perhaps state where it ranks in the leading causes of death among these youth. The two sentences on youth may also need to be about all ages if this review does not look at gatekeeper interventions for youth specifically.

Introduction, first paragraph: I'm not sure what is meant by a 'weak psychological system', but you need to revise the language here to make this term more technical.

Introduction, second paragraph: The statement 'The suicide rate is increasing every year' is incorrect. WHO's Global Health Estimates reported that 'In the 20 years between 2000 and 2019, the global age-standardized suicide rate decreased by 36%' -

<https://www.who.int/publications/i/item/9789240026643>

Introduction, second paragraph: 'The statement that 79% of the world's suicide occurred in low and middle-income countries.' Is a secondary citation in the document you cite. The primary citation is WHO data from 2016, and is actually 77% rather than 79%. I recommend instead citing <https://www.who.int/publications/i/item/9789240026643>. The updated figure for 2019 is 77%, the same as the 2016 figure but with a better citation.

Introduction, second paragraph: WISQARS would need to be referenced in the reference list. I understand that WISQARS is US only. You could instead cite the WHO global health estimates again, and paraphrase a statement like: 'Suicide was the fourth leading cause of death in young people aged 15-29 years for both sexes' <https://www.who.int/publications/i/item/9789240026643>. Reference 8 is a 2014 document, but is superseded now by these estimates.

Introduction, third paragraph: I think the first sentence of this just needs updating with the WHO report again. <https://www.who.int/publications/i/item/9789240026643> It now looks like Sri Lanka has a higher rate for both sexes.

Introduction, third paragraph: I think reference 13 is outdated now, and the WHO global estimates for 2019 should be used instead. With regards to reference 14, I think you should look at the most recent review of gatekeeper training to see if studies from South Asia were included, as that is most relevant to your review and justifies why this new review is necessary.

Introduction, fourth paragraph: Best to avoid the word 'commits', and say 'dies by suicide' instead.

Introduction, fifth paragraph: It isn't clear in the abstract that the review will be about college students only. Could you check that it is consistent? You also just need to cite citation 6 in the Wikipedia page, which is the Encyclopedia of Modern Asia.

Methods, types of studies: Is it possible that the authors can include studies in languages they speak, which might include some languages other than English? This would be a major strength of the review if you could do this and found studies in your languages.

Methods, outcome measures: I think you need to describe the outcome measures more specifically. How would you measure suicide prevention and gatekeeper behaviour? And you may just need to specify what 'knowledge' and 'attitude' refer to...

Methods, hand searching – do you mean included studies, when you say primary studies? It might be better to say 'included' studies, as primary studies mean every bit of original research you find.

Study records, data management: You just need to cite EndNote:  
[https://support.clarivate.com/Endnote/s/article/Citing-the-EndNote-program-as-a-reference?language=en\\_US](https://support.clarivate.com/Endnote/s/article/Citing-the-EndNote-program-as-a-reference?language=en_US)

Data synthesis - What do you mean by the sensitivity and specificity of the included studies? Their ability to rule in and rule out what condition? What do you mean by 'to track down the variables?'

Discussion – I'm not sure the first paragraph is necessary as it'd be good to talk about your review here.

Extended data – you don't need to include the PRISMA flow diagram at this stage.

Extended data – with the search terms, you just need to clarify if this is for PubMed?

I think you might need to make the case for why this review is necessary, as I'm not sure it will find a lot of studies. You could say that previous reviews last searched the literature in February 2017 (Yonemato et al., 2019) and May 2018 (Torok et al., 2019), and you know that studies have been published since. Or maybe these reviews were limited to developed settings, although I don't think this would be the case.

Just related to PRISMA-P, I couldn't see:

- Who the guarantor is for the review
- A statement on funding
- The section on outcomes and prioritization needs to discuss if any outcomes are primary and if any are secondary, and just describe the outcomes in more detail. I would see the PRISMA-P explanation and elaboration statement for an understanding of what you need to say here: <http://www.bmj.com/content/349/bmj.g7647>
- You would need to talk about whether you wanted to assess meta-biases with for example, a funnel plot for publication bias. I'd encourage seeing the E and E statement on this item again: <http://www.bmj.com/content/349/bmj.g7647>

**Is the rationale for, and objectives of, the study clearly described?**

Partly

**Is the study design appropriate for the research question?**

Yes

**Are sufficient details of the methods provided to allow replication by others?**

Partly

**Are the datasets clearly presented in a useable and accessible format?**

Not applicable

**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** Suicide prevention research and systematic reviews.

**I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.**

Reviewer Report 05 May 2023

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**Sheela Pavithran** 

Amrita College of Nursing, Amrita Institute of Medical Sciences, Kochi, Kerala, India

**Title**

How effective is Suicide Prevention Programme (SPP) in preventing suicide among college

students?

### **The review**

The authors have chosen an area of great concern to the present day - suicide among the adolescent/college students.

Objectives are clearly articulated in the review.

The study population, intervention and the outcomes are presented clearly

Authors have used an exhaustive search strategy and included all the major sources of evidence, a grey literature search and hand search ensured inclusion of all the relevant interventional studies that used SPP among gatekeepers to prevent suicide among the college students. This offers room for replication of the study too.

Conceptual homogeneity could be established by the statistical methods mentioned.

As the study is need of the hour - the escalating incidence of suicide among the youth, a focused intervention by the key gatekeepers as appropriate is necessary.

Based on the proposal presented here, the systematic review can be approved.

### **Is the rationale for, and objectives of, the study clearly described?**

Yes

### **Is the study design appropriate for the research question?**

Yes

### **Are sufficient details of the methods provided to allow replication by others?**

Yes

### **Are the datasets clearly presented in a useable and accessible format?**

Yes

**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** Chemotherapy and Breast Cancer

**I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.**

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