



Acute Effect of Classical Five Element Acupuncture and Western Acupuncture in Pre-Exam Anxiety of Medical Students - A Comparitive Study

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Abstract

Exam related anxiety is one of the most commonly suffered problems among medical students reported by many authors. Several studies show that medical students have marked undue stress prior to and during examination. Further, it has also shown to impair memory, concentration, decision making, learning and is associated with lower academic performance. In acupuncture, there are limited studies on its efficacy on pre-exam anxiety. Moreover most papers are based on auricular acupuncture. My study compares the efficacy of classical five element acupuncture and western acupuncture. 60 student subjects were randomized Using computerized number generation method into Group A (Five element; N = 30) and Group B (Western; N= 30) on 1:1 ratio. The Subjects of Group A and Group B received their respective treatment one day prior the university exam. Data was collected before and after treatment using 30 Point- VAS scale for anxiety and STAI Y-6 questionnaire along with BP and HR parameters. Primary outcome: Intensity of anxiety showed statistically significant reduction in both Groups ($P < 0.001$). However on observing t value Group A showed better improvement than Group B Secondary outcome: Physiological parameters also showed significant changes in both groups. However on observation of their mean, t value and SD betterment was in Group A than Group B.

Key Words: Exam anxiety, five element acupuncture, western acupuncture, VAS-A, STAI

Introduction

Anxiety is a state of emotion often characterized by a not so pleasant state of internal turmoil, often associated with nervous behavior, such as pacing back and forth, physical issues, and rumination. Anxiety is a word derived from Latin roots 'anxius' which means a state of depression and agitation with feeling of distress in the precordial region.

Pre-exam anxiety is a combination of fear of failure, dread, worry and catastrophizing along with physiological over-arousal, stress and physical symptoms that occur before or during exam/test situations.¹⁰ Pre-exam anxiety creates barriers in concentration to learn and perform.¹¹ Test anxiety can distress anyone, a primary or high school student, an undergraduate or post-graduate student, or a worker who has to take tests for career development or qualification.

Pre-exam stress is usually predominant in medical students and students appearing for competitive examinations. Several studies have recorded the prevalence of stress among medical students ranging from 27% to 73%.¹² As freshmen, Medical student's first year exam is probably the most stressful experience. The gradation from school to professional medical college can be identified as critical stage among the students. Additionally excessive study load, new medical terminologies, clinical environment, peer pressure, sleep deprivation, inadequate support adds to the mental attribute of medical students. Pre-exam anxiety in medical students can also be associated with changes in the physical and mental health such as increased anxiety, increased negative mentality that influences the performance of students.

Four major sectors of reported stresses which can contribute to pre-exam anxiety are improper lifestyle, lack of needed information, style of studying and psychological aspects.¹³ Improper lifestyle includes lack of sufficient physical activity, lack of adequate rest, improper nutrition and defective of time management skills which contributes to pre-exam anxiety as reported by many authors.^{14,15}

Psychological aspects contributing significantly to pre-exam anxiety are irrational and negative thinking about examination, its outcomes and feeling of lack of control over examination situation (e.g. Experiencing to be blank during examination) are reported by many authors.^{16,17} Another reported cause for pre-exam anxiety in medical students is their perception of excess course load.¹⁸ Examination system¹⁹ is itself is an important stress factor for students. Authors report that parental pressure is also related with high levels of worry, irrelevant thoughts regarding exam, and physical symptoms associated with anxiety prior to and during the examination.²⁰

Other reasons for pre-exam anxiety may include procrastination, and poor performance in the previous examination.²¹ Characteristics of examination environment like: nature of the task, atmosphere, level of difficulty, availability of time, examiner's nature, mode of effectuation and physical settings may affect the level of anxiety experienced by the student.^{22, 20}. Pre-exam anxiety is known to initiate into a vicious cycle. After experiencing pre-exam anxiety in one test, the student may become frightened of it happening again and he/she becomes more anxious and worried than the previously experienced anxiety. If the cycle continues unattended or unacknowledged, or the student seeking help, the student may begin to feel helpless and worse in every examination situation.²³ Students who experience pre-exam anxiety often have siblings or parents who

have similar exam anxiety or other types of anxiety moreover anxiety disorder seems to have certain genetic components.²⁴

Symptoms of pre-exam anxiety can range between moderate to severe. Students who show moderate symptoms may be able to perform relatively better than the students with severe anxiety who may often experience panic attacks.²³ General physical symptoms may include: headache, stomach upset, fear, feeling of dread, difficulty to breathe, increased sweating, weeping, flight of thoughts and blanking out. Students who suffer exam anxiety tend to be distracted during an examination, experience problem with comprehending relatively simple instructions and trouble organizing or recalling relevant information. Adrenaline, which is released by the adrenal glands both in stressful and excited circumstances, is known to cause physical symptoms in pre-exam anxiety, such as increased heart rate, sweating, and rapid breathing etc.

Materials and Methods

A total of 60 subjects both men and women with ages ranging between 17 and 18 participated in the study. The study subject were student volunteers from the Government Yoga and Naturopathy Medical College, Arumbakkam, Chennai District of Tamilnadu state in India. The subjects were recruited from the above mentioned college through screening done to assess inclusion and exclusion criteria. All the fifty seven subjects were 1st year B.N.Y.S students.

Ethical clearance

Ethical clearance was sought from the Institutional Ethical Committee prior to the start of the study and the approval for the same was granted.

Written Informed consent

Subjects who fulfilled inclusion criteria were informed about the purpose of the study and rights as research subjects. Informed consent form was administered in English. Adequate time was given to each subject to go through the information sheet and their queries were answered. Their right to withdraw from the study and the need for willingness to participate voluntarily in the study was explained. All the subjects expressed their willingness to participate in the study by giving a signed informed consent. (A sample information sheet and consent form is enclosed in Annexure)

Inclusion and Exclusion criteria

Inclusion criteria

The following inclusion criteria would be the basis for selecting the subjects: 1st year medical students at Government Yoga and Naturopathy medical college, Chennai. Appearing for basic science university exams. Baseline VAS for anxiety >15 points. Without previous anxiolytic, sedative and/ or analgesic medication. No former experiences with acupuncture. No pregnancy or lactating

Exclusion criteria:

Suffering from any other disease or disorder. On any antipsychotic or antidepressant drugs. Participating in another clinical trial. Having family history of depression. History of alcohol, smoking or drug addiction. Participants unwilling to give informed consent.

Study design

Type of the design: A randomized trial

Randomization Randomization was done using the online randomization tool at a website

<https://www.randomizer.org/> random numbers generation method was used.

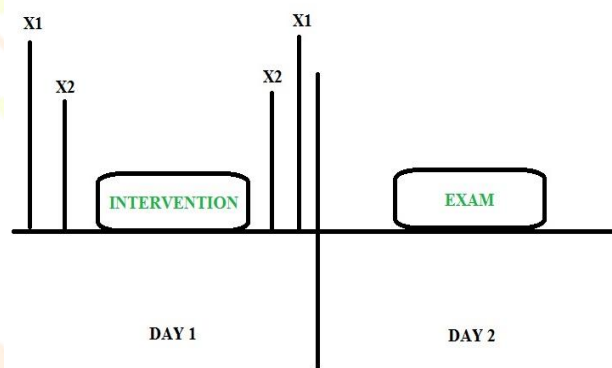
Allocation of patients into study and control groups

Patients were randomly allocated in Group A (classical five element acupuncture group) and Group B (western acupuncture group) in 1:1 ratio. 60 Subjects were initially screened and assigned to two groups. i.e., Group A (n= 30) and Group B (n= 30). Neither the investigator nor the patients were blinded to the intervention. The subjects were not informed of the group they were taken in.

Data Points

One day prior to the date of examination the subject's pre-exam anxiety was measured. This is followed by the intervention in respect to the group they belonged and the style of acupuncture. Post intervention again the data were measured using the same scales.

Figure ---: Illustration of Data points



X1: Heart Rate &

Blood Pressure

X2: VAS- A & STAI Y-6

Primary outcome variables

Level of pre-exam anxiety using validated (VAS-A) Visual analogue Scale for anxiety (SCALE: 0-30 POINTS; where 0 = Calm & 30 = anxious)

Secondary outcome variables

State and trait anxiety, using validated STAI (State-Trait-Anxiety Inventory) form Y-6
Physiological parameters – heart rate (bpm), blood pressure (mmHg). All the parameters were measured before and after intervention.

Intensity of anxiety Intensity of pre-exam anxiety was measured using Visual Analog Scale for anxiety (VAS) 30 point scale. It was administered prior intervention, one day before the examination, and 1 hour after the intervention.

VAS- Anxiety:

The VAS-A is a validated scale which is a 100-mm horizontal line divided into 30 equal-sized partitions.¹¹³ The left edge of the scale marked “calm” and the right edge marked “anxious (0= calm and 30= anxious). VAS—A is a single-item measure, also known as subjective units of distress, wherein subjects mark their subjective status on the visual scale. It is simple to afford and rapid in administration, and better understanding and completion rates.

Six Item Version of State Trait Anxiety Inventory:

This 6 item questionnaire was administered along with VAS-A ie., before the intervention and one hour after the intervention. It is a simplified version of STAI which is a 40 item questionnaire from which 1, 3, 6, 15, 16, and 17 items are only used in STAI Y-6

Intervention**Group A (Classical Five element Acupuncture)**

In this group 30 subjects after randomization were treated with classical five element acupuncture. Point's selection was done by “five element shu selection method”. Needle was retained for a period of 20 mins. VAS was given to the subject for scoring before needling and 1 hr after the needles were removed.

Five element shu selection method:

In this method each and every symptom presented by the subjects are correlated with respective five elements based on their distinctive features and functions. Cumulatively the major element with its yin or yang polarity has been identified. Further, the selected element will be matched with the ‘shu group (1-5) – which is grouped according to the functions’, based on this a point is selected from 60 points of command. Along with the selected point supportive points like yuan source, xi-cleft, back-shu, front-mu points are used according to the need.

Single shu point and an average of 3-5 needles for supportive points were used. The aim of five element acupuncture is to eliminate the pathogenic factor (8 factors according to acupuncture) and strengthening the affected element.

Eg: If Patient present symptoms like

- c/o headache on the temple area of the head – (headache belongs to wood element, sides of the head represents GB meridian).
- c/o Pulling pain around the left eye – (pulling nature represents wood, eye organ is related with wood element)
- c/o Pain in left side of the neck – (SI meridian passes over the sides of the neck)
- c/o Vomiting sensation – (it represents wood and earth element)

The majority of symptoms reveal the imbalance in the wood element and disturbance in qi flow. Along with it gastro- intestinal disturbance is present, which is related to the 5th group of the Shu table. All the symptoms are acute and external and represents yang imbalance. Therefore GB meridian of wood element whose 5th group point from Shu table (i.e.) GB 34 is selected and needled. This corrects the imbalance among

the elements. Later, to strengthen the meridian source point of GB can be given bilaterally. This approach identifies the root cause of the condition and helps to treat accurately.

Group B (Western Acupuncture)

In western acupuncture style pre- determined set of acupuncture points were given for a period of 20 mins. VAS was given to the patient for scoring before needling and 1 hr after removing the needle.

Points used for group B (Western acupuncture group)

GV 20(BAIHUI)
EX 6 (SISHENCONG)
GB 8 (SHUANIGU)
GB 20 (FENGCHI)
EX 7 (YIMING)

Needling

Needling methods for both groups were same. Both groups were treated with ‘use and throw’ stainless steel needles. Needles with the measurement of 0.25 * 0.25 were used throughout the study. Sterile measures were adopted and used needles were carefully disposed. Needles were inserted till the level where the sensation of presence of needle was perceived by the subject or at the level where deqi

Data Extraction:

Data were collected as self-reported observations using primary outcomes and secondary outcome variables. Baseline data were obtained on the day before examination. After randomization and respective interventions post data were obtained 1 hour after the intervention. Data were organized in Microsoft Excel sheets (version 2010).

Results

The present study was conducted to compare and evaluate the acute effect of classical five element acupuncture and Western Acupuncture on pre-exam anxiety of 1st year B.N.Y.S students. The effectiveness of intervention were assessed based on the outcome variables viz 30 point VAS-A score, blood pressure, heart rate and STAI Y-6 questionnaire. The primary outcome variable was measured using 30-point VAS-A score, taken before and after intervention one day before the examination. The secondary outcome variables were blood pressure, heart rate and STAI Y-6 questionnaire administered along with VAS-A

The measured outcome variables were statistically analyzed using SPSS software – version 16. PAIRED T-TEST was used to assess the outcome.

Primary outcome: Both the groups are statistically significant in reducing intensity anxiety ($p < 0.001$), however on observing t value Group A showed better improvement than Group B.

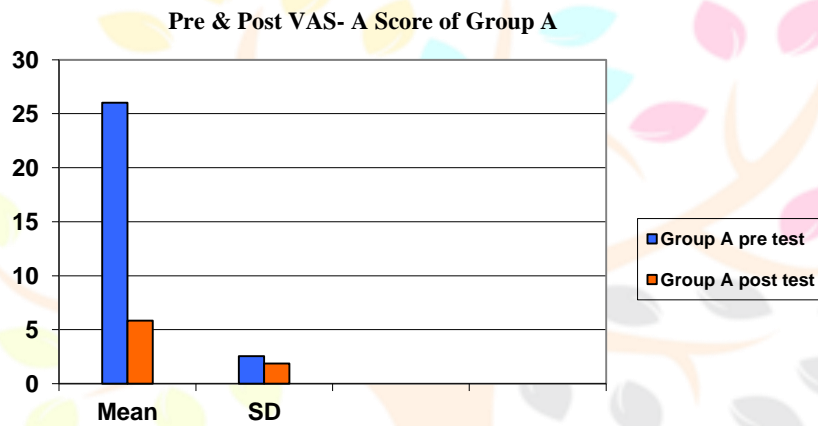
Secondary outcome: Analysis of blood pressure both systolic and diastolic showed statistically significant changes in both groups. However on observing the t value, Group A showed better improvement than group B

in lowering both systolic and diastolic blood pressure. Heart rate also showed statistically significant changes in both the groups and t value was higher in group A compared to group B. On analyzing STAI Y-6 Questionnaire, there results were statistically significant in both the groups.

Demographic details among the subjects recruited

A total of 60 subjects participated in the study. In which Group A had 30 subjects (Female: 24; Male: 6) and Group B received 30 subjects (Female: 23; Male: 7). The recruited subject’s age ranged between 17- 18 years. All the subjects were students and unmarried.

GROUPS		N	MEAN	SD	T- TEST
Group A	Pre- test	30	26.03	2.54	36.4769
Group A	Post- test	30	5.83	1.86	

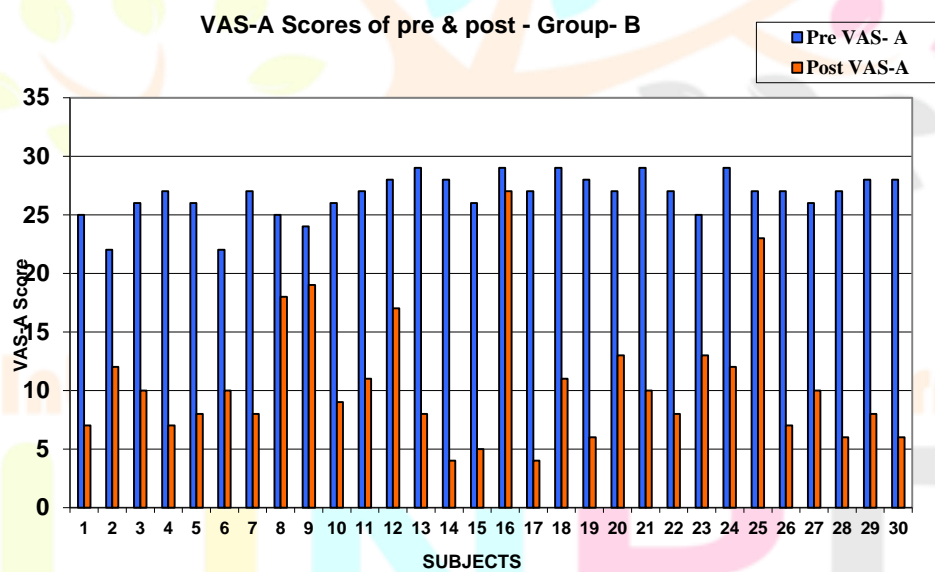
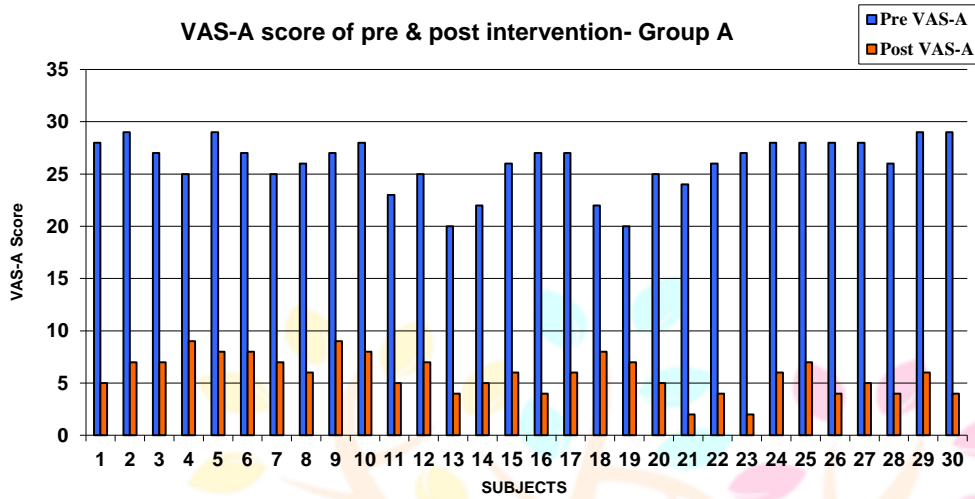


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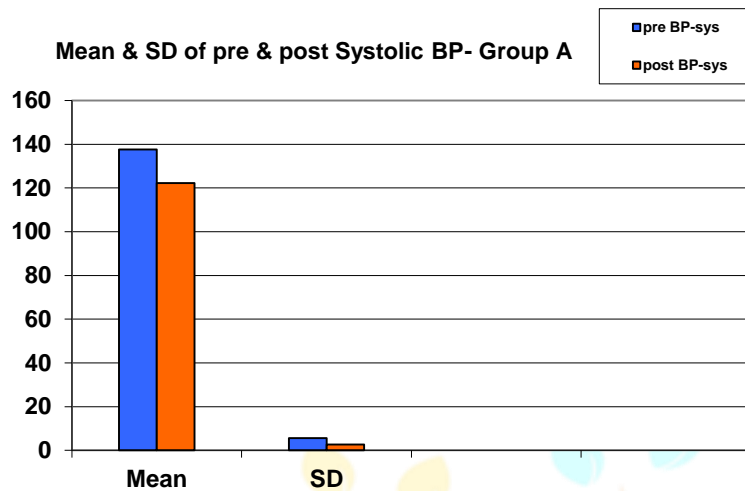
GROUPS	VAS- A	N	MEAN	SD	T value	P value
GROUP A	Pre	30	26.03	2.54	36.4769	<0.0001
	Post	30	5.83	1.86		
GROUP B	Pre	30	26.70	1.84	15.1434	<0.0001
	Post	30	10.57	5.46		

Research Through Innovation

Table shows difference in magnitude of anxiety among both groups. Data collected using VAS-A tool before and after intervention. The observed value between pre and post VAS-A scale in both groups showed significant changes. However on observing the difference in the mean, SD of pre and post scores and the T value in both groups, Group A showed better reduction in magnitude of anxiety.



GROUPS		N	MEAN	SD	T VALUE
Group A	Pre	30	137.60	5.67	14.8893
Group A	Post	30	122.27	2.72	

BP SYSTOLIC Mean, S.D and t-value of pre & post SYSTOLIC BP among group A**Discussion**

Pre- Exam anxiety is the major psychological stressor faced by the students of all ages. It is seldom recognized as a problem to seek medical help but has a spectrum of detrimental effects upon student's psychological well-being and performance in exam. In the current study, the effectiveness of classical five element acupuncture and western acupuncture on pre-exam anxiety was compared. Points used to treat Western Acupuncture group were GV 20, EX 6, GB 8, GB 20 and EX 7. Each point has its own character and action which helps to reduce the anxiety levels of the subject, this has been explained.

Method adopted to treat Group A was 5 element shu selection. On reviewing prior studies on pre exam anxiety, trials were conducted using only verum acupuncture (Chinese acupuncture) with specific set of points. To my knowledge studies involving TCM diagnosis and providing individualized treatment were very few.

A study by Jerusa A.A et al stated "results of their pilot study used individualized treatment in real acupuncture group, seem to offer best approach. It takes into account all clinical signs and symptoms presented by each patient."¹³² Therefore in this study also TCM diagnosis and individualized treatment was given to the subjects in Group A (classical five element group). reveals that both groups help in significant reduction of anxiety intensity ($P > 0.001$). In group A and the major element disturbed was corrected and tonified where as in Group B correction of imbalance in elements weren't done. However the change in intensity of anxiety may be due to specific action of these individual points.

This calming and relaxing effect of acupuncture can be explained to some extent with the hypothesis from previous studies. A study states that patients suffering from anxiety exhibited parasympathetic hypo-function, autonomic nerve dysfunction and sympathetic hyperfunction.¹¹⁵ The results discussed above suggest that the treatment may have enhanced the regulatory ability of the autonomic nervous system, possibly by increased vagal nerve excitability.

According to TCM, the predominant symptoms of anxiety are fear, shortness of breath, disturbed sleep, dizziness, irritability, forgetfulness, restlessness and headache which are related to disturbance of water, fire and

wood elements. In this study's classical group, the points selected to the patients vary among the elemental points of these three elements along with few in earth element. Supporting the involvement of water, fire and wood elements, it was stated by Wocao Wu et al that pre-exam anxiety is majorly associated with heart, liver and kidney function. The anxiety scales of STAI-Y showed significant changes in both groups.

However on observing the difference in the mean, SD of pre and post and t value in both groups, Group A showed better improvement than group B. Analysis of physiological parameters among both groups, the observed value between pre and post intensity showed significant changes in both the groups. (Group A $P < 0.0001$ and Group B $P < 0.0001$). Though both group treatments among the groups are significant Group A showed better changes than Group B. On the whole, patients in the classical five element group showed significant improvement in the reduction of magnitude of anxiety than western acupuncture group. The betterment was also observed in physiological parameters of blood pressure and heart rate.

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