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Procedure for online submission of manuscript

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Becoming a doctor is an arduous task. This journey of becoming a doctor from a student is guided by the medical curriculum, which is defined by Kern as an educational experience.\textsuperscript{1} Curriculum has various components comprising of mission and outcomes, educational strategy and content, teaching and learning methods, assessment, student support, faculty development, program evaluation and governance.\textsuperscript{2} One of the main stakeholders of the curriculum are students. In advanced countries, students have been empowered to make decisions regarding their curricula.\textsuperscript{3} However, in authors observation, Pakistani medical students have minimal or no input in designing their curriculum. Student empowerment is defined as 'any attitudinal, structural, and cultural activity, process or outcome where students of any age gain the ability, authority and agency to make decisions and implement changes in their own schools, learning and education, and in the education of other people, including fellow students of any age and adults throughout education.\textsuperscript{4} Student involvement in medical curriculum has been stressed by World Federation for Medical Education (WFME), Liaison Committee for Medical Education (LCME)\textsuperscript{5} and ASPIRE excellence initiatives.\textsuperscript{6} WFME has designed quality standards for basic medical education, which describe the basic standard for attainment of student engagement as “The medical school must have a policy on student representation and appropriate participation in the design, management and evaluation of the curriculum, and in other matters relevant to students”.\textsuperscript{7} In the 1980’s, Harden introduced the concept of ‘SPICES’ model\textsuperscript{8} which is being employed as an educational strategy in many medical schools across the globe. ‘S’ in this model emphasizes on Student centred approach as opposed to Teacher centred learning. Psychologists have also advocated ‘Self-directed learning’ in which students take control of their learning.\textsuperscript{9} One of such strategies employed is ‘Problem based learning’ in which students identify learning issues themselves and then find answers to the questions developed.\textsuperscript{10} This, however, is the minimal level of students being empowered. ‘ASPIRE’, which targets excellence in education, demands involvement of students in different committees pertaining to curriculum, assessment and student affairs.\textsuperscript{6} In medical schools, where students are involved in these committees, improvement in learning of students is expected. In curriculum committees, students can offer their feedback and opinion on mission and vision of medical school, matters of admission test, content volume and difficulty, teaching and learning methodology, time tabling and provision of electives, whereas in assessment committees student’s feedback would be of utmost importance regarding qualitative feedback offered to students by their teachers, frequency of assessment and inclusion of newer assessment techniques. Student affairs committee can provide feedback to the medical school administrators, regarding the infrastructure, educational environment and quality of education provided to them. Role of students in research and mentoring committees is no less important.

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10. Bate E, Hommes J, Duvivier R, Taylor DCM. Problem-based learning (PBL): getting the most out of your students - their roles and responsibilities: AMEE Guide No. 84. Med Teach [Internet]. 2014; 36: 1–12
ABSTRACT

Objective: To determine the beneficial antipsychotic effects of aspirin plus atypical antipsychotic agents in the treatment of schizophrenia.

Study Design: A double blind placebo controlled study.

Place and Duration of Study: The study was conducted in Psychiatry ward of Imam Reza and Shahid Hashemi Mental Hospital in Arak, from April to December 2011.

Materials and Methods: This double blind placebo controlled study was conducted on 60 patients with schizophrenia. Patients were assigned to case group who received an atypical antipsychotic agent (olanzapine, risperidone, clozapine) as the standard treatment of the schizophrenia plus aspirin 1000 mg /daily (aspirin or case group n=30), and 30 patients received standard treatment and placebo (control group, n=30). The PANSS questionnaire was used to evaluate patients at 0, 2, 4, 6 and 8 weeks after treatment. SPSS software was used for data analysis. Student’s t-test was applied and repeated measurement test to compare two groups.

Results: The difference between two groups regarding positive and negative symptoms was not significant (Repeated Measure/P=0.20 and P =0.20 respectively). However, there was a significant difference between two groups regarding general and total symptoms (Repeated Measure/P=0.003 and P=0.032 respectively). The results did not show any remarkable related side effects to aspirin in two groups.

Conclusion: The trial revealed that aspirin 1000 mg /day in combination with antipsychotic drugs for 8 weeks is an effective agent for the reduction of general and total symptoms of schizophrenia. Nonetheless, it did not modify the positive and negative symptoms.

Key Words: Aspirin, Atypical Antipsychotic, Adjunctive Therapy, Schizophrenia.
substance may lead to therapeutic benefits in schizophrenia. So this study was planned to determine the beneficial antipsychotic effects of aspirin plus atypical antipsychotic agents in the treatment of schizophrenia.

Materials and Methods
This double blind placebo controlled study was conducted on 60 patients in Imam Reza and Shahid Hashemi mental hospital in Arak from April to December 2011. In this controlled trial 60 schizophrenic patients based on DSM-V criteria were randomized in two groups. The enrolled participants were counseled, and informed consent was obtained before randomization, as per the institution's protocol. Moreover, the study protocol was approved by the ethics committee of Arak University of Medical Sciences (IRCT registration number: 201108197373N1). The Helsinki Declaration was respected and the patients were presented by a code and remained anonymous during the study. The criteria for enrollment were, schizophrenia based on DSM-IV criteria, age 15-55, at least, PANSS 60. On the other hand breastfeeding and pregnancy, peptic ulcer, aspirin or proton pump inhibitors contraindication and drug abuse were exclusion criteria.

To randomization we used sequential numbers, in this case, the first number was given to the first patient and received an atypical antipsychotic agents (17 patients received Olanzapine, 9 patients Risperidone, and 4 patients Clozapine) as standard treatment of the schizophrenia, also, aspirin 1000 mg/day (aspirin or case group, n=30). Sequentially the next number was given to next patient and received standard treatment, 14 patients received Olanzapine, 11 patients Risperidone, and 5 patients Clozapine) and placebo (control group, n=30). Each placebo tablet contained dextrin and was identical in appearance to the 500 mg aspirin tablet. Pantoprazole 20 mg/daily was administered for all patients. Aspirin and placebo were the same in shape, color, and taste. Both participants and study staff (researcher, examiner, and analyzer) were masked to treatment allocation. The PANSS was used to evaluate patients at 0,2,4,6,8 weeks after treatment. The PANSS is a common and validated questionnaire in clinical studies and assessed the symptoms of schizophrenia based on positive and negative syndrome scale. The 30 items are arranged as 7 positive symptoms (P1-P7), 7 negative symptoms (N1-N7) and 16 general psychopathology symptoms items (G1-G7). The patients in the psychiatric ward in Imam Reza and Shahid Hashemi mental Hospitals were rated within the first week of admission and at weekly intervals for 8 weeks. Baseline PANSS scores on the conceptual disorganization item and the total negative scale score predicted which patients would respond to antipsychotic treatment within 8 weeks.

Statistical analysis
The data were analyzed using Statistical Package for Social Studies version 20.0 (SPSS Inc, Chicago, Ill). Categorical data are presented as numbers (%), and continuous data as mean ± SD. We used the Student's t-test and repeated measurement test to compare two groups. α< 0.05 was considered significant.

Results
Sixty patients mean age 30.11±7.80 were enrolled in the trial. Regarding sex and age distribution the difference between two groups was not significant (P=0.5)(table I). The Mean±SD of positive and negative syndrome scale (PANSS) rating criteria in patients at admission, week 2,4,6 and 8 were assessed. The difference between two groups regarding positive symptoms was not significant at admission and week 2 (Independent t-test /p=0.14 and 0.33 respectively) and was significant at week 4,6 and 8 (Independent t-test /p=0.001 ).

Table I: The Demographic Data of Patients

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Control</th>
<th>Case</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Male</td>
<td>15(50%)</td>
<td>16(53%)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>15(50%)</td>
<td>14(47%)</td>
</tr>
<tr>
<td>Age</td>
<td>30.01±8.8</td>
<td>29.3±6.8</td>
<td>0.6</td>
</tr>
<tr>
<td>Duration of Disease</td>
<td>10.1±5.2</td>
<td>9.3±5.0</td>
<td>0.5</td>
</tr>
<tr>
<td>Admission No</td>
<td>4.40±1.90</td>
<td>3.90±1.60</td>
<td>0.20</td>
</tr>
</tbody>
</table>

Regarding negative symptoms, The difference between two groups was not significant at admission, week 2,4,6,8 (Independent t-test; p=0.14, p= 0.49, p=0.09,0.19 and p=0.29 respectively). There was no significant difference between two groups regarding general symptoms at admission and week 2 (Independent t-test /p=0.08 and 0.1 respectively) and was significant at week 4,6 and 8 (Independent t-test /p=0.001 ). Moreover, we did not detect significant difference between case
and control groups regarding total symptoms at admission week 2 and 4 (Independent t-test /p=0.2, p=0.1, p=0.06 respectively) but we showed significant difference at weeks 6 and 8(Independent t-test /p=0.002, p=0.006 respectively)(table II)(fig 1).

Generally, the difference between two groups regarding positive and negative symptoms was not significant (Repeated Measure/p=0.20 and 0.20 respectively). However, there was a significant difference between two groups regarding general and total symptoms (Repeated Measure/p=0.003 and 0.032 respectively) (table 2, fig1). We did not detect any remarkably related side effects to aspirin in two groups.

![Fig 1: The Changes of the Negative, Positive, General before and after 8 Weeks Treatment and Total Symptoms in Two Groups](image)

Table II: The Mean±SD Positive and Negative Syndrome Scale (PANSS) Rating Criteria in Patients

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Case Mean±SD</th>
<th>Control Mean±SD</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>27.60±3.90</td>
<td>29.10±3.60</td>
<td>0.14</td>
</tr>
<tr>
<td>Week 2</td>
<td>25.30±3.30</td>
<td>24.10±3.50</td>
<td>0.33</td>
</tr>
<tr>
<td>Week 4</td>
<td>21.60±3.10</td>
<td>17.70±3.30</td>
<td>0.001</td>
</tr>
<tr>
<td>Week 6</td>
<td>17.50±3.50</td>
<td>13.90±2.70</td>
<td>0.001</td>
</tr>
<tr>
<td>Week 8</td>
<td>14.70±2.50</td>
<td>10.10±2.20</td>
<td>0.001</td>
</tr>
<tr>
<td>Negative</td>
<td>23.10±3.60</td>
<td>21.80±3.00</td>
<td>0.14</td>
</tr>
<tr>
<td>Week 2</td>
<td>21.60±2.80</td>
<td>21.00±2.80</td>
<td>0.49</td>
</tr>
<tr>
<td>Week 4</td>
<td>15.00±2.40</td>
<td>16.20±2.90</td>
<td>0.09</td>
</tr>
<tr>
<td>Week 6</td>
<td>13.00±2.90</td>
<td>13.90±2.70</td>
<td>0.19</td>
</tr>
<tr>
<td>Week 8</td>
<td>11.30±2.80</td>
<td>12.00±2.70</td>
<td>0.29</td>
</tr>
<tr>
<td>General</td>
<td>48.20±3.90</td>
<td>46.20±4.40</td>
<td>0.08</td>
</tr>
<tr>
<td>Week 2</td>
<td>37.30±4.30</td>
<td>35.40±4.30</td>
<td>0.1</td>
</tr>
<tr>
<td>Week 4</td>
<td>33.20±4.60</td>
<td>29.10±3.60</td>
<td>0.001</td>
</tr>
<tr>
<td>Week 6</td>
<td>29.70±2.90</td>
<td>24.80±3.20</td>
<td>0.001</td>
</tr>
<tr>
<td>Week 8</td>
<td>26.90±3.40</td>
<td>21.60±2.60</td>
<td>0.001</td>
</tr>
<tr>
<td>Total</td>
<td>98.27±4.52</td>
<td>96.13±9.61</td>
<td>0.2</td>
</tr>
<tr>
<td>Week 2</td>
<td>83.97±3.40</td>
<td>81.2±7.80</td>
<td>0.1</td>
</tr>
<tr>
<td>Week 4</td>
<td>70.07±5.50</td>
<td>66.70±7.90</td>
<td>0.06</td>
</tr>
<tr>
<td>Week 6</td>
<td>60.20±3.4</td>
<td>56.23±7.50</td>
<td>0.002</td>
</tr>
<tr>
<td>Week 8</td>
<td>52.40±3.30</td>
<td>56.23±5.30</td>
<td>0.006</td>
</tr>
</tbody>
</table>

Discussion
Recent experiences have indicated the role of infection and inflammation in schizophrenia, these findings designated that prenatal bacterial or viral infections during pregnancy increased the risk of schizophrenia in children. Moreover, comprehensive studies revealed that the levels of interleukin-1 (IL-1) and IL-2, in the CSF were higher among patients with schizophrenia than the general population and complementary studies detected that high level of IL-2 in the CSF was a predictor of relapse of schizophrenia among these patients. Following these findings, some scientists practiced anti-inflammatory agents such as celecoxib and aspirin in schizophrenia as an adjunctive therapy and reported that with these anti-inflammatory agents are disease modifier.

In a controlled trial Laan et al. examined the effect of aspirin in schizophrenia and revealed more improvement among patients treated with aspirin than the placebo group, regarding the PANSS positive and total scores, particularly in patients with cytokines elevation. Furthermore, the authors did not reveal side effects owing to the high dosage of aspirin.

In the current controlled trial, we used aspirin 1000 mg/daily as adjunctive treatment with atypical antipsychotic agents on sixty patients mean age 30.11±7.80 for 8 weeks. The difference between two groups regarding the improvement of positive and negative symptoms was not significant. However, there was a significant difference between two groups regarding the improvement of general and total symptoms. In accord with our findings, Müller et al in 2002 revealed that celecoxib add-on treatment presented beneficial effect on treatment of schizophrenia, similar to our results positive and negative syndrome scale (PANSS) after five weeks treatment with celecoxib improved in two groups and difference between two groups was not significant while like our practice the celecoxib significantly improved the total score.

Consistently 2 years later in another experience, Muller et al. reported that celecoxib significantly improved PANSS total scale. Additionally, Muller et al in 2010 evaluated the effect of Celebrex on forty-nine patients with the first episode of schizophrenia and as oppose to our findings showed significant improvement in Celebrex group regarding positive and negative symptom.
symptoms scale (PANSS). Also, they revealed significant improvement in the CGI (clinical global impression) scale in celecoxib group.\textsuperscript{23} Another trial in agreement to our work in Iran by Akhondzadeh et al. on 60 patients with schizophrenia showed risperidone plus celecoxib significantly improved general psychopathology symptoms, total PANSS score and as oppose to us positive symptoms scales.\textsuperscript{24} The patients in our experience were well matched and the demographic characteristics, such as sex, age, and duration of the disorder, did not differ significantly between two groups and did not correlate with the therapeutic outcomes, so, we concluded that the therapeutic effect could be attributed to the aspirin. In line with our findings, Müller et al in 2002 indicated that sex, duration, and severity of the disorder were not correlated with therapeutic outcomes.\textsuperscript{21} Previous studies have not explained any notable side effects in association with anti-inflammatory agents,\textsuperscript{10,21} consistently we did not reveal any related side effects with the aspirin in this practice. Some limitations such as relatively small sample size and short duration of the treatment adhered to this practice and it would be interesting to evaluate the aspirin efficacy in larger series of patients with schizophrenia over a longer period exclusively to examine effects of aspirin on negative symptoms. In theory, the effect of aspirin and other anti-inflammatory agents without an antipsychotic medication would be more exciting; however, from ethics viewpoint is not acceptable. 

**Conclusion**

We detected that aspirin 1000 mg /day in combination with antipsychotic agents significantly decreases the general and total symptoms of schizophrenia after 8 weeks treatment. However, aspirin was not effective on positive and negative symptoms and more clinical trials are needed to confirm the results of this practice.

**Acknowledgements**

We would like to thank the nursing, the administrative and secretarial staff of the psychiatry department and clinic at Imam Reza and Shahid Hashemi mental Hospital in Arak for their contribution to the maintenance of our patient record without which this project would have been impossible.

**REFERENCES**

ABSTRACT

Objective: To compare the effectiveness of sustained-stretch-mobilization against oscillatory-mobilization in the management of adhesive capsulitis.

Study Design: It was Randomized control trial.

Place and Duration of Study: The study was conducted at Physiotherapy Department of National Institute of Rehabilitation Medicine Islamabad from September 2015 to February 2016.

Materials and Methods: Thirty Seven patients were included in the study and convenient sampling technique was used for randomization. Nineteen patients were treated with sustained-stretch-mobilization Technique and 18 patients were treated with oscillatory-mobilization. Patients with the capsular pattern in frozen and thawing stage with Apley’s scratch test positive, age between 30-60 were included in the study. Patients with limited range of motion due to secondary cause i.e. followed by cervical spondylosis, rotator cuff tendinitis or trauma etc were excluded. Pre-treatment and post-treatment values of range of motion, Numeric pain rating scale and Shoulder pain and disability index were analyzed by SPSS 21.

Results: Both manual therapy techniques are equally effective for external rotation, internal rotation, Numeric pain rating scale and Shoulder pain disability index but abduction showed that oscillatory-mobilization was more effective.

Conclusion: Sustained-stretch-mobilization and oscillatory-mobilization are equally effective for patients with adhesive capsulitis to relieve pain and restore range of motion.

Key Words: Adhesive Capsulitis, Oscillatory-Mobilization, Sustain-Stretch-Mobilization.

Introduction

Adhesive capsulitis is a condition of unknown etiology affecting shoulder mobility and function including stiff and painful shoulder with decrease range of motion in every direction. DUGLAE (1896) was first investigator who recognized this extra articular disorder and designated the clinical term “Scapulo-humeral periarthritis”. CODMAN (1934) described the unknown etiology and termed this condition as “Frozen shoulder”. Later Naviesar (1945) used the term “adhesive capsulitis. Adhesive capsulitis is common among patients in sixth decade of life, and onset before the age of 40 is rare and more common in women than men. The uninvolved shoulder also becomes affected, usually within five years, and after the first has recovered. The non-dominant shoulder is more likely to be affected. An increased prevalence of adhesive capsulitis was confirmed in female patients as well as those who had a longer duration of diabetes mellitus.

Adhesive capsulitis of the shoulder is clinically described as having three phases: FREEZING or painful phase that usually lasts from 2 to 9 months, FROZEN or progressive stiffness phase that lasts for 10-36 weeks, THAWING or resolution phase that typically lasts for 15-24 months in non-operative cases. The symptoms may persist for as long as 6-10 years from onset. Adhesive capsulitis can be of two type’s primary in which patients have symptoms but the etiology is unknown and secondary type in which symptoms are due to definite cause like after surgery, post traumatic, joint or soft tissues injuries.

The pathology of adhesive capsulitis remains unclear. Arthroscopy and open exploration of the capsule shows that the condition affects the glenohumeral capsular tissue and is particularly localized to the coracohumeral ligament. Sign and symptoms of adhesive capsulitis are Pain which starts slowly and is felt at the insertion of the deltoid, inability to sleep on the affected side, little
local tenderness. Restriction of both AROM and PROM in a specific capsular pattern with external rotation limited more than abduction and abduction more than internal rotation. Radiographs are usually normal.

Many treatment modalities are used for this condition and the fundamental goal of treatment is to restore and maintain function. Treatment strategies include Physical Therapy, Non-steroidal anti-inflammatory drugs, Corticosteroid injections, Suprascapular nerve block, manipulation under anesthesia, arthroscopy and open surgery, or combination of these modalities. In physical therapy pain is relieved by electrotherapy, hot pack and range of motion is gained by joint mobilization. There are different schools of thoughts about joint mobilization.

Systemic reviews done by Matthew j page (2014) conclude that a combination of manual therapy and exercise are not so effective when compare with intra articular injections in short term relief. For long term result we need high-quality RCTs to establish the benefits and harms of manual therapy and exercise interventions that reflect actual practice.

Kaltenborn technique of manual therapy gives sustained glides in three grades (I, II, III). Grade I and II are used for pain management and grade III is more effective in improving range of motion. Choi W-SP et al interpreted the effectiveness of Kaltenborn mobilization by measuring the acromion-humeral distance (AHD) whereas inferior glide is applied in grade II and grade III to increase the abduction range of motion. Results showed that grade III mobilization was more effective in improving range of motion.

In Maitland-mobilization oscillatory glides are given in five grades. Grade I and II of Maitland mobilization techniques are primarily used for treating joints limited by pain. Grades III and IV are primarily used as stretching maneuvers. Shrivastava Ankit et al conducted a randomized control trial to compare the effectiveness of Mulligan and Maitland mobilization. Results showed that extension improved more with Mulligan technique while all other ranges showed equal improvement with both techniques. Both techniques were also effective for pain relief but Mulligan gave slightly better result.

Adhesive capsulitis is challenging condition therefore it is difficult to decide which treatment technique is more effective. Many treatment strategies are available now a days but the purpose of the current study was to compare the effectiveness of sustained-stretch-mobilization against oscillatory-mobilization in the management of adhesive capsulitis.

**Materials and Methods**

A randomized controlled trial was conducted at the department of physiotherapy, National Institute of Rehabilitation Medicine Islamabad from September 2015 to February 2016. The inclusion criteria of study were Patient following the capsular pattern of adhesive capsulitis, Frozen and thawing stage, Apley’s scratch test positive, Age 30-60 and 50% limited ROM. All patients had restriction of movements in all directions. Patients were excluded if they had Adhesive capsulitis followed by cervical spondylosis, Limited ROM other than adhesive capsulitis and Patients with Rotator cuff tendinitis. Thirty seven diagnosed adhesive capsulitis patients with age between 30 and 60 were taken. Convenient sampling technique was used to collect the data. After the initial assessment, written informed consent forms were obtained from the participants who met the inclusion criteria. The selected subjects were randomly allocated to two different groups: Kaltenborn mobilization group having 19 patients and Maitland mobilization group having 18 patients. Variables include Numeric Pain Rating Scale (NPRS) for pain and Shoulder Pain and Disability Index (SPADI) for functional outcome measurement and shoulder ROM including external rotation, abduction and internal rotation. ROM was measured by goniometer. After the assessment and the data collection, participants were given the therapeutic intervention according to their groups. Patients were assessed at the 1st and the 10th visit.

In order to compare the effects of two treatment techniques, patients are treated with mobilization and home exercise plan. Glides given included anterior, posterior and caudal glides in Grade III with 10 seconds hold, 10 reps, and 3 sets 5 days a week in mid-range position for 10 days. Before giving glides distraction with 10 seconds hold, 10 repetitions were given and Scapular glides (superior, inferior and medial, lateral) were also included.

Maitland mobilization group (n=19) were treated with Maitland mobilization and home exercise plan.
This group received Oscillatory glides at the rate 2 oscillation per sec for 1 minute with 3 sets for 5 days a week. Direction of glides was anterior, posterior and inferior. Total numbers of sessions were 10. Using SPSS 21 Paired sample t-test was used to analyze within-group variables and Independent sample t-test was done to analyze between-groups variables.

**Results**

The mean age of the study participants was 50.65±6.413. The onset of pain was gradual in 89.19% patients while 10.81% had sudden onset, 94.59% patients had diurnal variation of symptoms worsening at night.

Table no I shows the pre-treatment and post-treatment values of sustained mobilization group while that for the oscillatory-mobilization group is shown in the table no II and both of which show significant differences.

Table no III shows the comparison of abduction, internal rotation, external rotation, NPRS and SPADI mean values for both sustained mobilization group and oscillatory-mobilization group which shows statistically no significant difference except for abduction where oscillatory-mobilization is considered far better.

**Table I: Pre-Treatment and Post-Treatment Mean and Standard Deviation Values for Sustained Mobilization Group With P Values**

<table>
<thead>
<tr>
<th>Study Variables</th>
<th>Pre-treatment Mean ± SD</th>
<th>Post-treatment Mean ± SD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abduction</td>
<td>52.32±12.356</td>
<td>81.74±20.653</td>
<td>.001</td>
</tr>
<tr>
<td>Internal rotation</td>
<td>39.37±8.221</td>
<td>60.32±8.699</td>
<td>.001</td>
</tr>
<tr>
<td>External rotation</td>
<td>41.47±12.554</td>
<td>64.95±113.451</td>
<td>.001</td>
</tr>
<tr>
<td>NPRS</td>
<td>8.73±6.805</td>
<td>2.52±.772</td>
<td>.001</td>
</tr>
<tr>
<td>SPADI</td>
<td>82.38±9.176</td>
<td>24.31±7.351</td>
<td>.001</td>
</tr>
</tbody>
</table>

**Table II: Pre-Treatment and Post-Treatment Mean and Standard Deviation Values for Oscillatory-Mobilization Group With P Values**

<table>
<thead>
<tr>
<th>Study Variables</th>
<th>Pre-treatment Mean ± SD</th>
<th>Post-treatment Mean ± SD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abduction</td>
<td>68.06±10.166</td>
<td>93.61±10.550</td>
<td>.00</td>
</tr>
<tr>
<td>Internal rotation</td>
<td>51.67±8.423</td>
<td>66.28±6.220</td>
<td>.00</td>
</tr>
<tr>
<td>External rotation</td>
<td>51.17±15.885</td>
<td>71.50±11.142</td>
<td>.00</td>
</tr>
<tr>
<td>NPRS</td>
<td>9.11±6.76</td>
<td>2.61±.689</td>
<td>.00</td>
</tr>
<tr>
<td>SPADI</td>
<td>86.84±6.646</td>
<td>28.33±6.453</td>
<td>.00</td>
</tr>
</tbody>
</table>

**Discussion**

The result of current study shows that sustained-stretch-mobilization and oscillatory-mobilization are equally effective in terms of SPADI, NPRS, external rotation and internal rotation in patients with adhesive capsulitis except abduction which responds better to oscillatory-mobilization.

In a previous review on adhesive capsulitis conducted about phases of adhesive capsulitis (freezing, frozen and thawing) and their recommended treatment, it is concluded that pain reducing medications and steroid injections must be used in freezing phase and manual therapy along with exercise in frozen and thawing phases. In resistant cases which show no improvement other surgical treatments are recommended. In current study patients in frozen and thawing phases were divided into two groups and given different manual mobilization therapies and significant improvement has been noticed.¹⁰

An RCT done by Shruti Naik et al (2015) to compare the two different manual therapy techniques in adhesive capsulitis concluded that MDT and Maitland mobilization were equally effective in reducing pain, improving the range of motion and also the functional scores in individuals with stage II adhesive capsulitis.¹¹ In this study we also observe the improvement in both groups.

A randomized multiple treatment trials were organized by Jing-lan Yang et al for the comparison of different mobilization techniques such as mid-range mobilization, end-range mobilization, and Mulligan’s mobilization. Results of the study showed that end-range mobilization and Mulligan mobilization were more effective than mid-range mobilization. In current study mid-range
mobilization was used in control group and significant improvement was observed in NPRS (p=.00). Syed Shakil-ur-Rehman et al conducted an RCT to make a comparison between kaltenborn mobilization and scapular mobilization in patients of adhesive capsulitis with abduction range of motion above 90o. The results of this study show that sustained-stretch-mobilization is more effective than scapular mobilization. In current study patients have been given sustained stretch glides and significant (p=.00) improvement was observed in NPRS and SPADI scale.

Gokhan Doner Pet al conducted a study assessing the effectiveness of Maitland mobilization in comparison to exercise. It is concluded that exercise with Maitland mobilization is far better than exercise alone. In current study oscillatory-mobilization has been used and found significant improvements in NPRS (p=.00) and SPADI (p=.00) has been observed.

**Conclusion**
The result of current study concluded that both sustained-stretch-mobilization and oscillatory-mobilization are equally effective. The SPADI, NPRS, external rotation and internal rotation responds better than oscillatory-mobilization.

**REFERENCES**
ABSTRACT

Objective: To check the frequency of stress urinary incontinence and to assess the awareness about pelvic floor muscle training for stress urinary incontinence among pregnant women.

Study Design: Cross sectional observational study.

Place and Duration of Study: The study was conducted from April 02, 2017 to July 30, 2017, at the department of Obstetrics and Gynecology Islamic International Medical College, Pakistan Railway Teaching Hospital, Rawalpindi.

Materials and Methods: A total of 322 pregnant women between gestational ages of 12 to 38 weeks were selected by convenience sampling technique. A structured closed questionnaire was used for data collection. All data were analyzed in SPSS version 21 and percentages and mean were calculated.

Results: The frequency of stress urinary incontinence among our study population was 32.9%. Awareness about pelvic floor muscle training was seen in only 9% of women in general and 27% of women suffering from stress urinary incontinence.

Conclusion: Frequency of stress urinary incontinence in our pregnant population is high. Awareness about pelvic floor muscle training and its benefits is very scant and very few pregnant women suffering from stress urinary incontinence are doing pelvic floor muscle training. This highlights the need of improving antenatal care.

Key Words: Pelvic Floor Muscle Training (PFMT), Pregnancy, Stress Urinary Incontinence (SUI).

Introduction

Stress urinary incontinence (SUI) is involuntary leakage of urine with physical activity. It occurs when intravesical pressure exceeds urethral closure pressure in the absence of detrusor muscle contraction. It may also occur due to bladder neck hypermobility or poor urethral closure pressure. It interferes with women’s quality of life and is the commonest cause of incontinence among women of all ages and during pregnancy. The reported prevalence of stress urinary incontinence during pregnancy in literature varies from 17.9% to 71%. This variation can be due to different selection criteria and definitions used in studies. Quality of life of more than 50% pregnant women is effected which worsens with advancement of pregnancy. Many women suffer in silence and do not report symptoms unless questioned, which prevents the exact incidence of stress urinary incontinence difficult to assess. Pregnancy, childbirth and aging all are the risk factors. Weak pelvic floor other than stress urinary incontinence, can also lead to fecal incontinence, prolapse of pelvic structures and sexual difficulties. Pelvic floor muscle training (PFMT) is repetitively selective voluntary contraction and relaxation of specific pelvic muscles. Pelvic floor muscle training (PFMT) raises bladder, prevents decent in bladder neck during increased abdominal pressure. It is the first line conservative treatment for prevention of stress urinary incontinence in women during pregnancy and afterwards and is considered safe. There is evidence from literature, Cochrane review, that pelvic floor muscle training can prevent stress urinary incontinence up to six months following delivery. Studies have not revealed any detrimental effect of pelvic floor muscle training on the process of labor and delivery. The objectives of this study is to check the frequency of stress urinary incontinence in pregnant women because most women do not report the problem considering it related to pregnancy and childbirth and are unaware of the benefits pelvic floor muscle training can
provide. Increased frequency and low awareness about stress urinary incontinence and pelvic floor muscle training is expected, respectively, in our population due to repeated pregnancies, poor nutrition and failure to seek help by considering it non-amendable and shameful.

**Materials and Methods**

A cross-sectional study was conducted over 4 months periods from April 02 to July 30, 2017 at the department of obstetrics and gynecology in Islamic International Medical College, Pakistan Railway Teaching Hospital Rawalpindi. Sample size calculation yielded 322 women done by WHO creative research system survey software, assuming that the percentage of incontinent women in the study population would be 50% with 5% estimated error and a confidence level of 95%. Women were selected by convenience sampling technique. Permission from institution's ethical committee was taken before conducting the study. A modified questionnaire for stress urinary incontinence diagnosis (QUID) was used for data collection, frequency of stress urinary incontinence and awareness about pelvic floor muscle training. The questionnaire for urinary incontinence diagnosis had 3 sections, Section 1 included demographic variables, and section 2 had questions for stress urinary incontinence diagnosis. Section 3 was about women's awareness and knowledge of pelvic floor muscle training with pictorial details in Urdu. Informed consent was taken and questionnaire was completed by interviewing women visiting clinic for routine antenatal care (study population). All women between gestational ages 12 to 38 weeks were included in the study. Exclusion criteria included women diagnosed with urinary tract infection, preterm labor and preterm premature ruptured membranes. All women who reported mild to severe symptoms of stress urinary incontinence were considered as incontinent. The data from questionnaire was entered in SPSS version 21 and results were calculated in percentages and mean with standard deviation for demographic variables.

**Results**

Age range of our study population was between 18 years to 43 years, mean age was 29.16 ± 4.946 years. Mean BMI was 26.97 ± 2.002. Eighty two percent of women were Parity 1 and above. Study results showed that 32.9% of pregnant women suffered from stress urinary incontinence ranging from mild to severe form. Fifty percentage of women suffering from stress urinary incontinence were above the age of 30 years and BMI above 30 was seen in 70% of women suffering from stress urinary incontinence. Chronic constipation and cough was seen in only 1% of effected women (table 1). Nine percent of women in general had awareness about pelvic floor muscle training, while awareness about pelvic floor muscle training in effected women was 27% out of which only 3% were performing it.

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI &gt; 30</td>
<td>70%</td>
</tr>
<tr>
<td>Age &gt; 30</td>
<td>50%</td>
</tr>
<tr>
<td>Parity &gt; 1</td>
<td>82%</td>
</tr>
<tr>
<td>Previous 1 or more LSCS</td>
<td>48%</td>
</tr>
<tr>
<td>Chronic cough</td>
<td>1%</td>
</tr>
<tr>
<td>Chronic constipation</td>
<td>1%</td>
</tr>
</tbody>
</table>

**Discussion**

The study shows that 3 out of 10 pregnant women in our population is suffering from stress urinary incontinence. The women do not complaint about the problem during routine antenatal visit until inquired and they also lack knowledge and benefits about pelvic floor muscle training.

Advanced age, obesity and multiparity is seen as a risk factor for stress urinary incontinence in our study. Literature backs aging, parity and obesity as known risk factors for stress urinary incontinence. One study reports 20% increase in urethral hypermobility following first vaginal delivery. According to Norwegian EPINCOT study, association with cesarean section is also noticeable and comparable to risk in nulliparous. Poor knowledge and motivation about pelvic floor muscle training seen in the study can be due to multiple reasons. One reason can be the busy antenatal clinic, where less time is given to hear all complaints from the women and less time given to provide extra teachings. Another reason can be the pelvic floor muscles which are not visible, so women do not know the right way to perform the exercise. Also anemia, protein and other nutritional deficiencies are common in our population and can make it difficult.
Pelvic floor muscle training is considered free of cost, safe and effective method to prevent and treat stress urinary incontinence in pregnancy and post-partum. A cochrane review summarized the results of 5 randomized trials and shows that women undergoing intensive pelvic floor muscle training in early pregnancy were 56% less likely to report urinary incontinence in late pregnancy and around 30% less likely to report urinary incontinence in 6 months postpartum. A meta-analysis reports improvement in stress urinary incontinence ranging from 48% to 93% with effective pelvic floor muscle training (6-8 second contraction, 3 sets of 8-12 contraction, and 2-4 days per week). The response is seen in one to three weeks. Evidence shows that at least 8 to 12 weeks of pelvic floor muscle training is required to see the good results. Health education in the form of antenatal class is beneficial and some centers recommend teaching pelvic floor muscle training as early as 10 weeks in the booking antenatal class. Limitation of our study is that the level of severity for stress urinary incontinence is not defined. This study is useful as it identifies the frequency and importance of inquiring about symptoms of stress urinary incontinence and we plan to review our policy of routine antenatal care.

**Conclusion**

The study concludes that frequency of stress urinary incontinence is not far less than the prevalence seen elsewhere in the world, around 3 out of 10 pregnant women. Awareness about pelvic floor muscle training in pregnant women is very scant. Pregnancy provides women an opportunity to visit a health care provider multiple times, discuss issues affecting quality of life and get teachings like pelvic floor muscle training. But our antenatal teaching is falling behind in this particular area and require revision.

**REFERENCES**

OBJECTIVE ARTICLE

Effectiveness of the Circuit Class Training versus Individual Task Specific Training for Improving Upper Limb Functions in Post-Acute Stroke Patients

Rabia Basri, Gouhar Rahman, Maryam Naseem

ABSTRACT

Objective: To determine the effectiveness of circuit class versus individual task specific training to improve upper limb functions in post stroke patients.

Study Design: Double blinded randomized controlled trial.

Place and Duration of Study: This study was carried out from January 1st 2016 to December 31st 2016 at physiotherapy department Fauji Foundation Hospital Peshawar.

Materials and Methods: A total of 60 subjects with post-acute phase of stroke and upper limb impairments were enrolled in this study. The subjects were randomly allocated into two groups, experimental (n=30) treated with circuit based task specific training and control (n=30) treated with individual task specific training. The patients in both groups were assessed using motor assessment scale at the beginning of treatment and 6 weeks after training program.

Results: The Mean age of patients was 58 and 59 years in control and experimental group respectively. There were more left hemiplegics as compared to right hemiplegics in both groups. The patients in circuit training group showed better results as compared to the patients in individual task specific training group with respect to upper limb functions, advanced hand activities and hand functions six weeks after treatment.

Conclusion: Post-acute stroke survivors show better results in upper limb functions, advanced hand activities and hand functions with by task specific trainings in circuit groups as compared to individual task specific trainings.

Key Words: Circuit Class Training, Motor Assessment Scale, Rehabilitation Stroke, Task Specific Training.

Introductions

According to W.H.O about 85% of deaths due to stroke occur in middle and low income countries. There is no well designed population based survey on stroke prevalence in Pakistan but estimated average incidence rates is 250/100,000, which is higher than incidence rates in western nations. About 70-80% of individuals who sustain stroke have upper extremity impairments and many of them do not regain proper functional use of paretic arm which leads to difficulty in achieving activities of daily life (ADLs) and proper engagement in community. At 6 months post stroke, about 25-53% of patients remain dependent at least at one ADL task, which often involve use of bilateral or unilateral arm activities. It has been reported that 55% to 75% of patients suffering from stroke have difficulty in grasping, holding and manipulating objects. There are different approaches being proposed to improve upper extremity function after stroke such as functional training, neuro-facilitation techniques and strengthening and reported with mixed results. Majority of these studies have small sample sizes with limited generalizable effects. While increase in strength following strength training, especially in chronic stroke reported no indication for functional use of paretic arm. There is now mounting evidence that both motor and functional change in the paretic extremities is associated with forced use of affected extremity. Indeed cortical re-organization had been demonstrated following task specific training, intensive movement therapy, constraint induced...
movement therapy CIMT,\textsuperscript{10} rhythmic auditory cueing (BATRAC)\textsuperscript{13} and robotic aided exercise training.\textsuperscript{14,15} Task specific training (TST) which is now evident for stroke rehabilitation\textsuperscript{16,17} established that positive cortical reorganization occur in human cortex which is driven by activity and repetitive practice of new task, furthermore it had been concluded that recovery of motor function in patients with stroke is best facilitated by intensive and task specific treatment. Based on the motor relearning theory,\textsuperscript{18} TST emphasizes on repetition of functional task not the isolated movement patterns.\textsuperscript{16} Observational studies showed that patients receiving treatment after stroke spend large parts of the day inactive and appear to have the presence of therapist to practice all new skills. Providing task specific treatment to a group of patients in post stroke in circuit class had been proposed as a new method of increasing amount of time patients spend actively participated in task specific practice\textsuperscript{19}. Circuit class therapy can be defined as the therapy provided to more than 2 patients involving tailored interventions, with the focus on functional tasks received within the group settings, provided to patients with similar or different degree of functional abilities and that involves a staff to patients ratio no more than 1:3.\textsuperscript{20} Practically this can involve the subjects physically moving among the stations or circuits according to the functional need within the group setting, optimally the stations are targeted at repetitions of e.g. range of motion exercises, electrotherapy sessions, strengthening exercises, balance and gait training etc.\textsuperscript{7,8} Participants are continuously monitored and progressed accordingly.\textsuperscript{21}

There are number of benefits associated with circuit training. It is beneficial for the patients and health system as it is cost effective and for therapist as well as time and energy saving treatment model. Studies therefore investigated the effects of circuit trainings with the aim to establish it as alternative approach for stoke rehabilitation. Interestingly most of studies favored circuit training program over individual training program in improving different functional parameters post stroke. However, most of the circuit based tasks from the published studies were focused on the leg strength, walking speed, distance and balance etc. Only few studied circuit class training effects on upper limb functional parameters\textsuperscript{18} Also results of these studies cannot be generalized to all stroke population due to very small sample size\textsuperscript{6} and due to baseline differences in subjects characteristics in as those studies as they enrolled patients with wide range of neurological impairment other than stroke and other baseline differences in groups for evaluating effects of circuit training program.\textsuperscript{19,22} The approaches should be utilized to implement circuit trainings as alternative treatment model in stroke setup of Peshawar as an evidence based practice.

A randomized controlled trial was therefore conducted to examine the effects of circuit based training programs versus individual training on recovery of upper limb functions in post stroke patients.

**Materials and Methods**

A double blinded randomized controlled trail was done in physiotherapy department at Fauji Foundation Hospital Peshawar. Sixty subjects with post-acute phase stroke and upper limb impairments were enrolled. Recruitment method included self-referred patients, patients referred by clinicians or physiotherapist from other hospitals. Previous medical charts of the patients were reviewed for duration of hospital stay, diagnosis, side of the brain injury, onset of stroke and patients were evaluated for the eligibility criteria i.e., Stroke with unilateral motor deficits, patients between 3-8 months of stroke, Age 45-65 years, Able to participate in group and >1 grade on manual muscle testing (MMT) for upper limb including hand, <2 on Ashworth scale of spasticity at the affected upper extremity. The exclusion criteria included, poor cognition, patients previously received physiotherapy, medically non stable patients, patients with pain in upper limb ;>3 on visual analogue scale, history of significant psychiatric illness, patients having moderate to severe visual impairments. The ethical approval was taken from Fauji Foundation Hospital Peshawar. The informed consent was based on Helsinki ethical considerations.\textsuperscript{22}

In this program evaluation, each therapy model, delivered for 1.5 hour/day, 5 week for 6 weeks. Both group received standard physiotherapy treatment, one group at individual level and another group in a circuit’s class.
**Individual Task Specific Training:** Patients participated in a total 1.5-hour/day for 6 weeks with the 1:1 patient to therapist ratio. Activities performed number of repetitions, time on task and progressions of those activities were determined individually by treating therapist.

**Circuit Class Training:** Patients participated in the 1.5-hour/day of physiotherapy session with >1:1 patients to therapist ratio. The whole study consisted up-to 5:1 patients to therapist ratio. The circuits were divided up-to 3 specific stations (figure 1), 15-20 minutes on each circuit as tailored to patients activity level. In station 3 electrical stimulation for wrist extensor provided to those patients reported wrist extension less than 20 degrees (frequency, 100Hz: 150micro-second with on time 10 seconds and off time 10 seconds ramp 1s and treatment time 10-15 minutes). Each exercise session had a brief warm up and cools down period for 5 minutes in which subjects performed upper extremity stretches and active and assisted range of motion exercises. These exercises were specific to patients as directed by physiotherapist. Any adverse symptom e.g. pain, fatigue etc. were reported to therapist.

**Progression:** Each functional activity was progressed such that the level of difficulty, complexity and repetition numbers matched to each individual’s ability. It was ensured that patients were performing tasks with sufficient challenge. The overall rehabilitation goals were made independently to conduct of study.

**Outcome measure:** The outcome measures were three subscales of the motor assessment scale MAS (1 upper arm functions, 2) hand movements and 3) advanced hand activities). MAS developed by Carr et al. to evaluate functional ability skills after stroke. It uses a 9 point ordinal scale. This instrument has revealed high test re test consistency(r=0.98), inter rater reliability(r=0.95) with high construct validity (0.88). This instrument can be used to document motor recovery at any stage of stroke. 

Non-parametrical test was used for the statistical analysis because it was convenience sampling, using SPSS version 19. Man Whitney U test was used to examine between group differences for baseline and final treatment scores.

**Results**
The Means and standard deviations were calculated for descriptive parameters of study given in the Table I. There were no statistically significant differences between groups for age, stroke onset, gender, length of hospital stay and hemi-paretic side as p< 0.05. In both groups the number of left hemiplegics was more as compare to right hemiplegics. In both groups the attendance rate was 100% for 6 week training program and all subjects were able to perform the exercise plane as prescribed by experienced physiotherapist.

**Table I: Subjects Characteristics at Baseline**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Experimental Group n=30</th>
<th>Control Group n=30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Age of subjects ± SD</td>
<td>58.01±3.69</td>
<td>59.83±2.76</td>
</tr>
<tr>
<td>Gender of the subjects</td>
<td>14= male, 16=female</td>
<td>15=male, 15=females</td>
</tr>
<tr>
<td>Stroke onset (months)±SD</td>
<td>4.46±1.38</td>
<td>4.63±1.35</td>
</tr>
<tr>
<td>Side of the hemiparesis</td>
<td>18 LHP and 12RHP</td>
<td>20 LHP and 10 RHP</td>
</tr>
<tr>
<td>Mean LOHS (days)± SD</td>
<td>13.10±2.27</td>
<td>14.40±1.95</td>
</tr>
</tbody>
</table>

LHP= Left hemiparesis  RHP= Right hemiparesis  LOHS=Length of hospital stay  SD= standard deviation
Table II indicates that there was no statistical significant difference at baseline between groups for upper limb functions (ULF), hand movements (HM) and for advanced hand activities (AHA) as p value was >0.05. The association of post treatment scores showed that there was major variations in the experimental group for study parameters as p value was <0.05.

The group A indicates control group that received individual task specific training and group 2 indicates experimental group (circuit class training) in tables below. The Mean rank for upper arm function of individual task specific training ITST and circuit class training CCT group were 25 and 35, respectively (p=0.01), hand movement for ITST and CT were 20 and 40 (p=0.00). The statistical analysis shows that group circuit was 10% more effective to individual group on upper limb functions, 20 more effective on hand movements and 12% more effective on advanced hand activities.

Table II= Baseline and Post-Treatment Analysis between Groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Groups</th>
<th>Mean rank</th>
<th>Sum of rank</th>
<th>1st Quartile</th>
<th>Median</th>
<th>3rd Quartile</th>
<th>2-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ULF</td>
<td>ITST</td>
<td>28.30</td>
<td>869.0</td>
<td>3.0000</td>
<td>4.0000</td>
<td>-0.94</td>
<td>0.34</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CCT</td>
<td>32.70</td>
<td>981.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HM</td>
<td>ITST</td>
<td>33.80</td>
<td>1014.0</td>
<td>1.0000</td>
<td>1.5000</td>
<td>2.0000</td>
<td>-0.83</td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td>CCT</td>
<td>27.20</td>
<td>816.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AHC</td>
<td>ITST</td>
<td>31.10</td>
<td>933.0</td>
<td>1.0000</td>
<td>1.5000</td>
<td>2.0000</td>
<td>-0.63</td>
<td>0.75</td>
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<tr>
<td></td>
<td>CCT</td>
<td>29.90</td>
<td>891.0</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>ULF</td>
<td>ITST</td>
<td>25.60</td>
<td>768.0</td>
<td>4.0000</td>
<td>4.0000</td>
<td>-2.49</td>
<td>0.02</td>
<td></td>
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<tr>
<td></td>
<td>CCT</td>
<td>35.40</td>
<td>1062.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HM</td>
<td>ITST</td>
<td>26.20</td>
<td>612.0</td>
<td>3.0000</td>
<td>4.0000</td>
<td>5.0000</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>AHC</td>
<td>ITST</td>
<td>30.50</td>
<td>1218.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CCT</td>
<td>34.40</td>
<td>1991.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ULF=upper limb functions  HM=hand movements  AHC= advanced hand activities  CCT= circuit class training  ITST= individual task specific training  b= before treatment  a=after treatment

Discussion

A number of systematic reviews have suggested that task based intense treatment should be the top priority for stroke patients functional recovery. The recent studies emerged with an approach that task based training can be organized into circuit with series of work stations. Circuit class training stratifies at-least 3 key features of efficient and effective training. First by utilizing different work stations, circuit class training allows patients to extensively practice training in a meaningful and progressive way. Second circuit class training is efficient use of therapist time in which patients actively engaged in practice when compared to individual training. The circuit class training is potentially cost effective to health care system by decreasing therapist to patients ratios. Thirdly, circuit class training consists of peer support and social interactions that may enhance compliance to exercise programs. The present study indicates that circuit class training for 4 week durations promoted a significant improvement in upper limb functions of stroke patients. The more significant effects for functional improvement in circuit group can be due to many reasons including the maximum repetition of activity, social interactions of patients and less inactive time duration in such circuits. If the circuit trainings are able to prevent the inactive time durations and associated secondary complications, it would presumably lead to health cost saving in long run. The health care system is therefore promoting the community based rehabilitation programs. The results of present study are consistent with studies done by Blennernesheset et al and Pang et al. and they also concluded for better effectiveness of circuit class training on upper limb functions post stroke. The pilot study conducted by Dean et al concluded the significant effects of circuit training on upper limb functional group. These studies examined and compared the improvement of upper limb with lower limb functional improvement that is the control group practiced the mobility task while the experimental group practiced the upper limb tasks. It is well known fact that recovery after stroke is immediate in lower limb as compare to upper limb which recovers slow comparatively due to nature of blood supply of brain. The baseline similarities of the groups cannot be excluded in phenomena called generalizability.

Study Limitations and Future Recommendations:

Small sample size was one of the limitations of this trial. The trial was conducted on post-acute stroke patients and the result of this study cannot be implemented on chronic stroke subjects. Future studies therefore needed to have larger sample size with extensive assessment tools to consider diversity in functional abilities of upper limb. Also there is need to divide stroke subjects with subgroups with different impairment level so the results would be generalizable to stroke population.

Conclusion

This study suggests that circuit based task specific
training is more effective as compared to individual task specific training for improving functional parameters of upper limb among Post-acute stroke patients.

REFERENCES


ABSTRACT

Objective: The objective of this study was to determine the frequency of red cell alloantibodies in pregnant women of North West Pakistan.

Study Design: It was a descriptive study.

Place and Duration of Study. This study was conducted in one year November 2012 to October 2013 at the Haematology Department, Army Medical College, National University of Sciences and Technology (NUST) in collaboration with Department of Gynaecology and Obstetrics, Military Hospital, Rawalpindi.

Materials and Methods: A total of 600 samples were studied and it was a non probability convenience sampling. Pregnant females of any age, parity and gestational age were included in the study and women with known autoimmune diseases (SLE, Rheumatoid Arthritis) were excluded. Data was collected through specifically designed proforma and was analysed by using SPSS version 20. Descriptive statistics were used to describe the data. Frequency and percentages were calculated for qualitative variables like blood group and alloantibodies. Mean and standard deviation were calculated for quantitative variables like age, gestational age and parity. Chi-square test was applied to find an association between all categorical variables. p-value <0.05 was considered significant.

Results: The frequency of alloantibodies in pregnant women in this study was 0.5% (3/600). Prevalence of alloimmunization specifically in Rh- negative blood group was 5.5% (3/54). All the antibodies detected were anti-D antibodies.

Conclusion: Rh D antibodies are the only frequent antibodies in majority of pregnant women with Rh negative blood group. So the practice of routine antenatal antibody screening for every pregnant woman should be avoided.

Key Words: Antibody Formation, Blood Group Antigens, Pregnancy, Pakistan.
women which can enable us to set our own guidelines for the antenatal antibody screening.

**Materials and Methods**

It was a descriptive study and was conducted in the Hematology Department, Army Medical College, National University of sciences and Technology (NUST) in collaboration with Department of Gynaecology and Obstetrics, Military Hospital, Rawalpindi. It was completed in one year from Nov 2012 to Oct 2013. It was a Non Probability Convenience Sampling.

A total of 600 pregnant females were recruited from the out-patient department of Gynaecology and Obstetrics who came for routine antenatal checkups and were advised routine blood tests. All pregnant women were included irrespective of their age, parity and gestational age. Women with known autoimmune diseases were excluded. History was taken from the females according to the structured questionnaire. Their age ranged from 19 to 40 years. Majority of females were in their third trimester and were primigravida. They were asked about their gravida status, transfusion experience and especially the blood group of their husbands. Out of 600 women only 321 (53.5%) were aware of their husband’s blood group. Obstetric history was also taken and those who gave history of one or more abortions were considered to have bad obstetric history.

Permission from the hospital ethical committee was taken. Informed consents were obtained from all the patients.

5.5 ml of venous blood was withdrawn from antecubital vein using 10 ml syringe and was collected in two separate tubes. 2.5 ml blood was for the tube containing EDTA for ABO and Rh grouping and the other 3 ml blood was left to clot in the plain tube for antibody screening and identification. Sample of each patient was given a laboratory number and record was maintained. Each sample was then analysed.

Blood group was determined by forward and reverse blood grouping technique using commercially prepared blood grouping reagents (Biotec) and freshly prepared pooled red cells. During Rh blood typing, indirect antiglobulin test was performed on all negative results in order to confirm the weak D phenotype before reporting the sample as Rh positive or negative. But we were not able to notice the presence of any weak D antigen among 54 Rh negative blood samples.

All samples irrespective of their blood group were screened for antibodies using 3 cell panel (Diamed) by performing Indirect Antiglobulin Test (IAT). The samples which showed positive results on screening were identified using 11 cell panel (Diacell). Microscopy was done on all negative samples in all stages of IAT.

Data was entered on a specifically designed proforma and was analysed using SPSS version 20. Descriptive statistics were used to describe the data. Frequency and percentages were calculated for qualitative variables like blood group, alloantibodies. Mean and standard deviation (SD) were calculated for quantitative variables like age, gestational age, parity. Chi-square test was applied to find an association between all categorical variables. p-value <0.05 was considered significant.

**Results**

A total of 600 women were screened for red cell alloantibodies. Age range of patients included in the study was 19 years to 40 years. Maximum number of patients 351 (58.5%) presented in their third trimester. (Fig I).

![Fig 1: Presentation of Study Group in Various Trimesters](image)

Previous transfusion history was given by 123 (20.5%) women. Regarding the major blood group systems, Figure II shows the frequency of major blood group systems.

There were 546 (91%) D antigen positive and 54 (9%) D antigen negative women in the study group.

Among the study group there were 348 (58%) primigravida and 252 (42%) multigravida females.
Out of 348 primigravida 37(10.6%) were found to be D antigen-negative and the rest of 17 D antigen negative were multigravida (Table I).

Table I: Rh Phenotypes of Primigravida and Multigravida Females

<table>
<thead>
<tr>
<th>Rh D Antigen</th>
<th>Frequency (%)</th>
<th>Primigravida (348)</th>
<th>Multigravida (252)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>546(91%)</td>
<td>311(89.4%)</td>
<td>235(93.3%)</td>
</tr>
<tr>
<td>Negative</td>
<td>54 (9%)</td>
<td>37(10.6%)</td>
<td>17(6.7%)</td>
</tr>
</tbody>
</table>

A total of 3 irregular antibodies were identified in their blood samples, showing an overall frequency of alloantibodies as 0.5% (3/600). Within the whole study group (n=600), anti-D was the only detected antibody, accounting for 100% of all the allantibodies. The husband’s blood group was found to be D antigen-positive in all. Among the 54 women in the D antigen-negative group, 3 developed antibodies, so the prevalence of alloimmunization in this group was 5.5% (3/54). No antibody was detected among the D antigen-positive group, showing an association of Rh D antigen with antibody formation (p<0.001). An association is seen between antibody formation and the blood phenotype, as all the three women who were anti-D antibody positive belong to A negative blood phenotype. In this study, alloantibodies were found in 1.2% (3/249) of multigravida females and in 0% (0/348) of antenatal women who were primigravida showing statistically significant association between multigravida status and alloimmunization rate (p<0.041). As alloantibodies were found in 2.7% (3/112) of antenatal females with an adverse obstetric history and in 0% (0/485) of antenatal women without an adverse obstetric history hence this study also shows a statistically significant association between adverse obstetric history and alloimmunisation rate (p<0.001) (Table II).

Table II: Association between Antibody Formation and Rh Phenotype (p<0.001), Gravida Status (p<0.041), Adverse Obstetric History (p<0.001)

<table>
<thead>
<tr>
<th>Patient Characteristics</th>
<th>Antibody Formation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Present</td>
</tr>
<tr>
<td>RhD positive</td>
<td>0(0%)</td>
</tr>
<tr>
<td>RhD negative</td>
<td>3(5.5%)</td>
</tr>
<tr>
<td>Primigravida</td>
<td>0(0%)</td>
</tr>
<tr>
<td>Multigravida</td>
<td>3(1.2%)</td>
</tr>
<tr>
<td>Adverse obstetric history</td>
<td>3(2.7%)</td>
</tr>
<tr>
<td>Normal obstetric History</td>
<td>0(0%)</td>
</tr>
</tbody>
</table>

Discussion

This study with 0.5% frequency of red cell alloantibodies shows that throughout the world this frequency varies. A comparison of different study results are shown in Table III.

In this study frequency is less as compared to the study carried out in Iran(4.5%) and Southern Pakistan(1.8%). Reason behind it is that firstly the sample size in this study is smaller which increases the chances of missing rare antibodies which are reported in different case reports and secondly majority of females are primigravida in this study. It is also evident from this study that multigravida status, bad obstetric history and Rh-negative phenotype are main risk factors for antibody formation which supports the studies carried out in India and Malaysia. In contrast to these studies, a Nigerian study reveals comparatively higher alloimmunization rate of Rh positive phenotype when compared to Rh negative phenotype as 13 out of 17 detected antibodies were found in sera of Rh positive females. Anti-D antibodies are the most frequently seen in this study like Europe, Arab and Asia with China as an exception showing anti E and anti Mi antibodies more common than anti D antibodies. Recent studies carried out in America and Australia also show anti E antibody more prevalent than anti D antibodies. So these antibodies other than anti-D antibodies are the reason behind persistence of this hemolytic disease even after the introduction of RhIg.
cause haemolytic disease worldwide are anti Co (a), anti Rh 17, anti Diego, anti Kell, anti c, anti Cw, anti Jk(b) and anti Kpa. Keeping in view the evidence of presence of these rare alloantibodies in Pakistani women each and every blood group was screened for red cell alloantibody but none of these were found.

Many developed countries have formulated their own antenatal antibody screening guidelines in order to decrease the disease incidence. These countries include UK, Netherlands, Sweden, Australia and New Zealand. Studies conducted in China suggested that routine antenatal antibody screening of every Chinese pregnant woman is not beneficial except those who are D antigen-negative or those having a previous history of haemolytic disease of the newborn. Guidelines for screening have also been laid down by the Drug Controller General, India (Drugs and Cosmetics Act., 1989). In 2007, a case was reported in India wherein two women of Rh (D) positive phenotype were found to be positive for alloantibodies has promulgated the need for antibody screening in Rh (D) positive women as well.

Unlike these countries, Pakistan lacks the availability of proper antenatal antibody screening guidelines. This study can be helpful in formulating these guidelines by suggesting that regular antibody screening of each and every pregnant woman is not necessary and can be a burden on economy so it should remain limited to females with Rh negative phenotype. Females who have bad obstetric history, are multigravida should also be considered important candidates for antibody screening. There is a need of carrying this study in all regions of Pakistan with large sample size so that we could be able to identify population which is at increased risk of developing haemolytic disease of newborn.

**Conclusion**

Rh D antibodies are the only frequent antibodies in majority of pregnant women with Rh negative blood group. However, keeping in view the absence of non-Rh D antibody in our setup, a guideline can be formulated about introduction of routine antenatal red cell alloantibody screening for just the women having Rh-negative phenotype. However in order to lower the risk of Haemolytic disease of the newborn, Rh – positive women with bad obstetric history and

| Country       | Author                  | Year | Frequency | Most Frequent Antibody |
|---------------|                        |      |           |                        |
| Saudi Arabia  | Nabeel, S and Bodangi   | 2011 | 1.8%      | Anti-D                 |
| China         | Lee CK, et al          | 2003 | 0.79%     | Anti-E and Anti-Mi     |
| Taiwan        | Wu KH, et al           | 2003 | 0.01%     | Anti-E and Anti-Mi     |
| Nigeria       | Jeremiah ZA, et al     | 2011 | 3.4%      | No Anti-D antibody found |
| Zimbabwe      | Cakana, AZ and Ngwenya, L | 2000 | 1.7%      | No Anti-D antibody found |
| Canada        | Heddle NM, et al       | 1993 | 5.4%      | Anti-D                 |
| Tunisia       | Rezik T, et al         | 2012 | 3.6%      | Anti-D                 |
| Turkey        | Gunduz E, et al        | 2010 | 1.21%     | Anti-D                 |
| Greece        | Foudoulaki-Paparizos L, et al | 2013 | 0.66%     | Anti-D                 |
| Sweden        | Filbey D, et al        | 1995 | 0.57%     | Anti-D                 |
| North West Pakistan | Present Study     | 2013 | 0.5%      | Anti-D                 |
| America       | Smith HM, et al        | 2013 | 3%        | Anti-E                 |
| Australia     | Paul M, et al          | 2015 | 0.73%     | Anti-E                 |
| Iran          | Shahverdi E, et al     | 2017 | 4.5%      | Anti-D                 |
| Southern Pakistan | Karim F, et al        | 2015 | 1.8%      | Anti-D                 |

Table III: Frequency of Red Cell Alloimmunization
increased gravida status can also be selected for alloantibody screening test.

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ORIGINAL ARTICLE
Levels of Homocysteine and Lipid Profile in Subclinical Hypothyroidism
Aqsa Malik1, Amina Rahim1, Yasir Iqbal1, Abdul Khaliq Naveed1

ABSTRACT
Objective: To measure the serum levels of homocysteine and lipid profile in patients of subclinical hypothyroidism.
Study Design: A case control observational study.
Place and Duration of Study: The Study was conducted in Biochemistry Department of Islamic International Medical College, Rawalpindi during a period of one year from March 2016 to February 2017.
Materials and Methods: A total of 128 subjects were selected for the study from the medical outpatient department using convenient non probability sampling technique. Selection criterion was age group of 20 to 55 years and exclusion criteria were history of diabetes, hypertension, cardiovascular or renal disease. Selected patients were divided into two groups. In group I (selected as control) were sixty four healthy volunteers who presented for routine annual medical and physical examination. In group II (patient’s group) were 64 patients diagnosed as subclinical hypothyroidism based upon thyroid stimulating hormone (TSH) levels >4.12 mU/mL and normal free T3 (FT3) and T4 (FT4) levels on two consecutive measurements. Lipid profile and homocysteine levels in the serum of the subjects of both groups were estimated. The collected data was entered in SPSS version 21 for analysis. Descriptive data were given as mean ± standard deviation (SD). Independent t test was used and p values less than 0.05 were considered statistically significant.
Results: Group I (control) consisted of 82.81% females and 17.18% males. In group II (sub clinical hypothyroid patients) were 87.5% females and 12.5% males. The mean ages of controls and subclinical hypothyroid patients were 33.65±5.98 and 35.20±7.55 years respectively. There was a significant increase in mean tHcy in subclinical hypothyroid patients than in control group (Mean ± SD, 12.67±2.35 μmol/l vs 3.76±1.59 μmol/l). Serum total cholesterol in subclinical hypothyroid patients was significantly increased than the control group (Mean ± SD, 195.25 ± 10.63 mg/dl vs 162.05 ± 17.39 mg/dl). There was a significant decrease in mean HDL-Cholesterol in subclinical hypothyroid patients than in control group (Mean ± SD, 48.11 ± 4.62 mg/dl vs 53.85 ± 6.55 mg/dl). There was a decrease in mean serum triglyceride in hypothyroid patients than in control group which was not statistically significant (Mean ± SD, 111.25 ± 18.82 mg/dl vs 140.29 ± 17.69 mg/dl).
Conclusion: It was found in our study that the serum levels of homocysteine and lipid profile are increased in subclinical hypothyroidism.

Key Words: Atherosclerosis, Homocysteine, Lipid Profile, Subclinical Hypothyroidism.

Introduction
In developed, as well as developing countries cardiovascular disease namely the coronary heart disease remains the leading cause of mortality and morbidity. In Pakistan it is estimated that 410 out of 10,000 people die every year due to ischemic heart disease. Atherosclerosis is an important risk factor in cardiovascular disease which is caused by dyslipidemia. Dyslipidemia is increase of plasma cholesterol and triglycerides (TGs) and a low HDL-Cholesterol level which contributes to the progress of atherosclerosis. Dyslipidemia is diagnosed by measuring plasma levels of total cholesterol, TGs, and individual lipoproteins and these are collectively termed as lipid profile.
In addition to the increase in levels of cholesterol and LDL-Cholesterol investigators have found serum homocysteine to be an independent risk factor for atherosclerosis. Hcy increases the possibility of cardiovascular disease by various mechanisms including endothelial dysfunction, oxidative stress, endoplasmic reticulum stress, smooth muscle cell proliferation and platelet aggregation.
Thyroid disease, namely hypothyroidism and...
hyperthyroidism, constitutes one of the most common endocrine abnormalities. Among the thyroid diseases, hypothyroidism is a disorder in which thyroid activity is reduced and does not produce enough thyroid hormones. It leads to hypersecretion of pituitary thyroid stimulating hormone (TSH) and an increase in the serum level of TSH. Its prevalence worldwide is estimated to be 4-15%. In Pakistan it is 4.1% mainly due to deficiency of iodine. Thyroid hormones, Thyroxine (T4), and Triiodothyronine (T3) play an important role in all major metabolic pathways by regulating protein, carbohydrate, and lipid metabolism; including synthesis, mobilization, and degradation.

Hypothyroidism is an endocrine disorder which presents with varied degree of thyroid dysfunction and metabolic effects. It is a proven fact that patients with hypothyroidism are prone to develop cardiovascular disease. This is based upon autopsy findings revealing that coronary artery atherosclerosis is two times common in a hypothyroid patient as compared to the control. This increased incidence of cardiovascular disease in hypothyroid patients has been attributed to increase in the levels of low-density lipoprotein and total cholesterol. Subclinical hypothyroidism is the earliest stage of thyroid dysfunction and is defined as increased serum thyroid stimulating hormone (TSH) concentrations with normal thyroid hormone levels and absence of clinical symptoms and signs of hypothyroidism. It is yet to be proven that subclinical hypothyroid disease is prone to atherosclerosis and we aimed to find it out in our study. In this study we measured serum lipid profile and plasma Hcy concentrations of subclinical hypothyroid patients and compared them to control group to find any predisposition toward atherosclerosis.

**Materials and Methods**

This was a case control observational study conducted at biochemistry department of Islamic International Medical College Rawalpindi with the collaboration of department of medicine, Pakistan Railways Hospital during a period of one year from March 2016 to February 2017. Approval from the ethical review committee of the institute was attained before the commencement of the study. An informed verbal and written consent from the patients was taken to participate in the study. A total of 128 subjects were selected for the study from the medical outpatient department using convenient non probability sampling technique. Selection criterion was age group of 20 to 55 years and exclusion criteria were history of diabetes, hypertension, cardiovascular or renal disease. Selected patients were divided into two groups. In group I (selected as control) were sixty four healthy volunteers who presented for routine annual medical and physical examination. In group II (patient’s group) were 64 patients diagnosed as subclinical hypothyroidism based upon thyroid stimulating hormone (TSH) levels >4.12 mU/mL and normal free T3 (FT3) and T4 (FT4) levels on two consecutive measurements. After overnight fasting of 12 hours, 5 ml of blood was collected from the median cubital vein of each control and patient. Sample of plain tube was left to clot for 30 minutes then centrifuged at 3500 x g for 5 minutes; the separated serum was divided into several aliquots and stored at −70°C until the estimation of total homocysteine and lipid profile.

Plasma homocysteine were measured using an ELISA kit from Cusabio according to the manufacturer's instructions in the biochemistry laboratory of Islamic international medical college. Serum levels of total cholesterol, HDL-Cholesterol, LDL-Cholesterol and triglycerides were determined using a Cobas Dimension RXL Autoanalyzer (Germany) in the Pakistan railways hospital laboratory. The desirable levels for lipid profile parameters were total cholesterol (< 200 mg/dl), triglycerides (<150mg/dl), HDL-Cholesterol (30-60 mg/dl) and LDL-Cholesterol(<100 mg/dl).

The collected data was entered into SPSS version 21 for analysis. Gender was expressed as percentages. Descriptive data were given as mean ± standard deviation (SD). Independent t test was used and p values less than 0.05 were considered statistically significant.

**Results**

Group I (control) consisted of 82.81% females and 17.18% males. In group II (subclinical hypothyroid patients) were 87.5% females and 12.5% males. (Table I) The mean ages of controls and subclinical hypothyroid patients were 33.65±5.98 and 35.20±7.55 years respectively. There was a
significant increase in mean values of Hcy levels in subclinical hypothyroid patients than in control group (Mean ± SD, 12.67 ± 2.35 μmol/l vs 3.76 ± 1.59 μmol/l; 95% Confidence Interval, respectively; p=0.002) (Table II). The mean tHcy of subclinical hypothyroid patients was 8.91μmol/l higher than of control group.

There was a significant increase in mean serum total cholesterol in subclinical hypothyroid patients than in control group (Mean ± SD, 195.25 ± 10.63 mg/dl vs 162.05 ± 17.39 mg/dl; 95% Confidence Interval, respectively; p=0.000) (Table II). The mean serum total cholesterol of subclinical hypothyroid patients was 33.2 mg/dl higher than of control group.

There was a significant decrease in mean values of HDL-Cholesterol in subclinical hypothyroid patients than in control group (Mean ± SD, 48.11 ± 4.62 mg/dl vs 53.85 ± 6.55 mg/dl; 95% Confidence Interval, respectively; p=0.000) (Table II). The mean values of HDL-Cholesterol of hypothyroid patients were 5.74 mg/dl lower than of control group.

There was a significant increase in mean serum LDL-Cholesterol in subclinical hypothyroid patients than in control group (Mean ± SD, 126.79 ± 22.24 mg/dl vs 93.70 ± 14.58 mg/dl; 95% Confidence Interval, respectively; p=0.000) (Table II). The mean Serum LDL-Cholesterol of subclinical hypothyroid patients was 33.09 mg/dl higher than of control group.

There was a decrease in mean serum triglyceride in hypothyroid patients than in control group which was not significant (Mean ± SD, 111.25 ± 18.82 mg/dl vs 140.29 ± 17.69 mg/dl; 95% Confidence Interval, respectively; p=0.010) (Table II).

Table I: Demographic Characteristic of Control and Subclinical Hypothyroid Patients

<table>
<thead>
<tr>
<th></th>
<th>Gender</th>
<th>Mean age in years ± SD</th>
<th>Gender Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I Control (n=64)</td>
<td>Male</td>
<td>32.12 ± 7.98</td>
<td>17.18%</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>35.45 ± 8.23</td>
<td>82.81%</td>
</tr>
<tr>
<td>Group II Subclinical Hypothyroid (n=64)</td>
<td>Male</td>
<td>34.65 ± 9.76</td>
<td>12.5%</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>36.23 ± 9.44</td>
<td>87.5%</td>
</tr>
</tbody>
</table>

Discussion

In our study we found serum total cholesterol (TC) and LDL-Cholesterol (LDL) was significantly increased in subclinical hypothyroidism patients as compared to control. These findings are consistent with results of Duntas LH, Bandi A et al. and Díez JJ. It is postulated that in hypothyroidism there is reduced activity of HMG CoA reductase which might lead to decrease in total cholesterol but our findings are on the contrary. The elevation of serum cholesterol might be because of rise in the levels of serum low density lipoproteins and intermediate density lipoprotein. Furthermore the plasma concentration of cholesterol might also be increased due to decrease in the rate of cholesterol secretion in the bile and resulting reduced excretion in the feces. This happens due to decrease in number of low density lipoprotein(LDL) receptors on liver cells leading to decreased in activity of LDL receptors and decreased receptor-mediated catabolism of low density lipoproteins (LDL) and Intermediate density lipoproteins.

HDL-Cholesterol (HDL) levels are elevated in hypothyroidism. It occurs due to the decreased activity of the cholesterol ester transfer protein (CETP) resulting in reduced transfer of cholesteryl esters from HDL to very LDL-Cholesterol (LDL). But our findings were on the contrary. In our study we found that serum HDL levels were significantly decreased in subclinical hypothyroid patients compared to the control. These findings are in consistent with the results of Pandian BG and Al-Hakeim HK who also reported decreased HDL levels in hypothyroid patients.

Table II: Comparison of Lipid Profile and Homocysteine Levels between Control and Subclinical Hypothyroid Patients

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Group I Control (n=64) Mean ± SD</th>
<th>Group II Subclinical Hypothyroid patients (n=64) Mean ± SD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hcy (μmol/l)</td>
<td>3.76 ± 1.59</td>
<td>12.67 ± 12.35</td>
<td>0.002</td>
</tr>
<tr>
<td>Total cholesterol (mg/dl)</td>
<td>162.05 ± 17.39</td>
<td>195.25 ± 30.63</td>
<td>0.000</td>
</tr>
<tr>
<td>HDL-Cholesterol (mg/dl)</td>
<td>53.85 ± 6.55</td>
<td>48.11 ± 4.62</td>
<td>0.000</td>
</tr>
<tr>
<td>Triglycerides (mg/dl)</td>
<td>111.25 ± 18.82</td>
<td>140.29 ± 47.69</td>
<td>0.010</td>
</tr>
<tr>
<td>LDL-Cholesterol (mg/dl)</td>
<td>93.70 ± 14.58</td>
<td>126.79 ± 22.24</td>
<td>0.000</td>
</tr>
</tbody>
</table>
In our study serum triglycerides (TG) levels were found increased in patients of subclinical hypothyroidism. This finding is consistent with the reports of Ali A17 and Saleh AA18 who also reported high TG levels in hypothyroidism. The reason being, lipoprotein lipase activity is decreased in hypothyroidism which decreases the clearance of Triglyceride rich lipoproteins. In our study we observed that Hcy was significantly elevated in patients of subclinical hypothyroidism as compared to the control group. This finding is contrary to the report of Aldasouqi et al.19 but is in accordance to reports by Saleh AA18 and Al-Habori MA.20 There are two postulated mechanisms of increase in homocysteine levels in hypothyroidism. Either there is a rise in homocysteine formation due to direct effect of thyroid hormone on homocysteine metabolism in the liver or there is decreased in homocysteine clearance from the kidneys. Decreased serum levels of thyroid hormone affect the Hepatic activity of flavoproteinimmethylenetetrahyd rofolate reductase (MTHFR) enzymes vital for remethylation of homocysteine to methionine. Furthermore the conversion of riboflavin to the active coenzyme flavin adeninedinucleotide becomes faulty leading to poor activity of MTHFR and hence increased Hcy levels. There were few limitations of this study, which include small sample size and it should have been a cohort study. Despite this we believe that our study may prove helpful in further research related to homocysteine and lipid profile parameters in subclinical hypothyroidism.

Conclusion

It was found in our study that the serum levels of homocysteine and lipid profile are increased in subclinical hypothyroidism. As these they are prone to atherosclerosis, therefore early screening and regular monitoring of these factors are recommended in subclinical hypothyroid patients.

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Objective: To explore the role of students’ engagement in curricular reforms in a private medical college.

Study Design: A qualitative case study.

Place and Duration of Study: The Study was conducted from 1st Jan to 30th Jun 2017 in Islamic International Medical College Rawalpindi.

Materials and Methods: Sixteen participants, 08 students and 08 faculty, were selected using purposeful homogenous sampling strategy. All the selected participants were the members of the college curriculum planning committee. For students 2x FGDs and for faculty in depth interviews were recorded, transcribed and imported to NVivo software for analysis. Thematic analysis was done to make the major themes.

Results: Six main themes were identified. The importance of curricular reforms was acknowledged and students’ engagement was valued both by the faculty and students. Some limitations in accepting these suggestions were also recognized.

Conclusion: The study has emphasized the importance of student input in curricular reforms to eliminate the existing problems in it and faculty has fully valued these suggestions with few reservations.

Key Words: Student’s Engagement, Student’s Empowerment, Curricular Reforms, Medical Institution.
Materials and Methods
This was a qualitative case study conducted from 1\textsuperscript{st} Jan 2017 to 30\textsuperscript{th} Jun 2017 at Islamic International Medical College Rawalpindi. This approach helped to explore individuals through complex interventions to develop theory, evaluate programs and interventions. Sampling technique was purposeful sampling and strategy was homogeneous sampling. As per inclusion criteria 08 MBBS students and 08 faculty, being the members of the college curriculum planning committee, were chosen after their written consents. Semi structured face to face interviews were recorded from the selected faculty members to get in depth views. Two FGDs, in the group of four, were done with the students as it was convenient for them to express shared views among their colleagues. All interviews/FGDs were conducted at a safe and secure mutually predefined place and time. The data was recorded, transcribed and transferred to NVivo software for analysis. All the text was coded generating thematic nodes in the NVivo software version. The emerging themes were named according to the nodes in which data was stored. Analysis was done using search queries, node analysis and node comparison diagrams.

Results
Three main themes for faculty interviews data and three for students FGDs were recognized. They are:

Table I: Themes from Faculty Interviews

<table>
<thead>
<tr>
<th>Questions Asked</th>
<th>Main Themes</th>
<th>Common Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: In your opinion why curricular reforms are needed in Pakistani medical institutions?</td>
<td>Importance of curricular reforms</td>
<td>F1: “The curricular thought has brought about certain changes in medical education which are consistent with the advancement of communication technologies, advent of social media, expansion of research in different medical fields as well as the expansion of the basic educational concept in medical education itself.”</td>
</tr>
</tbody>
</table>

Table II: Themes from Students’ FGDs

<table>
<thead>
<tr>
<th>Questions Asked</th>
<th>Main Themes</th>
<th>Common Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: What problems do you feel with the present curriculum of your college?</td>
<td>Problems in the present curriculum</td>
<td>22: “The thing is a lot is covered in a very short span of time and we have just added the entire Neurology in 8 week. It was sort of hard to adjust in such a short span of time.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>55: “We have this integrated modular system so, far what I have experienced is that the course is too extensive and it’s really hard for the students to manage it.”</td>
</tr>
<tr>
<td>2: What are the areas which you think your input is valuable as a student with respect to course design, teaching and assessment?</td>
<td>Students’ input in curriculum</td>
<td>45: “Our participation in curriculum planning will influence in a much better way that there is always room for improvement, there are many things in which there is”</td>
</tr>
</tbody>
</table>
Importance of Curriculum Reforms: This theme describes the importance of curriculum reforms in Pakistani medical institutions as expressed by 08 faculty members. They described it under subthemes of a need of the time, advancement in research and cultural reason. (Table I) Examples of representative statements of the faculty are as follows:

F8: “I think it is also the need of the time to minimize the burden on the students because in conventional system there is lots and lots of curriculum which they have to go through in five years of their tenure whether they will become a dermatologist or gynecologist they have to read and they have to all the subjects.”

Value of Student’s Engagement: This theme is about the value given by the faculty to the students suggestions for the curriculum. The faculty has given 88 references for this theme describing it as an essential aspect of the students, making them empowered of their own curriculum and their suggestions worth should be checked. (Fig 1) The representative statements of the faculty are as follows: (Table I).

F1: The curriculum is planned for the sake of the students and the value of the student’s opinions for the curriculum planning has to be seriously considered while the curriculum is being planned for their sake.”

F8 “They have to keep in mind that our organization has been formed on a certain mission that is inculcation of Islamic and ethical values in our curriculum. However, if the students’ suggestions are not according to those mission and vision that is not acceptable.”

Problems in the Present Curriculum: This theme reflects the various problems being faced by the students in the present curriculum as the course contents, assessment methods, integration of the curriculum and faculty training. (Table II).

Value of Student’s Suggestions in Curriculum: This theme reflects the students view about the value given by the faculty to their suggestions for the curriculum and were satisfied with few reservations. (Table II).

S1: “Teachers and all the staff actively listens---have always actively listened to my complaints and my problems.”

S6: “they make our education system better and beneficial for students.”

Discussion
The institutions claiming to have excellence in students’ engagement must involve them in the curriculum, having active role and interaction with the faculty for curriculum planning.7 This study
focuses on same aspects of student's engagement in curriculum and reveals that the faculty appreciates the role of student's engagement in curriculum planning and value their voice.

**Importance of Curricular Reforms:** The results of this study indicate great importance to the curricular reforms in a medical institute. The most important and latest curricular reforms are changing the traditional discipline based curriculum with the integrated system by introducing clinical subjects at early stage. This enhance the cognitive and practical skills of the students. Although their long term benefits have yet to be seen but curricular reforms seems to be inevitable solution to the increasing demand of the high quality medical graduates. The educational environment remains high in a reformed curriculum resulting into better results for the institution. It is believed that the future model of education will be competency based, so a new approach for the educational model is required to equip the doctors for the future challenges. New demands for reforms of medical institutes curriculum are emerging, stressing upon standardization of learning outcomes, promoting integration, encouraging habits of inquiry and focusing on doctors professional identity. A meaningful agenda for the curriculum reforms is also being contemplated by the Pakistani government to acquire the requisite knowledge, values, attitude and civic participation skills to live in harmony with each other.

**Value of Student's Engagement in Curriculum as Perceived by the Faculty and Students:** The study reveals greater importance and value of student's engagement in curriculum by the faculty and students by acknowledging their collaborative role. Literature reveals that in medical education active student participations in the curriculum is highly appreciated as it creates a vision of shared curriculum planning. Participation in learning activities is positively related to engagement as well as student self-reported outcomes and satisfaction with the institute. To reverse the passive learning experience, the student empowerment should be done by themselves supervised by critical and democratic faculty.

**Common Problems in Curriculum:** The study reveals few problems like lengthy course content, teaching methodologies and assessment methods. The literature also reveals that the faculty and students are not clear about the level and type of integration which results in to problems with lengthy contents of the modules and teaching methods. Minor subjects are overcrowded and time pressured curriculum could not be effectively introduced in short span of time. So the rapidly changing curriculum could pose number of dilemmas to the teachers which may present further problems in future.

**Students Input in Curriculum:** The study reveals that students used to give their suggestions regarding teaching and learning methodologies, assessment techniques, time tabling and learning environment. Literature also stress that the student committees should identify their strengths and weaknesses with a desire to find solutions to rectify it. Students are very important in developing resources, conducting research and evaluating programs.

**Limitations of Students Suggestions for Curriculum:** This study also reveals few limitations for accepting the student's suggestions as faculty feels that student's lack of experience in curriculum, lack of experienced staff and financial constraints. Despite these limitations faculty must be receptive to student's suggestions and should motivate them for their voice in curriculum.

**Limitations of the Study:** The student's engagement in curriculum planning in the above studied institute is recent and all the participants are not well aware of its significance and needs more motivation to do the same.

**Conclusion**
This study revealed that the medical students are very vigilant about the curriculum. They can suggest wisely for its improvement and faculty values their engagement in the curriculum. This mutual and positive interaction between students and faculty is the real essence of student's engagement in curriculum planning. So after achieving the desired level of student's engagement in curriculum, further research is recommended to observe its effects on the policy of curriculum designing of the institution.

**Contributors:** The study was part of MF Master in Health Profession Education. UM & RY supervised.
the study and were involved in every part of it. 

Acknowledgments: We acknowledge all the participants of the study for sparing time and taking keen interest in expressing their views.

REFERENCES


ABSTRACT

**Objective:** The study was conducted to determine the reliability and validity of Course Interest Survey tool to measure motivation of MBBS students in Pakistan.

**Study Design:** Quantitative cross-sectional study.

**Place and Duration of Study:** The study was conducted at Women Medical College Abbottabad, from 17th October 2014 to 30th August 2015.

**Materials and Methods:** Simple random sampling by lottery method was used to collect data from three hundred students. Each student from all five years of MBBS was assigned a numerical number. The numbers were written on a piece of paper and placed in a box and mixed. A researcher blinded to the procedure randomly selected the required number of students. Course interest survey form was distributed to the randomly selected students at the end of term and data was collected. Ethical approval of the study was received. Reliability was determined by Cronbach’s alpha, and validity of the tool was determined by factor analysis on IBM SPSS software version 22.

**Results:** All the students were females between the ages of eighteen and twenty-four years. The participants had diverse cultural background. The Cronbach’s alpha for the CIS scale and its subscales Attention, Relevance, Confidence and Satisfaction were α=0.86, 0.75, 0.75, 0.24 and 0.69 respectively. The overall Kaiser-Meyer-Olkin was 0.88. Factor Analysis with varimax rotation revealed four components explaining 51% of the total variance.

**Conclusion:** Course interest Survey is a reliable and a valid tool to measure motivation of MBBS students in a private medical college of Pakistan. Results of Women Medical College cannot be generalized to all the medical colleges.

**Key Words:** ARCS Model, Course Interest, Medical Students and Motivation, Motivation, Valid Motivational Tool and Medical Students.

Introduction

Motivation is derived from the Latin root word “motive” which means “to move and is a goal directed activity.” Many theories of motivation have been mentioned in the literature focusing on a specific aspect. Amongst these, ARCS Model of Instructional Design provides a synthesis of the different theories and attempts to present a holistic view of motivation. The acronym ARCS stand for Attention, Relevance, Confidence, and Satisfaction. According to this theory attention is the ability to grab interest. It has three types “Perceptual Arousal”, “Inquiry arousal” and “Variability”. Relevance is the relationship of the content to things that are important to the learners and is achieved by “Goal Orientation”, “Motive Matching” and “Familiarity”. According to Bandura, highly self-efficacious people believe they have control over their ability to be successful. Confidence is this positive expectation for success. Keller provides three ways to inculcate confidence. “Learning Requirements”, “Positive Consequences” and “Personal Responsibility”. Satisfaction refers to the contended feelings of learners about their learning experience. There are three strategies to increase satisfaction; “Intrinsic Reinforcement”, “Extrinsic Rewards” and “Equity”. Motivation based on this theory has been studied in business, psychology, philosophy, music, patients and technology enhanced courses. All of these studies advocate manipulation of motivation through instructional design. Literature searched on the Pub Med, Pub Med Central, Biomed Central and World Wide Web with the search engine Google
revealed one hundred and twenty articles for a valid motivation measurement tool and medical students. No study was found on a validated motivational tool to determine motivation of medical students in MBBS course. CIS tool, based on this model has provided evidence of reliability, and non-construct based validity of motivation. However, despite evidence of validity of CIS internationally in different contexts, there is no empirical evidence to show that CIS is a reliable and valid tool to measure learner motivation for medical students. The purpose of this study was to determine reliability and validity of Course Interest Survey instrument among MBBS students. This study is significant because a valid CIS tool can be used for diagnosing motivational profiles of medical students and to develop strategies to improve motivation.

Materials and Methods
This study was a part of a quantitative, cross sectional study carried out at Women Medical College Abbottabad from October 2014 to August 2015. Expecting an overall rate of return of seventy percent, a random sample of three hundred students was generated from a list of MBBS students of all five years by simple random sampling. Ethical approval for the study was received. Study participants were female MBBS students aged eighteen to twenty-four years with diverse ethnic and cultural background. The survey forms were distributed to the randomly selected students at the end of their first term examination. Two hundred and twenty completed Course Interest Survey forms (CIS) with no missing data and filled up consent form were included in the study those not meeting these criteria were excluded. Sample size was adequate for Principal Component Analysis for which a general rule is that 9 sample should be 5 times the number of variables. Content relevance, detailed in Keller was taken as evidence of content validity of CIS scale. CIS has thirty-four items divided among the four subscales: Attention (eight items), Relevance (nine items), Confidence (eight items) and Satisfaction (nine items). Five options were given for each item which were scored as “1=not true, 2= slightly true, 3= moderately true, 4= mostly true, 5= very true”. The minimum score was 34 and maximum was 170 with a midpoint of 102. The minimum, maximum and midpoints of subscales vary because these do not have equal number of questions. Questions 4, 26, 8, 25, 6, 11, 17, 7 and 31 are stated negatively. These items were reversed in calculations as 5=1, 4=2, 3=3, 2=4, and 1=5. The data was analyzed using IBM SPSS software version 22. Descriptive statistics, Cronbach’s alpha for reliability and factor analysis for validity were carried out.

Results
The Mean score of the thirty-four item CIS scale was 119.2±15.8 standard deviation, and mean scores on its subscales were; Attention 25.1±5.8, Relevance 35.60 ±5.07, Confidence 27.7±3.5 and Satisfaction 30.85±5.1 standard deviation. None of the questions were rated at the extreme as not true and very true. Questions 9, 10, 6, 7, 8, 11, 17 and 25 had correlations of 0.2. Questions 6, 7, 17 were also negatively correlated after reversing the coding. The remaining questions had Correlation > 0.2 (Table 1).
Principal Component Analysis generated a correlation matrix, which showed that Questions 4, 6, 7, 8, 9, 11, 17, 25, 26 and 31 had small correlations < 0.3 because of insufficient common variance leading to as many factors as items and were not considered for further analysis (Pett, Lackey & Sullivan, 2003). The suitability of Principal Component Analysis (PCA) for the remaining 24 questions was assessed. Inspection of the correlation matrix showed that the remaining 24 questions had at least one correlation coefficient greater than 0.3. The overall Kaiser-Meyer-Olkin (KMO) measure was 0.88, meeting KMO ‘middling’ criteria suggesting that sample size is adequate relative to number of items in the CIS scale. The Individual KMO values for Questions 33 and 34 were highest and “meritorious” at 0.84 and 0.88 according to KMO criteria. Individual KMO for Questions 14 and 19 was > 0.7. It was > 0.6 for Questions 3, 10, 15, 18, 21, 32. KMO > 0.5 was found for Questions 1, 2, 5, 12, 22, 23 and 28. For Questions 16, 19, 20, 21 and 24 KMO was >0.4. Question 24 had the lowest KMO value of 0.38. KMO value below 0.6 suggests that the sample size is small or inadequate for individual item analysis. Bartlett’s test of sphericity was statistically significant (p < .000), indicating that the data can be factorizable. PCA revealed five components that had Eigenvalues greater than one and which explained 29.21%, 10.18%, 6.31%, 5.75% and 4.39% of the total variance for components 1, 2, 3, 4 and 5, respectively. First four components contributed 5 to 10% of total variance were retained. Cumulative percent of five components contributes 55% variance. Visual inspection of the scree plot (Fig 1) indicated that four components should be retained. A Varimax orthogonal rotation revealed four components (Table II). These four components explained 51% of the total variance. Component 1 comprised of Questions 1 to 7 (Table II). Questions 1, 2, 3, 5 and 7 of this component were from the Attention subscale. The loadings of these questions were 0.82, 0.78, 0.64, 0.60 and 0.51 respectively. Loadings of Questions 4 and 6, originally from the Relevance subscale were 0.63 and 0.55 in that order. Component 2 comprised of Questions 8 to 16 (Table II). Questions 8, 9, 10 and 16 were from Satisfaction subscale. Questions 12, 13, 14 were from Relevance subscale. Question 15 was from Attention subscale of CIS scale. Question 11 was from Confidence subscale. The loadings of Questions 8, 9 were excellent at 0.77 and 0.75 respectively. Question 10 had a loading of 0.63 and Question 16 had a loading of 0.30 for the second Component. Loading of Question 11 was 0.50. Remaining questions had loadings of 0.34 (Q16), 0.42 (Q15), 0.46 (Q14), 0.46 (Q13), and 0.47 (Q12). Component 3 consisted of Questions 17 to 21 of the rotated component matrix. Question 17 and 18 had loadings of 0.68 and 0.65 respectively. These questions were from the Satisfaction subscale. Questions 19 and 20 were from Confidence subscale and had loadings of 0.63 and 0.60 in that order. Question 21 from Satisfaction subscale had a loading of 0.37 on this component. Component 4 comprised of 3 items. Questions 22 and 24 were from the Relevance subscale with excellent to very good loadings of 0.79 and 0.61 on this component respectively. Question 24 from Confidence subscale also had a very good loading of 0.65.

Table II: Rotated Component Matrixa and Communalities of CIS Scale

<table>
<thead>
<tr>
<th>Questions</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Communalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The instructor uses an interesting variety of teaching techniques</td>
<td>.828</td>
<td>.133</td>
<td>.172</td>
<td>-.008</td>
<td>0.733</td>
</tr>
<tr>
<td>2. The instructor does unusual or surprising things that are</td>
<td>.780</td>
<td>.243</td>
<td>.065</td>
<td>-.005</td>
<td>0.672</td>
</tr>
<tr>
<td>3. The instructor creates suspense when building up to a point</td>
<td>.643</td>
<td>.152</td>
<td>.047</td>
<td>-.250</td>
<td>0.501</td>
</tr>
<tr>
<td>4. The students actively participate in this class</td>
<td>.633</td>
<td>.176</td>
<td>.357</td>
<td>.212</td>
<td>0.604</td>
</tr>
</tbody>
</table>

### Discussion

CIS scale was found as a very reliable tool to measure motivation of medical students in Women Medical College Pakistan. The Cronbach alpha reliability of CIS scale was 0.86 and of the subscales Attention, Relevance, and Satisfaction was 0.78, 0.70 and 0.69 which was acceptable, but reliability of subscale Confidence was 0.24 which is not acceptable (Table I). Reliability of CIS scale would improve if Questions 6, 7, 17 were to be deleted. It would remain the same if Questions 8, 9, 11, 25 were deleted and it would decrease, if remaining items were to be deleted. Reliability of CIS scale reveals homogeneity of the items of the scale but reliability of Confidence Subscale may have been lowered due to random errors or difficulty in item interpretation. Cronbach's alpha of 0.86 for CIS scale in this study is comparable to the previous study which had a reliability of 0.95 for the CIS scale. Reliability for the subscale Attention was an acceptable 0.75 compared to 0.84, Relevance was acceptable at 0.70 compared to 0.84, Confidence was low at 0.24 in comparison to previous 0.81 and Satisfaction was minimally acceptable 0.69 compared to previous 0.88, respectively. Another study on motivation for an anatomy course had reliabilities of 0.86, 0.82, 0.88, 0.87 and 0.96 for attention, relevance, confidence, satisfaction and the overall scale respectively. Another tool developed on the four constructs also provided evidence of construct validity evidence. CIS has a valid four factor structure to measure

<table>
<thead>
<tr>
<th>Item</th>
<th>Attention</th>
<th>Relevance</th>
<th>Confidence</th>
<th>Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. The instructor knows how to make us feel enthusiastic about the subject matter of this course</td>
<td>.600</td>
<td>.308</td>
<td>.060</td>
<td>.193</td>
</tr>
<tr>
<td>6. The instructor makes the subject matter of the course seem important</td>
<td>.551</td>
<td>.177</td>
<td>.094</td>
<td>.376</td>
</tr>
<tr>
<td>7. The students in this class seem curious about the subject matter</td>
<td>.512</td>
<td>.060</td>
<td>.324</td>
<td>.151</td>
</tr>
<tr>
<td>8. I feel that this course gives me a lot of satisfaction</td>
<td>.142</td>
<td>.769</td>
<td>.150</td>
<td>.055</td>
</tr>
<tr>
<td>9. I enjoy working for this course</td>
<td>.145</td>
<td>.757</td>
<td>.069</td>
<td>.225</td>
</tr>
<tr>
<td>10. I feel satisfied with what I am getting from this course</td>
<td>.238</td>
<td>.630</td>
<td>.179</td>
<td>.291</td>
</tr>
<tr>
<td>11. I feel confident that I will do well in this course</td>
<td>.115</td>
<td>.500</td>
<td>-.003</td>
<td>.316</td>
</tr>
<tr>
<td>12. The content of this course relates to my expectations and goals</td>
<td>.107</td>
<td>.471</td>
<td>.300</td>
<td>.297</td>
</tr>
<tr>
<td>13. The personal benefits of this course are clear to me</td>
<td>-.030</td>
<td>.463</td>
<td>.395</td>
<td>.297</td>
</tr>
<tr>
<td>14. In this class I try to achieve high standards of excellence</td>
<td>.295</td>
<td>.460</td>
<td>.200</td>
<td>.265</td>
</tr>
<tr>
<td>15. My curiosity is often stimulated by the questions asked or the problems given on the course</td>
<td>.138</td>
<td>.422</td>
<td>.342</td>
<td>.060</td>
</tr>
<tr>
<td>16. I am pleased with the my work compared to how instructor's evaluations of well I am doing</td>
<td>.352</td>
<td>.397</td>
<td>.338</td>
<td>-.027</td>
</tr>
<tr>
<td>17. I feel that I get enough recognition of my work in this course by means of grades, comments, or other feedback</td>
<td>.127</td>
<td>.029</td>
<td>.680</td>
<td>.172</td>
</tr>
<tr>
<td>18. The amount of work I have to do is appropriate for this type of course</td>
<td>.040</td>
<td>.193</td>
<td>.654</td>
<td>.023</td>
</tr>
<tr>
<td>19. I get enough feedback to know how well I am doing</td>
<td>.244</td>
<td>.195</td>
<td>.632</td>
<td>-.145</td>
</tr>
<tr>
<td>20. I find the challenge level in this course to be about right: neither too easy nor too hard</td>
<td>.224</td>
<td>-.001</td>
<td>.606</td>
<td>.290</td>
</tr>
</tbody>
</table>
motivation of medical students in a women only medical college in Pakistan. Another study found that males had more interest in medical courses compared to females.\textsuperscript{11} Two factors matched very well with Attention and Satisfaction and two with a different combination of items compared to the original model. Random error affects both reliability and validity and may be the reason where no reliable correlations were determined for Confidence Subscale.\textsuperscript{12} Reliability analysis identified three items in CIS scale creating ambiguity in analysis which lowered the reliability of the scale (Table I). The key themes of these items can be discussed in light of the attribution theory, self-efficacy, and locus of control. For question 6 “You have to be lucky to get good grades in this course” 39.1% students agreed that it was moderately to very true. Most participants attributed getting good grades to an external uncontrollable factor “luck”. Outcomes viewed as uncontrollable promote anxiety and avoidance, whereas those under control lead to increased effort and persistence. However, 28% students did not think that “they have to be lucky to get good grades in class”. For question 17 “It is difficult to predict what grade the instructor will give my assignment”, 27% students agreed that it was moderately true to predict what grade the instructor will give them. Twenty two percent of the students participating in this study did not agree that they can predict what grade the instructor will give them. This may either be due to the reason that students consider the tasks to be too difficult or attribute it to the examiner which are external factors not within the control of learner.\textsuperscript{13} The remaining 78% participants thought that they can predict what grade the instructor will give them. Confidence of students is lowered because they may be attributing their performance to luck, task difficulty and low ability cues which they might have received from their teachers, colleagues or based on their past performances in examinations\textsuperscript{14} For question seven, “I have to work too hard to succeed in this course,” two-thirds of the students did not think that hard work is required to be successful in a course, and in terms of Attribution Theory, these students are confident that that they can pass the examination without “effort” which is an internal, stable attribute within the control of the learner. Motivational issues can be identified by poorly performing items in CIS scale by Attribution Theory, Self-Efficacy Theory, and Locus of Control\textsuperscript{15} for the Confidence category of ARCS model. The Relevance subscale items have their theoretical basis in Hulls, Tolman, Lewin, Maslow's Hierarchy of Needs, Self-determination Theory and Flow Theory.\textsuperscript{16} However, a study conducted in Turkey did not identify a relationship between self efficacy and academic performance though self efficacy of males was found to be more than that of females.\textsuperscript{16} Attention is a synthesis of several related theories, including Arousal Theory, Curiosity, Boredom and Sensation Seeking.\textsuperscript{17} Items in Attention and Relevance subscales were not found to decrease reliability. It means the questions in these two subscales reflect the underlying construct as effect indicators. Items in these two subscales can be used to measure subcomponents of motivation. It is expected that deleting these items would increase the reliability of CIS scale and Confidence subscale. Although Relevance subscale had reliability of 0.70, questions 8 and 25 should be considered for removal if this subscale is to be used as stand-alone scale. Reliability of Satisfaction subscale was 0.69. To improve reliability of the Satisfaction subscale, Keller recommends providing clear learning goals with well-defined assessment criteria promoting a sense of fairness and hence Satisfaction.\textsuperscript{2} Constructive feedback on effort and performance besides feedback on result, if provided to the students would increase Satisfaction.\textsuperscript{18} Questions six, seven and seventeen, eight and twenty-five are negatively worded items and might have made interpretation of the questions difficult. Since questions six, seven and seventeen poorly correlated with CIS scale and subscale Confidence, convergent validity evidence is lacking, but CIS scale correlated with the remaining items. CIS scale has provided reliable measurement in a different culture and context from the one where it was developed also referred to by Keller. Cultural difference may be the reason for different loadings in the four components found on factor analyses compared to the original theoretical construct of ARCS. The Subscales of CIS had strong correlations with each other as well as with CIS scale, indicating that they are measuring the different dimensions of same construct. Component one can be considered to depict the Attention Subscale, Component two
Satisfaction, Component 3 Confidence and Component 4 can be considered to depict Relevance. CIS scale and its subscales are causal indicators reflecting the underlying construct of motivation and hence defining it rather than being defined by the construct. Four factor structure of CIS scale provided construct validity evidence for our cultural context in female medical students.

In our context motivation may be understood differently. Age, maturity of learner, regional cultural context may be the underlying reasons. Item to total correlations were not high, but that does not matter as the items were not expected to be correlated as homogeneity was not the purpose. Motivation is affected by certain factors which cannot be modified. Gender, age, ethnicity, socioeconomic status, personality, year of medical study, are some such factors. Factors like teacher and peer support, self-efficacy, autonomy, competence and relatedness are modifiable in learning environment. Factors such as study skills, safety, security, and physical wellbeing may have been confounders in the study.

Limitations of the Study
The results cannot be generalized as it was conducted at a medical college which admits only females. Self-report measures may have introduced bias due to underreporting, over reporting or failing to respond to a question.

Conclusions
Psychometric properties of the tool suggest it is a reliable and valid motivation measurement tool. However, evidence for its educational impact on medical students is lacking. Psychometric testing on mini version of the scale is warranted. Teachers require training in self-efficacy and feedback for increasing confidence and satisfaction of students. Domain of Motivation should be added when designing courses and assessing students, besides the three domains of Bloom’s taxonomy. Further studies should be carried out on utility as construct validity is an “ongoing process” that takes place over a number of studies, in a number of ways.

REFERENCES


OBJECTIVE

To analyze the clinical and histopathologic parameters of patients with breast cancer from the North West population of Pakistan.

STUDY DESIGN: Cross sectional descriptive study.

PLACE AND DURATION OF STUDY: Data was extracted from the Institute of Radiology and Nuclear Medicine Hospital, Peshawar and Khyber Teaching Hospital, Peshawar from March 2014 to December 2016.

MATERIALS AND METHODS: Demographic, clinical and histopathological data was extracted from patient files using proformas. The following parameters were assessed: age, family history, marital status, side and type of surgery, resection margins, tumor markers, foci, tumor grade, TNM stage and lymph node, vascular and lymphatic invasion. Data was analyzed for descriptive statistics. Logistic regression was performed by stratifying patients according to the disease stage as early stage (ES) (stage I and II) and late stage (LS) (stage III and IV) to get odds ratios (ORs) and P-values.

RESULTS: Clinical and histopathological data of 362 patients with breast cancer was profiled. From the available data 82 (33%) patients were early stage breast cancer, while 167 (67%) were late stage breast cancer. The mean age of patients in the ES breast cancer (45.8 years) was not statistically different from LS breast cancer (45.8 years) (p=0.99).

ER+ cases were 62%, PR+ cases were 47% and HER2 positive cases were 49%. Lymph node invasion (p<0.0001), vascular invasion (p=0.05) and lymphatic invasion (0.009) were statistically significantly associated with LS disease. Lymph node invasion was predictive of LS breast cancer (OR=17.1, p<0.0001). In addition, lymphatic invasion was predictive of LS breast cancer (OR=3.2, p=0.01).

CONCLUSION: The clinical and histopathologic patterns in ES and LS breast cancer are different which may require different management approaches. Majority of the patients present with late stage disease. Tumor markers positivity pattern differs from western population. Lymph node invasion is a better predictor of late stage disease.

KEY WORDS: Breast Cancer, Clinico-pathologic, Estrogen Receptors, HER2-Neu Peptide, Lymph Nodes, Progesterone Receptor.
A data collection instrument was developed with the help from pathologists and oncologists and was used to catalogue the data. Demographic, clinical and histopathological data was extracted for patients with breast cancer. The demographic and clinical data included age of the patient, marital status, family history of breast cancer and surgical information (laterality of tumor and type of surgery). The histopathological data included lymph node invasion, vascular invasion, lymphatic invasion, grade of the tumor, TNM stage of the tumor, resection margin status and final diagnosis and subtypes of breast cancer. In addition, data on estrogen receptor (ER), progesterone receptor (PR) and human epidermal growth factor receptor 2 (HER2) status was retrieved from patient files.

Data was analyzed for descriptive statistics. The distribution of data was assessed using Histogram with normal curve. Based on the presentation of data independent sample t test was used for comparing the means between the two groups (group 1=age in early stage breast cancer; group 2=age in late stage breast cancer). In addition, Fisher’s exact test or chi square test was used for categorical data depending on the number of data points in the cells of a 2×2 table and sample size assumption. Logistic regression was performed by stratifying patients according to the disease stage as early stage (stage I and II, ES) and late stage (stage III and IV, LS) to get odds ratios (ORs) and P -values. P value ≤ 0.05 was considered statistically significant. SPSS version 21 was used for all statistical analyses.

Results
Clinical and pathological data of 362 patients with breast cancer was profiled. The mean ± standard deviation age of patients with breast cancer was 45.7 ± 11.9 years. The age of patients with breast cancer follow a normal distribution.

The mean age of patients in the early stage breast cancer (45.8 years) was not statistically different than the mean age of patients with late stage breast cancer (45.8 years). Three tumor markers are also used namely: estrogen receptor (ER), progesterone receptor (PR) and human epidermal growth factor receptor 2 (HER2). These markers are used as prognostic and predictive factors in breast cancer. ER, PR and HER2 are a routine diagnostic work-up in patients with breast cancer in Pakistan.

Breast cancer presentation patterns and histopathology findings vary in different regions and races. Studies in Pakistan have attempted in analyzing the clinico-pathologic data but they have not stratified breast cancer into different ethnicities. We plan to specifically to analyze the clinico-pathologic parameters and tumor marker status from northwest ethnic population of Pakistan. Analyzing the clinico-pathological data will help us in assessing the disease patterns and in clinical and public health intervention measures. The purpose of current study was to analyze the clinical and histopathological parameters of patients with breast cancer from the northwest population of Pakistan.

Materials and Methods
The current study was a cross sectional study. Data was extracted from the Institute of Radiology and Nuclear Medicine Hospital, Peshawar and Khyber Teaching Hospital, Peshawar from March 2014 to December 2016. The sample size of the current study was 362 patients with breast cancer and the sampling technique was consecutive sampling. The study was approved from the Ethics Board of Khyber Medical University, Peshawar. The inclusion criteria were all the available clinical and pathological data for patients with breast cancer from March 2014 to December 2016 registered at Institute of Radiology and Nuclear Medicine Hospital, Peshawar with the availability of data for these patients in Khyber Teaching Hospital, Peshawar. Thus, this data represents the northwest Pakistani population as patients from every district come to these hospitals for breast cancer treatment. The exclusion criteria were patients with metastatic disease to breast, other breast tumors, secondary tumors in breast and recurrent breast cancer.

A data collection instrument was developed with the help from pathologists and oncologists and was used to catalogue the data. Demographic, clinical and histopathological data was extracted for patients with breast cancer. The demographic and clinical data included age of the patient, marital status, family history of breast cancer and surgical information (laterality of tumor and type of surgery). The histopathological data included lymph node invasion, vascular invasion, lymphatic invasion, grade of the tumor, TNM stage of the tumor, resection margin status and final diagnosis and subtypes of breast cancer. In addition, data on estrogen receptor (ER), progesterone receptor (PR) and human epidermal growth factor receptor 2 (HER2) status was retrieved from patient files.

Data was analyzed for descriptive statistics. The distribution of data was assessed using Histogram with normal curve. Based on the presentation of data independent sample t test was used for comparing the means between the two groups (group 1=age in early stage breast cancer; group 2=age in late stage breast cancer). In addition, Fisher’s exact test or chi square test was used for categorical data depending on the number of data points in the cells of a 2×2 table and sample size assumption. Logistic regression was performed by stratifying patients according to the disease stage as early stage (stage I and II, ES) and late stage (stage III and IV, LS) to get odds ratios (ORs) and P -values. P value ≤ 0.05 was considered statistically significant. SPSS version 21 was used for all statistical analyses.

Results
Clinical and pathological data of 362 patients with breast cancer was profiled. The mean ± standard deviation age of patients with breast cancer was 45.7 ± 11.9 years. The age of patients with breast cancer follow a normal distribution.

The mean age of patients in the early stage breast cancer (45.8 years) was not statistically different than the mean age of patients with late stage breast cancer.
cancer (45.8 years) (p=0.99, independent sample t test) (Table 1).
From the available data 82 (33%) patients were early stage breast cancer, while 167 (67%) were late stage breast cancer. Moreover, the histologic subtypes were ductal (88%), medullary (5%), lobular (4%) and other types (3%). ER+ cases were 62%, PR+ cases were 47% and HER2 positive cases were 49%.

The other clinical and pathological variables including family history, marital status, laterality of tumour, lymph node status, vascular invasion, lymphatic invasion, resection margin status, ER status, PR status, HER2 status, tumour grade, type of surgery and tumour foci were cross tabulated with disease stage (ES breast cancer and LS breast cancer) to identify any relationship.
Lymph node invasion (p<0.0001, Fishers' Exact test), vascular invasion (p=0.05, Chi Square test and lymphatic invasion (0.009, Chi Square test) were statistically significantly associated with late stage disease. In addition, HER2 positivity and type of surgery (modified or total mastectomy) were also associated with late stage disease with a trend towards statistical significance (p=0.07 and p=0.08 respectively, Chi Square test).

Next, we assessed the predictive significance of clinical and pathological variables using logistic regression model. On univariate logistic regression lymph node invasion was predictive of late stage breast cancer (OR=17.1, 95% CI 4.36-66.9, p<0.0001). In addition, lymphatic invasion was predictive of late stage breast cancer (OR=3.2, 95% CI 1.32-8.06, p=0.01). Finally, there was a trend towards statistical significance in case of vascular invasion and ER positivity for predicting late stage breast cancer (p=0.07 and p=0.09 respectively).

Discussion
The current study compiled and analysed the clinicopathologic data of 362 patients with breast cancer. The available data was entered into different statistical models to explain clinically relevant information for pathologists, oncologists and surgeons. This study specifically reported the clinicopathologic characteristics of patients with breast cancer from the northwest Pakistani population.

The mean age of patients diagnosed with breast cancer is similar to the African population. There was no difference in the mean age of patients with early stage breast cancer and late stage breast cancer in the current study. The median age of patients diagnosed with breast cancer in Pakistan population is very low (45 years) compared to USA population (62 years). In addition, less than 5% of the cases presents with age less than 40 years in USA. However, in our study 26% of the patients presented with age less than 40 years. Furthermore, there is no difference in the mean age of patients in early stage and late stage breast cancer in our population but patients in late stage disease are 4 years older in African population. These figures in our study compared to the published literature are alarming and require public health intervention measures.

Majority of patients present at a late stage (67%) in Pakistani population compared to Brazil (53%) and Egypt (46%). Interestingly, in USA only 17% of the cases of breast cancer are diagnosed at a later stage. The difference between Pakistan and USA (67% versus 17%) is striking. The early diagnosis of breast cancer in USA is attributed to the fact that the breast screening and its awareness is a routine practice in USA. Thus, this mandates the need for early diagnosis through the introduction of mammography as a screening tool in Pakistan with properly planned breast cancer awareness campaigns.

The histologic subtypes presented in the current study are significantly different from the reported literature. This may be, because, patients who visit the hospitals included in the study might have previous pathology reports from a variety of different pathology laboratories. Logistically, validating all the reports from different laboratories is a challenging task which might be difficult to achieve in resource limited settings.

Furthermore, the rates of ER, PR and HER2 positivity in Pakistani population appear different. ER+ cases a significantly less (62%) compared to western population (78%) and PR+ cases are, again significantly less (47%) compared to western population (60%). In contrast, HER+ cases are more than 2 times higher in Pakistani population compared to western population. The under-reporting of ER and PR and over-reporting of HER2 may have attributed to the fact that the immunohistochemistry protocols and the reporting criteria might not be stringent in pathology labs of Pakistan. This warrants a standardised immunohistochemistry protocol, a standardised and validated scoring criterion and a validated diagnostic cut-off.

Moreover, we assessed the utility of various clinical and pathological variables for any association and or prediction of late stage breast cancer. Lymph node invasion, vascular invasion and lymphatic invasions were associated with late stage disease. These findings support the existing literature. HER2 positive cases are present mostly in late stage breast cancer and again this finding supports the
existing literature. Modified radical and or total mastectomy are offered as a treatment option to patients with late stage breast cancer. However, the current literature suggests that breast conserving surgery could potentially be an option in stage III disease. Thus, these findings suggest that the surgical practice could potentially become more rigorous and may move toward breast conserving surgery.

Finally, lymph node invasion and lymphatic invasion as predictor or explanatory variables could predict late stage disease as a predicted or response variable. These findings are consistent with the existing literature. These predictive factors should thus be considered in the pathology reports as a “marker” of late stage disease.

**Conclusion**

The clinico-pathologic patterns in early stage and late stage breast cancer are different, which may require different management approaches. Majority of the patients present with late stage disease, however, age at presentation is similar in early stage and late stage disease. Tumor markers positivity pattern differs from western population which may require further studies to identify the risk factors. Lymph node invasion is a better predictor of late stage disease and may be used as a surrogate marker of late stage presentation.

Analysis of the clinico-pathologic parameters could have important clinical and public health applications. We hope that these findings from a relatively large sample of patients would help to improve the management of patients with breast cancer in our local population.

**Table I: The Distribution of Age in Early Stage and Late Stage Breast Cancer**

<table>
<thead>
<tr>
<th>Grouping</th>
<th>N (%)</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ES</td>
<td>82 (23%)</td>
<td>45.87</td>
<td>11.356</td>
<td>1.254</td>
<td>0.99</td>
</tr>
<tr>
<td>LS</td>
<td>167 (77%)</td>
<td>45.86</td>
<td>12.197</td>
<td>.944</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: ES= Early stage breast cancer, LS= Late stage breast cancer
*Independent sample t test

**Table II: Cross Tabulation (Chi Square Test and Fisher’s Exact Test) of Clinical and Pathological Variables with Disease Stage**

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>Retired</th>
<th>Single</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>58</td>
<td>5</td>
</tr>
<tr>
<td>Unmarried</td>
<td>121</td>
<td>14</td>
</tr>
</tbody>
</table>

**Lactoty of Tumour**

<table>
<thead>
<tr>
<th>Lactoty</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left</td>
<td>16</td>
<td>37</td>
<td>42</td>
<td>72</td>
<td>0.56</td>
</tr>
<tr>
<td>Right</td>
<td>19</td>
<td>43</td>
<td>43</td>
<td>72</td>
<td></td>
</tr>
<tr>
<td>NA</td>
<td>43</td>
<td>72</td>
<td>72</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lymph Node Invasion</th>
<th>Retired</th>
<th>Single</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absent</td>
<td>10</td>
<td>23</td>
</tr>
<tr>
<td>Present</td>
<td>3</td>
<td>118</td>
</tr>
</tbody>
</table>

**Vascular Invasion**

<table>
<thead>
<tr>
<th>Vascular Invasion</th>
<th>Retired</th>
<th>Single</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absent</td>
<td>12</td>
<td>09</td>
</tr>
<tr>
<td>Present</td>
<td>8</td>
<td>20</td>
</tr>
</tbody>
</table>

**Lymphatic Invasion**

<table>
<thead>
<tr>
<th>Lymphatic Invasion</th>
<th>Retired</th>
<th>Single</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absent</td>
<td>27</td>
<td>10</td>
</tr>
<tr>
<td>Present</td>
<td>24</td>
<td>29</td>
</tr>
</tbody>
</table>

**Resection Margin**

<table>
<thead>
<tr>
<th>Resection Margin</th>
<th>Retired</th>
<th>Single</th>
</tr>
</thead>
<tbody>
<tr>
<td>R0</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>R1</td>
<td>30</td>
<td>17</td>
</tr>
</tbody>
</table>

**ER Status**

<table>
<thead>
<tr>
<th>ER Status</th>
<th>Retired</th>
<th>Single</th>
</tr>
</thead>
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<tr>
<td>Absent</td>
<td>16</td>
<td>33</td>
</tr>
<tr>
<td>Present</td>
<td>34</td>
<td>51</td>
</tr>
</tbody>
</table>

**PR Status**

<table>
<thead>
<tr>
<th>PR Status</th>
<th>Retired</th>
<th>Single</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absent</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Present</td>
<td>12</td>
<td>35</td>
</tr>
</tbody>
</table>

**HER2 Status**

<table>
<thead>
<tr>
<th>HER2 Status</th>
<th>Retired</th>
<th>Single</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absent</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>Present</td>
<td>12</td>
<td>25</td>
</tr>
</tbody>
</table>

**Tumour grade**

<table>
<thead>
<tr>
<th>Tumour grade</th>
<th>Retired</th>
<th>Single</th>
</tr>
</thead>
<tbody>
<tr>
<td>I and II</td>
<td>33</td>
<td>38</td>
</tr>
<tr>
<td>III</td>
<td>49</td>
<td>77</td>
</tr>
</tbody>
</table>

**Type of Surgery**

<table>
<thead>
<tr>
<th>Type of Surgery</th>
<th>Retired</th>
<th>Single</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modified/Total Mastectomy</td>
<td>23</td>
<td>21</td>
</tr>
<tr>
<td>Lumpectomy</td>
<td>28</td>
<td>48</td>
</tr>
</tbody>
</table>

**Tumour Foci**

<table>
<thead>
<tr>
<th>Tumour Foci</th>
<th>Retired</th>
<th>Single</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focal Lesions</td>
<td>22</td>
<td>10</td>
</tr>
<tr>
<td>Multiple Lesions</td>
<td>43</td>
<td>10</td>
</tr>
</tbody>
</table>

Abbreviations: a = Chi Square Test, b = Fisher’s Exact Test, R0 = Negative resection margin, R1 = Positive resection margin, ER = Oestrogen receptor, PR = Progesterone receptor, HER2 = Human epidermal growth receptor

**Table III: Logistic Regression Modelling to Assess the Predictive Significance of Clinico-Pathological Variables for Late Stage Disease**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive family history</td>
<td>0.79</td>
<td>0.22-2.83</td>
<td>0.72</td>
</tr>
</tbody>
</table>
REFERENCES

Objective: Child health in Pakistan is the greatest significant national issue that needs to take serious attention. Pakistan ranks is 23rd in global under-five mortality. In terms of development, the country is ranked at 125 out of 169 countries. This study aims to highlight the matter of under-five mortality and related government practices.

Materials and Methods: This is a review, to assess child mortality trends in Pakistan. We analyzed results from surveys, reports, journals that were related to child survival and death. We have selected data from 1989 to 2013 and recent researches from different data bases and gray literature like demographic, health and socio-economic surveys. We analyzed socio-economic and health indicators to assess the current situation.

Results: It was found that under-five mortality in Pakistan is 117 per thousand live births in 1990-91. Mortality rate decreased to 94 per thousand live births in 2007 demographic health survey. In 2012-13, this rate declined to 89 per thousand live births. At the provincial level, we found the highest child mortality in Punjab where under-five child mortality rate was 133 and 105 in 1991 and 2013 respectively.

Conclusion: We want to lessen child Mortality through given human services offices and their uses, instruction, mindfulness projects and neediness eradication. Although Pakistan could not achieve the millennium development goals for child mortality, sustainable development goals provide another opportunity to urgently work towards reducing child mortality at the national level.

Key Words: Indicator, Maternal Health, Mortality, Socio-Economic.
Objective
To review the trend of child mortality in Pakistan from 1989 to 2013 and find out the situation during this time series and to highlight socio-economic and demographic indicators as well.

Demographic Indicators
Pakistan is the sixth most populated country in the world with a population of approximately 180 million. About 37% of Pakistan’s population is below 14 years of age, 59% is between 15 and 64 years of age while 4% is above 65 years of age. Two-thirds of Pakistanis live in rural areas. Average life expectancy has increased from 34 years in 1947 to 65 years in 2015. Between 1950 and 2011 Pakistan’s urban population expanded over seven fold and total population increased by over four fold. Currently, annual population growth rate stands at 1.45%.

Socio-economic Indicators
Pakistan has poor child health indicators despite a higher per capita income than the average for low-income countries. According to Pakistan’s Economic Survey 2012, Pakistan’s economic growth is slow having average annual growth rate of 3.7% in 2012. Gross National Income (GNI) per capita in Pakistan is US$ 1,120, still, approximately one quarter (23%) of the population lives below the international poverty line of US$ 1.25 purchasing power parity (PPP).

Table I: Demography and Social Health Status

<table>
<thead>
<tr>
<th>Social Indicator</th>
<th>Urban</th>
<th>Rural</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult Literacy Rate %1</td>
<td>66</td>
<td>53</td>
<td>57</td>
</tr>
<tr>
<td>Average Household Size 1</td>
<td></td>
<td></td>
<td>6.2</td>
</tr>
<tr>
<td>Access to piped water % HH2</td>
<td>51</td>
<td>13</td>
<td>27</td>
</tr>
<tr>
<td>Toilet Facility % HH1</td>
<td>97</td>
<td>60</td>
<td>73</td>
</tr>
<tr>
<td>Fully Immunized Recorded Children %1</td>
<td>70</td>
<td>56</td>
<td>60</td>
</tr>
<tr>
<td>Married Women % (aged 15-49)1</td>
<td>86</td>
<td>67</td>
<td>73</td>
</tr>
</tbody>
</table>

Source: 1. PSLM 2014-15

Above displayed pointers completely make to uncertainty to decrease child mortality, in these table investigate the education status is still low notwithstanding monstrous increment in the general Adult mindfulness, 57% in 2015. Female literacy level is low at 45% particularly as compared to male literacy rate of 68%, which is an expression of low social development. Only about 27% of population has access to tap water as the main source of drinking water. This proportion drops to 19% for rural population who rely mainly on unprotected surface sources with inadequate chlorination putting them at risk of water-borne diseases. Thirteen percent resident use non-flush toilet and 13% of population has no access to toilet facility, however, this sanitation situation is promotes infectious disease.

MDG4 Achievements
Many countries have achieved MDG Goal 4 to reduce child mortality and improving child survival through major reduction in some of the leading causes of under-five deaths such as diarrhea, pneumonia, and measles even before 2015. Pakistan has not been able to meet the deadline of 2015 even in the presence of several child survival programs implemented with the collaboration of UNICEF such as oral rehydration, Integrated Management of Neonatal and Childhood Illness IMCI, breastfeeding promotion, immunization, and growth monitoring. Other programs also contribute to improvement in child survival such as WHO Control of Diarrheal Disease, Extended Program on Immunization (EPI) and Acute respiratory Infections-ARI, Government of Pakistan National program for family planning and primary health care (NPFP) also known as Lady health worker (LHW) Program, Maternal Newborn and child health care Program (MNCH), and National Nutrition Program (NNP). Almost programs focus on primary findings and management of the maternal and childhood illness.

Presently, impulse to all projects development main drivers of mortality under five years and grown-up mortality related with social causes in like manner drinking water sources, sanitation and hygienic condition, human services practices and practices in regards to basic leadership, medicinal services getting and regenerative wellbeing. It is source foundations of youngster passing and furthermore known to the social causes.

Ecological Background
Pakistan has a 1,046 kilometer (650 miles) long coastline along the Arabian Sea and Gulf of Oman in the south. It is bordered by Iran and Afghanistan in the west, India in the east and China in the north. Pakistan’s economy is predominantly agrarian about and 75% population lives in rural areas. Pakistan is administratively divided into four
provinces: Sindh, Punjab, Baluchistan and Khyber Pakhtunkhwa (KPK).

Sources
We considered both gray literature and electronic databases searched by PubMed [http://www.ncbi.nlm.nih.gov/pmc/], MEDLINE [https://www.ncbi.nlm.nih.gov/pubmed/] and UNdata [http://data.un.org/] and gray literature i.e. surveys, statistical, developmental and gazette reports was manually searched from various governmental institutions and international non-governmental organizations.

Inclusion
We included all those publications that were published in English from 1989 to 2015 and that were about child and maternal health indicators. We also included maternal health studies that identified socio-economic and demographic causes and consequences of under-five mortality. We contemplated 16 investigate articles and others were 24 surveys, reports and polices that all were fulfill the walled in area to models.

Exclusion
Abstracts, editorials, clinical trials and reports were not part of our review. We also excluded conference papers and proceedings.

Presentation
In this study we analyzed trends of child mortality and related indicators extracted from child health studies. We examined all data in four categories by age, year, ecological background, and socio-economic and demographic indicators. The reference management software EndNote version X6 was used to manage all literature for this review.

Results
Our findings show the trend of child mortality in Pakistan from 1989 to 2013. We examined all data in various countries in the region. Data assembled from different sources is presented in Table I.

Materials and Methods
Design
This is a review paper to explore socio-economic and demographic indicators of child mortality and designed for awareness and improvement concerning child mortality trends in Pakistan. It is based on observational research strategy and chose meta-Analysis with the fixation well-being pointer accomplishments for think about it.

Table I: Progress toward Millennium Development Goal 4

<table>
<thead>
<tr>
<th>South Asian Countries</th>
<th>Population (Million)1</th>
<th>19902</th>
<th>2010</th>
<th>Progress</th>
<th>MDG 20153</th>
<th>MDG Need</th>
<th>MDG Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>33.4</td>
<td>192</td>
<td>101</td>
<td>0.1</td>
<td>64</td>
<td>8.4</td>
<td>on track</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>153</td>
<td>139</td>
<td>46</td>
<td>3.2</td>
<td>46</td>
<td>3.6</td>
<td>on track</td>
</tr>
<tr>
<td>Bhutan</td>
<td>0.7</td>
<td>136</td>
<td>54</td>
<td>4.7</td>
<td>46</td>
<td>4.1</td>
<td>on track</td>
</tr>
<tr>
<td>India</td>
<td>1,260</td>
<td>114</td>
<td>61</td>
<td>2.3</td>
<td>38</td>
<td>6.3</td>
<td>off track</td>
</tr>
<tr>
<td>Maldives</td>
<td>0.3</td>
<td>105</td>
<td>11</td>
<td>3.3</td>
<td>35</td>
<td>5.4</td>
<td>on track</td>
</tr>
<tr>
<td>Nepal</td>
<td>30.9</td>
<td>135</td>
<td>48</td>
<td>3.0</td>
<td>45</td>
<td>4.9</td>
<td>on track</td>
</tr>
<tr>
<td>Pakistan</td>
<td>180.4</td>
<td>122</td>
<td>72</td>
<td>1.6</td>
<td>41</td>
<td>7.0</td>
<td>off track</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>21.2</td>
<td>29</td>
<td>12</td>
<td>1.6</td>
<td>10</td>
<td>6.9</td>
<td>on track</td>
</tr>
</tbody>
</table>

Fig 1: Map of Pakistan with Child Mortality Rate
The above map shows the current status of child mortality in various regions of Pakistan. Punjab is the most populous province and produces most of the country's agricultural output. Punjab also has the highest under-five mortality rate of all provinces. Baluchistan has a dry desert climate and it is rich in natural resources including contains natural gas and minerals. Baluchistan has the second highest child mortality rate in the country. Sindh is Pakistan's second largest province known for its agricultural output. It is bound in the west by the Indus River and Baluchistan, in the north by Punjab, in the East by the Indian states of Gujarat and Rajasthan, and in the south by the Arabian Sea. Child mortality rate in Sindh is lower than Punjab and Baluchistan. However, developmental indicators such as access to tap water, toilet facility and literacy rate are lower in Sindh than other provinces. Kyber Pakhtunkhwa (KPK) produces timber as well as citrus and dried fruits. KPK has a lower child mortality than other provinces. There is a need to explore the social causes of child mortality at the national level and follow specific strategies to reduce child mortality.
1. Population Reference Bureau 2012

Pakistan has committed to the United Nations “Health for All” declaration. As part of this declaration, Pakistan aims to achieve reduction of its under-five mortality ratio from 140 per 1000 live births to 43 per 1000 live births between 1990 and 2015. However, above data shows Pakistan’s progress towards MDG4 has not been on track. While under-five mortality declined from 117 per 1000 live births to 89 per 1000 live births between 1990 and 2014, Pakistan’s under-five mortality is still higher than most others countries in the region.

![Disturbing state of the younger mortality in the Punjab territory at 105/1000 live births. Tragically, watched poorest outcomes in the Baluchistan there was pattern proceed onward most astounding (111/1000 live births) death rate according to last PDHS 2012-13 as contrast with first PDHS information that was discovered (101/1000 live births) Mortality proportion in 2006-07. While, region of Sindh had most noteworthy rate (106/1000 live births) in PDHS 1990-91 and PDHS 2007 discovered (101/1000 live births) and further declined (93/1000 live births) in PDHS 2013. KPK likewise on a similar tract we discovered most astounding rate (98/1000 live births) in PDHS 1990-91 while PDHS 2007 discovered (75/1000 live births) and declined in (70/1000 live births) death rate in the PDHS 2013.

Discussion

Association with Maternal Health

The child morbidity and mortality rate is associated with high fertility which is considered to be a risk factor of newborn mortality. Maternal health status is significant in child health and mortality. Antenatal Care (ANC) allows skilled health personnel to instruct...

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**Table I: Provincial Distribution of the Child Mortality**

<table>
<thead>
<tr>
<th>Province</th>
<th>PDHS Surveys</th>
<th>Neonatal</th>
<th>Post Neonatal</th>
<th>Infant</th>
<th>Child</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
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<td>Punjab</td>
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mothers about how to take care of themselves and their baby during and after pregnancy. The World Health Organization (WHO) recommended at least three and preferably four ANC visits \(^{20}\) to identify any pregnancy and delivery complications. Overall, in Pakistan, only 28.4% women receive four or more ANC visits. 70.1% women only receive less than four ANC visit. However, in rural areas of Pakistan only 19.8% women acquired WHO recommended number of visits and 78.9% obtain less than three visits.\(^{21}\) Low birth spacing has been found to increase the risk of infant and child mortality in many studies.\(^{22}\)

**Association with Morbidity and Immunization**

Globally, morbidity is substantially reduced among children that received vaccines. In developing countries where vaccine-preventable diseases are the main causes of mortality among infants and children, it increasingly significant to demonstrate the effect and value of immunization programs, which must compete with other cost-effective interventions for extremely limited resources.\(^{23}\) A report from Guinea-Bissau showed lower than expected mortality associated with BCG and measles vaccines, and increased mortality after diphtheria-tetanus-pertussis (DTP) and oral poliovirus vaccine (OPV) vaccinations. According to WHO guidelines, parents should give the children a BCG vaccine, three doses of DPT, Polio vaccine, and measles vaccines from birth to 23 months.\(^{24}\) In Pakistan the proportion of fully immunized children increased from 78% in 2008-09 to 81% in 2010-11.4-15 Moreover, breastfeeding has been found to be protective against child mortality and preventive for diarrhea and ARI deaths.\(^{25}\) According to demographic surveys broke-down make mindfulness about significance of child vaccination over the land zones of provincial and urban ranges of the Pakistan then it is watched that is similarly more remarkable to the zones of country territories.\(^ {26,27}\)

**Association with Nutrition**

Deaths among children under five years of age were found to be associated with self-reported poor maternal health. It may also be associated with low birth weight, under-nutrition or illness exposure among children of mothers in poor health. As expected, child’s age remained the most powerful determinant of child’s death.\(^{28}\) This could be due to greater susceptibility of infants to communicable childhood illnesses.\(^{29}\) In Pakistan, poor nutrition effects at least 10 million children and avoid almost 123,000 deaths each year.\(^{30}\) Although, estimated proportions of deaths are associated with under nutrition and it is linked to an underlying cause of death.\(^{31,32}\)

**Association with Education**

Pakistan’s situation of health and literacy rate of mothers is not satisfactory. Although literacy level has been increasing in population aged 10 years and above, unfortunately overall literacy rate in Pakistan is low when compared to other South Asian Association for Regional Cooperation (SAARC) countries. Overall, Pakistan has a literacy rate of 58 percent.\(^{33}\) Mother’s education has very strong association with child mortality and maternal health. Women who at least have basic education are more likely than illiterate mothers to adjust the size of their families according to their capabilities, and are more likely to provide better care for their children and send them to school.\(^{34}\)

**Association with Family Planning**

In preventing child deaths family planning is also a significant variable. Socio-economic factors such as the family’s place of residence, spouse education, and employment have also been correlated with family planning. A long time period between births allows a mother more time to recover from gestation and delivery. This also provides opportunity to provide breastfeeding, proper food and nutrition to existing children.\(^{35}\) A Korean study found that some maternal education is associated with shorter birth spacing.\(^{36}\) The effects of birth interval are fundamentally associated and dependent on the use of family planning methods of the mothers. Children born after a short interval of one year have a higher mortality rate, suggesting child should be born after more than one year.\(^{37,38}\)

**Health System**

In Pakistan, the provincial health department is responsible for making provincial health policy in accordance with national health policy and to translate it into strategic plans, whereas the primary implementation responsibility lies with districts within each province. Provincial governments are also responsible for providing funds to districts for
health execution and for supervising district government performance. The District Health Department is an effective part of the public health sector in Pakistan. It is responsible for management of budget, establishment of routine curative besides preventive, annual district health planning and promotion of healthcare services. Planning functions spread out to designing healthcare services in accordance with community needs and formulation of policies pertaining to institution of user charges in health facilities in districts. The public sector in Pakistan consists of physically established health care network, comprising of more than 13,663 health facilities ranging from primary to tertiary care centers. There are approximately one thousands two hundred seventy beds per 83,028 population. While there are 5,377 dispensaries included with 1,179 beds. There are about 602 rural health centers (RHCs) with 10,377 beds. Additionally, there are 5,428 basic health unit/sub health centers with 6,581. There are also 697 maternal and child health centers with 345 beds. Still, this expanded infrastructure is ineffectively equipped and poorly maintained resulting in low utilization, limited coverage and inadequate access to essential basic services. To fill this space, private sector serves about 70% of population health needs, with a fee-for-service system. Private sector facilities range from nursing homes, dispensaries, small clinics, drug sellers, traditional healers, to big tertiary care hospitals offering varying quality of services. Specialist discovered genuine and open perceptions of different markers amid the information audit and assess the raw numbers identified with general and maternal wellbeing, for example, pregnancy, labor and delivery period, and also child wellbeing sicknesses, treatment, health facility centers execution and socio statistic profile of the family. These survey exhibited the genuine state of the country that occupant in lower groups. To rehash comes about now request is expanding for a National passing registry framework and set up database on the reasons for child mortality.

Conclusion
Health and education indicators have improved in Pakistan over the last decade. Key improvements recorded in rates of newborns, infant, less five years and maternal mortality but still, off track on the MDGs 2015 targets. Pakistan had lagging or making slow progress in 23 of the 32 MDG targets stated on, these targets are associated to education and health. Badly, needed efforts for implementation on the SDGs targets for achievement of reduce child mortality by 2030. While, we had been want to decrease Child Mortality through given medicinal services, instruction, awareness projects and deprivation eradication. In spite of the fact that Pakistan couldn’t accomplish the MDGs objectives for child mortality, yet now feasible improvement objectives gave another chance to direly work towards diminishing child mortality in the nation.

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**EDITORIAL**  
Student Empowerment in Medical Education

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