




Setting-based interventions to promote mental health at the university: a systematic review

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Abstract

Objectives Universities are dynamic environments. But university life presents challenges that may affect the mental health of its community. Higher education institutions provide opportunities to promote public health. Our objective is to summarise the current evidence on strategies to promote mental health at the university, following a setting-based model.

Methods We conducted a systematic literature review following standard methods. Published literature that

evaluated structural and organizations strategies to promote mental health at the university was selected.

Results 19 papers were included. The majority of the studies were targeting the students, with only four aiming to promote employees' mental health. The most promising strategies to promote mental wellbeing included changes in the way students are taught and assessed. On the other hand, social marketing strategies had not impact on mental health. There is inconclusive evidence related to the effectiveness of policies to promote mental health.

Conclusions Universities should invest in creating supportive physical, social and academic environments that promote student and staff mental wellbeing. However, the

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current body of evidence is scarce and more research is needed to recommend what are the best strategies.

Keywords Mental health promotion · Setting-based approach · University

Introduction

Mental health is a resource for daily living, a state of wellbeing that allows individuals to cope with stress, think, feel, interact with others, work productively and enjoy life (WHO 2004). Consequently, the promotion of mental health is vital to enable individuals to flourish and contribute to society. Good mental health results from individual skills as well as community assets (Kobau et al. 2011; WHO 2004).

Distinct yet inter-related populations of students and staff make universities a unique setting for the promotion of mental health. First, university students are considered a high-risk population due to their age, as most mental health problems have their onset before 24 years of age (Reavley and Jorm 2010). Second, students are exposed to personal and academic stressors that can negatively impact on their mental health (Cvetkovski et al. 2012; Hamaideh 2011; O'Reilly et al. 2014; Tupler et al. 2015). Lastly, employees at higher education institutions are at greater risk for mental health problems compared to workers in other industries (Kinman and Wray 2014).

Although several reviews have focused on the effectiveness of individual-based interventions to promote the mental wellbeing of students (Conley et al. 2013, 2015; Davies et al. 2014; Reavley and Jorm 2010) and the effectiveness of workplace interventions to promote mental wellbeing (Czabala et al. 2011), much less is known about strategies conducted in the university, following a setting-based model. The setting-based model can be framed as a socio-ecological and salutogenic approach. It recognises that health is largely determined by people's

environmental, economic, social, organizational and cultural circumstances, and, consequently, the main aim is to improve “the place” where the person lives, studies and/or works. Setting-based approaches move from individual-based to population-based interventions and are more concerned with changing the structural and organizational factors that impact on health rather than the individual risk factors (Dooris 2009). In this scenario, ‘health promoting universities’ have become a major principle, which encourages the development of strategies with a “focus on population, policy and environment” (Tsouros et al. 1998). Consequently, setting-based approaches aim to integrate health-related aspects into the routine life of the university and to create an environment that promotes health and productivity, as well as connectedness and global wellbeing.

This paper presents the result of a systematic review of the published literature evaluating the impact of setting-based interventions that explicitly aimed to promote and improve the mental wellbeing of university students and employees.

Methods

We conducted a systematic review following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al. 2009). The protocol of the systematic review was published in PROSPERO, a database of prospectively registered systematic reviews in health and social care (CRD 42014011839).

Search strategy

PsycINFO, Medline (including Premedline), Cinahl, Web of Science, Scopus, ERIC, Embase, A+ Education, APAFT via Informit and Business Source Premier datasets were used. To focus on the most up-to-date information, the search was confined to the literature published during the period of January 2004 to June 2015. The search strategies used are available as an online resource. In addition, the reference list of the selected studies and systematic reviews related to the topic of interest was reviewed to retrieve studies not identified in the electronic search.

We structured the search strategy around these concepts:

- Population/setting: university students and staff.
- Intervention: any structural and/or organizational strategy to promote mental health.
- Outcome: any improvement in mental health or/and mental wellbeing.

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Selection of studies

We included any quantitative study, regardless of their design, so long as they contained information on the impact of the intervention. This included those using experimental (i.e. randomized controlled trial, both explanatory and pragmatic), or observational (e.g. controlled trial without randomization; or pre–post and time series) approaches.

Duplicated papers were excluded. Studies were screened for inclusion in two phases and the process was carried out in duplicate by reviewers (AF read all the studies and BV, EH, JN, MR and XL made the duplicate). In Phase 1, records were selected by reviewing the title and/or the published abstract. In Phase 2, the full-text article was reviewed. In case of any disagreement, researchers discussed the problems, trying to reach consensus. When consensus was not reached, a third co-author read the paper.

Articles were included if:

- (a) The study setting was the university; studies undertaken in colleges were included if the term ‘college’ referred to a tertiary education institution or a residential college;
- (b) The intervention followed a setting-based approach. Setting-based interventions used the following methods (Dooris 2009):

Policies;
Strategies to improve the built environment;
Social marketing;
Academic- and curriculum-based strategies; and/or
Community coalitions.

Consequently, we excluded all interventions whose main aim was to directly modify individual behaviours.

- (c) It included any global measure of mental wellbeing, mental health, wellness or mental health related quality of life. Studies using condition-specific outcome measures (such as depression or anxiety) were also included as a proxy for mental health and wellbeing;
- (d) It was written in English;
- (e) It was published after the year 2004.

All the articles that met the criteria were included for quality assessment and data extraction.

Quality assessment

The quality of each study was addressed taking into account internal validity (risk of bias), as well as the external and ecological validity of the study. Each study

selected was assessed using a checklist taking into account the experimental (Jadad et al. 1996) or observational approach used (Mallen et al. 2006). Methodological quality was not used to exclude studies.

External validity was also assessed using the criteria developed by Green and Glasgow (2006), including reach and representativeness, program or policy implementation and adaptation, outcomes for decision making, and maintenance and institutionalization.

Data extraction and analysis

Key features of the papers were extracted using a predefined template. Key features included aim, intervention components, study design, participants (i.e. students and/or staff) and sample size, the main outcome measures reported by the authors, and main results. Point estimates and confidence intervals were extracted if available.

Results are presented in a narrative way following the different strategies that can be used from a setting-based approach, if available (i.e. policies; built environment; social marketing; academic- and curriculum-based strategies; and/or; and community coalitions).

Results

The electronic search strategy identified 21,427 records. After removing records that were duplicated, 12,914 papers were evaluated by two reviewers. A total of 12,490 papers were excluded by reviewing title and abstract. Of the 424 full-text articles assessed for eligibility, 19 were finally included (Fig. 1).

Four studies evaluated the impact of policies on mental health. Two assessed social marketing strategies and thirteen were focused on academia-based strategies. The majority of the 19 studies were targeting the students’ wellbeing, with only four targeting the promotion of employees’ mental health.

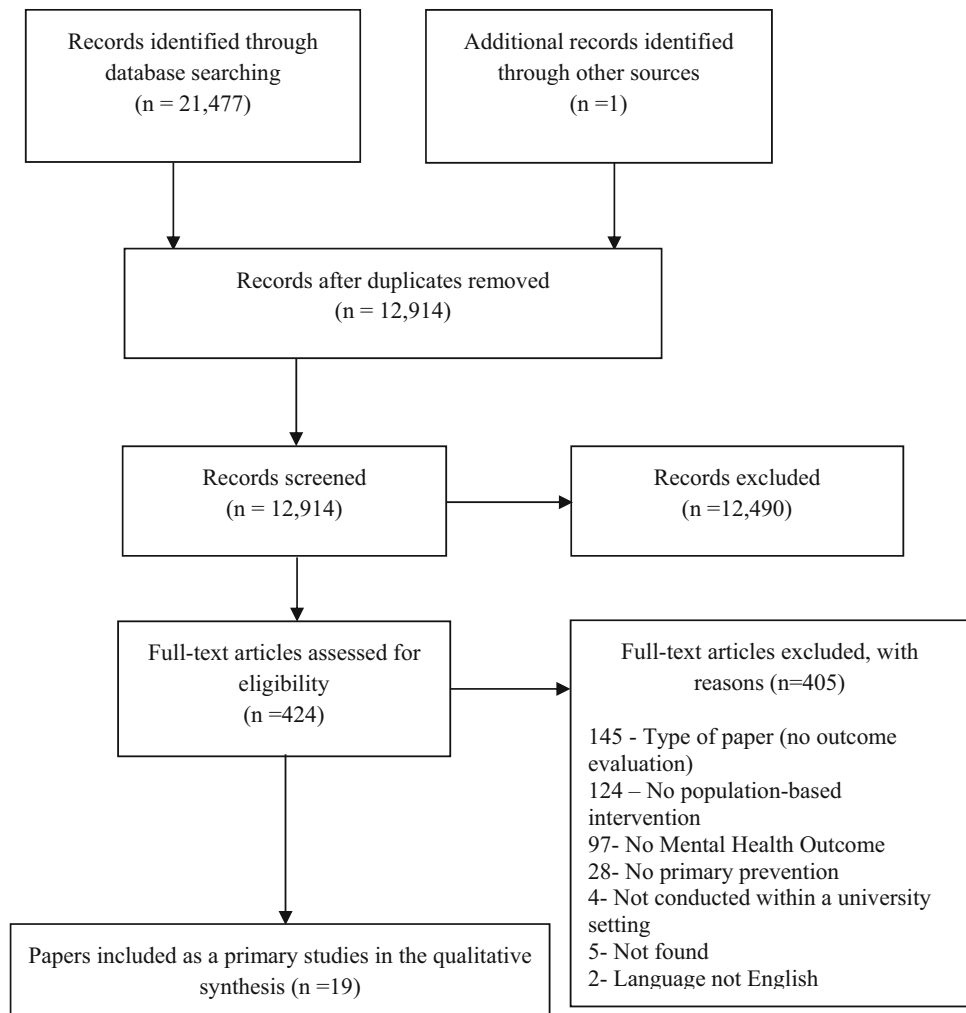
Online Supplementary Table 1 summarises the papers included in this review.

Quality assessment

Internal validity

Table 1 summarises the main aspects related to the internal validity of the studies.

In terms of internal validity, the quality of the evidence is very low. There is only one cluster randomised trial (published in two different papers), but its risk of bias is high due to a high attrition rate of participants. Only two studies incorporated a clear control group, while six had a

Fig. 1 Flow diagram

historical cohort that was used as a control group. The risk of bias is very high; as a result, it cannot be inferred that the differences between the groups were due to the interventions.

External validity

The external validity of the studies can be considered low to moderate. The main strength of the body of evidence reviewed is the fact that some of them were real programs that were conducted in real life settings, which indicate that such strategies were institutionalised and maintained after the study concluded. However, the majority of the papers presented the experience of one college or just one school, which limits the generalization of the intervention to other groups or populations. Indeed, half of the papers were conducted in health-related disciplines (i.e. medicine, psychology or nursing), which may have affected the findings, as these students tend to be more engaged in the promotion of mental health and wellbeing due to the nature

of their disciplinary and professional expertise and interest. Finally, some of the papers missed relevant outcomes that may be related to the process of decision making, such as information about the costs of implementing the program, or outcomes such as performance (when assessing academic-based strategies) or levels of absenteeism due to illness (when evaluating occupational health and safety programs for staff). Nonetheless, the reviewers do acknowledge that these data could have been presented in other papers that may have been missed and not included in this review (Table 2).

Policies

This section includes those setting-based approaches that have used the implementation of a policy as a strategy to promote mental health. By policy, we mean an institutional plan that defines procedures and guides action.

In 1984, the University of Illinois implemented a policy that mandated any students who made a suicide threat, or attempt, to receive four sessions of professional assessment

Table 1 Assessment of the risk of internal bias

First author (year)	Type of study	Random.	Allocation	Complete data	Appropriate sampling	Justification of measurement	Control group	Control of confounding
Joffe (2008)	Time series	na	na	na	Yes	Yes	Partially	No
Grawitch et al. (2007)	Cross-sectional	na	na	na	Not explained	Yes	No	Partially
Pignata and Winefield (2013)	Cross-sectional	na	na	na	Survey sent to all the staff; only 14 % responded	Yes	No	No
Pignata et al. (2014)	Pre-post	na	na	na	Only 13 % of the original sample answered time 2 survey	Yes	No	Partially. They adjust for baseline psychological strain
Reavley et al. (2014a)	Cluster randomised trial	Yes	Not possible	54.1 % were lost at follow-up 9 (wave 3)	na	na	na	na
Reavley et al. (2014b)	Cluster randomised trial	Yes	Not possible	27.9 % were lost at follow-up (wave 3)	na	na	na	na
Becker et al. (2008)	Academia-based interventions	na	na	na	Not explained	No	No	No
Shek (2012)	Pre-Post	na	na	na	Not explained	Yes	No	No
Shek (2013)	Pre-Post	na	na	na	Not explained	No	Yes	Not known
Hassed et al. (2009)	Non-randomized controlled trial	na	na	na	148 of an eligible cohort of 270 (61 %)	Yes	No	No
Bergen-Cico et al. (2013)	Pre-post	na	na	na	Yes	Yes	Yes	Partially
Foster et al. (2014)	Non-randomized controlled trial	na	na	na	Less than 10 % of the potential sample completed both pre and post tests.	No	Yes	No
Bughi et al. (2006)	Pre-post	na	na	na	104 students, they select the last 32 for the pre-post analysis	Yes	No	No
Bloodgood et al. (2009)	Non-randomized controlled trial	na	na	na	All the students in the 2 cohorts. All accepted	Yes	Partially	No
Rohe et al. (2006)	Time series	na	na	na	All the students were invited to participate (98 % consented).	Yes	Partially	No
Reed et al. (2011)	Time series	na	na	na	All students were invited, 58 % responded	Yes	Partially	Partially
Slavin et al. (2014)	Cross-sectional	na	na	na	All students invited; 84 % response rate	Yes	Partially	No
Tucker et al. (2015)	Time series	na	na	na	Only 34.5 % of total in class 2013 and 32.7 % of total in class 2014 participated	Yes	Partially	No
Jones and Johnston (2006)	Time series	na	na	na	All students invited; response rate oscillated between 79 % and 83 %	Yes	Partially	No

Table 2 Assessment of the risk of external bias

First Author (year)	Reach and representativeness	Implementation	Outcomes for decision making	Maintenance and institutionalisation
Joffe (2008)	Only 1 university	Yes	Partially	Yes
Grawitch et al. (2007)	Only 1 university	No	No	No
Pignata and Winefield (2013)	Only 1 university	No	No	No
Pignata et al. (2014)	13 universities	No	No	No
Reavley et al. (2014a)	9 campuses within 1 university	No	Partially	No
Reavley et al. (2014b)	9 campuses within 1 university	No	Partially	No
Becker et al. (2008)	Only 1 university	Yes	Partially	Yes
Shek (2012)	Only 1 university	Partially	No	Partially
Shek (2013)	Only 1 university	Partially	No	Partially
Hassed et al. (2009)	Only 1 school within 1 university (medical school)	Yes	Partially	Yes
Bergen-Cico et al. (2013)	1 college within 1 university (psychology school)	Yes	Partially	No
Foster et al. (2014)	Only 1 university	Partially	No	No
Bughi et al. (2006)	2 universities (medical schools)	No	Partially	No
Rohe et al. (2006)	1 medical school	Partially	Partially	Yes
Bloodgood et al. (2009)	1 medical school	Yes	Yes	Yes
Reed et al. (2011)	12 US Medical School Campuses	No	Yes	No
Slavin et al. (2014)	1 medical school in 1 university	Yes	Yes	Yes
Tucker et al. (2015)	1 medical school in 1 university	Yes	Yes	Yes
Jones and Johnston (2006)	1 nurse school in 1 university	Yes	Yes	Yes

(Joffe 2008). Using a time series study, the rates of suicide before and after the policy was implemented were compared. These rates were also compared with the rates of other universities. The rate of suicides before the policy (1976–1983) was 6.91 per 100,000 enrolled students. After the policy was implemented (1984–2005) it was reduced to 3.78 per 100,000 enrolled students. This represented a reduction of 45.3 %. However, while the program of mandated assessment was associated with a 72.2 % reduction in suicide amongst undergraduate students, there was an increase of 94.6 % among graduate and professional students, casting doubt on the efficacy of the intervention for different groups within the population. The overall decrease in the rates of suicide at this university contrasted with an increasing rate of suicide at similar universities that did not have this policy. Although the absence of an appropriate control group and lack of adjustment for confounds could bias the study findings, its external validity is moderate.

Three papers were included that evaluated the impact of different workplaces' policies and practices on employees' mental health. A descriptive cross-sectional study conducted in the USA (Grawitch et al. 2007) examined the relationship between satisfaction with different workplace practices and employee outcomes. The workplace practices that were correlated with an improvement in mental health included: (a) Employee involvement policies; (b) growth and development practices (i.e. programs and policies that provide

employees with the opportunity to increase their knowledge and skills through opportunities for advanced training and continuing education); and (c) occupational health and safety programs (i.e. that focus on prevention, wellness programs, health screenings and stress management). In comparison, some policies and practices were associated with decreased mental wellbeing; these included policies and practices that focused on recognition (i.e. practices and policies that provide monetary and nonmonetary rewards for employees) and work-life balance for employees (e.g. flexible work arrangements). A case study conducted in an Australian university (Pignata and Winefield 2013) found no differences in psychological health outcomes between employees who reported that stress-reduction interventions were implemented in their workplace and those who were not aware of these interventions. One year later, the same authors published a similar study conducted in 13 universities (Pignata et al. 2014). In this second study, employees who reported an awareness of stress-reduction interventions implemented at their university scored lower on psychological strain. However, these studies only examined employees' perceptions of the employer's healthy workplace practices, and did not evaluate the real existence or quality of specific programs.

Social marketing

Social marketing is defined as 'the application of commercial marketing technologies to the analysis, planning,

execution, and evaluation of programs designed to influence the voluntary behaviour of target audiences to improve their personal welfare and that of society' (Donovan 2011). This review only included one study, published across two separate papers, which met the inclusion criteria.

The intervention (MindWise) was designed to be whole-of-campus and to be run over two academic years. The researchers randomized the campuses to a control or intervention condition. The intervention included key messages about mental health that were delivered through social media (such as Facebook and Twitter), e-mails, posters, campus events, factsheets/booklets and mental health first aid training courses. The student results (Reavley et al. 2014b) indicated that there was no impact on mental wellbeing outcomes. Similarly, the results of the staff groups (Reavley et al. 2014a) showed no benefit in terms of improved mental health outcomes, but did show an increase in knowledge and recognition of depression and risky alcohol consumption. In spite of using an experimental design, the risk of bias of this study is high due to the contamination between the intervention and the control group (i.e. students can attend different campuses during the same year) and by the high level of attrition. Its external validity is low to moderate as the strategy was not maintained long term.

Academic-based strategies

This section focuses on the interventions that aimed to improve the mental wellbeing of university students through academic-based strategies, including mandatory courses on topics related to mental wellbeing, different assessment strategies, and curriculum design.

Mandatory courses included in curricula

Becker et al. (2008) conducted a one group pre–post study to evaluate the impact that a mandatory course 'Health in Modern Society' had on the mental wellbeing of enrolled students. It was a two-credit general education course that used active learning techniques; such as debates/round-tables, problem-based learning, and simulated-scenarios/case studies; and covered areas related to lifestyle, mental health, and sexual health. Post-test measures compared with pre-test measures showed a statistically significant increase in mental health knowledge and a non-statistically increase in mental health wellness behaviours. The absence of a control group also affects the validity of the findings.

Similarly, Shek (2012, 2013) evaluated the impact of a mandatory leadership course on students' wellbeing from the University of Hong Kong. The course focused on positive youth development and addressed areas related to

self-understanding, resilience, interpersonal relationships and self-leadership. Pilot evaluations of the program (a one group pre–post study and a non-randomized controlled trial) suggested that the course was effective in increasing connectedness, hope and general positive youth development qualities. However, detailed information is not provided in the report. Consequently, these results should be taken with caution.

The 'Health Enhancement Program (HEP)' is a mandatory course delivered to all first-year medical students at Monash University, Australia (Hassed et al. 2009). It consisted of eight lectures providing information on: the link between physical and mental health, mind–body medicine, behaviour change strategies, mindfulness-based therapies, and the importance of healthy behaviours. The lectures were supported by six 2 h tutorials with 15–16 participants. Compared with pre-test measures, post-test results were significantly better for outcomes related to psychological quality of life, depression symptomatology, hostility and global mental health. Although, the absence of a control group increases the risk of bias, the external validity of the study is moderate to high.

Using a non-randomized controlled trial, Bergen-Cico et al. (2013) assessed the effectiveness of a brief mindfulness-based stress reduction elective course for psychology students in a US university. They found that after 6 weeks, students in the intervention group increased their scores for mindfulness and self-compassion, but there was no effect on anxiety levels. The risk of bias of this study is moderate because of the potential confounders. The external validity was determined to be low to moderate.

Curriculum infusion

Curriculum infusion can be defined as 'a pedagogy that involves integrating health issues into academic courses with the aim of changing attitudes and behaviours' (Riley and McWilliams 2012). We found two papers that can be classified under this category.

Bughi et al. (2006) evaluated the effect that a psycho-educational lecture on stress management had on the mental wellbeing of third and fourth year medical students. This was infused into a 1-month rotation in Diabetes/Endocrine service at a tertiary referral centre and a one group pre–post study approach was used to evaluate its impact. After 1 month, the prevalence of reported stress decreased by 46.7 %. However, the absence of a control group and other information related to its external validity precludes any strong conclusion.

More recently, Foster et al. (2014) tested the effectiveness of infusing one brief intervention in a general first-year mandatory course with a non-randomized controlled

study. It consisted of a manual that was offered to the students during the first tutorial of a unit of study and explained how to cope with daily stressors. Some of the students, in addition, received a daily SMS that acted as a prompt to help students cultivate positive emotions. There was no impact on the level of wellbeing for students in the control group and in the manual-only intervention group. However, the students who received the manual and the SMS demonstrated improved wellbeing, suggesting that the daily SMS was a key factor related to the success of the intervention. The fact that less than 10 % of the participants concluded the study and the absence of randomizations together with its low external validity are major limitations of this study.

Assessment strategies

Rohe et al. (2006) compared two medical school classes: the class of 2005 (the last class under a 5-interval grading system), and the class of 2006 (the first class under a 2-interval grading system of pass/fail). Both classes took the same array of courses. However, students covered by the 2-interval grading system reported lower levels of perceived stress. Bloodgood et al. (2009) found similar results. They followed students during four semesters and compared those in the 5-interval grading system, with others in a 2-interval grading system. Students that changed to a pass/fail grading system had higher levels of wellbeing for the three first semesters evaluated, although not for the fourth. Results also suggested that the change was not associated with lower levels of academic performance in those subjects. The internal validity of these studies is compromised by the attempted comparison of two cohorts in different temporal moments. However, their external validity is moderate to high, as these are strategies currently implemented that have also taken into account other possible outcomes (i.e. academic performance).

Reed et al. (2011) conducted a survey in seven medical schools in the USA. The study found that students in medical schools using grading scales with three or more categories had higher levels of stress, burnout, emotional exhaustion and depersonalization. The cross-sectional design of the survey, however, limits its conclusions.

Changes in the curriculum

Broad curriculum changes were explored by the Saint Louis University School of Medicine (USA) (Slavin et al. 2014). In 2009 and 2010, the School introduced a series of curriculum changes that aimed to alter the structural conditions of the curriculum that contribute to the stress

and mental health problems of their students. A variety of changes were, therefore, explored. Firstly, the grading system for preclinical courses was changed from a 5-interval system to a 2-interval pass/fail system. Secondly, contact hours during the first 2 years of the curriculum were reduced by nearly 10 %. Thirdly, the School introduced more longitudinal electives. Fourth, learning communities were established that were composed of students and faculty staff who shared common interests. Finally, a required course based on mindfulness and resilience was included in the curriculum. The researchers found lower levels of depression symptoms, anxiety symptoms and reported stress in those students exposed to the changed curriculum in comparison with the students in older cohorts who were not exposed to changes. However, another study found contrary results (Tucker et al. 2015). The authors also looked at a traditional medical course vs a new curriculum in terms of medical students' wellbeing, stress and performance. The new curriculum included a change in the traditional structure of co-occurring discipline-based courses, which was substituted with ten successive interdisciplinary courses followed by a capstone course to further integrate basic sciences and clinical information with clinical correlations. Learning activities based on problems and small-group sessions were increased. They also changed the traditional five-interval grading system, replacing it with an honour-s/pass-fail system. When comparing the two classes, students in the new curriculum class scored higher than students in the traditional class in depression scores and perceived stress, and lower in quality of life. There was no difference in the students' average exam scores, suggesting that there was no impact on academic performance.

Jones and Johnston (2006) explored the impact of a student-centred, problem-based curriculum vs traditional curriculum on student wellbeing and performance, using a sample of nursing education students in Scotland and a times-series design. At week 25, students in the new course reported fewer academic concerns, clinical concerns and personal problems. They also reported lower levels of distress. However, these same students had a greater level of absence due to sickness. Similar patterns were found at week 50 except for academic worries: the difference observed previously had disappeared. In terms of academic performance, those in the new course performed less well on a comparative essay, but better in the exam.

The results of these studies are threatened by the possibility of selection bias, as the cohorts are from different years and may be exposed to different historical and contextual events. However, these three studies show moderate to high external validity.

Discussion

This review indicates that most setting-based mental health promotion strategies at the university are based on modifying the way students are taught and assessed. The risk of bias of the studies reviewed is high, although some have acceptable external validity. There is a lack of information with regard to interventions directed at employees. The results suggest that policies that successfully promote the mental wellbeing of university staff include the involvement of employees in decision making and provide opportunities to increase employees' knowledge of mental health and wellbeing. Unfortunately, the number of studies found was low and the quality of the evidence was poor, prohibiting any strong recommendation.

The results of this review should be considered with the following limitations in mind. Firstly, the search strategy only included scientific literature. Consequently, we missed potentially useful grey literature. This may be important for interventions which are based on policies, as these can be difficult to evaluate in terms of effectiveness and impact. We recommend complementing this report with a review of the grey literature in this area. Secondly, due to the large amount of data retrieved and the relatively short timeframe, a general assessment of the studies and literature was performed, rather than a systematic analysis of the quality of the studies.

In spite of the above limitations, this is a comprehensive review of the effectiveness of setting-based interventions to promote mental health and wellbeing of university staff and students. The process was carried out in duplicate and followed the PRISMA guidelines. A sensitive strategy was adopted with no restrictive filters. This strategy led us to review an extensive number of papers that were manually excluded. However, we are confident that we have included all the information relevant for our aim.

Mental illnesses are one of the leading causes of disease burden worldwide, in low, middle and high income countries (Whiteford et al. 2013). It is urgent to establish strategies to prevent mental disorders and promote mental health. Key settings such as primary care, workplace or the university are ideal places to do this, as they can reach a large population and are well positioned to promote public health approaches, adopting a system perspective that takes into account that the place where people live matters.

The fact that the majority of the interventions utilise academic-based strategies makes sense, as the review focused on a specific type of setting and population—the university. Universities are unique places of learning where the setting has a strong focus on teaching, learning and research to support students to develop, thrive and graduate. It is these areas in which interventions can impact the whole student population. It also mirrors the principles of the setting-based approach, framed into a socio-ecological

model, which recognises that 'healthy structures' (e.g. how we design the curricula) is a pre-condition for 'healthy processes' (e.g. how we communicate with the students) and that both structures and processes are also pre-conditions for healthy outcomes (Dooris et al. 2014).

The integration of mindfulness-based stress-reduction programs in university curricula is a major trend in health-related faculties (Dobkin and Hutchinson 2013). However, as identified earlier, the majority of the studies assessing curriculum-related strategies to promote mental health were done in health-related disciplines. Students from these disciplines may be more willing to participate in this type of course. Future research should focus on the impact of embedding mindfulness or life skills courses in other disciplines.

Another academic strategy that may be promising is changing the grading system of university courses. Although evidence suggests that this strategy may improve the mental health of students, concerns have been raised with regard to the effect that this strategy can have on academic performance. A recent study in the medical context suggested that the new system was associated with decreased performance on the preclinical examination, although no decrease in performance was apparent on other exams (McDuff et al. 2014).

New pedagogical methods, such as 'Flipped' teaching, problem-solving and student-centred teaching, may have the potential to promote the mental health of students. However, the current body of evidence is scarce, contradictory, and ultimately inconclusive. More research is needed to clearly comprehend the consequences of these educational methods.

This review found little data on evaluating policies to promote mental health and wellbeing within universities. This may be related to the difficulty of evaluating policies and defining mental health outcomes. In the area of mental health promotion, most of the policies are related to the prevention of suicide incorporating 'restriction of means approaches' (Silverman 2008; Stratford 2012; Washburn and Mandrusiak 2010). These approaches include regulations limiting access to building roofs; protocols, such as restricting the size of window openings; and norms restricting student access to laboratories with dangerous or harmful chemicals. However, there are no data on the impact that these strategies have had.

In recent years, there has been an increased interest in evaluating the impact that the built environment may have on mental health (Evans 2003). Unfortunately, no research evaluating the impact of the built environment on the mental health of the university community was identified. Nonetheless, a series of recommendations have emerged from the review of the literature that deserve further research: the creation of stress reduction spaces (Klainberg et al. 2010); the design of "healing gardens" (Lau and

Yang 2009); and the explicit inclusion of windows in new buildings, or, “digital windows” in old buildings, which are large plasma displays showing real-time outside scenes, to increase sense of belonging, connectedness and mental restoration (Friedman et al. 2008).

Finally, the lack of studies targeting staff is surprising, particularly given the growing policy interest in mental health at the workplace (Mykletun and Harvey 2012). The lack of evidence related to environmental strategies is not specific of the university sector, but a constant in the promotion of mental health at the workplace (Kahn-Marshall and Gallant 2012). This is possibly due to the difficulties associated with their implementation (e.g. organisational commitment to change) and evaluation.

Conclusion

To encourage the promotion of mental health at the university, classical individual strategies that build personal skills should be combined with a setting-based approach that impacts on and improves the overall setting of the university, which includes the physical, occupational, organisational, cultural and academic environments. This review has shown that academic-based interventions enhancing the way students learn and academics teach are promising. However, the current body of evidence is scarce and more (high-quality) research is needed to recommend what are the best strategies.

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Compliance with ethical standards

Ethical standards This paper presents the results of a systematic review of published studies. No ethical approval was required.

Conflict of interest The authors declare that they have no conflict of interest.

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