



EFFECTIVENESS OF IMPLEMENTING 'DOUGHNUT ROUND' IN SELF DIRECTED LEARNING OF ANATOMY IN PHASE 1 MBBS STUDENTS

Anatomy

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ABSTRACT

Introduction: In present Competency based Medical education curriculum MCI proposed a separate hours for the self directed learning for each subjects. "Doughnut Rounds" are one of the methods of the SDL where students participate with his/her peer actively. Till now so far the literatures have been searched for, its implementation in discipline of Anatomy has not been found searched.

Aim: To assess the effectiveness of the Doughnut Rounds in Self Directed Learning Sessions in Anatomy, amongst the Phase 1 MBBS students

Methodology: After the permission from Institutional Ethics Committee, with the volunteering students three rounds of Doughnut Rounds have been arranged in Phase 1 MBBS students of the last academic year in three topics viz clinical applied parts of inferior Extremity, Thorax and Abdomen. Pre-test and Post test MCQ based prevalidated questionnaire was placed to assess the effectiveness of participation in DR.

Result: In the inferior extremity In the pretest of the abdomen 22 % students passed, with 54 % students getting less than 29%. In post-test, 88 % students passed, with no student getting less than 29%. The difference in the pre-test & post-test marks was statistically significant. The difference in the number of students passing in the pre-test & post-test was also statistically significant. In abdomen (n=41) in the pre-test the pass: fail ratio was 9:32 (22:78) with 22(54%) students getting less than 29% and nobody managing to cross 59% and in post-test the ratio was 36:5 (88:12) with no student getting less than 29% and 27 (66%) students getting more than 59% & 4 (10%) students crossing 79%. In the pretest of the thorax 53 % students passed, with 10 % students getting less than 29%. 42 % students crossed 59% and 16% students got more than 79 %. In post-test, 88 % students passed, with no student getting less than 29%. Moreover 72 % students got more than 59% with 39 % students crossing 79%. The difference in the pre-test & post-test marks was statistically significant. The difference in the number of students passing in the pre-test & post-test was also statistically significant.

Conclusion: This study reflects well the effectiveness of implementing the Doughnut rounds in Self Directed Learning sessions of Anatomy.

KEYWORDS

Anatomy teaching; Self Directed Learning; Doughnut round

INTRODUCTION:

The 21st century medical scenario has changed lips and bounds. The advent of laser treatment, educating the society regarding the control of contagious diseases, teaching the "overly knowledgeable patients" regarding the ill effects of OCTs, the domain of work and the roles of IMG has evolved. Now the key roles of an IMG are Clinician, Communicator, Lifelong Learner, Leader, Professional (C2L2P). An undergraduate student has the idea of a clinician. But the rest are still uncovered. To keep themselves relevant all through they must fulfill one of the requirements of an IMG, i.e. be a "Lifelong Learner". To be a lifelong learner, the individual has to understand his/her "learning goal", visualized through "need to achieve the goal", achieved through "human and material resources for learning" and "choosing and implementing appropriate learning strategies" and finally "evaluate self for learning outcomes".

To keep the knowledge of a medico relevant over the years, the newer "learning goals" had been formulated, leading to "curriculum hypertrophy" as said by Abrahamson (1978)¹ and seen in the huge syllabus of the undergraduate medical students. To address this point MCI has introduced compulsory attendance in CME, workshops, conferences and making publications mandatory for promotions. But as the saying goes, one can only take the horse to the water but not drink for it, similarly these steps had not been able to fulfill the desired outcome. It has been long proved that a self-motivated initiative can go a long way, than being imposed upon. Hence the concept of Self Directed Learning (SDL) has been introduced as a part of undergraduate curriculum.

Why SDL

1. Taking the initiative in learning leads to learn more things and learn better.
2. Self-directed learning is a sign of taking responsibility, is a sign of maturity, and is a sign of psychological development.

Implementing the idea of SDL for post graduation students, is easier as they have the necessary background knowledge of the subjects, knows about standardized resources and how to gather them, has the idea of what is relevant and what is not. But to introduce it for a group of individuals, who does not have the necessary background knowledge is always difficult. Hence the idea of teacher assisted SDL. Here the

role of the teacher is not to provide the knowledge but

1. To make understand the relevance of the knowledge gathered.
2. To judge the authenticity of the available resources.
3. The quantity of the knowledge to be gathered for the task.
4. To show how to link the acquired knowledge, in gathering and understanding the future knowledge.

These have led to an emphasis on "lifelong learning skills." These include

1. The ability to analyze problems.
2. Define what needs to be learnt.
3. Know how and where to access information. Check for the authenticity of the information.
4. Evaluate information.
5. Be aware of the one's own limitations.

Doughnut Rounds (DRs) are an innovative approach to self-directed learning (SDL). The doughnut activity enables students to have a structured conversation with several people in a short space of time. It is particularly suitable for younger students.

The format of the Drs²

1. The students stand in two concentric circles facing each other.
2. Working with the partner they face, they take it in turns to share information and ideas or ask each other question.
3. At a signal from the teacher the outside circle moves a given number of places clockwise.
4. Students now report to the new partner and repeat the process.

| ROUND 1 | A | B | C | D | E |
|---------|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | |
| ROUND 2 | A | B | C | D | E |
| 2 | 3 | 4 | 5 | 1 | |
| ROUND 3 | A | B | C | D | E |
| 3 | 4 | 5 | 1 | 2 | |
| ROUND 4 | A | B | C | D | E |
| 4 | 5 | 1 | 2 | 3 | |
| ROUND 5 | A | B | C | D | E |
| 5 | 1 | 2 | 3 | 4 | |

The purpose of this study was to explore the usefulness of DRs in learning the clinical anatomy of the lower limb, abdomen & thorax.

DRs had previously been used in Surgical ICU training³, for teaching trauma and orthopaedics to 1st year students⁴ DRs have also been used as informal discussion sessions for curricular development in other disciplines, such as Nursing⁵. DRs had been utilised to identify the perceived needs of learners and hence identify new topics for continuing education⁶.

In 2017 a pilot study of doughnut rounds in clinical anatomy was carried out⁷.

Most of the previous studies have focused on DRs in the clinical disciplines of Surgery, Orthopaedics and Nursing. The purpose of this topic is to understand the feasibility of DRs in as a tool for self directed learning, in the pre-clinical subject in India.

Objective

To assess the effectiveness of the Doughnut rounds as the toll for Self Directed Learning in Phase I MBBS Students of Anatomy

MATERIALS & METHODS

Study design: Interventional Study

Study setting: Calcutta National Medical College

Study duration: Six (6) months

Study participants: Phase I MBBS students undergoing training in Anatomy

Inclusion: By choice or volunteering

Exclusion: None

Sample size: 40

Sampling method: Systematic Random sampling

Informed consent: Yes

IEC approval: Yes

The portion of Lower Limb, Abdomen and Thorax were divided into multiple clinically relevant portions after the scheduled topics were completed according to the regular class routine. Post a mock session on Doughnut Rounds (Drs), students were asked to volunteer. The volunteering students were divided into smaller groups of 6-8. The volunteering students were given the preselected topics and were asked to frame questions with the answers and submit them to a moderator (a faculty member). The moderator ensured the relevance of the question, reliability of the answer, ensured no repentance of questions and briefed the supervising senior student. Under the senior student's supervision, participating students took part in the DR after a week. The senior student ensured about the correct answer. With every DR a pre-test and post test MCQ based question on the topic,

At the end of all the sessions both participating and non-participating students were invited to take part in a MCQ based mock exam covering lower limb, abdomen & thorax.

At the end of each part the pre-test marks were compared with post-test marks and any significant difference was searched for. likert scale, used during pre-test and post-test was checked for any change in the intensity of their feelings. At the end of all the three parts, participants and similar number of non participants were tested against single MCQ based question. The difference in the performance between the case and the control was then searched for any significant difference.

Statistical analysis: Data were analyzed using SPSS (Statistical Package for Social Sciences) version 20.0, IBM, Armonk, NY, USA. Wilcoxon test was applied to compare the mean scores before and after intervention and McNemar's chi-square test was applied to compare the paired nominal data of 50% pass marks at 5% significance level.

OBSERVATION & RESULTS

The DR of the inferior extremity was carried out with 21 volunteers in the stated format. For the subsequent parts the number of volunteers increased to 41 for abdomen and 43 for thorax. The below given tables are the results of the DRs. The pass percentage was taken as 50%.

Table 1: Comparison of percentage marks achieved in pre-test & post-test of DR rounds in SDL in the topics of (1) inferior extremity, (2) Abdomen & (3) Thorax

| Percentage of marks | Inferior extremity | | Abdomen | | Thorax | |
|---------------------|--------------------|-----------|----------|-----------|----------|-----------|
| | Pre-test | Post-test | Pre-test | Post-test | Pre-test | Post-test |
| 90-99% | 0 | 0 | 0 | 0 | 1 | 8 |
| 80-89% | 0 | 0 | 0 | 4 | 6 | 9 |
| 70-79% | 0 | 1 | 0 | 9 | 3 | 4 |
| 60-69% | 0 | 2 | 0 | 14 | 8 | 10 |
| 50-59% | 1 | 8 | 9 | 9 | 5 | 7 |
| 40-49% | 3 | 5 | 5 | 3 | 10 | 5 |
| 30-39% | 5 | 2 | 5 | 2 | 9 | 0 |
| 20-29% | 4 | 2 | 12 | 0 | 1 | 0 |
| 10-19% | 7 | 1 | 9 | 0 | 0 | 0 |
| 0-9% | 1 | 0 | 1 | 0 | 0 | 0 |

In inferior extremity (n=21) in the pre-test the pass: fail ratio was 1:20 (5:95) with 12 (57%) students getting less than 29% and nobody managing to cross 59% and in post-test the ratio was 11:10 (52:48) with 3 (14%) students getting less than 29 % and 3 (14%) students getting more than 59%.

In abdomen (n=41) in the pre-test the pass: fail ratio was 9:32 (22:78) with 22(54%) students getting less than 29% and nobody managing to cross 59% and in post-test the ratio was 36:5 (88:12) with no student getting less than 29% and 27 (66%) students getting more than 59% & 4 (10%) students crossing 79%.

In thorax (n=43) in the pre-test the pass: fail ratio was 23:20 (53:47) with 10 (23%) students getting less than 29% , 18 (42%) students managing to cross 59% and 7 (16%) students getting more than 79 % . In post-test the ratio was 38:5 (88:12) with no student getting less than 29 % , 31 (72%) students getting more than 59% and 17 (39%) students secured above 79%.

Table 2: Comparison of percentage marks achieved in pre-test & post-test of all three parts

| Parts | Percentage of students | | | | | |
|----------------|------------------------|-----------|----------|-----------|----------|-----------|
| | Inferior extremity | | Abdomen | | Thorax | |
| Marks obtained | Pre-test | Post-test | Pre-test | Post-test | Pre-test | Post-test |
| <29% | 57% | 14% | 54% | 0 | 23% | 0 |
| <49% | 95% | 48% | 78% | 12% | 47% | 12% |
| >49% | 5% | 52% | 22% | 88% | 53% | 88% |
| >59% | 0 | 14% | 0 | 66% | 42% | 72% |
| >79% | 0 | 0 | 0 | 10% | 16% | 39% |

Table 3: Average marks achieved in pre & post-test of all three parts

| Inferior extremity | | Abdomen | | Thorax | |
|--------------------|-----------|---------|----------|---------|----------|
| Pretest | Post test | Pretest | Posttest | Pretest | Posttest |
| 28 % | 48 % | 26.97 % | 63.43 % | 54.5 % | 69.6 % |

There is a difference in the number of students achieving percentage of marks in the pre-test and the post-test of a particular part. In pre-test the number of students achieving lower percentage of marks in inferior extremity > abdomen > thorax. Similarly in pre-test the higher percentage of marks obtained in inferior extremity < abdomen < thorax. The number of students passing in the pre-test in inferior extremity < abdomen < thorax. The average marks in all the three parts increased in the post test.

Table 4: Statistical analysis of percentage marks achieved in pre-test & post-test of all three parts

| Part | Pre-test score (mean±SD) | Post-test score (mean±SD) | P value |
|-----------------|--------------------------|---------------------------|----------|
| Inferior (n=21) | 6.14 ± 2.632 | 10.57 ± 3.218 | p<0.0005 |
| Abdomen (n=41) | 16.51 ± 7.490 | 32.51 ± 5.891 | p<0.0005 |
| Thorax (n=43) | 16.37 ± 5.546 | 20.88 ± 5.020 | p<0.0005 |

Statistically the percentage of marks achieved in post-test is significantly more, than in pre-test

Table 5: Mc Nemar's chi square test for 50% marks achieved in pre-test & post-test

| Parts | Pre-test score | Post-test score | | P value |
|-------|----------------|-----------------|-----------|---------|
| | | Above / = 50% | Below 50% | |

| | | | | |
|---------------------------|---------------|----|----|----------|
| Inferior Extremity (n=21) | Above / = 50% | 10 | 10 | p<0.0005 |
| | Below 50% | 0 | 1 | |
| Abdomen (n=41) | Above / = 50% | 2 | 28 | p<0.0005 |
| | Below 50% | 0 | 11 | |
| Thorax (n=43) | Above / = 50% | 5 | 15 | p<0.0005 |
| | Below 50% | 0 | 23 | |

Statistically the number of students passing in post-test is significantly more, than the number of students passed in pre-test.

Table 6: Comparison of marks achieved by volunteering and non-volunteering students

| Marks achieved | Volunteers (n=40) | Non-volunteers (n=40) |
|------------------------|-------------------|-----------------------|
| 80-89% | 3 (7.5%) | 0 |
| 70-79% | 2 (5%) | 0 |
| 60-69% | 4 (10%) | 1 (2.5%) |
| 50-59% | 9 (22.5%) | 1 (2.5%) |
| 40-49% | 13 (32.5%) | 7 (17.5%) |
| 30-39% | 6 (15%) | 15 (37.5%) |
| 20-29% | 3 (7.5%) | 12 (30%) |
| 10-19% | 0 | 3 (7.5%) |
| 0-9% | 0 | 1 (2.5%) |
| Average Marks achieved | 48.5 % | 29.37 % |
| >50% | 18 (45%) | 2 (5 %) |
| < 50% | 22 (55%) | 38 (95 %) |

In the final exam (n=40) the pass: fail ratio of the volunteers was 18:22 (45:55) and that of the non-volunteers was 2: 38 (5:95). Average marks achieved being 48.5% and 29.37% for volunteers and non-volunteers respectively.

Table 7: Statistical analysis of marks obtained by volunteering and non-volunteering students

| | Group | N | Mean | Std. Deviation |
|-------|----------------|----|-------|----------------|
| Marks | Volunteers | 40 | 48.13 | 15.471 |
| | Non-volunteers | 40 | 30.13 | 11.064 |

Table 8: Chi square test

| | t | df | Sig. (2-tailed) | 95% CI | | |
|-------|-------------------------|-------|-----------------|--------|--------|--------|
| | | | | Lower | Upper | |
| Marks | Equal variances assumed | 5.985 | 78 | .000 | 12.013 | 23.987 |

There was a **significant difference** in the scores for volunteers (M= 48.13, SD 15.471) and non-volunteers (M=30.13, SD= 11.064) conditions; $t(78) = 5.985, p < .0005$

Statistical analysis: Data were analyzed using SPSS (Statistical Package for Social Sciences) version 20.0, IBM, Armonk, NY, USA. Wilcoxon test was applied to compare the mean scores before and after intervention and McNemar's chi-square test was applied to compare the paired nominal data of 50% pass marks at 5% significance level

DISCUSSION:

The recent Competency Based Undergraduate Curriculum laid down by MCI, proposes for self directed learning. Doughnut rounds are a form of new self directed learning. It has been used in clinical subjects before but it was not used in preclinical subjects. So this was an opportunity to see the usefulness and applicability of the doughnut rounds in clinical anatomy.

The response to the process was lukewarm, in the beginning but with progression of time more and more students volunteered. The entire exercise was divided into three parts. Volunteering students were told to submit two questions with answers to a faculty member, who moderated the questions and the answers. The faculty member also ensured that no question was repeated. The moderated questions and the answers were then handed back to the students. A pre-test MCQ along with a questionnaire based on Likert scaling was given. Under the supervision of a senior student the doughnut round was conducted next. The same MCQ paper was given as post-test along with another questionnaire based on Likert scaling. This was repeated thrice for the part of abdomen and thorax as well. At the end of all the three sessions a final MCQ test was taken for same number of volunteers and non-

volunteers. A final subjective questionnaire based on Like rt scaling was given to the volunteers to understand their feeling. The marks were tallied in excel, with 50% marks being the pass marks. Statistical analysis was carried out using SPSS.

In the inferior extremity difference in the pre-test & post-test marks was statistically significant. The difference in the number of students passing in the pre-test & post-test was also statistically significant. In the pretest of the abdomen 22 % students passed, with 54 % students getting less than 29%. In post-test, 88 % students passed, with no student getting less than 29%. Moreover 66% students got more than 59% with 10 % students crossing 79%. The difference in the pre-test & post-test marks was statistically significant. The difference in the number of students passing in the pre-test & post-test was also statistically significant. In the pretest of the thorax 53 % students passed, with 10 % students getting less than 29%. 42 % students crossed 59% and 16% students got more than 79 %. In post-test, 88 % students passed, with no student getting less than 29%. Moreover 72 % students got more than 59% with 39 % students crossing 79%. The difference in the pre-test & post-test marks was statistically significant. The difference in the number of students passing in the pre-test & post-test was also statistically significant.

In the final exam the 45% volunteering students passed as against 5% of the non volunteering students. The difference in the number of students passing in the final exam was statistically significant.

After carrying out three sessions on the clinical aspect of the inferior extremity, abdomen and the thorax through doughnut rounds, the difference before and after the sessions were found to be statistically significant in all the three sessions. The difference in the performance of the volunteering and the non-volunteering students was also found to be statistically significant in the final exam. The students felt that the sessions helped to improve their knowledge and communication skills. They found the sessions to be more enjoyable and valuable than the traditional large group or small group teachings.

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REFERENCES

1. Abrahamson, S. (1978) Diseases of the curriculum, Journal of Medical Education, 53(12):951-957.
2. <http://esolonline.tki.org.nz/ESOL-Online/Planning-for-my-students-needs/Resources-for-planning/ESOL-teaching-strategies/Oral-Language/Listening-and-speaking-strategies/The-doughnut>
3. FLEISZER D, FLEISZER T, RUSSELL R (1997) Dough-nut rounds: A self-directed learning approach to teach-ing critical care in surgery. Med Teach, 19(3): 190-193.
4. BULSTRODE C, GALLAGHER FA, PILLING EL, FUR-NISS D, PROCTOR RD (2003) A randomised con-trolled trial comparing two methods of teaching medi-cal students trauma and orthopaedics: traditional lec-tures versus the "donut round". Surgeon, 1(2): 76-80.
5. BROOKES D (1991) Self-study programmes and nurs-ing education. Nurse Educ Today, 11(4): 303-309.
6. BOWMAN B, WOLKENHEIM B, LE BECK M, SCHNEI-DER K (1985) Needs assessment: an information pro-cessing model. J Contin Educ Nurs. 16(6): 200-204.)
7. Yimeng Zhang1, Marie A. Zerafa Simler1*, Isabel Stabile2 (2017) Supported self-directed learning of Clinical Anatomy: a pilot study of doughnut rounds, Eur. J. Anat. 21 (4): 319-324 (2017)