Application of Positive Psychology Education in Chinese Medical Students to Increase Their Psychological Well-being: A Pilot Study

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Positive psychology; Chinese medical students; PERMA, Medical education
Abstract
Background
Anxiety and depression have been on rise in Chinese medical students due to the heavy academic pressure of medical practice and the deteriorating doctor-patient relationship in China. The psychological well-being of the Chinese medical students has become a critical focus of attention for the medical education community. In the present study, we aimed to explore the potential effect of positive psychology education on improving the mental health of Chinese medical students.

Methods
A total of 49 undergraduate students (mean age = 19.5 years old) at their year-2 and year-3 medical study in our institute were enrolled in an 8-week positive psychology training course, which was embedded into a regular school curriculum. Their hope scale, life satisfaction scale, subjective happiness scale, as well as depression and anxiety scales were measured before and after the training program, respectively.

Results
The analyses results showed that over 95% of the participants reported an improved mental status after the training program. Their positive emotions, including hope, life satisfaction and happiness, significantly increased, while the negative emotions, including depression and anxiety, were significantly relieved.

Conclusions
These evidence suggest that positive psychology education holds promise for increasing the mental well-being and reducing psychological distress among Chinese medical students. Further research is required to demonstrate the efficacy of this program using larger representative sample cohorts.

Background
Training in medicine is highly emotional and physical demanding, which has led to prevalent anxiety, depression and distress among medical students worldwide[1-7]. This is especially true for the Chinese medical students and young trainees due to the deteriorating doctor-patient relationship in China[8-11]. It was recently reported that over 60% of the Chinese medical students suffered different
degrees of mental problem[12, 13]. They were more susceptible to stress, burning out, depression and anxiety, and had less career satisfaction and self-esteem as compared with their counterparts [12-15]. The psychological well-being of the Chinese medical students has become a matter of concern national widely, as it shapes not only the quality of future doctors but also the quality of the national healthcare.

To deal with these situations, a series of strategies have been taken by multiple administrations in China. For example, psychology education has been emphasized more and more frequently in universities[16], and an increasing number of school consulting offices have also been established [17]. While these interventions provided helpful psychological support for the few students with existed mental illness, they failed to serve the rest large population of the ordinary students who do not have a diagnosed disorder yet [17]. Moreover, these psychology interventions were more preoccupied with the negative side of life, for example the depression, anxiety and stress, but seldom built inner strength and positive emotions on general students, such as resilience and grit, which is important for the personal growth of the young people.

An increasing number of studies have shown that the incorporation of positive psychology into school education can significantly increase the psychological well-being of the students[18-20]. Positive psychology is a new branch of psychology, which focuses on nurturing strengths, building resilience and developing grit among the ordinary people instead of treating the existed deficits and disorders of the few [21, 22]. Substantial evidences have found that positive psychology education can enhance the anti-setback ability and subjective well-being of the students, and finally improve their academic accomplishment[23, 24]. With the unprecedented level of anxiety and depression in Chinese medical students and the far more enough mental health care for them, there is a great need to investigate how insights from the field of positive psychology can help medical students flourish, in both their professional studies and personal lives.
In the present study, we aimed to examine the effect of positive psychology education on improving the mental health of medical students in our institute. We conducted an 8-week positive psychology training program, which was set as a selective course within regular school curriculum on year-2 and year-3 medical students. We then analyzed their positive and negative emotion levels before and after the training program by using multiple standard questionnaires. We found that positive psychology training can act as an effective way to improve the psychological well-being of the medical students. The findings in this pilot study bring chances and hopes for improving the mental health of Chinese medical students, and warrant further investigations on larger cohorts of populations.

Methods

1. Participants

A total of 61 undergraduate medical students who majored in Medical Imaging at the School of Medicine, South China University of Technology (SCUT) attended this training program voluntarily. Finally, 49 of them who completed all the questionnaires were included in the current analysis. Among the 49 participants, 31 were at year 2, and 18 were at year 3 of their medical study. Their ages range from 17 to 22 years old, with an average of 19.5. 36 of the participants were female, and 13 were male. The social demographic characteristics of the participant students are described in Table 1.

2. Procedures

The positive psychology training program was set as a selective course, which was embedded into the regular school curriculum. The students who consented to participate in the course were then invited to complete multiple outcome measure questionnaires as detailed in the following Measures section prior to the commencing of the training and also in the week following the completion of the course, respectively. The surveys were anonymous with the exception of study year, gender and age, and no compensation was provided for the participation. All the 61 enrolled students finished the whole training class, and 49 of them who completed the whole set of questionnaires were included in the
current analysis.

3. **Interventions**

The positive psychology training program was set as a 1.5-hour group class once a week, and lasted for 8 continuous weeks. The protocol of this training program is based on Dr. Martin Seligman’s PERMA (Positive emotion, Engagement, Relationship, Meaning, Accomplishment) model[25]. In brief, during each weekly class, a different topic related to the cultivation of PERMA will be talked, including the cultivation of positive emotional states (e.g. gratitude and appreciation), cultivation of intrinsic motivation through ‘flow”, and learning of being in harmony with the bad mood by highlighting the meaning of life. In addition, multiple cases about medical professional (e.g. doctor-patient relationships) were also introduced and discussed in class to guide the students to find the thinking traps using positive psychology theory. The class involved both conceptual and experiential learning. At the same time, multiple out-of-class exercises were also assigned, for example, the students were instructed to write down the good things which happened during the day, and encouraged to identify and develop their key character strengths in daily life.

4. **Measures**

The following five scales were used to measure the psychology status of the participants, including hope trait scale, life satisfaction scale, subjective happiness scale, depression and anxiety scale (S-Document). All these scales were first translated from English into Chinese by one of the authors who were fluent in both Chinese and English. Translations were then checked by another author of the study to ensure the consistency with the original meaning of the scale items, and no other adaptations to these scales were made.

**The trait hope scale.** The hope trait was measured by using the 12-item Trait Hope scale[26, 27]. This questionnaire asks respondents to rate their agreement with 12 statements related with hope,
which is rated on a 1-8 scale ranging from 1 (definitely false) to 8 (definitely true). A sample item is: “I can think of many ways to get the things that are important to me.”

**Life satisfaction scale.** The life satisfaction was measured by using the 5-item satisfaction scale developed by Dr. Ed Diener Emmons[28, 29]. This scale utilizes a 7-point response scale ranging from 1 (strongly disagree) to 7 (strongly agree) for 5 items. A sample item from this scale is, “In most ways, my life is close to ideal”.

**Subjective happiness scale.** The subjective happiness scale is a 4-item scale of global subjective happiness[30, 31]. Amongst, two of the items ask respondents to characterize themselves using both absolute ratings and ratings relative to peers, whereas the other two items offer brief descriptions of happy and unhappy individuals and ask respondents the extent to which each characterization described them. Each item is rated on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). A sample item from this scale is, “Compared to most of my peers, I consider myself (1-less happy to 7-more happy)”.

**Depression and anxiety scale**

Participants’ symptoms of depression and anxiety were measured by using the patient-reported outcome measurement information system (PROMIS)[32], which is a five item Likert-type response scale to measure the frequency with which respondents had experienced symptoms of depression and anxiety over the past week. A sample item from this scale is, “I felt worried”. Participants were asked to rate their agreement with 5 answer choices ranging from “Never” to “Always”.

5. **Data analyses**

The data were analyzed by using SPSS (version 18). Independent t tests were used to determine whether there were any differences between pre- and post-test scores on each outcome measure. Estimated means were used to describe the averaged pre-test and post-test scores on the outcome
measures. P≤0.05 was considered as statistically significant.

Results

1. **Basic psychology status of the participated medical students**

We first estimated the original psychological status of the participants before the training. For the hope scale, the scores of the participants ranged from 25 to 59 (the full score is 64), with an estimated mean of 42 and standard deviation (SD) 7.2 (Table 2). However, it was also interesting to find that 41 of 49 (83.7%) students reported that they worried about their health (item 7 in the questionnaire), and 40 of 49 (81.6%) reported that they usually found themselves worrying about something (item 11 in the questionnaire).

The score of the life satisfaction ranged from 10 to 33 (the full score is 35), with a mean of 19 and SD 5.5 (Table 2). Only 12 of 49 (24.5%) students agreed that they have gotten the important things they want in life, 17 students (34.7%) agreed that in most ways their life was close to their ideal, and only 15 students (30.1%) reported that they would change almost nothing if they could live their life over.

The score of the subjective happiness ranged from 13 to 24 (the full score is 28), with a mean of 18 and SD 2.8 (Table 2). Amongst, 30/49 (61.2%) students reported they were happy (score ranged from 5 to 7), even when as compared to most of the peers (item 1 and 2). However, it was also found that up to 20 students (40.8%) reported that although they were not depressed, they never seemed as happy as they might be.

For the depression (the full score is 84), the mean score of the participants was 66 (ranging from 42 to 72, SD 4.6), it was found that 30 of 49 (61.2%) students reported that they often felt discouraged about the future, and 20 of 49 (25%) students reported that they often felt emotionally exhausted. For the anxiety, the mean score of the participants was 63 (the full score is 85, Table 2). 28 of 49 (57.1%) students reported that they often felt worried, and 30% of them reported that many situations made them worry. There were also 51% of the students reporting trouble in relaxing and
18% in sleeping.

2. **Intervention effects of the training program**

We then analyzed whether and how the positive psychology training would change the emotion levels of the participated students. We first generally asked how they subjectively felt about this course anonymously. It was found that over 95% students reported that they felt this training course is “useful” or “very useful” for their personal growth. We then analyzed how each of their psychology traits changed. For the hope trait, it was found that the hope score of the students increased 38.5% after the training (Fig.1). They reported they were more confident and can think of more ways to get out of the jam or problem in the future. For the life satisfaction and subjective happiness, similar trend was observed (Fig.1). The mean score for life satisfaction increased 28.6%, and subjective happiness increased 45.5% (Fig.1). These findings suggest the efficacy of positive psychology training in building positive character strength among medical students.

We also estimated whether the training program would relieve the negative psychological status of the participants. By comparing the scores of depression and anxiety of the participants before and after the training, significant decrease was observed for both symptoms. As shown in Fig.1, the group’s mean score of the depression decreased 53.2%, and the anxiety dropped 45.6% after the training program, suggesting the potential effect of positive psychology in alleviating depressive symptoms.

3. **Gender and academic year difference of the training program**

We also analyzed whether there were any differences on the basic psychology status or intervention effects between different genders or academic years. Generally, it was found that female and male students had similar symptom levels on almost every questionnaire. However, it was also interesting to find that for some specific terms within the questionnaire, they may have significantly different response. For example, in the hope scale questionnaire, females reported much higher score in item
“I can think of many ways to get the things in life that are important to me.” than the male students (P=0.02). In the life satisfaction scale, female students reported higher score on the item of “The conditions of my life are excellent.” than the male ones (P=0.05). These results suggest that female students seem more optimistic than male students, at least in some way. For other items as well as the academic year comparison, however, we did not observe any significant difference.

Discussion
In the present study, we found that a regular school curriculum-based positive psychology training course can significantly build positive strength and relieve negative stress of the Chinese medical students. These findings suggest the promising effect of positive education on improving the psychological well-being of Chinese medical students, and that teaching well-being in schools is both feasible and desirable.

Embedding positive psychology into school education
In this study, we set the training program as a regular school course based on two reasons. First, course-based training can make more students benefited as compared with the traditional one-on-one school counselling service. Multiple evidences have shown that integrating positive psychology into school education can not only act as an antidote to depression for the ordinary student population, but also as a way to increase their happiness and life satisfaction [20, 33]. Second, school-based training program is more acceptable by the Chinese students as compared to the one-on-one counselling. Different from Western population, Chinese people seldom seek help from psychology doctors even they are in bad mental status. It was once reported that among the people diagnosed with mental illness in China, only less than 10% of them sought help from psychology professionals[34]. The major underlying reason is that in Chinese traditional culture values, seeing psychology doctor is a symbol of weakness and vulnerability. This reminds us that embedding the positive psychology into the regular school curriculum may be more acceptable and practical on improving the psychology status of the general student population.
Positive psychology education among medical students

Burnout, depression and anxiety among the medical students and young trainees of healthcare professionals have become a special attention globally[1-7]. As the emerging of positive psychology, a series of evidence have shown the effectiveness of cultivating positive emotions in optimizing health and well-being [35-38]. Researchers in medical community have also proposed that positive psychological concepts, such as resilience, character strength, and mindfulness, could and should be integrated into clinical practice to help clients alleviate suffering and increase wellbeing [39-42]. However, no direct evidence was provided so far.

The current study attempted to address this issue by developing a positive psychology course among the Chinese medical students, and explored how above insights can help improve their psychological well-being. This study has two important implications for scientific research and clinical practice. First, the findings suggest that PERMA-based positive psychology interventions, including positive emotion cultivation, engagement and motivation, and finding the purpose and meaning of life, is effective for medical students, which can not only enhance their wellbeing but also alleviate their negative psychological symptoms. Second, it is feasible to integrate positive psychology education into the regular school curriculum, and make it as a supplementary component of the traditional therapies to aid mental health professionals in group-based treatment.

Limitations

While this study provided promising evidence for the application of positive psychology education in Chinese medical students to improve their psychological well-being, the following limitations should be noted. First, the sample cohort used in the current pilot study was small, which consisted only 49 students. To make the findings more convincible, a larger student cohort should be employed in future study. Second, there was no follow-up data in the current study, and the duration of the training effect should be estimated in the long future. Although some students reported that some habits established from the training course, for example writing down good things every day,
effectively helped them maintain positive mindset, these effects need to be investigated using standard analysis in future.

Conclusions
In summary, this pilot study provides a potential way to relieve the epidemic psychological stress among Chinese medical students based on positive psychology theory. With the increasing attention on the mental well-being of young medical professionals in China, and the increasing number of tools and models on positive psychology education, more and deeper investigations on larger populations will be warranted.

Abbreviations
1. SCUT: School of Medicine, South China University of Technology
2. PERMA: Positive emotion, Engagement, Relationship, Meaning, Accomplishment
3. PROMIS: Patient-Reported Outcome Measurement Information System
4. SD: Standard Deviation

Declarations
Ethics approval and consent to participate
The study has been approved by the research ethics committee of the School of Medicine, South China University of Technology (SCUT). All of the participants agreed to participate in the current study, and written informed consent was obtained from all participants.

Consent for publication
Not applicable.

Availability of data and material
All data generated or analyzed during this study are included in this published article.

Competing interests
The authors declare no conflict of interests.

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**Authors’ contribution**

XQZ designed the project, interpreted the survey results and wrote the manuscript. BSZ and MDW developed the survey and analyzed the data. All authors have read and approved the manuscript.

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Tables

Table 1. Social demographic characteristics of the medical students enrolled in the study (n=49).
| Variables | Range or N(%) | Mean ± SD |
|-----------|--------------|-----------|
| Age       | 17-22        | 19.5±0.94 |

**Academic year**

| Year       | N(%)          |
|------------|---------------|
| Year 2     | 31 (63.3%)    |
| Year 3     | 18 (36.7%)    |

**Gender**

| Gender | N(%)         |
|--------|--------------|
| Female | 36 (73.5%)   |
| Male   | 13 (26.5%)   |

Table 2. Basic psychology status of the participated medical students.

| Variables           | Range (Full score) | Median | Mean ± SD |
|---------------------|--------------------|--------|-----------|
| Hope scale          | 25-59 (64)         | 43     | 42±7.2    |
| Pathway thoughts    | 14-29 (32)         | 23     | 22±3.9    |
| Agency thoughts     | 10-29 (32)         | 20     | 20±4.5    |
| Life satisfaction   | 10-33 (35)         | 19     | 19±5.5    |
| Subjective happiness| 13-24 (28)        | 14     | 18±2.8    |
| Depression          | 42-72 (84)         | 65     | 66±4.6    |
| Anxiety             | 45-68 (85)         | 63     | 63±5.2    |

**Figures**
Intervention effects of the training program. After the 8 weeks of positive psychology training, the positive mind of the participants (hope, life satisfaction and subjective happiness) was significantly improved, while the negative mind (anxiety and depression) was relieved. In the figure, the average score of the pre-training group was normalized to 1.

*P<0.05, * *P<0.01.