



# Teaching Basic Suturing Skills To Undergraduate Students Of BAMS Using *Yogya Vidhi*

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**Abstract:** The undergraduate students of Ayurveda have to learn about medicine and surgery. The theoretical aspects needs to be accompanied by basic surgical skills. The curriculum does not provide direct student-patient access particularly in surgery. Hence there has to be an approach like simulations or mannequins for teaching surgical skills. Ancient classical texts narrates this as '*Yogya vidhi*'. Present project is an attempt to design a teaching learning module for basic suturing skills (*Seevan karm*). Assessment tool used to evaluate cognitive, psychomotor and skill improvement in student volunteers. 11.53% volunteers performed excellent, 42.30% volunteers did Very Good, 38.46% volunteers were Good and only 7.69% were among satisfactory scoring zone. The improvement in knowledge is found statistically significant  $p < 0.05$ .

**Index Terms -** *Yogya vidhi*, Suturing, *Seevan karm*, OSATS, teaching-learning tools

**I. Introduction:** The undergraduate students studying Medicine and Surgery of Ayurveda derive ancient protocols through classical texts written by various *Acharya*. *Sushrut Samhita* is one very popular *Samhita* specially attributed to surgical branch of Ayurveda, the *Dhanvantari sampraday*. *Acharya Sushruta* is worldwide respected as "Father of Surgery in India" <sup>(1)</sup>. *Sushruta* has very rightly designed and contributed a chapter "Yogyasutriyam" to learn surgical techniques on an objects before practicing of similar techniques on human beings<sup>(2)</sup>. Mere theoretical knowledge especially of the surgical procedures cannot produce a competent medical professional. Practice of numerous technique is must to gain skill proficiency. For this purpose, *Sushruta* explained and demonstrated different kinds of "*Yogya Vidhi*". He has been emphasized so seriously for new learners to practice similar operations on simulated objects for obtaining highest rate of success and become a life giver medical professional<sup>(3)</sup>. For example practice of excision (*Chhedan karma*) can be done on pumpkin and cucumber. The idea behind the selection of this fruit that outer surface of this fruit are not so hard and inner compartment is bulky and soft so that a new scholar can easily cut feel that what much pressure is required to excise. Practice of incision and drainage (*Bhedan karma*) can be done on a leather bag, leathern pot containing full of water and slim. Whenever a scholar has tend to practice incision over this model, he will judge the exact pressure is required to incise and how to explore a cavity. Scraping (*Lekhan karma*) can be practiced using broad sheet of dead animal leather with hair. Puncturing (*Vedhan karma*) can be practiced using veins of dead animal and stalk of lily plant. Probing (*Esana karma*) can be practiced using holes in pieces of wood eaten by moths. Suturing (*Seevan karma*) can be practiced using thin and thick cloths. Bandaging (*Bandhan*) could be using models, mannequins prepare from mud / cloths <sup>(4)</sup>. A scholar can develop his surgical skill in a safe and regulated environment <sup>(5) (6)</sup>.

**II. Material & Methods:** The undergraduate students of Ayurveda have to learn about medicine and surgery. The theoretical aspects needs to be accompanied by basic surgical skills. The curriculum does not provide direct student-patient access particularly in surgery. Hence there has to be an approach like simulations or mannequins for teaching surgical skills. Ancient classical texts narrates this as '*Yogya vidhi*'. Present project is an attempt to design a teaching learning module for basic suturing skills (*Seevan karm*). Assessment tool used to evaluate cognitive, psychomotor and affective domain improvement in student volunteers.

Workshop - Investigators organized "*Yogya Vidhi* learning suturing workshop" for final year BAMS students at *KVTR Ayurved College, Boradi*. The workshop were announced to all final year BAMS students. 26 Students eventually registered and attended the workshop on a voluntary basis. The suturing workshop covered the principles of wound closure as well as basic knot tying and suturing techniques. Initially the student volunteers were familiarized to different kinds of knots and suturing technique through a practical demonstration / video clips / power point presentations, subsequently volunteers attended practice sessions of suturing skills on specially designed suturing pad (simulation) in small groups of three to four students with designated experts.

Suturing Assessment – Both before and after teaching we assessed students suturing ability. This involved them closing a 5cm wound in a synthetic suturing pad using an interrupted suturing technique. The time limit was set as 10 min. for this task. These were analyzed by an investigator blinded as to whether the sutured pad is pre or post teaching, using OSATS. For each suture pad the number of suture completed is counted, inter suture distance measured and suture tension is assessed using a previously described method and recorded measurements using a millimeter Vernier caliper scale.

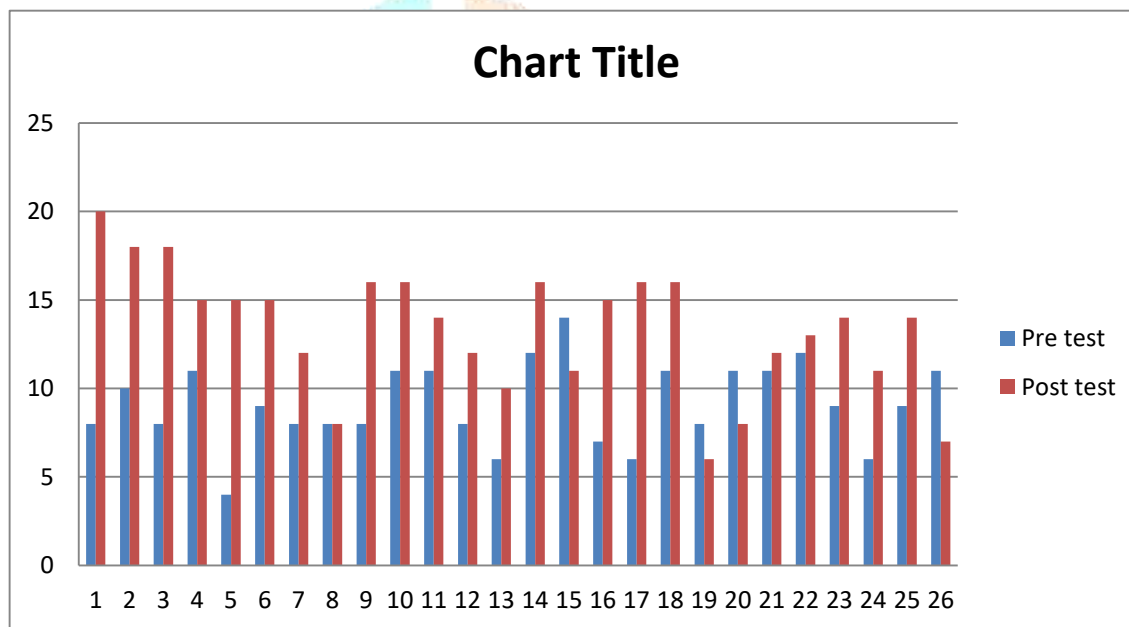
Questionnaire – Following the workshop student volunteers answered a questionnaire. This is to assess their basic knowledge about *Yogya Vidhi* and basic suturing skills. The impact of the workshop on their suturing techniques and their desire to pursue a surgical career. A four point Likert scale is used to score their responses (1. Strongly disagree 2. Disagree 3. Agree 4. Strongly agree. ) with a space for free text comments to the question. What was good about the workshop?

III. **Results:** The preliminary survey revealed the need for surgical skill curriculum. The simulation approach in “*Yogya Vidhi*” in *Sushrut Samhita* shows significant improvement in basic suturing skills with mean cumulative pre course and post course values. The self-evaluation contained positive feedback as well.

The cognitive domain has been assessed with a pre-post test on the day of workshop.

There is clear demarcation in scores attained by student volunteers (Figure 1), showing definite knowledge improvement post workshop, the same has been assessed on statistical parameters and found significant;  $p < 0.05$  (Table: 1).

Figure: 1



**Table: 1 Weich's correction (Repeated measures one-way ANOVA data)****Table Analyzed**

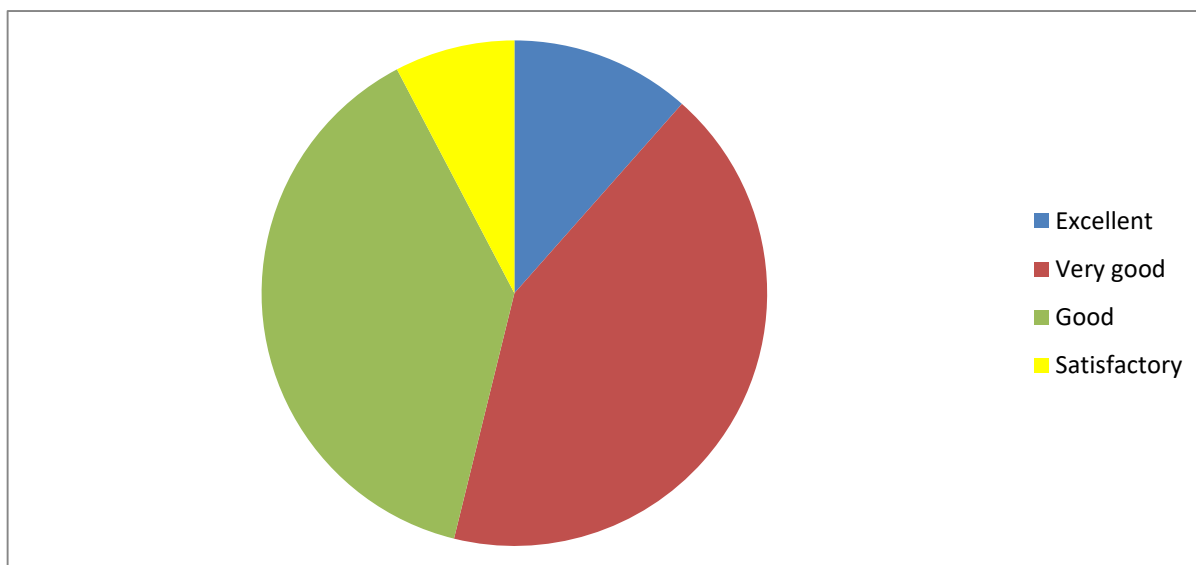
Column B vs. Column A	POST-TEST vs. PRE-TEST
<b>Unpaired t test with Welch's correction</b>	
<b>P value</b>	<b>&lt;0.0001</b>
<b>P value summary</b>	<b>****</b>
<b>Significantly different (P &lt; 0.05)?</b>	<b>Yes</b>
<b>One- or two-tailed P value?</b>	<b>Two-tailed</b>
<b>Welch-corrected t, df</b>	<b>t=5.138 df=43.1</b>
<b>How big is the difference?</b>	
<b>Mean ± SEM of column A</b>	<b>9.115 ± 0.4551, n=26</b>
<b>Mean ± SEM of column B</b>	<b>13.38 ± 0.6952, n=26</b>
<b>Difference between means</b>	<b>4.269 ± 0.8309</b>
<b>95% confidence interval</b>	<b>2.594 to 5.945</b>
<b>R squared (eta squared)</b>	<b>0.3798</b>
<b>F test to compare variances</b>	
<b>F, DFn, Dfd</b>	<b>2.333, 25, 25</b>
<b>P value</b>	<b>0.0387</b>
<b>P value summary</b>	<b>*</b>
<b>Significantly different (P &lt; 0.05)?</b>	<b>Yes</b>

The Psychomotor domain was assessed using OSATS, on a 20 points checklist. The observations found are as follows

**Table: 2**

No.of students	Score	Grade	Remark	%
03	18,19,20	A+	Excellent	11.53
11	15,16,17,	A	Very good	42.30
10	12,13,14	B+	Good	38.46
02	09,10,11	B	Satisfactory	07.69

Total students = 26

**Figure: 2**

**Discussion:** A large number of medical graduates are not acquired with the basic surgical skills. Current medical education incorporate concept of experimental training <sup>(7)</sup>. The basic surgical fundamentals may be practiced using various manikins, virtual reality simulators, low & high fidelity bench models etc. as teaching- learning tools <sup>(8)</sup>. This module is already described by *Acharya Sushrut* as “*YOGYA VIDHI*” nearly 7<sup>th</sup> or 6<sup>th</sup> century BCE <sup>(9)</sup>. The concept of *Yogya vidhi* and modern day equipment are blended to design the workshop. 11.53% volunteers performed excellent, 42.30% volunteers did Very Good, 38.46% volunteers were Good and only 7.69% were among satisfactory scoring zone. “*Yogya Vidhi* learning suturing workshop” enhanced *Ayurveda* student’s competence with basic surgical skills and inspired them towards a career in surgery. Though it has taken some efforts from faculty, it is a cost effective and sustainable way to ensure ongoing undergraduate surgical skills exposure.

The feedbacks from volunteers reveals a positive approach towards learning the topics in curriculum by audio visual aids rather than traditional classroom teaching. Furthermore the clinical and surgical skills can be more efficiently acquired with practice on simulation. Hence it is highly recommendable to institutions of *Ayurvedic* medical science to adopt modern day medical education practices to provide a better amalgam of knowledge and skill to the future health care providers of society.

**Conclusion:** “*Yogya Vidhi*” in *Sushrut Samhita* mimics simulation in modern medicine to learn basic surgical skills. Researchers followed Halstedian approach of “see one, do one, teach one” <sup>(10)</sup>. This project helped to acquaint students with a very important topic in general practice that is suturing.

According to the statistical analysis knowledge content of volunteers got a boost, as evident from significant improvement in the test scores (Table: 2). Students were more confident to perform suturing after they practice suturing of simulated suturing pads. This can be confirmed on the scores of OSATS, where majority of students performed better than average (Figure: 2). Hence it can be suggested to focus more on “*Yogya Vidhi*” that is a simulation approach into the undergraduate curriculum of *Ayurveda*. So that students become more proficient in handling surgical instruments and basic surgical skills before stepping into a real surgical situation.

**Impact:** *Yogya vidhi* (simulation) is an effective practice to enrich undergraduate medical students in cognitive, psycho-motor and affective domain of surgical knowledge.

**Limitations:** Present study was conducted on a small sample size and covered only suturing skills. Other skills may also be tested on a larger sample size.

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