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CONTENTS

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Formative Assessment for Undergraduate Medical Students

Masood Anwar, Fahd Mudassar Hameed

"Assessment" has various connotations, purposes and definitions. It is defined as "the process used by teachers and students to recognize and respond to student learning in order to enhance that learning, during the learning".[1] It employs a variety of methods to collect, analyze and interpret information in order to evaluate, measure, and document the academic readiness, learning progress, and skill acquisition as a result of their educational experience.

Objectives of Assessment:

The objective of an assessment program is not limited to determination of whether a student has acquired enough knowledge and skills to be allowed to practice these independently. More importantly it provides this information which can be used to refine the educational program in order to improve subsequent learning and development of students. It also provides feedback to students, educators, parents, policy makers, and the public about the effectiveness of educational program

Types of Assessments:

There are various types of assessments described in literature but in health sciences educational program only two types are important, summative assessment and formative assessment. Summative assessment determines the extent to which a student has achieved curricular objectives. It is used to make pass/fail decisions and determine students' grades on predetermined criteria. In other words it is "assessment of learning". Formative assessment is a continuous and systematic process of gathering information, providing feedback and applying corrective measures during an ongoing educational program. It aims at improving the students' learning process by pointing out there deficiencies in learning and suggesting how to improve their knowledge and appreciation of the standards that are expected from them. In other words it is "assessment for learning". Formative assessment also helps the faculty in improving their instructional methods and programme directors in improving the programme to achieve objectives of the programme.

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Types of Formative Assessment:

Formative assessment is again of two types; Formal or Planned and Informal or Interactive.[1] Formal or Planned formative assessment is planned in advance to elicit information on students' understanding of subject and skill learning using specific assessment tasks. It measures the extent to which the students have learnt what they were intended to learn. Informal or Interactive formative assessment, on the other hand, can be used to collect a variety of information. It includes information on students' ongoing understanding and recall, scope and depth of prior knowledge, conception and interest in learning the subject. This information can then be used to devise strategies to enhance students' learning. To make formative assessment useful teachers must be able to assess the gathered information for its significance, interpret it correctly and devise appropriate interventions.

Table I: Comparison of Formal and Informal Formative Assessment

Formal or Planned Assessment	Informal or Interactive Assessment
Parts of the process are eliciting, interpreting and acting	Parts of the process are noticing, recognizing and responding
Carried out on all students simultaneously	Carried out in small groups or individual students
Carried out at long time intervals	Carried out at short time intervals or even continuously
Helps students to get through the curriculum	Helps students in lifelong learning
Assesses mainly the subject learning	Assesses subject, personal and social learning as well as communication skills
Relies on teacher's professional knowledge	Relies on teacher's professional, social and cultural knowledge and communication skills

Purpose of Formative Assessment

Formative Assessment provides information not only about the progress in learning of students but also about the performance of teachers. It helps

students in appreciating the standards that are expected from them. A research review of 250 empirical studies on class-room based assessment studies showed that students' gains from formative assessment were "among the largest ever reported for educational interventions".[2] The basic purpose of formative assessment is to gather information about the students and faculty performance in order to improve the curriculum and its implementation. Formative assessment, both formal and informal, thus is a part of an ongoing cycle. It begins with either eliciting a response on a predesigned task or noticing response during an ongoing task. It is followed by interpreting or recognizing the response and then acting on or responding to it. The corrected cycle starts again.

Formative assessment helps us in the following ways:

1) Students strengths and weaknesses are pin pointed.
2 Directions can be set for teaching and learning.
3) Motivates students to improve themselves apart from assessment driven motives.
4) Gives opportunity to explore the subject in a thoughtful and meaningful way.
5) Promotes holistic understanding of the subject by each student.
6) Promotes use of higher-order skills (critical thinking, problem solving, etc.) for the understanding of course content supporting a deep learning attitude.[3]
7) A variety of instructional methods can be used to address individual student's needs.[4]

Key Strategies for Formative Assessment

Dylan William has described five key strategies for Formative Assessment.[5]

1. Clarifying, sharing, and understanding learning intentions and criteria for success – getting the students to really understand what their classroom experience will be and how their success will be measured.
2. Engineering effective classroom discussions, activities, and learning tasks that elicit evidence of learning – developing effective classroom instructional strategies that allow for the measurement of success.
3. Providing feedback that moves learning forward – working with students to provide them the information they need to better understand problems and solutions.
4. Activating learners as instructional resources for one another – getting students involved with each other in discussions and working groups can help improve student learning.
5. Activating learners as owners of their own learning – engaging the students in process of thinking about and assessing their own work.

Methods of conducting Formative Assessment

The beauty of formative assessment is that one is at liberty to employ any method, ranging from simple observation of the student during an ongoing learning activity to ask students to write reviews on given topics or perform a skill or even to design questions.

The purpose of the assessment items, tasks, or activities must be that they are windows into the students' cognitive processes. Assessments that allow students to show their thinking, and allow teachers to best elicit evidence about these cognitive processes, are where the emphasis should be.

The following is brief description of assessment methods used:[6]

1. Learning /Response Logs: Students maintain a log where they record their learning, and respond to a lesson regarding their understanding. The teacher then collect the logs at the end of the instruction to further reinforce the instruction as and if required. A specimen of such a log is shown in.
2. Practice Presentation: Students practice a presentation model with peer feedback. This will enhance their presentation skills and knowledge of subject matter. Rubrics for presentation should be provided beforehand.
3. Questions: Questions of higher order are asked with students like explain, justify, imagine or defend to challenge their depth of knowledge. The questions may take one of the several forms, e.g.
   a. Quick questions during the instruction
   b. Constructed long essay questions
   c. Short Essay questions based on a scenario.
4. Self/Peer Assessment Quizzes: Students reflect on their learning by answering difficult questions.
5. Think-Pair-Share: The teacher presents a question. Students think for 20-30 seconds. And then share with their colleague. This may also take the form of "Brain Storming" on the question in a small group and after attaining a common understanding, sharing with the class.
6. Generating Questions: Students may be asked to generate questions at the end of an instructional activity. These questions can then be discussed

either in the class or small groups.

7. Interacting with computer simulation, manikin or model: Students may be asked to perform tasks by interacting with computer simulation, manikin or even a simulated patients and record results. Rubrics may be prepared beforehand.
8. One minute paper: The teacher says to sum up the important concept and jot it down. The work done can be discussed in the class.
9. Completing performance based tasks: Rubrics may be prepared beforehand.
10. Transfer and apply: Once core knowledge is given to the students, students are asked how they will apply it in different practical situations/scenarios.

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ORIGINAL ARTICLE

Screening of High Risk Patients with Mitral Valve Prolapse – Role of Heart Rate Variability

Muhammad Alamgir Khan, Syed Muhammad Imran Majeed, Madiha Sarwar

ABSTRACT

Objective: To screen out patients with Mitral Valve Prolapse at high risk of ventricular arrhythmogenesis, based upon Heart Rate Variability.

Place and Duration of Study: Department of Cardiac Electrophysiology Armed Forces Institute of Cardiology/National Institute of Heart Diseases, Rawalpindi from May 2007 to March 2008.

Materials and Methods: This cross sectional study included 37 patients with mitral valve prolapse. Patients with acute or old myocardial infarction, diabetes mellitus, ischemic heart disease and systemic hypertension were excluded. Patients were holtered for 24 hours and time domain analysis of heart rate variability was carried out. Statistical time domain measures of heart rate variability i.e. SDNN, SDANN and RMSSD were calculated. Descriptive statistics were used to calculate frequencies and percentages of categorical variables using SPSS version 22.

Results: Mean values of SDNN, SDANN and RMSSD were 141.62 ± 30.80, 125.16 ± 25.58 and 28.40 ± 8.06 milliseconds respectively. Two patients (5.40%) had reduced HRV in all the three indices. In one patient (2.70%) values of SDNN and SDANN were reduced whereas in another one patient (2.70%) the values of SDNN and RMSSD were reduced. In remaining one patient only SDNN was found to be reduced.

Conclusion: There is a subset of patients with mitral valve prolapse with reduced heart rate variability which may be at risk of ventricular arrhythmogenesis.

Keywords: *Heart rate variability, Mitral valve prolapse, Arrhythmogenesis, Holter monitorin.*

Introduction

Screening of patients at high risk of sudden cardiac death poses a huge challenge to researchers in the area of cardiovascular medicine.[1] Sudden cardiac death is defined as natural death from cardiac causes, heralded by abrupt loss of consciousness within one hour of the onset of acute symptoms.[2] In majority of the cases the mechanism underlying sudden cardiac death is ventricular fibrillation.[3] As the patient expires shortly after the onset of acute symptoms, there is no much time for treatment. Hence, the best way to prevent sudden cardiac death is its prediction and putting the patient under medial surveillance.[3] Mitral valve prolapse is a common valvular heart disease in which sudden cardiac death has been reported.[4]It refers to the displacement of an abnormally thickened mitral leaflet into the left atrium during systole.[5] Its prevalence is about 0.6 - 2.4 % in the general population.[6] Mitral valve prolapsehas been associated with ventricular arrhythmias along with other complications like mitral regurgitation, heart failure and bacterial endocarditis.[7] Although, the disorder generally takes a benign course, nevertheless, a few unfortunate patients remain at high risk of ventricular arrhythmias and sudden cardiac death. The risk of sudden cardiac death in these patients is 0.1% per year, not much different from the rest of the general population (0.2%), however, the risk may increase to 0.9 to 2% in cases with associated complication especially mitral regurgitation.[8] This is a subset of patients in whom risk stratification of sudden arrhythmogenic death is recommended.[9]Heart rhythm is under the control of autonomic nervous system. Sympathetic and parasympathetic (vagal) are the two divisions of autonomic nervous system having reciprocal effect on heart rate. Sympathetic system activation leads to positive chronotropism whereas parasympathetic activation leads to negative chronotropism.[10] Sympathetic overactivity is the basis of autonomic imbalance in these patients as indicated byraised blood levels of catecholamines, and enhanced β receptoraffinity.[11] In a healthy individual, at rest, vagal effect prevails leading to reciprocal suppression of sympathetic nervous system.[12]Evidence suggests that autonomic imbalance in patients suffering from mitral valve prolapse leads to ventricular arrhythmias which may terminate into sudden cardiac death.[13] A recent

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study has indicated that sympathetic preponderance not only affects cardiac rhythm but also promotes myxomatous degeneration in mitral valve leaflets and worsens the disease.[11]This has led researchers to work on quantification of autonomic nervous system. In past few years, various ECG based quantitative markers of autonomic activity have been developed for risk stratification, like heart rate variability, baroreflex sensitivity, QT dispersion and heart rate turbulence.[14]Among these, heart rate variability has emerged as a simpleand easy tool to quantify the autonomic nervous system.[15]Heart rate variability is the temporal oscillation between consecutive heart beats as represented by variable RR intervals on the surface ECG.[16] It is a noninvasive and cost effective marker of autonomic imbalance that can be used in patients with mitral valve prolapse to screen out the high risk group.[17]Holter ECG recordings of 24 hours duration generally, are used for the analysis of heart rate variability. Heart rate variability represents respiratory sinus arrhythmia and is primarily mediated by vagus nerve. Its value within normal range signifies sympathovagal balance with vagal dominance.[18] Reduced vagal and raised sympathetic activity is reflected by decreased heart rate variability. This kind of autonomic imbalance is characteristic of patients with mitral valve prolapse.[19] It therefore, follows that reduced heart rate variability representative of sympathetic dominance can isolate the patients with mitral valve prolapse who are at risk of sudden arrhythmogenic death.

The present study was carried out to determine patients with mitral valve prolapse at high risk of sudden arrhythmogenic death, based upon heart rate variability.

Materials and Methods

It was a cross-sectional descriptive study, conducted at Armed Forces Institute of Cardiology/National Institute of Heart Diseases, Rawalpindi from May 2007 to March 2008. Before starting the study, formal approval from medical ethics committee was obtained. Written and informed consent was also taken from all the patients. 37 patients with mitral valve prolapse, from 15 to 38 years of age were included in the study through convenience non-probability sampling. Mitral valve prolapse was diagnosed on 2 dimensional echocardiography using parasternal long axis view, as per the following criteria.[20]

- Systolic displacement of mitral leaflet greater than 2 mm
- Leaflet thickness of 5 mm or more for classic prolapse and less than 5 mm for non-classic prolapse

Patients with acute or old myocardial infarction, diabetes mellitus, ischemic heart disease and systemic hypertension were excluded. Patients fulfilling the inclusion criteria were Holter monitored for 24 hours using 'Life Card CF' Holters from Del Mar Reynolds Medical Company limited. After 24 hours of recording, the digital ECG data were transferred from holter recorder to a computer having Pathfinder 700 series software installed. Out of three channels, the one which displayed best ECG recording and with least artifacts was selected. The whole data were edited manually with extreme care using visual checks and manual correction of all QRS complexes. All the erroneous beats were identified and edited from data. After editing, the time domain analysis of heart rate variability was carried out. Statistical time domain measures of heart rate variability i.e. SDNN (Standard deviation of all normal to normal intervals), SDANN (Standard deviation of the averages of normal to normal intervals in all 5 minutes segments of the entire recording) and RMSSD (The square root of the mean of the sum of the squares of differences between adjacent normal to normal intervals) were calculated. Statistical analysis was done by using IBM SPSS Statistics version 22. Descriptive statistics were used to calculate frequencies and percentages of categorical variables.

Results

There were 37 patients with mean age of 26.27 ± 6.18 years and male to female ratio of1.6:1.

Displacement of mitral leaflets on echocardiography was 3.68±0.98 mm whereas the leaflet thickness was 4.86±0.82 mm (Table I).

Values of SDNN, SDANN and RMSSD were 141.62 ± 30.80, 125.16 ± 25.58 and 28.40 ± 8.06 respectively (Table II). Five patients (13.51%) were found to have reduced SDNN values whereas three patients (8.10%) had reduced SDANN and another three (8.10%) had reduced RMSSD values (Table III).

Out of 37, HRV was reduced in 5 patients in total

(13.51%).Detailed analysis of HRV parameters revealed that in two patients (5.40%) all the three HRV indices were reduced (group 1). In one patient (2.70%) values of SDNN and SDANN were reduced (group 2) whereas in another one patient (2.70%) the values of SDNN and RMSSD were reduced (group 3). In remaining one patient only SDNN was found to be reduced (Table IV).

Table I: Echocardiographic findings in patients with mitral valve prolapsed (N=37)

Echocardiographic finding (parasternal long axis view)	**Measurement (mm) Mean ± SD**
Displacement of mitral leaflets	3.68 ± 0.98
Thickness of mitral leaflets	4.86 ± 0.82

Table II: Values of heart rate variability indices (N=37)

HRV indices	**Value (ms) Mean ± SD**
SDNN	141.62 ± 30.80
SDANN	125.16 ± 25.58
RMSSD	28.40 ± 8.06

Table III: Frequency of patients according to reduction in single HRV index (N=37)

HRV indices	**Patients with reduced HRV**
SDNN	5 (13.51%)
SDANN	3 (8.10%)
RMSSD	3 (8.10%)

Table IV: Frequency of patients according to cumulative reduction in HRV indices (N=37)

Patients	**Reduced HRV**			
	All the three indices (group 1)	SDNN+SDANN (group 2)	SDNN+RMSSD (group 3)	SDNN
Frequency	2	1	1	1
Percentage	5.40%	2.70 %	2.70 %	2.70 %

Discussion

According to the results of our study, 5 patients (13.50%) out of 37 had reduced heart rate variability. Combined analysis of all the HRV indices divided the patients in three groups. In first group, two patients (5.40%) had reduced heart rate variability in all the three parameters (SDNN, SDANN and RMSSD). In second group, two patients had reduced HRV in two parameters (SDNN plus SDANN or RMSSD) and in third group the remaining one patient showed reduced HRV inonly one parameter (SDNN). Although all the three groups had reduced HRV and are at risk of sudden arrhythmogenic death, the risk is comparatively higher for group one (5.40%) as compared to the other two groups. It is reported in literature that prediction of sudden cardiac death on the basis of single predictive tool is not reliable. Hence judicious combination of different predictive markers is recommended. This goes in accordance with the high risk group of our study in which HRV was reduced in all the three parameters. Han et al studied heart rate variability in sixty seven children with mitral valve prolapse. Their study included thirty seven healthy and age-matched children as controls.[17] Time and frequency domain indices of heart rate variability were calculated from 24 hours holter ECG recordings. They found that all the time and frequency domain indices were significantly lower in children with mitral valve prolapse than in controls (p-value < 0.05).They also reported that frequency of individuals with reduced heart rate variability was significantly higher in the diseased group as compared to the control group (p-value < 0.05).Lower values of heart rate variability indices in children with mitral valve prolapsewere suggestive of sympathovagal imbalance in favor of sympathetic activity. Anders, et al carried out a study to evaluate mitral valve prolapse as a cause of sudden cardiac death in young adults.[9]They conducted series of autopsies of the patients who died of sudden cardiac death. They found the incidence of mitral valve prolapse among autopsies of sudden cardiac death cases, to be about 4 to 5%. They presented six such cases of unexpected death in young female adults and concluded that even clinically benign cases of mitral valve prolapse, in young adults, might result in sudden unexpected death. Rosenthal et al studied 20 patients with mitral valve prolapse and 12 controls without the disease.[21]During programmed ventricular stimulation, 9 patients and ventricular arrhythmias as compared to the healthy subjects where only one subject showed arrhythmogenesis (p < 0.05). On high intensity stimulation, five more

patients showed ventricular arrhythmias. They concluded that frequency of patients with mitral leaflet prolapse who had inducible ventricular tachyarrhythmias during programmed ventricular stimulation was significantly higher than the healthy controls.

Tsuji et al, in Framingham Heart Study, analysed association of heart rate variability with mortality.[22] Their study included 736patients with an average age of 72 ± 6 years. They studied various frequency and time domain measures of heart rate variability. During follow up, 74 subjects of their study died. They found significant association between reduction of heart rate variability measures and all-cause mortality (p=0.009). They concluded that estimation of heart rate variability by ambulatory monitoring offers predictive value that goes beyond the information provided by the traditional risk markers. Results of the studies mentioned above including those of our study conclude that there is a subset of patients with mitral valve prolapse which may be at high risk of sudden arrhythmogenic cardiac death. This high risk group can be screened out on the basis of heart rate variability. Studies mentioned above also indicate that heart rate variability is a significant predictive marker of sudden arrhythmogenic death and can be used for risk stratification in patients with mitral valve prolapse. However, the predictive value of heart rate variability can be enhanced if combined with other ECG based markers of arrhythmogenesis like Signal Averaged ECG, T wave alternans and QT dispersion. Within the domain of mitral valve prolapse, leaflet thickness greater than 5 mm and association with mitral regurgitation increase the effectiveness of heart rate variability as a predictive marker of sudden cardiac death.

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ORIGINAL ARTICLE

Diagnostic Accuracy of Electrocardiography in Diagnosis of Left Ventricular Hypertrophy

Seemi Saba, Iffat Sultana, Sana Ahmed, Mahboob ur Rehman, Syed Jawad Shah

ABSTRACT

Objective: To determine diagnostic accuracy (in terms of sensitivity, specificity, positive predictive value and negative predictive value) of electrocardiography for left ventricular hypertrophy (LVH).

Study Design: Cross sectional validation type.

Place and Duration of Study: Pakistan Institute of Medical Sciences (PIMS) from 1st January 2013 to 30th June 2013.

Materials and Methods: A cross-sectional study was conducted at department of cardiology. Two hundred and fifty hypertensive patients, both male and female were included in the study. The data was collected by non-probability, purposive sampling. A performa was filled indicating their bio-data, history and clinical examination. All the patients were then subjected to 12 lead electrocardiogram (ECG) and echocardiography to detect LVH. Sokolow Lyon product index and Cornell product index was calculated on ECG to detect LVH. Data was analysed using SPSS 11.

Results: Out of 250 hypertensive patients, a total of 110 (44%) patients had LVH by echocardiography Out of these 110 patients, 60 (54.5%) patients had both positive Sokolow Lyon and Cornell product indices and 50 (45.5%) had negative both Sokolow Lyon and Cornell product indices. The calculated sensitivity, specificity, positive predictive value, negative predictive value and overall diagnostic accuracy of combined Sokolow Lyon and Cornell product indices were 54.5%, 97.9%, 95.2%, 73.3% and 78.8% respectively.

Conclusion: The ECG criteria of combined Sokolow Lyon and Cornell product indices had a high specificity and PPV for the detection of left ventricular hypertrophy using echocardiography as a gold standard. However ECG has low sensitivity and NPV for LVH and hence is not a reliable screening tool for detection of LVH.

Keywords: *Hypertension, left ventricular hypertrophy, Electrocardiography, Echocardiography, Sokolow Lyon product index, Cornell product index.*

Introduction

Various studies have shown that left ventricular hypertrophy is surely an important possibility factor in individuals having hypertension, resulting in a new fivefold to 10-fold increased throughout cardiovascular events,[1] which is similar to the increase seen in patients with a history of myocardial infarction.[2] Among hypertensive patients the prevalence of LVH is 59%.[3] Left ventricular hypertrophy (LVH) is a strong independent risk factor of cardiovascular morbidity and death.[4] Adverse cardiovascular events have been reduced by reduction of LVH.[5] Accurate and also early analysis regarding remaining ventricular hypertrophy will be for that reason a vital portion of attention regarding people along with hypertension. Two commonly used modalities to diagnose left ventricular hypertrophy are echocardiography and electrocardiogram. The diagnostic sensitivity of ECG is increased with the increased cardiac mass.[6] The sensitivity of echocardiography for the prediction of anatomical LVH (93%) exceeded that of ECG (54%), while both methods had a high specificity (97%).[7] The sensitivity of various ECG criteria is low (usually below 50%), while the specificity is reasonably high (often in the variety of 85% to help 90%).[8] Electrocardiography can be used as an alternative tool for diagnosis of left ventricular hypertrophy in patients where facilities of echocardiography are not available. The actual composite of various ECG criteria's may be a practical technique to increase the diagnostic power regarding ECG. The actual mixtures with the Cornell product using the Sokolow voltage as well as using the Sokolow product seem to be by far the most effective options. The actual proportion regarding people having LVH in numerous reports discovered simply by Cornell product has been 27. 3% as well as 23. 6% simply by Sokolow-Lyon product, along with combined Cornell as well as Sokolow-Lyon products arrived at 39. 3%.[9] The actual specificities regarding cornell product or service as well as sokolow lyon product or service tend to be 92% as well as 89% for LVH.[10] This research was planned to determine the diagnostic accuracy of combination of Sokolow-Lyon product with Cornell

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product criteria's of ECG for LVH keeping echocardiography as the gold standard and to determine that can ECG be used as a diagnostic modality for assessing LVH in areas where echocardiography may not be available.

Materials and Methods

Our target population was hypertensive patients registered in OPD and Admitted in Cardiology unit, PIMS from 1st January till 30th June 2013. Keeping the prevalence of LVH among hypertensive as 59%, confidence interval at 95% and level of significance at 8%, the calculated sample size by WHO calculator was 250 patients with hypertension. Age above 18 years of either gender with hypertension of any duration was included. Hypertensive Patients with aortic stenosis, hypertrophic obstructive cardiomyopathy, prior myocardial infarction left ventricular aneurysm, atrial fibrillation, right and left bundle branch block, pacemaker, pleural effusion and ascites were excluded. An informed written consent was taken from each patient. A performa was filled indicating their bio-data, history and clinical examination. All the patients were then subjected to a 12 lead electrocardiogram (ECG) and 2.5MHz probe of Toshiba machine of echocardiography to detect LVH. Sokolow Lyon product index and Cornell product index was calculated on ECG to detect LVH.Overall diagnostic accuracy of combined Sokolow-

Lyon and Cornell product was calculated using SPSS 11.0.

LVH on echocardiography

Left ventricular mass (LVM) would be calculated by using Devereux's anatomically validated formula. Diagnostic criteria for LVH for male >108g/m2 and for female >100g/m2.

LVM = 1.04[(LVIDd + IVS + LVPWT) 3 – (LVIDd) 3 – 13.6

LVH on ECG

(Cornell product and Sokolow Lyon product criteria's would be used)

12 lead electrocardiography with standard voltage and speed of 10mm/mv and 25 mm/sec respectively.

Cornell product criteria[11] SV3 + RaVL (+8 in women) × QRS duration (≥ 2,440 mm × ms value diagnostic for LVH)

Sokolow-Lyon products [(SV1 + RV5 or RV6) × QRS duration] ≥ 2940 mm·ms value diagnostic for LVH).

Diagnostic accuracy

True positive: If the results of ECG (positive or negative) would be in accordance with the echocardiography findings, the result would be considered as a true positive.

Sensitivity: The ability of the ECG to detect individuals with LVH.

Specificity: The probability that an individual who does not have LVH is labelled as negative by ECG.

Positive predictive value (PPV): The probability that a person has LVH given that the ECG is positive.

Negative predictive value (NPV): The probability that a person does not have LVH given that the ECG is negative.

Results

Our study included 250 patients with hypertension. The age of the patients ranged from 18 to 78 years. The mean age of the patients was 50.02±13.07 years. Among the study group 102 (40.8%) were male and 148 (59.2%) were female patients. Out of 250 hypertensive patients, a total of 110 (44%) patients had LVH by echocardiogram. Among the 110 patients with LVH on echocardiography 60 (54.5%, ie true positive) had both positive Sokolow Lyon and Cornell product indices and 50 (45.5%, i.e false negative) had negative both Sokolow Lyon and Cornell product indices. Among the 140 patients with no LVH on echocardiography, 3 (2.1%, i.e false positive) had both positive Sokolow Lyon and Cornell product indices and 137 (97.9%, i.e true negative) had negative both Sokolow Lyon and Cornell product indices. The calculated sensitivity, specificity, PPV and NPV of both Sokolow Lyon and Cornell product indices were 54.5%, 97.9%, 95.2% and 73.3% respectively.

The overall diagnostic accuracy of combined Sokolow Lyon product and Cornell product indices was 78.8%.

Discussion

We conducted this study to determine diagnostic accuracy of combination of Sokolow Lyon product index and Cornell product index and the results suggested a high specificity. However ECG has low sensitivity and NPV for LVH and hence is not a reliable screening tool for detection of LVH. The appropriate diagnostic work-up of suspected left ventricular hypertrophy in patients with hypertension is less

Table I: Diagnostic Accuracy (sensitivity, specificity, PPV, NPV) of combined Sokolow Lyon and Cornell product indices in the diagnosis of LVH taking echocardiograms as gold standard

		Patients with LVH (as confirmed on echocardiography)		
		Positive Echo	Negative Echo	
ECG (Sokolow Lyon product and Cornell voltage product)	Positive ECG	TP (60)	FP (3)	PPV= TP / (TP + FP) =60/63 =95.2%
	Negative ECG	FN (50)	TN (137)	NPV=TN/ (TN+FN) =137/187 =73.3%
		Sensitivity = TP / (TP + FN) = 60/110 = 54.5%	Specificity = TN / (FP + TN) = 137/140 =97.9%	Diagnostic accuracy = $\frac{TP + TN}{TP+TN+FP+FN} \times 100$ = $\frac{60+137}{60+137+3+50} \times 100$ = 78.8%

clear, however.[12] In the study by Crow et al[13] correlations between ECG and echocardiographic LV mass index were modest (<0.40). ECG-LV hypertrophy sensitivity at 95% specificity was < 34%. Our study also showed that ECG in diagnosing LVH is less sensitive in comparison to echocardiogram. In the study Waqas Hameed et al[14], comparison between ECG and echocardiogram using Romhilt-Estes score point for diagnosis of LVH reveal that this criteria has 35% sensitivity and 90% specificity and suggested that sensitivity of ECG is low in detecting LVH, however, sensitivity can be improved by combining Sokolow Lyons voltage and Cornell voltage criteria with Romhilt-Estes point score. Whereas in this study combination of sokolow lyon and cornell product do not improve the diagnostic efficacy of ECG for LVH. The sensitivity and specificity of these criteria vary widely depending upon the populations studied, the "gold standard" employed (echocardiographic or magnetic resonance imaging LV mass versus necropsy measurements), and the severity of LVH. Overall, conservative estimates of the sensitivity of the various criteria for moderate to severe LVH is in the 30 to 60 percent range, with specificities in the 80 to 90 percent range.[15] Molloy et al.[16] Suggested that the simple product of voltage and QRS duration is useful to identify LVH more accurately than voltage criteria alone. Keeping these results in view combination of products of both ECG criteria's have been used rather than alone voltage based criteria's in our study and not successful to enhance the overall diagnostic accuracy of ECG for LVH.

Domingos et al [17] compared the efficaciousness of four electrocardiographic criteria: Sokolow, Gubner, Cornell as well as Romhilt, in the particular diagnosis involving left ventricular hypertrophy (LVH) within hypertensive sufferers. Among these 4 criteria's, the Sokolow index with a sensitivity of 40%, diagnostic accuracy of 50% and specificity of 100% was the most accurate than rest of the three abovementioned criterias. When at least one of the indices was positive, the sensitivity was 52% and diagnostic accuracy was 57%. Our study also proved that sensitivity of sokolow product is greater than the cornell product in detection of LVH. Calderón A et al[9] assessed the efficacy of composite form of Cornell product with the Sokolow voltage or with the Sokolow product in detection of LVH, revealed the sensitivities of 27.3% by Cornell product and 23.6% by Sokolow-Lyon product in LVH detection whereas the sensitivity of composite form reached 39.3%. The specificities of cornell product and sokolow lyon product are 92% and 89% for LVH. Whereas our study results do not show an improvement in sensitivity of ECG criteria when use in same composite form. Further research is necessary to evaluate the cost effectiveness of different diagnostic strategies and to create alternative diagnostic technologies for assessment of left ventricular hypertrophy.

Conclusion

The ECG criteria of combined Sokolow Lyon and Cornell product indices has a high specificity and PPV for the diagnosis of left ventricular hypertrophy keeping echocardiography as the gold standard. However these composite criteria have low sensitivity and hence are not reliable screening tools for detection of LVH.

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ORIGINAL ARTICLE

Morphological Spectrum of Diseases in Patients Presenting with Enlarged Cervical lymph Nodes, Diagnosed on FNAC

Madiha Sajjad, Rehan Ahmed Khan, Samina Iltaf

ABSTRACT

Objective: Purpose of the study was to know the relative frequencies of different morphological disease patterns in patients of cervical lymphadenopathy by FNAC.

Study Design: A descriptive cross sectional study.

Place and Duration of Study: Surgery and Pathology department of Pakistan Railway teaching Hospital Rawalpindi from January 2005 to October 2011.

Materials and Methods: Results of fine needle aspiration cytology of patients with enlarged cervical lymphnodes was recorded.

Results: Total number of patients was 150. The male to female ratio was 1.3:1 (86 males and 64 females). The maximum patients were in 11-20 years (40%), followed by 21-30 years (20%). The youngest patient was 4 Years and the oldest was 67 years. The FNAC showed chronic granulomatous inflammation suggestive of tuberculosis (43%) as the commonest pathology, followed by reactive hyperplasia (39%), nonspecific lymphadenitis (9%), lymphoma, (5%), and metastatic carcinoma (4%).

Conclusion: All patients with enlarged cervical lymph nodes should be thoroughly investigated. FNAC is a reliable diagnostic tool in evaluation of lymphadenopathy. Chronic granulomatous inflammation suggesting tuberculosisis one of the major causes of enlarged cervical lymphnodes in our country.

Key Words: *Cervical lymphadenopathy, Tuberculosis, FNAC.*

Introduction

Cervical lymph node enlargement is a common presenting feature in all age groups.[1,2] There are numerous lymph nodes in the neck and knowledge of their drainage area is important to reach to a diagnosis. Persistent lymph node enlargement is frequently a diagnostic dilemma requiring a complete clinical workup and a battery of investigations. There is a wide range of differential diagnoses for cervical lymphadenopathy ranging from relatively trivial and benign to malignant conditions.[1,3] The main causes are infections, reactive conditions, primary malignancies and metastatic tumors. Despite these varied causes, in regions where tuberculosis is rampant, there should be a strong suspicion of tuberculosis. The presence of granulomas with relevant background features in lymph node aspirates in this setting is highly suggestive of tuberculosis. In this regard FNAC is a reliable first line investigation for evaluation of cervical lymphadenopathy. It offers a relatively simple, fast and accurate way of diagnosis.[3,4] It can differentiate inflammatory and infective processes from neoplastic ones and avoids unnecessary surgeries. FNAC is indicated in persistent cervical lymphadenopathy as a diagnostic aid. Tender lymph node enlargement of a week or two in duration suggests acute lymphadenitis secondary to an infection in its drainage area, and is not an indication for FNAC. It should be treated with a course of antibiotics followed by reappraisal in 2 to 4 weeks. If, on re-examination, the lymph nodes are unchanged or larger, further workup is indicated. FNAC of cervical lymph nodes carries a high diagnostic accuracy and provides guidance for subsequent clinical management.[5,6] However, whenever equivocal results are produced and for detailed subtyping of certain disease entities such as lymphoma, surgical biopsy for histological and immunohistochemical studies is recommended.[3,5,6]

As enlarged cervical lymph glands are a common presentation in our outpatient departments, this study was carried out to find out the relative frequencies of various pathologies identified in the FNAC aspirates from these patients.

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Materials and Methods

This study was conducted at Surgery and Pathology department of Pakistan Railways Hospital, Riphah international University, from January 2005 to

December 2011. The study design is non-interventional descriptive.A total of 150patients presenting with enlarged lymph nodes in the neck wereincluded in this study.

Inclusion criterion waspatients with enlarged neck nodes of more thanone-month duration with no definite response to conservative medical treatment. Both sexes of all age groups wereincluded.

Exclusion criteria were patients with enlarged neck nodes of less than 1 month duration and those having acute inflammation or infection in the drainage area of lymph nodes. FNAC of palpable lymphnodes were performed by a pathologist according to a standard procedure. A 23-gauge needle was used for aspiration.The aspirated material was smeared onto glass slides which were immediately fixed in 95% alcohol. Routine Haematoxylin & Eosin (H&E) staining was done. Slides were reviewed by two pathologists. Main variables studied were the morphologic pattern of disease, age and sex of the patients. To collect data, the pathology data registers were used. The data was entered in SPSS16 and the results were compiled. As this was a non-interventional study, no statistical tests were done. However percentages, ratios and measures of central tendency (mean, mode and median) were calculated.

Results

In our study, the mean age of the patients was 24 years. The age range was from 4 years to 67 years. The maximum patients were in the age group 11-20 years (40%) and then in the age group 21-30 years (20%). 86(57%) patients were female, 64 (43%) patients were male. The ratio of male to female patient was 1.3:1. Chronic granulomatous inflammation suggestive of tuberculosis was the most frequent finding, followed by reactive hyperplasia, nonspecific lymphadenitis, lymphoproliferative disorder and metastatic carcinoma. The eight patients diagnosed with lympho-proliferative disorders were subjected to biopsy for further histopathology and immunohistochemical diagnosis. The results achieved in the present study were compared with different national and international studies.

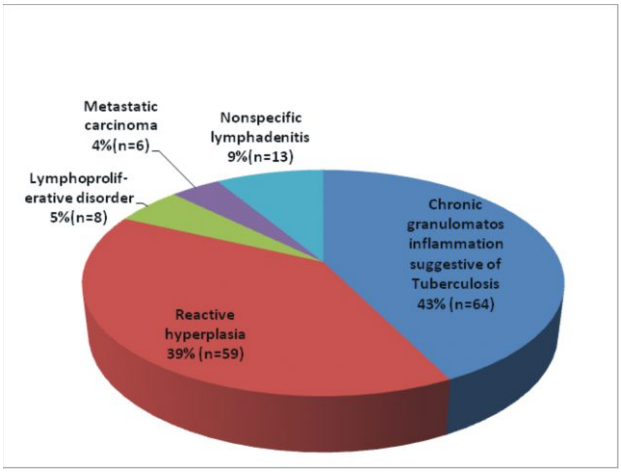

Fig 1: Pattern of cytological findings and their relative frequencies (N= 150)

Discussion

In our study of 150 cases of cervical lymphadenopathy the ratio of female to male patients was 1.3:1. This is inaccordance with most local and foreign studies.[3,7-9] Maximum number of patients was in the age group 11-20 years (40%). The mean age of presentation was 24 years. This is comparable with most of the local studies.[4,7,8] In most of the local studies the commonest age group was 30- 36yrs[2,10,11] whereas mean age was the 5th decade in foreign studies.[3] Chronic granulomatous inflammation suggestive of tuberculosis was the most frequent morphologic pattern of inflammation identified (43%) in our study as well as almost all other local studies.[10,12,14] It is in contrast to very low frequency of 1.6% in international studies.[4,5] Tuberculosis is seen as the most common cause of granulomatous inflammation seen in South East Asia and in developing countries.[2] This may be because of poor nutrition and overall health in developing countries.[2] Initial western studies did not report tuberculosis in their studies. But after the world wide increasing incidence of HIV infection, tuberculosis is being reported from western population as a significant cause of cervical lymphadenopathy. Reactive hyperplasia constituted the second largest group in the present study (39 %), seen in first 2 decades of lifefollowed by nonspecific lymphadenitis in 9%, lymphoma in5% and metastatic carcinoma in 4% patients. This is also in accordance with many local studies.[1-4] FNAC has been used extensivelyfor diagnosis of malignant lymphadenopathy.In the

diagnosis of metastatic malignancy, the lymph node puncture is as rewarding as the surgical biopsy. Among causes of malignant lymphadenopathy, lymphoma was found to be commonest.There were 8 cases of malignant lymphoma (5%). Metastatic malignancy was diagnosed in 6 patients (4%), predominant tumor being squamous cell carcinoma.[2,4,15] Our study showed concordance with most local studies for the frequency of lymphoma cases.[2,10] Somewhat lesser number of metastasis were observed than that reported by other local researchers.[14] Most of the western studiesand one from Iran demonstrated a higher incidence of malignant lymphadenopathy.[16-18] However the number of cases in present study was too small to draw any conclusions.

Conclusion

FNAC is a reliable diagnostic tool in evaluation of lymphadenopathy and can be performed as outpatientprocedure. It is evident that tuberculosis is still the commonest cause of cervical lymph node enlargement in developing countries. FNAC is an efficient way to detect cervical tuberculous lymphadenopathy.

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ORIGINAL ARTICLE

Dyslipidaemia in Newly Diagnosed Diabetic Patients with and without Microalbuminuria

Iffat Sultana, Muhammad Farooq, Aamir Shahzad, Asim Zulfiqar, Shayan, Mohammad Masood Savul

ABSTRACT

Objective: To determine the association of dyslipidemia in newly diagnosed diabetic patients with and without microalbuminuria.

Study Design: Cross sectional study.

Place and Duration of Study: The study was conducted from December 2009 to July 2011 at Medical Unit 1, Pakistan Railway Hospital, Islamic International Medical College (IIMC) Rawalpindi.

Materials and Methods: A cross sectional study was carried out in Medical Unit 1 Pakistan Railway Hospital Rawalpindi. The newly diagnosed diabetic patients i.e. the patients who have not yet been given any treatment, of both genders, without overt-proteinuria were included in the study. A proforma was filled indicating their bio-data, history and clinical examination and laboratory investigations which included fasting blood glucose, urinary albumin and lipid profile. If albumin was negative with dipstick, a sample of urine was sent for microalbuminuria. Frequency of dyslipidaemia in patients with and without microalbuminuria was determined.

Results: Out of the 317 newly diagnosed diabetic patients screened for microalbuminuria, 43 patients (13.5%) had microalbuminuria while 274 patients (86.6%) did not have microalbuminuria. Out of these patients with microalbuminuria, 58.8% (i.e 24) of patients had dyslipidaemia. Among microalbuminuria negative patients only 36% (i.e101) of patients had dyslipidaemia.

Conclusion: The dyslipidemia, occurs more frequently in newly diagnosed diabetics who have micro-albuminuria than those without micro-albuminuria.

Keywords: *Type 2 Diabetes Mellitus, Microalbuminuria, Dyslipidaemia.*

Introduction

Diabetes mellitus is a chronic disease resulting in different long term complications.[1] Poor glycaemic control is considered as a strong risk factor for the development of complications like nephropathy.[2,3] While recent data suggest that tight glycaemic control by itself is not sufficient to prevent complications as many of the diabetic patients do not develop complications like diabetic nephropathy even when their glycaemic control is not optimal.[4] This indicates that some other risk factor is also involved resulting in nephropathy. Microalbuminuria is an early marker of diabetic nephropathy and is independent risk factor for cardiovascular disease.[5] Clinical and experimental studies have highlighted that dyslipidemia has potential role in the development of microalbuminuria and diabetic nephropathy by causing Mesangial, tubulo-interstitial, and glomerular changes in the kidney.[6,7] In a study, subjects who developed microalbuminuria had higher cholesterol levels than subjects who have microalbuminuria.[8] In addition, lower cholesterol levels predicted regression of microalbuminuria to normoalbuminuria.[9] HDL is considered as a good cholesterol and its low levels are found to be present in patients with microalbuminuria.[10] In this regard, there is some evidence that lipid reduction by antilipidaemic agents might decrease proteinuria in diabetic patients.[11]

Based on these data, it appears that measurement of plasma lipids can add to the prognostic value of albumin excretion in the prediction of subjects at risk of diabetic nephropathy. This interesting correlation between microalbuminuria and dyslipidaemia is the focus of the present day research.

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Materials and Methods

The study was carried out from 1st December 2009 to 31st July 2011 on the newly diagnosed diabetic patients registered in Diabetic Clinic of Pakistan Railway Hospital Rawalpindi (Teaching hospital of Islamic International Medical College and Trust). Sample size of 326 was calculated with 95% confidence interval, using WHO sample size calculator. Type II diabetics of both genders were included in study. Patients with gestational diabetes, type I diabetics, type II diabetics with overt-

proteinuria and patients already taking statins, ACE inhibitors or ARBs were excluded from study. Complete history and clinical examination was carried out and 3 ml venous blood samples were collected in yellow-top gel tubes for laboratory analyses. Blood samples for Fasting Plasma Glucose (FPG) and fasting lipid profile i.e. serum cholesterol, triglycerides, HDL-Cholesterol were estimated in the laboratory using colorimetric methods on an auto analyser. If albumin was negative with dipstick, spot urine sample was sent for microalbumin. Albumin was estimated using immunoturbimetric method on an auto analyser. Frequency of dyslipidaemia in patients with and without microalbuminuria was calculated. Data was analysed by using SPSS 16.0. Descriptive statistics were calculated like frequency and 95% confidence interval for various parameters. For inferential statistics chi-square test was used. Level of significance was kept at 0.05.

Results

Of the total 326 patients included initially in the study, 9 patients were lost to follow up. Study thus comprised 317 patients. Out of the 317 patients screened for albuminuria 131 were males (41.33%) and 186 were females (58.8%). Overall the mean age of patients included was 47.20 years. The average age in case of males was 48.68 years and that of females was 46.12 years. The maximum numbers of patients in this study were from the age group 41-50 years (i.e. 110 patients). Forty three out of 317 patients i.e. 13.5% had microalbuminuria, 19 were males with mean age of 51years and 24 were females with a mean age of 50 years. Among these patients with microalbuminuria, 24 i.e. 55.8% of patients had dyslipidaemia as well,while 19(44.1%) patients with microalbuminuria did not have dyslipidaemia. In contrast out of 317 patients 274 patients i.e. 86.6% did not have albuminuria. Among these microalbuminuria negative patients, only 36 % (101) of patients had dyslipidaemia. So the frequency of dyslipidaemia was more in patients with microalbuminuria than patients without microalbuminuria in diabetic patients and was statistically significant ($p< 0.01$).

Table I: Frequency of Dyslipidaemia in Diabetics with or without Microalbuminuria

Patients' Categories	No of Patients	Dyslipidaemia Positive Patients	P value
Diabetics with microalbuminuria	43	24 (8.8%)	P < 0.01
Diabetics without microalbuminuria	274	101(36%)	
Total	317	125 (39%)	

Discussion

Diabetes mellitus owes its mortality and morbidity mostly to its complications. Two of the risk factors most putatively responsible for diabetic complications are microalbuminuria and dyslipidemias.[12]The main objective of our study was to find the association between albuminuria and dyslipidemias in newly diagnosed diabetic patients. The results were very convincing in favour of increased frequency of dyslipidemias in patients with albuminuria. Our findings are consistent with a study conducted in Lahore, in which the prevalence of diabetic nephroathy and hyperlipidaemia in newly diagnosed type 2 patients was found to be 56.2%.[13] It is important to note that diabetic nephroathy is associated with high mortality rate and improvement in microalbuminuria results in decrease in all cause mortality.[14] Not only the hyperglycaemia, hypertension, abdominal obesity and smoking, result in diabetic nephropathy but hyperlipidaemia is also a risk factor for microalbuminuria with diabetes.[15]In our study diabetic patients with albuminuria, 55.8% of the patients had dyslipidemia. Most of the patients i.e. 37% had both TG and LDL-C were elevated. Similar relationship between serum cholesterol level and the progression of renal dysfunction in type 2 diabetic patients has been found in other studies.[15,16] So Kim et al (2006) reported triglycerides (Tg) to be a factor in the progression of diabetic nephropathy.[17] Similarly fasting plasma Tg levels are reported to be a strong independent risk factor of microalbuminuria and macroalbuminuria in the UK Prospective Diabetes Study (UKPDS).[18] In prospective studies of patients with type 2 diabetes, an elevated TG-to-HDL-C ratio has been independently associated with the progression of microalbuminuria.[19]An important question is whether dyslipidaemia results in

microalbuminuria or its other way out. This clinical relevance needs to be assessed in a long-term outcome study of renal function. However it has been observed that lipid lowering drugs can reduce diabetic nephropathy progression as pitavastatin and rosuvastatin reduced the urinary excretion of albumin by 60 and 40% respectively, in animal studies.[20] Similarly The FIELD study also provided promising data that adding fenofibrate to primary statin therapy might be a useful strategy to decrease microalbuminuria progression in type 2 diabetics.[21]These observations suggest a causative relationship between dyslipidaemia and diabetic nehropathy.

Conclusion

The dyslipidemias occur more frequently in those newly diagnosed diabetics who tend to excrete albumin in their urine even in amounts small enough to be detected by routine dipstick used for urinalysis. A diabetic patient who is found to have dyslipidemia should be screened for microalbuminuria because a timely intervention at an early stage can prevent or delay so many complications of diabetes.

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ORIGINAL ARTICLE

Effects of Ginger Extract on Hyperlipidemic Diet Induced Non Acholic Fatty Liver Disease

Hafsa Nisar, Rehana Rana, Shazia Imran

ABSTRACT

Objective: To determine the effects of ginger extract on the histomorphological changes of fatty liver of hyperlipidemic diet induced NAFLD.

Study Design: It was randomized control trial.

Place and Duration of Study: The study was carried out from October 2012 to March 2013, in the department of Anatomy, Islamic International Medical College, Rawalpindi, in collaboration with National Institute of Health (NIH), Islamabad.

Materials and Methods: A total of 35 male albino mice were used and divided into 3 groups. The control group (C) was fed on normal laboratory diet, while the remaining two groups, fatty group (FG), ginger group (GN), were fed on hyperlipidemic diet for twelve weeks to induce hyperlipidemia/nonalcoholic fatty liver. Then GN group with induced hyperlipidemia/ fatty liver was administered normal laboratory diet with ginger extract as a drink in replacement of water for another twelve weeks.

Results: Total body weight was reduced as compared to their initial body weights. The histological examinations of this study revealed reverse fatty (steatotic) changes and showed marked reduction in number of fat globules, ballooning degeneration, glycogenated nuclei.

Conclusion: This research shows that ginger extract has marked antihepatotoxic effects. Ginger extract ameliorates high fat induced fatty liver disease.

Key words: *Nonalcoholic fatty liver disease, Hyperlipidemia, Steatotic, Glycogenated nucleiand ginger.*

Introduction

Non-alcoholic fatty liver disease (NAFLD) is a common histopathological condition characterized by significant deposition of lipids mainly triglycerides in the hepatocytes of the liver parenchyma.[1] Histologically it exists as simple steatosis occupying >5% of hepatocytes in the absence of significant inflammation and hepatocellular damage and sometimes fibrosis.[2] It resembles alcohol-induced liver injury histologically, but by definition it occurs in patients with little or no history of alcohol consumption. NAFLD is the most common chronic liver disease in USA and considered to be increasing in Asia Pacific region including South Asia.[3] NAFLD affects approximately 15-40% of general population and its prevalence is increasing worldwide. The prevalence increases to 50-75% in obese individuals.[4] The community prevalence of NAFLD in South Asia and South East Asia ranges from 5- 30%.[5] Recently a hospital based study in Pakistan had shown a frequency of approximately 14% however, there is no community based study from Pakistan to the best of our knowledge.[6] NAFLD is emerging as one of the most common causes of chronic liver disease.[7] Primary NAFLD is related to insulin resistance and thus frequently occurs as part of the metabolic changes that accompany obesity, diabetes, and hyperlipidemias.[7] This research was done among study groups with an aim to see the reverse histomorphological effects of ginger extract on non-alcoholic fatty liver disease. Ginger is a popular spice. For centuries it's been used as a medicinal plant. It has been discovered to possess many pharmacological activities, such as antioxidant, anti-inflammatory, anti-arthritic, anti-migraine, anti-thrombotic, anti-inflammatory, hypolipidemic, hypocholesterolaemic and anti-nausea properties making it a useful medication for a variety of disorders. The predominant pungent constituents of ginger are gingerols and shogaols which are responsible for many of its medicinal properties.[8] It has also been reported that ginger decreases the level of cholesterol and improves high-fat diet, fructose, cholesterol, or streptozocin-induced lipid derangements in rodents.[9]

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Materials and Methods

This study was randomized control trial and was approved by the Institutional Review Committee of Riphah International University before its

commencement. Thirty-five adult male BALB/c mice having weight of 35-50g and age between 10-12 weeks were obtained from animal house of NIH, Islamabad where they were kept under standard laboratory conditions. Mice were randomly divided into 3 groups. The control group C (n = 10) was fed a standard pellet diet with tap water to drink. The fatty group FG (n = 10) was fed a hyperlipidemic diet for 12 twelve weeks to induce non-alcoholic fatty liver disease. This diet consisted of standard pellets supplemented with 4% cholesterol powder and 40% butter with tap water to drink. The ginger treated group GN (n = 15) was fed on hyperlipidemic diet for 12 twelve weeks, after which this group was given standard diet and their drink was substituted with ginger extract for a period of another twelve weeks. Ginger extract was prepared by soaking fifteen grams of ginger rhizome slices in 500 ml of boiling water for 30 min and were then filtered.[1] Mice were weighed at zero and twelve weeks after establishing fatty liver. Then again after further twelve weeks before sacrificing ginger treated group. Animals of group C and group FG were sacrificed at the end of 12 weeks while group GN were sacrificed at the end of 24 weeks. Animals were anaesthetized. They were dissected and liver was removed and preserved in containers containing 10% formalin. Tissue processing and embedding was done in paraffin. Slides were prepared and stained with haematoxylin and eosin. Special staining was done with Masson Trichrome for the demonstration of fibrosis. Microscopic study was done under 40X objective. Slides were studied for the histopathological criteria of diagnosis of NAFLD, which were macrovesicular fatty change in hepatocytes with displacement of nucleus to the periphery of the cell. Additional presence of features like ballooning degeneration, glycogenated nuclei, inflammatory infiltrates predominantly periportal or perivenular and fibrosis were also observed. All measurements were taken by using an ocular square reticule micrometer fitted into the eyepiece of the microscope. Statistical analysis was done in SPSS version 20.0. Results were compared by applying t-test and ANOVA. A p–value of <0.05 was considered as statistically significant.

Results

Body weight and histological analysis of all experimental animals were done. The mean initial and final body weights of animals in control group were 50.10g (SD ± 5.26) and 52.90g (SD ± 5.47) in control group respectively. In control group, there was significant increase in weight ($p < 0.001$). (Table I)

The mean initial and final body weights of animals in FG group were 50.50g (SD± 5.72) and 54.40g (SD ± 5.48) respectively. It was significantly increased ($p < 0.001$).The mean initial and final body weights of animals in group GN were 48g (SD ± 2.78) and 40.04g (SD ± 7.02) respectively. Weight was significantly decreased in group GN ($p < 0.001$). (Table I)

All the groups had similar initial weight with insignificant difference ($p = 0.1$). (Table I)Final weight was significantly different in all the groups ($p<0.001$). (Table I)

All five histological parameters were observed qualitatively as well as quantitatively. Hematoxylin and Eosin staining was used for fat globules, ballooning, abnormal nuclei, inflammatory infiltrate and Masson Trichrome stain was used to demonstrate the presence of fibrosis. Fat globules were absent in all (100%) animals in control group C; it was present in all (100%) animals in experimental group FG, in 6 (40%) animals in experimental group GN. Number of fat globules were counted and compared with control. Fat globules were significantly higher in experimental group FG followed by experimental group GN ($p < 0.001$). (Fig 1)

Ballooning degeneration was not present in any animal (0%) in control group C; it was present in all the animals (100%) in group FG, in 7 (46.7%) animals in group GN. Ballooning degeneration was significantly higher in experimental group FG followed by experimental group GN ($p < 0.001$). (Fig 1)

Inflammatory infiltrate were absent in all (100%) animals in control group C, it was present in 9 (90%) animals in experimental group FG, in 13 (86.7%) animals in experimental group GN. inflammatory infiltrate were significantly higher in group FG, group GN as compared to control group ($p < 0.001$). (Fig 1)

Abnormal nuclei were absent in all (100%) animals in control group C, it was present in 9 (90%) animals in experimental group FG, in 8 (53.3%) animals in experimental group GN. Abnormal nuclei were significantly higher in experimental group FG

followed by experimental group GN (p = 0.001). (Fig 1)

Fibrosis was absent in all (100%) animals in control group C, it was present in 8 (80%) animals in experimental group FG, in 5 (33.3%) animals in experimental group GN. Fibrosis was significantly higher in experimental group FG followed by experimental group GN (p = 0.003). (Fig 1)

Table I: Inter and Intra Group Comparison of Initial and Final Weight of Mice (n=35)

Groups	Initial Weight with SD	Final Weight with SD	p-value
Control Group C (n = 10)	50.10± 5.26	52.90 ± 5.47	< 0.001
Group FG (n = 10)	50.50 ± 5.72	54.40 ± 5.48	< 0.001
Group GN (n = 15)	48.00 ± 2.78	40.04 ± 7.02	< 0.001
p-value	0.116	< 0.001	

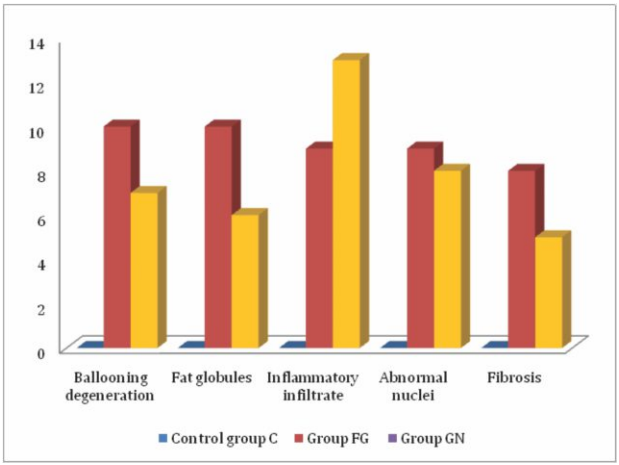

Fig 1: Description of Qualitative Microscopic Parameters of liver in all the Groups

Discussion

In the present study, it was observed that there was significant increase in the weight of experiment group FG after having hyperlipidemic diet for a period of twelve weeks that is initial and final body weights were 50.50g and 54.40g respectively. Our result was in accordance with previous work done by M. H Ahmida[1] reporting that after administration of a hyperlipidemic diet in mice induced significant weight gain in his experiment in positive control group of rats. Weight went down from initial value of 48g to final weight of 40.04gin GN group. In ginger treated group there was significant decrease in body weight which is similar to the findings of Al-Amin[9] in which the diabetic rats lost their weight after having ginger as a drink for a period of two weeks. Histological examination of slides of control group at low power revealed polyhedral hepatocytes with rounded vesicular nuclei. At high power anastomosing cords of hepatocytes were seen along with sinusoids lined by endothelial cells and draining into central vein. Examination of liver sections of FG group mice given high fat diet for twelve weeks showed evidence of accumulation of mixed large and small sized fat globules (macro vesicular/micro vesicular steatosis) which indicate the accumulation of lipids mainly in the form of triglycerides in the cytoplasm of the hepatocytes. Due to accumulation of fat globules the nuclei were pushed to the periphery. Many cells were seen having one large vacuole filling the whole cell with thin rim of cytoplasm around and pushing the nucleus to one side. Other cells were having smaller vacuoles with either central or eccentric nuclei. Steatosis is the hallmark histological feature of nonalcoholic fatty liver. In our study mild to moderate steatosis was observed in majority of animals of group FG while in group GN steatosis was markedly reduced to almost nil. These findings were also found by Eman[10] who induced fatty liver in rats by injecting oxytetracyclineintraperitonealy (120mg/kg) for three consecutive days.

Besides there was massive ballooning of hepatocytes and distribution of polymorphonuclear infiltrate in hepatic parenchyma with very little fibrosisin group FG. Many hepatocytes also showed nuclear clear vacuolation due to glycogen accumulation. Glycogenated nuclei were found scattered in the liver parenchyma. Similar or more advanced changes in liver histology were noted by others.[10,11] These findings correlate with the marked increase in serum cholesterol, triglycerides and blood glucose. The increase in these parameter in the blood is in correlation with the fatty degeneration of the liver. Hepatic fibrosis is one of the main consequences of liver disease. It represents wound healing in response to chronic insult and is final common pathway for more chronic liver disease

regardless of their mechanism.[12,13] As our study was of shorter duration fibrotic changes were not very significant in group FG and GN. Spotty inflammation which was slight periductal and perivenular was observed in group FG. Experimental group FG had significantly higher number of inflammatory infiltrate as compared to experimental group GN (p = 0.004). After giving ginger extract orally the histopathological changes induced by fatty liver disease improved. The presence of polyphenols such as gingerol and curcumin in ginger possesses considerable antioxidant properties including radical scavenging activity and inhibitory effect on lipid peroxidation.[14] In addition ginger protects the liver against hepatotoxic agents by enhancing the hepaticantioxidant activity.[15]

Ginger extract supplementation as a drink for twelve weeks reduced fat globules and ballooning degeneration in group GN. It might be due to its direct radical scavenging activity. The results of this research rejected the null hypothesis thereby making the alternate hypothesis true that states that ginger extract has beneficial effects on fatty liver disease. It would be interesting to work on these herbal medicines in future. Further work can be done to investigate the active components of ginger responsible for the observed beneficial effects in fatty liver disease.

Conclusion

This research shows that ginger extract has marked antihepatotoxic effects. The histological parameters like steatosis, ballooning degeneration, glycogenated nuclei and focal inflammation were significantly changed although hundred percent protections was not provided. Hence our data suggest that ginger extract ameliorates high fat induced fatty liver disease.

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ORIGINAL ARTICLE

Effect of Cinnamon Bark on Streptozotocin induced Diabetic Male Mice

Nurain Baig Mughal, Maria Sarfaraz, Amena Rahim

ABSTRACT

Objective: To determine the effect of cinnamon bark on glucose metabolism in streptozotocin induced diabetic mice.
Study Design: Interventional experimental study.
Place and Duration of Study: This study was carried out in the animal house of National Institute of Health, Islamabad in collaboration with Department of Biochemistry, Islamic International Medical College from 7th November 2013 till 21st January 2014.
Materials and Methods: Fifty albino Balb/C male mice were included in study. Among them, ten mice were used for cardiac puncture for baseline biochemical analysis. While in rest of the forty mice, Type 2 diabetes was induced by intraperitoneal administration of low dose (40 mg/kg) streptozotocin (streptozotocin) injections for four consecutive days. Diabetes induction was confirmed on day 21. Two groups with twenty mice each were made. Group I was control group that was left untreated while group II received cinnamon bark diet at a dose of 5mg/day for 8 weeks.
Results: At baseline the mean BGR was 135.9±29.67 mg/dl and day 21; BGR of 336.85±46.4 mg/dl. In the experimental group the mean BGR after 08 weeks of cinnamon therapy was 184.1±24.56 mg/dl; The BGR significantly decreased after 08 weeks of cinnamon therapy as compared to Day 21 BGR; p=0.00. The mean BGR at 08 weeks was significantly decreased between the control and experimental groups; p= 0.000. At baseline the HbA1c ranged from 5.5 to 6.2 % with a mean of 5.93±0.20. In the Control group after 08 weeks the mean HbA1c was 11.27±1.28%. While in the experimental group the mean HbA1c after 08 weeks of cinnamon therapy was 7.7±0.68%. The mean HbA1c at 08 weeks was significantly decreased between the control and experimental groups; p= 0.000.
Conclusion: Cinnamon therapy was effective in improving BGR and HbA1c levels in a diabetes type 2 induced male mice.

Key words: *Diabetes mellitus, Cinnamon, Blood glucose Random (BGR) and Glycosylated hemoglobin (HbA1c).*

Introduction

Diabetes Mellitus is the commonest endocrinal disorder. It presents in two major forms that is Type 1 also called as Insulin dependent diabetes mellitus (IDDM) & Type 2 also known Non insulin dependent diabetes mellitus (NIDDM).[1] Type 2 diabetes is commoner than type 1 and its prevalence is at rapid in both developed and developing countries. It is characterized by abnormalities in the carbohydrates, lipids and lipoproteins metabolism which can lead to hyperglycemia, hyperlipidemia, hyperlipoprotenemia, atherosclerosis and hypertension. Multi factorial causes are attributed for diabetes mellitus. In developed countries Type 2 diabetes constitutes about 85% to 95% of all diabetes Worldwide Prevalence of diabetes in adults was anticipated to be 4.0% in 1995 and increase to 5.4% by the year 2025.[2] The International Diabetes Federation proposes that the number of people living with diabetes will rise from 366 million in 2011 to 552 million by 2030. Pakistan has become 7th largest country in regarding diabetic patients and it is predicted that it will be 4th largest country by the year 2030.[3] Growing interest in herbal remedies is noted due to poor compliance and side effects associated with allopathic treatment of diabetes mellitus. Cinnamon has a long history as an anti-hyperglycemic spice, but trials involving cinnamon supplementation have produced variable results.[4] Currently the trends have started to shift more towards the natural products to combat the present increasing health issues.[1,4] A Bark of Cinnamomum zeylanicum is commonly called Cinnamon has been used for many years to treat different diseases in Asia. It is a biologically active herb/spice having properties like insulin. Different studies have shown that cinnamon bark has antimicrobial, anti inflammatory, hypoglycemic and antihyperlipidemic effects.[5] It has also shown to decrease the risk of colonic cancer.[4,5]Cinnamon contains biologically active substances that have demonstrated insulin-mimetic properties. It is suggested, that similar to insulin, cinnamon compounds affects protein phosphorylation-dephosphorylation reactions in the

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intact adipocyte.[6] Cinnamon has been shown to potentiate the effect of insulin through upregulation of the glucose uptake in cultured adipocytes.[6] The cinnamon extract improves insulin action via increasing glucose uptake in vivo, at least in part through enhancing the insulin-signaling pathway in skeletal muscle.[6] Cinnamon exhibits the potential to increase the amount of proteins involved in insulin signaling, glucose transport, and anti-inflammatory/ anti-angiogenesis response.[7]

Material and Methods

Chemicals

Streptozotocin 1g (Manufacturer- Calbiochem USA)
The chemical was purchased from United States of America through a licensed firm.

Preparation of the Cinnamon Bark

Cinnamon bark was purchased from the market. The Cinnamon bark (~500 g) was thoroughly powdered and kept airtight in cool, dry and dark conditions.

Animals

Fifty healthy male albino Balb/C mice, weighing 28-38g and aged between 6-8 weeks old. They were housed at animal house of National Institute of Health (NIH), Islamabad under the controlled conditions of room temperature 20+2o C, relative humidity 50%-70% and 12 hours light-dark cycle. Mice were fed normal standard ad libitum diet and water. Mice received the care in accordance with the NIH guidelines and the study protocol was approved by the local ethics committee.

Induction of diabetes mellitus

A freshly prepared solution of streptozotocin (40 mg/kg body weight) in 0.1M citrate buffer (pH 4.5) was injected intraperitoneally to the mice for 05 consecutive days. The mice were checked for BGR with a glucometer on Day 21. The mice having marked significant (BGR > 200 mg/dl) were selected for the study as stable hyperglycemic animals.

Dose calculation of the Cinnamon Bark

The dose of cinnamon used was 200mg/kg/day.
Dose calculation was as follows;
200 mg/kg= 200/1000= 0.2 gm/kg.
Average weight of one mouse = 25 gm= 25/1000= 0.025 kg.
Dose of cinnamon per mouse= 0.2×0.025= 0.005 gm/day
Dose to be added to water supply of one cage (10 mice) = 0.05 gm= 50 mg
Dose per mouse= 5 mg/day.

Data collection procedure

All 50 mice were weighed; naso-anal height was measured before any treatment. Mice were kept in healthy environment where ample amount of water and food availability was ensured. Ten mice had their blood glucose random (BGR) and Glycosylated haemoglobin HbA1c measured.
Diabetes Mellitus was induced in remaining forty mice by intraperitoneal injection of Streptozotocin. After induction of diabetes mellitus mice were randomly divided in two equal groups. Induction of diabetes was confirmed by random sampling in both groups on day 21. A reading of >200 mg/dl mice were considered as diabetic
Group I (Control group): These 20 diabetic mice were left untreated for 08 weeks.
Group II (Experimental group): These 20 diabetic mice were started on cinnamon diet for 8 weeks.
All mice of both groups had their BGR and Glycosylated haemoglobin (HbA1c) measured through blood from cardiac puncture on 08 week and in doing so they were sacrificed. Blood glucose random levels were measured using the kit method (glucose oxidase/ GOD POD method). Glycosylated hemoglobin (HbA1C) of the mice was determined by cation exchange resin method.

Data analysis plan

Data was analyzed using statistical package for Social Sciences (SPSS version 17). Descriptive statistics were used to describe the data. Mean and standard deviations were used to describe blood glucose random (BGR) and glycosylated hemoglobin (HbA1c). Paired student T-Test was applied for the comparison of numeric variables. P value of <0.05 was considered as significant.

Results

Blood glucose random (BGR)

At baseline the BGR ranged from 100 to 185 mg/dl with a mean BGR of 135.9±29.67 mg/dl (Table 1). On day 21; BGR ranged from 256 to 450 mg/dl with a mean BGR of 336.85±46.4 mg/dl. The BGR was significantly high 21 days after streptozotocin injection; p=0.00. All mice had BGR > 200 mg/dl i.e. they had become diabetic. In the Control group after 08 weeks the mean BGR was 313±52.25 mg/dl. While in the experimental group the mean BGR after 08 weeks of cinnamon therapy was 184.1±24.56

mg/dl The BGR significantly decreased after 08 weeks of cinnamon therapy as compared to Day 21 BGR; p=0.00. The BGR decreased by 54% after 08 weeks of cinnamon therapy as compared to BGR on day 21. The mean BGR at 08 weeks was significantly different between the control and experimental groups; p= 0.000 i.e. cinnamon effectively reduced the blood sugar in diabetic mice as compared to controls (Table II).

Table I: Biochemical parameters at baseline (n= 10 mice)

	BGR (mg/dl)	HbA1c (%)
N Valid	10	10
Mean	135.9000	5.9300
Median	129.0000	6.0000
Mode	100.00[a]	6.00
Std. Deviation	29.67022	.20028
Minimum	100.00	5.50
Maximum	185.00	6.20

Table II: Comparison of BGR at 8 weeks between control group and experimental group

	Group	N	Mean	Std. Deviation	Std.Error Mean	P value
BGR	Control group	20	313.1000	52.25434	11.68443	0.000
	Experimental group	20	184.1000	24.56334	5.49253	

HbA1c

At baseline the HbA1c ranged from 5.5 to 6.2 % with a mean of 5.93±0.20% (Table I). The HbA1c levels after diabetes induction on Day 21 were not available. In the Control group after 08 weeks the mean HbA1c was 11.27±1.28%. While in the experimental group the mean HbA1c after 08 weeks of cinnamon therapy was 7.7±0.68% (Table II). The mean HbA1c at 08 weeks was significantly different between the control and experimental groups; p= 0.000 i.e. cinnamon effectively reduced the blood HbA1c in diabetic mice as compared to controls.

Table III: Comparison of HbA1c at 08 weeks between control and experimental groups

	Group	N	Mean	Std. Deviation	Std. Error Mean	P value
HbA1c	Control group	20	11.2750	1.27191	.28441	0.000
	Experimental group	20	7.7100	.68664	.15354	

Discussion

In our study all 40 mice had successful induction of diabetes. This was also reported in other studies including the study by Graham et al[8] in which after streptozotocin injection more than 95% developed diabetes within 4 to 5 days. In a study by Ventura-Sobrevilla et al[9] the grade of streptozotocin-induced hyperglycemia in mice was dependent on streptozotocin dose. Five injections of low dose produced hyperglycemia on 21st day and a single injection of high dose (130 or 150 mg/Kg body weight) produced severe hyperglycemia on day 03 in this study. Our results show that the intraperitoneal administration of streptozotocin to mice significantly increased glucose blood levels 21 days after injection. We fed our experimental group on cinnamon diet 200/mg/kg/d/mouse or 50 mg/10mice/day. Similar dose was used in another study by Kim et al.[10] In the Control group after 08 weeks the mean BGR was 313±52.25 mg/dl. While in the experimental group the mean BGR after 08 weeks of cinnamon therapy was 184.1±24.56 mg/dl; The BGR significantly decreased after 08 weeks of cinnamon therapy as compared to Day 21 BGR; p=0.00. The BGR decreased by 54% after 08 weeks of cinnamon therapy as compared to BGR on day 21. The study by Kim et al showed similar results to our study with respect to blood glucose lowering effect of cinnamon. In this study the fasting blood glucose and postprandial 2 h blood glucose levels in the cinnamon treated group were significantly lower than those in the control group ($p < 0.01$). In our study the mean BGR at 08 weeks was significantly different between the control and experimental groups; p= 0.000 i.e. cinnamon effectively reduced the blood sugar in diabetic mice as compared to controls. A study by Blevins et al reported that oral administration of cinnamon significantly decreased glycosylated hemoglobin (HbA1c).[11] In our study the Control group after 08 weeks the mean HbA1c was 11.27±1.28%. While in the experimental group the mean HbA1c after 08 weeks of cinnamon therapy was 7.7±0.68%. The mean HbA1c at 08 weeks was significantly different between the control and experimental groups; p= 0.000 i.e. cinnamon effectively reduced the blood HbA1c in diabetic mice as compared to controls. In our study all the mice survived the study period for 08 weeks. In other

studies however a lower survival rate has been reported but that is on untreated mice. Study by Tian

ORIGINAL ARTICLE

Effect of Body Mass Index on Intracytoplasmic Sperm Injection Outcomes

Mahwish Mengal, Shazia Ali, Nasim Ashraf, Anjum Siddiqui, Arif Siddiqui

ABSTRACT

Objective: To determine the effects of increased BMI on ICSI outcomes.
Study Design: It was an analytical cross sectional study.
Place and Duration of Study: Islamabad Clinic Serving Infertile Couples, Islamabad, Pakistan. Duration of the study was one year, from January 2013 to December 2013.
Materials and Methods: Total of 150 females were classified into three groups on the basis of BMI. Those with BMI ranging from 18.5 - 24.9 kg/m2 /were placed in normal group [n=50], those with BMI ranging from 25 - 29.9 kg/m2/were placed in overweight group [n=50] and those with BMI ranging more than 30kg/ m2 were placed in obese group [n=50]. Serum levels of FSH, LH, Te, TSH, T3 and T4 were done in all three groups and their effects on oocyte and embryo quality were observed during controlled ovarian stimulation and after ICSI procedure.
Results: Obese group had significantly decreased ICSI outcomes due to increased levels of testosterone (p value< 0.05).
Conclusion: Increased BMI leads to decreased ICSI outcomes.

Key words: *Obesity, Oocyte Quality, Embryo Quality, ICSI Outcomes, Infertility.*

Introduction

Infertility can be defined as inability to conceive after 12 or more months of regular unprotected sexual intercourse.[1] Pakistan is among the currently most populated countries of the world, and has a population growth rate of around 2%, it also has high rate of infertility (21.9%) amongst which 3.5% is primary and 18.4% is secondary.[2] The causes of female infertility relates mostly to the hypothalamus, pituitary gland, ovaries, the fallopian tubes, body of the uterus, cervix and the vagina.[3] The fecundity of females is sensitive to body weight. Girls require a particular threshold of body fat to enter puberty.[4]However, extreme body fat has adverse effects on female fecundity.[5] These effects present at several levels which include disturbed levels of gonadotropins, anovulation, disturbed steroid production, decreased conception rates, increased abortion rates and increased risk of other complications in pregnancy including hypertension, premature birth and increased frequency of fetal anomalies.[6,7,8] Adipose tissue is a fundamental site for synthesis and breakdown of steroids. It is also the site where androgens are converted to estrogens by activity of aromatase enzyme; estradiol is converted to estrone and dihydroepiandrosterone (DHEA) to androstenediol by 17b-hydroxysteroid dehydrogenase activity.[9] This leads to increased steroid levels in obese females which alters transmission of androgens and estrogens to their respective sites.[10] Serum concentration of sex hormone binding globulin (SHBG) is decreased in obese women. Decreased levels of SHBG lead to elevated levels of testosterone, dihydrotestosterone and androstenediol. This relative hyperandrogenaemia seen in obese women may result in decreased ovarian activity causing menstrual irregularities and oligoovulation or anovulation.[6, 11] The increase prevalence of obesity and its adverse effects on fertility in overweight and obese women has made assisted reproduction technology (ART), such as Intracytoplasmic Sperm Injection (ICSI) as the opted treatment amongst these groups. During the ICSI procedure high doses of exogenous gonadotropins are required for follicular growth and collected oocytes are fertilized in vitro by sperm injection. Developing embryo, 2 to 5 days later is transferred into the female uterus. Pregnancy is confirmed by increased serum beta hCG levels.[12] Before the beginning of ICSI procedure, a rapid evaluation of the retrieved oocyte for maturity is done. The quality is assessed by presence of degenerative changes in the cytoplasm, polar body (PB) or zona pellucid.[13] Embryo quality (day -3 scoring) is classified on the presence of number of blastomeres along with the cleaving status of the embryo, it provides information of embryo health

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and its chances of resulting into pregnancy in infertile couples as shown in Fig 1.

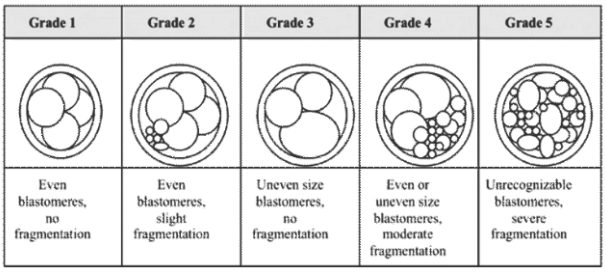

Fig 1: This image shows Embryo grading (day -3 scoring) Classification according to Veeck.[14]

In the present study association between increase body mass index and serum levels of reproductive hormones (FSH, LH, Te) and thyroid profile on oocyte quality and intracytoplasmic injection (ICSI) outcome in infertile female attending infertility clinic was done.

Materials and Methods

The study was conducted at Islamabad clinic serving infertile couples, Islamabad Pakistan. The duration of the study was one year, from January 2013 to December 2013. It was an analytical (Cross sectional) study. A total of 150 female subjects were included in the study. The subjects were divided into three major groups according to BMI classified by WHO. BMI ranges from 18.5 - 24.9 kg/m2were placed in normal group [n=50], BMI ranges from 25 - 29.9 kg/m2 were placed in Overweight group [n=50] and BMI ranges more than 30kg/ m2 were placed in Obese group [n=50]. Probability (systametic) sampling procedure was used. Sample size was calculated by open Epi sample size calculation for cross sectional, cohort and clinical trials.[15]Consent from subjects and permission from institutional review committee (faculty of health & medical sciences) was obtained for the study. Normal, overweight and obese infertile females between 20-39 years of age having ovarian cause of infertility, females with tubal blockage as cause of infertility were included in the study. Females having uterine and cervical causes of infertility were not included in the study. The variables included in the study were BMI, serum levels of FSH, LH, Testosterone, TSH, T3, and T4. The blood sample was taken on day-3 of the menstrual cycle for hormonal assay of serum FSH, LH, Testosterone, T3, T4, and TSH. Analysis was done by ARCHITECT i technology by using Chemiluminescent Microparticle Immunoassay (CMIA). Down regulation was done by giving subcutaneous Gonadotrophin-Releasing Hormone (GnRH) agonist depot preparation (Suprefact 0.1mg; Sanofi Aventis. Guildford, UK). Ovarian stimulation was done by giving subcutaneous administration of recombinant FSH 50-IU preparation (Puregon; NV Organon, Oss, The Netherlands). The ovarian follicular response was monitored by trans-vaginal ultrasound three to four days after the commencement of the ovarian stimulation. Monitoring was done on alternate days. When the size of the leading follicles on ultrasound was more than 18mm in diameter, 10,000 IU of hCG (Ovitrelle; Serono, Rome, Italy) was administered intra-muscularly. Ovarian retrieval was done 351/2 – 36 hours after hCG injection using the vaginal ultrasound technique under general anesthesia. Half an hour after egg collection the eggs were denuded prior to microinjection using Hyalurunidase (Hyase; Vitrolife) and then rinsed several times in droplets of culture medium and were observed under the microscope. During this process oocyte quality was observed and those oocyte that had excruded the first polar body (metaphase II stage) were considered mature eggs of good quality.ICSI was carried out on all mature eggs. Fertilization was confirmed 16-18 hours after ICSI procedure. Cleavage was confirmed after another 24 hours of in vitro culture. All embryos graded according to Veeck classification (Fig 1) prior to embryo transfer on day 3 of egg collection. Good quality embryos were transfered by using Sims-Wallace Embryo Replacement Catheter (SIMS – Portex Limited, Hythe Kent, UK) of blastocyst stage on day-3 of egg collection under ultrasound guidance.Progesterone (Cyclogest ®400 vaginal pessaries; Shire UK) were given until Pregnancy Test was done and continued for 12 weeks if subject was pregnant. Twenty one (21) subjects out of 150 were excluded from the study which included eleven (11) from overweight group and ten (10) from obese group before embryo transfer. These subjects suffered from Ovarian Hyperstimulation Syndrome (OHSS), an iatrogenic complication for ovarian stimulation by intracytoplasmic sperm injection procedure following gonadotropins. SPSS version 17 was used for data analysis. Mean ± SD were calculated for body weight. Median ± SD were

calculated for hormones. Stratification was done with regards to BMI. One way ANOVA test was used.

Table I: The effects of increased BMI on serum hormone levels in normal, overweight and obese groups (n=50)

Hormones	Body Mass Index			P-value
	Normal Median±SD	**Over Weight** Median±SD	**Obese** Median±SD	
Testosterone ng/mL	0.7 ± 0.9	9.5 ± 13.4	22.4 ± 30.2	0.00 *

*P ≤0.05 considered significant

Table II: Post hock for serum testosterone levels amongst normal, over weight and obese groups

Body Mass Index	N	Subset for alpha = 0.05		
		1	2	3
Normal	50	.7438		
Overweight	39		9.5569	
Obese	40			22.4470

Means for groups in homogeneous subsets are displayed.
a. Uses Harmonic Mean Sample Size = 42.468.
b. The group sizes are unequal. The harmonic mean of the group sizes is used.

Table III: The effects of increased BMI on the embryo quality (Blastomere) in normal, overweight and obese groups (n=50)

Embryo Quality (Blastomere)	Body Mass Index			P-value
	Normal Mean±SD	**Over weight** Mean±SD	**Obese** Mean±SD	
Grade-I	1.84±0.8	1.96±0.8	1.92±0.9	0.7
Grade-2	1.12±0.4	1.36±0.6	1.24±0.5	0.09
Grade-3	1.0±0.0	1.04±0.19	1.02±0.14	0.3

P ≤0.05 considered significant

Table IV: The effects of increased BMI on embryo quality (Blastocyst) in normal, overweight and obese groups (n=50)

Embryo Quality (Blastocyst)	Body Mass Index			P-value
	Normal Mean±SD	**Over weight** Mean±SD	**Obese** Mean±SD	
Blastocyst	1.5±0.7	1.5±0.8	1.5±0.7	0.8

P ≤0.05 considered significant

Table V: The effect of increased BMI on ICSI outcomes in normal, overweight and obese groups (n= 50)

ICSI Outcomes	Body Mass Index				P-value
	Normal n=50	**Over Weight n=39**	**Obese n=40**	**Total n=129**	
Pregnancy Test (Positive)	30 (60%)	3 (7.69%)	8 (20%)	41 (31.7%)	0.00*
Pregnancy Test (Negative)	20 (40%)	36 (92.31%)	32 (80%)	88 (68.3%)	

*P ≤0.05 considered significant.

groups of females included ranging from 18-44 years.

Conclusion

According to our study increased BMI effects serum testosterone level that result in low pregnancy rate (ICSI outcomes) in obese women. The results of the present study suggest that decreasing weight before opting for ICSI procedure would increase the chances of successful ICSI outcomes by improving oocyte quality which is affected by high levels of testosterone and reduces the chance of miscarriages. So, losing weight before ICSI treatment increases the chances of pregnancy.

Recommendations

Future recommendations regarding this study is that larger sample size, male cause of infertility, serum prolactin levels and uterine cause of infertility should also be included.

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ORIGINAL ARTICLE

Various Risk Factors in Stroke Patients at Military Hospital Rawalpindi

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ABSTRACT

Objective: To determine the frequency of various risk factors of stroke.
Study Design: A descriptive study.
Place and Duration of Study: Military Hospital Rawalpindi, from January 2011 to January 2012.
Materials and Methods: Three hundred diagnosed patients with stroke were probed into for different risk factors, based on history, clinical examination and laboratory methods.
Results: Nineteen percent were female and eighty one percent were male patients. The mean age of the patients was 59 years. Minimum age was 38 years and maximum age was 90 years in the patients under study. Physical inactivity was the most common risk factor (78%) followed by hypertension (72%), obesity (67%), type 2 diabetes mellitus (42%), smoking (42%) etc.
Conclusion: Physical inactivity is the most common risk factor followed by hypertension which contribute to the pathology of stroke.

Keywords: *Stroke, Risk factors, Hypertension, Obesity.*

Introduction

Stroke is a medical emergency and can cause permanent neurological damage, complications and death. It is one of the leading causes of disability in our country and around the globe.[1] Patients presenting with stroke have history of one or more risk factors which contribute directly or indirectly to the pathogenesis of stroke. Increased awareness and prophylactic measures against stroke have contributed a lot to decline in the annual incidence and death rate for stroke.[2,3,4] Due to multiple risk factors responsible for development of stroke, prevention against stroke need co-ordinated and effective strategy to decrease morbidity and mortality related to stroke. Prevalence of stroke rate is different in different countries of the world depending upon demographic, environmental and other risk factors.[4,5] Pathologically Stroke has been divided into ischemic and hemorrhagic types. however based on clinical grounds we cannot differentiate between these two types .[3,5] Weight reduction, promotion of regular exercise, reducing alcohol consumption, smoking cessation and co-ordinated control over other risk factors have proved effective in control of the devastating frequency of stroke in various countries of the world.[1,5] The role of health education, preventive medication or carotid endarterectomy cannot be neglected as useful tool of preventing stroke.[2,6] Ischemic stroke results from thrombotic or embolic occlusion of a major vessel in the brain leading to infarction of the area of brain supplied by that vessel and results in ischemic stroke. If oxygen supply to brain is compromised for more than 60 to 90 seconds its function is impaired and irreversible damage to brain occurs if blood supply is halted for more than three hours which can lead to death even.[4,5,6] The resulting deficit depends upon the area involved and extent of occlusion and status of collateral circulation. As a result of ischemia, different excitatory and neuropeptides are released that augment calcium influx into neurons which cause cell death and increase in neurological deficit.[3,7]

Spontaneous and non-traumatic intracerebral bleed with no evidence of vascular anomaly (aneurysm and angioma) is usually due to hypertension. Presence of micro aneurysm that develop on perforating branches is the pathologic basis for hemorrhagic stroke.[5] Hemorrhagic strokes result in tissue injury and commonly involve basal ganglia, pons, thalamus, cerebellum and white matter.[2,3] Different risk factors for intracerebral bleed include hypertension, vascular anomaly, bleeding disorders, leukemia's. haemophilia, thrombocytopenia, liver failure, renal failure, DIC, alcohol intake, primary or secondary brain tumors etc.[3,7] Distortion and injury to the brain tissue due to hematoma result in loss of blood supply

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to affected tissue with resulting infarction. Blood released as a result of hemorrhage is itself has direct toxic effects on brain tissue and vasculature.[4]

The purpose of this study was to determine the frequency of different risk factors which cause stroke in patients who present to emergency department or medical wards at Military Hospital Rawalpindi. So that in future proper strategies regarding primary and secondary prevention of various risk factors of stroke can be made to decrease morbidity and mortality due to stroke.

Materials and Methods

It was a descriptive study carried out from January 2011 to January 2012. A total of 300 patients admitted to medical wards/reported at emergency department at the Military Hospital Rawalpindi, with the diagnosis of stroke. These patients were investigated for the presence of different risk factors which include hypertension, type 2 diabetes mellitus, obesity, hyperlipidemia, smoking, ischemic heart diseases, valvular heart diseases, atrial fibrillation, physical inactivity. The data was analyzed using SPSS 15.

Inclusion Criteria

1. Patients of age ≥ 30 years of both sexes
2. Diagnosed patients of stroke presenting within 24 hours of onset of symptoms
3. CT Scan brain confirmed cerebral infarction/hemorrhage

Exclusion Criteria

1. Patients of stroke with pathology other than infarction/hemorrhage like tuberculoma, and SOL.
2. Clinically unstable patients requiring respiratory/intensive care or those who could not be moved for relevant investigations eg CT brain to confirm diagnosis.

All the patients included in the study were admitted in medical ward. Detailed history with special emphasis on different risk factors like Diabetes mellitus, hypertension, ischemic heart disease, previous stroke/TIA, smoking, obesity, valvular heart disease, alcohol use, amount of physical activity and in female patients use of contraceptive pills were taken. It was followed by thorough physical examination to confirm the diagnosis. Diagnosis was further supported by all necessary investigations like blood complete picture, lipid profile, liver function tests, prothrombin time, serum albumin, urine routine examination, ECG, chest X-rays, renal function tests, blood sugar (fasting and 2 hours after breakfast) and ultrasound KUB and abdomen, CT scan/MRI brain, carotid doppler and 2D Echo were done to look for the cause of stroke. All the patients were followed for their duration of stay in the hospital. Their clinical condition was daily determined to look for the improvement.

Results

During the study period, data of 300 patients fulfilling the inclusion criteria were recorded. Out of three hundred patients 243(81%) were male and 57(19%) were female. The mean age of the patients was 59 years. Minimum age was 38 years and maximum age was 90 years (SD ± 10.41).

Table I: Frequency of risk factors of stroke

S. No.	Risk factors	No. of patients (%)
1	Physical inactivity	(78%)234
2	Hypertension	(72%)216
3	Diabetes Mellitus	(42%)126
4	Hyperlipidemia	(12%)36
5	IHD	(17%)51
6	Smoking	(42%)126
7	Obesity	(67%)201
8	Family history of stroke	(23%)69
9	Atrial febrillation	(9%)27
10	Valvluar Heart Disease	(4%)12
11	Misc a. Hypothyroidism	(1%)3

There were 213 patients in whom more than one risk factors were present, Mortality rate was 11% (33 out of 300 died) and was more seen in patients who presented with haemorrhagic stroke, sepsis and aspiration pneumonia and massive ischemic infarcts. Also all the mortality was more in patients above 50 years of age and more in male 24(8%) as compared to female 9(3%) patients.

Table II: Frequency of multiple risk factors in study patients

No. of risk factors	No. of patients (%)
One	87(29%)
Two	51(17%)
Three	93(31%)
Four	42(14%)
Five and more	27(9%)

Discussion

Diabetes mellitus, raised cholesterol levels, cigarette smoking (active and passive), heavy alcohol consumption, drug use, lack of exercise, obesity, alcohol, processed red meat consumption etc are some of the most common and important risk factors for stroke.[8] Some risk factor eg alcohol has multiple effects which cause stroke. Regular and excessive use of alcohol predispose to ischemic stroke, and intracerebral and subarachnoid hemorrhage via multiple mechanisms such as raised blood pressure, atrial fibrillation, rebound thrombocytosis, increased platelet aggregation and abnormal clotting mechanisms.[9,10] Amphetamines, cocaine, over-the-counter cough and cold drugs containing sympathomimetics are some of the drugs causing intracerebral bleed.[9] Prevalence of stroke is more in blacks and Hispanics (about twice the risk of whites), and men have about a 40% higher incidence of stroke than women do.[3,7] After the age of 55 The rate of stroke approximately doubles with each decade. In hypertensive patients the risk is increased by four-fold. Smoking and diabetes mellitus have also been proven to be the aggravating factors for stroke.[4] Similarly other risk factors as mentioned before have been also found to aggravate stroke.[8,11] In our study the most common risk factor was physical inactivity followed by hypertension, obesity, diabetes mellitus etc. Different studies done in our country and abroad have also showed that the prevalence of different risk factors of stroke in various communities are different but unfortunately is increasing.[1,5,6] Although no large scale study has been done in our country so we cannot apply the result of this study on our whole population. However the results of studies done before in our countries showed some variations. As we also came to know that majority of stroke patients had more than one risk factors so it is recommended that proper strategy about health education and prevention of these risk factors on large scale of population should be arranged to prevent this highly morbid and lethal complication.[7,9,12] Stroke patients also have very poor quality of life afterwards due to various complications which is a great burden both on family and society and also require rehabilitation services which is not available everywhere in developing countries like Pakistan.[8] Government and private health sectors /NGO's should in this regard plan and execute proper short and long term health policies to educate the masses and help them in prevention of stroke and quick and easy availability of treatment.[7]

As per the result and comparison of our study with different other studies done on same subject (as shown in table III) it is quite obvious that hypertension, diabetes mellitus, smoking, obesity etc are the most common risk factors which can precipitate stroke .[3,9,13]

Conclusion

As per the results of our study, it is evident that majority of the stoke patients presented due to common and reversible precipitating factors, out of which physical inactivity was the commonest followed by hypertension, obesity, diabetes mellitus type 2 etc.[14] Therefore it is the need of the day that all the patients and their relatives should be briefed in details about the prevention of these precipitating factors and care of the patients at home. This will help in the follow up and evaluation of such patients.[15] If we just prevent these factors by proper health education of the patients we can reduce the prevalence of stroke and also can decrease the morbidity and mortality.

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Table III: Comparison of our results with other studies

Risk factors	Ahmed A[13]	Marwat MA[9]	Mughal SA[10]	Almani SA[11]	Khan NI[12]	Present study
Hypertension	70.8	75	58	59.3	65	72
Diabetes mellitus	39.2	54.5	65	55.2	36.3	42
IHD	28.8	36.3	50	62.5	9	17
Smoking	26	13.6	-	94.7	32	42
Hyperlipidemia	-	13.6	-	-	32.7	12
Vulvular heart disease(MS/MR/AR/AS etc)	-	6.8	60	-	3.6	4
Physical inactivity	-	-	-	-	-	78
Atrial fibrillation	-	-	-	-	-	9
Obesity	-	-	-	-	-	67

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ORIGINAL ARTICLE

Gender Wise HIV Disease Awareness among Primary School Teachers in Islamabad

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ABSTRACT

Objective: To assess the level of awareness and methods of primary prevention about HIV/AIDS among primary school teachers.

Study Design: A descriptive cross-sectional study of 60 male and female teachers, between 25-40 years of age, teaching for at least three years in public and private schools situated in suburb of Islamabad, was conducted using a structured questionnaire. A stratified random sampling design was used to collect data. Analysis was done on SPSS version 17.

Place and Duration of Study: The study was conducted at Golra Station suburb in Islamabad from October 2012 to December 2012.

Results: 77 percent respondents have heard about the AIDs, 40 percent believe that they should not quit good relations with the AIDs Patient, 88 percent believe it is our moral obligation to help the aids victims, 50 percent believe AIDS is a major issue, and same strength responded that it is not their problem. Most of the respondents believe that AIDS is a preventable disease. Majority of the respondents are of the opinion that Government is not solely responsible to control AIDS, all the stake holders must participate in the control of AIDS.

Conclusion: It is inspirational to know that majority has knowledge relating to HIV/AIDS. The study emphasizes the need to educate the teaching community about the prevention methods and to endow them with the crucial information and skills to facilitate them to inculcate knowledge to the younger generation at a younger age group as this can challenge the moral and ethical issue relating with the sexual spread of AIDS. However, taboos of public discussions of sexual illness remain a key limitation towards preventive activities.

Keywords: *Primary School Teachers, HIV/AIDs, Stake holder, Prevention.*

Introduction

HIV /AIDS is now more than a health problem it has become a security concern as virtually a large pool of the population is at risk specially in a countries where the demons of poverty ,hunger, unorganized infrastructure of health care, illiteracy and unstable political situation.

Pakistan is in the region where high risk countries like India, China and Afghanistan are in its neighbors, its age structure is of typical developing country with the young population of median age 0-14 around 40 %. Pakistan is further identified by the WHO as low prevalence but high risk country with the estimated cases around 100.000 and death around 5000 in year 2005.[1]

Pakistan is now included among the countries where the threat of AIDS epidemic is of a major concern. According to UNAIDS estimates, the prevalence of HIV/AIDS among the population of men and women aged 15-24 in Pakistan is about 0.1 per cent. Surveillance data from the Sind provincial AIDS control program indicate that the country has, however, entered the "concentrated epidemic" stage for HIV/AIDS[2], in the sense that the HIV prevalence in high-risk subpopulations is five per cent or higher.[3] These high-risk subpopulations are injecting drug user communities and commercial sex networks in larger cities in Pakistan. This poses a serious threat of a generalized epidemic, especially among the younger population.[4] Countries where the economic indicators are low the younger population specially females are more likely to indulge in a high risk behavior and the burden of sexually transmitted illness is high in this group. According to UNICEF in Africa the girls and young women age 15-25 are twice affected as compared to young men. This is a descriptive cross sectional designed to assess the level of knowledge and awareness of the HIV/AIDS epidemic among school teachers in suburbs of Islamabad focusing on the knowledge about the spread and preventive measures.

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Materials and Methods

This is a cross-sectional descriptive study of school teachers aged 25-40 years was conducted in the schools of Golra Islamabad. Islamabad suburb Golra

and nearby sectors have more than 30 schools with 4 public sector schools and 26 private sector. The total number of schools taken in the study is 10 with the total strength of the teachers in those schools is 150. The teachers teaching primary classes were included on the basis of stratified random sampling procedure. The sample size was 60 with 41 male teachers and 19 female teachers. Teachers were included on the basis of educational status (minimum graduates), and three years experience of teaching and age 25-40 years. Exclusion criteria were the age above 40 and teaching experience of less than 3 years. The data collection was carried out from October 2012 to December 2012. A questionnaire was designed having all the relevant based on socio demographic and psychosocial items with structures responses was used for males and females. The questionnaire was admitted to senior faculty of a medical school as a pretest. The data were collected by a team of male and female interviewers in order to facilitate communication. The interviews were conducted in schools of the concerned respondents. The study was given due ethical consideration and proper consent was obtained on the consent form from all the respondents.

Results

Fig 1 shows 77 percent of the male respondents have heard about the AIDS as compared to 82 percent of the females respondents, 60 percent of the male

Table I: Demographic Profile

		Educational Status		Total
Gender	Age Ranges	BA	MA	
Male	25-40	31	10	41
Female	25-40	10	9	19
Total		41	19	60

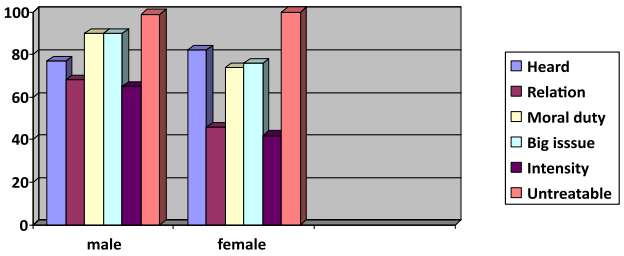

Fig 1: Percentage of respondent's responses about different issues

teachers believe they can have relationship with the AIDS Patients but only 40 percent of the females are of the same view, 88 percent of the male teachers believed on the moral obligation to help the AIDS victims, 60 percent of the male respondents believe that the intensity of AIDS increases with the increase in the propaganda, almost 90 percent of both male and female teachers were of the view of big issue and almost 100 percent believe it is untreatable. Female teachers mostly believe since all the social stigmas are attached with the disease it should be hided, surprisingly 40 percent of the female teachers are of the view of imparting sex education regarding the prevention, while more than 90 percent male teachers are in favor of the deaths reported due to AIDs.

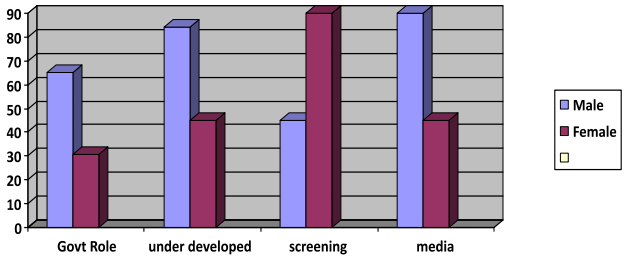

Fig 2: Role of the Stake Holders

The male teachers by and large assumed that it is now more than the disease of the developed world and all the necessary steps must be initiated to control the disease, 80 percent of the female teachers are of the view in early screening and helping the students through the education. Majority of the respondents say that Government is not solely responsible to control AIDS, all the stake holders must play their role in the control of this disease.

Discussion

This study reflects that most of the communities are now aware of the AIDS problem in our society but there are serious gaps in knowledge about the modes of spread and ways of primary and secondary preventions. Sizeable percentages of males and females consider HIV being an incurable disease but they are not thinking on the serious terms of preventing further spread. The study portrays that both the male and female teachers are well versed with the AIDS and its spread and female teachers are specially in favor of the preventive measures teaching at the primary level. In a survey conducted

nation wise it was reported that about 91 per cent of young people of Pakistan had already heard of HIV/AIDS in an urban setting.[5] In Chile a study about investigating knowledge of HIV/AIDS among 15-19 year old population there was no significant differences in health education cognition and application of preventive practices related to HIV/AIDS when compared with either gender or their educational level.[6] A similar study from the United Arab Emirates about the HIV knowledge among the students of early classes (first year university students) establish serious misconception exist and women were less erudite than men.[7] It was utmost surprising to notice more females responded in the assenting when they were asked about the AIDS disease and were favoring sex education. This could be explained by the fact that females are more now more exposed through the electronic and print media. Having a computer/ internet in the home did however contribute to improved knowledge among females. When considering the mode of spread and preventive strategies for HIV/AIDS, a significant percentage know about the cause through which the infection could spread, which is favoring the findings noticed in a national survey.[8] In this study, significant females blamed sexual contact as the major mode of spread, while more males reported used syringes as the main cause. In some survey studies conducted in neighboring India, it was noticed female adolescents were less conversant about HIV/AIDS compared with male adolescents, while the males responded with high rate of exposure toward sex education measures compared with the females.[9] This study favors the same finding. Moreover, few studies highlighted a sizeable gender gap in the knowledge and attitudes towards HIV/AIDS and other sexually transmitted diseases, males knowledge remain better than females.[10] Nevertheless, having good knowledge about HIV/AIDS does not necessarily translate into healthy behaviors.[11] Our study revealed significant knowledge gap between male and female genders which can be seen while considering the high risk behavior.[11] It was further found that the risk factor profile differed somewhat between the males and the females. These differences are due to women and men living in different ways within the cities and across the Pakistan. Further gender disparities also contributed towards this. In addition investment in primary education is higher for males than for females this is specifically evident in terms of access to education.[12] A recent demographic survey showed that education is positively related to knowledge of HIV/AIDS which supports the findings in this study.

Conclusion

Our findings suggest though necessary information is available but there is a huge need to educate young adults about the moral ethical and religious values, and organize them with common information's about primary prevention of HIV/AIDS and its problems and further give them psycho social support to adopt healthy behaviors. The teachers can contribute significantly towards educating the young people specially though morning assemblies, seminars and different social activities. At the same time Government should direct efforts towards these stake holders and both the education and health sectors should be consulted. There is sufficient evidence available that important health issues should be part of the curriculum in primary and high schools.

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ORIGINAL ARTICLE

Coping Strategies among Adolescent Children of Depressed and Non Depressed Parents

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ABSTRACT

Objective: The objective of the present study was to find out differences in coping strategies of adolescents of depressed and non-depressed parents.

Study Design: Comparative cross-sectional study.

Place and Duration of Study: The study was conducted at Pakistan Atomic Energy Commission (PAEC) Hospital in Islamabad during the period of April 2014 to June 2014.

Materials and Methods: The sample consisted of 130 adolescents including 50 from families of depressed parents and, 80 from non-depressed parents. The data was collected through purposive sampling technique. Brief COPE scale was used to assess coping strategies of the subjects.

Results: The results indicate significant difference in coping strategies of adolescents of depressed and non-depressed parents. The adolescents of depressed parents used more dysfunctional coping strategies such as active avoidant coping strategy. The results also highlighted significant gender differences.

Conclusion: Results of the study suggest that children of depressed parents use dysfunctional coping strategies as compared to children of non-depressed parents. The findings are important for future research and prevention studies with children of depressed parents to incorporate healthy and functional coping strategies.

Keywords: *Depressed parents, Non-depressed parents, Adolescent children, Coping strategies.*

Introduction

Adolescence is a developmental transition between childhood and adulthood which usually starts at puberty and ends at age 18 or 19. During this period of growth not only physical changes but also psychological, emotional, social and cognitive development bring about an added burden on growing individual and thus a need to cope effectively with this plethora of changes is essential. Young adolescents while adaptating to biological changes of puberty, reformulating relation with parents and peers, developing ability to think in an abstract and hypothetical ways, striving towards identity formation and autonomy and constructing values encounter varying amounts of stress from multiple sources.[1,2] Facing all these challenging developmental tasks it becomes imperative that adolescents develop effectual coping strategies. Therefore, ability to cope effectively with stress has been viewed as a crucial component of resilience among adolescents and important in influencing patterns of positive growth and development.[3]

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Coping refers to an attempt of individual to decrease the sources of stress, to overcome the barriers responsible for frustration, and to resolve conflicts. Lazarus & Folkman[4] defined coping as "Constantly changing cognitive and behavioral efforts to manage specific external and /or internal demands that are appraised as taxing or exceeding the resources of the person". There are hundreds of options available to the individual as one copes with specific stressful events and circumstances. Different experts have identified several coping categories. These are categorized as adaptive/functional and maladaptive/dysfunctional coping strategies. Adaptive coping strategies such as problem-focused coping, positive coping and religious coping can play important role in buffering the effect of stress as these strategies are characterized by attempts to adopt solution-oriented and positive ways of coping. On the other hand maladaptive coping strategies including avoidant coping and denial coping contribute to aggravate the stressful situation. These coping strategies reflect active attempts to avoid the stressor or escape from its effects. Coping in adolescents becomes even more important if they have stressful home environment. Parents exert significant influence on adolescents and their psychological functioning affects the way adolescents deal with stressors of life. Several

studies have indicated that parental depression is a strong predictor of psychological problems in adolescents and creates unpredictably stressful environment for children[5, 6] and depressed parents demonstrate inconsistent patterns of interaction e.g. being emotionally and physically withdrawn, and intrusive with their children.[7,8] Because of the elevated levels of chronic stress in the families of depressed parents, it is essential to understand how their adolescent children cope with this stressful environment. Identification of adaptive and maladaptive coping strategies can help these adolescents for better management of their everyday stresses as well as making maximum use of their potentials. The present research is designed keeping in view the practical significance of the problem. This study aims at investigating coping strategies of adolescent children of depressed and non-depressed parents. Limited studies have been conducted to explore the differences in coping strategies of adolescent children of depressed parents and non-depressed parents in the recent past. Moreover these study designs remained confined to one or two aspects of coping mechanism. All these studies were conducted on sample from western culture. There is no research evidence on coping mechanism of children of depressed parents in Pakistan. Our study will essentially focus on conventional Pakistani families. Further, the coping inventory used in this study is more comprehensive and will identify wide range of coping strategies used by adolescent children of depressed and non-depressed parents. Data analysis will help us to design psychotherapeutic interventions for adolescent children to use healthier coping strategies instead of using maladaptive coping.

Materials and Methods

A quantitative cross sectional study was carried out at psychiatric unit of Pakistan Atomic Energy Commission (PAEC) Hospital Islamabad April 2014 to June 2014. The sample was selected through purposive sampling technique. The sample of the study consisted of 130 adolescents of depressed parents and non-depressed parents. Fifty adolescents were from families of depressed parents and 80 from non-depressed parents. Parents' past and current history of depression was assessed with the semi structured case history proforma according to DSM-IV-TR criteria.[9] The age range of parents was 30-64 (M = 43.97, SD= 7.39) and the age range of the children was of 12-18 (M = 14.86, SD= 2.00). Among adolescent children 65 (50%) were males and 65 (50%) were females. The data was collected from adolescents after getting informed consent from their parents. They were briefed about the purpose of the study and assured that the information obtained from their children will be kept strictly confidential. After getting their consent, instruments were administered with the adolescents. Adolescents were instructed to respond on each item of the questionnaire booklet. They were asked to respond to the items by selecting an option which resembles closely to their situation, feelings or behaviours. At the end, participants were thanked for their cooperation. Demographic sheet was administered to collect the data regarding age of parents, gender of child, child age and other information such as family monthly income and parents' education. The Urdu version of Brief COPE[10] was used to identify the coping strategies used by adolescent children. Brief COPE is a briefer form of COPE Inventory [11] consisted of 28 items categorized into 14 subscales. Items are arranged in a 4-point Likert format (1= Never, 2= Very less, 3= Sometimes, and 4= A lot).In the present research the scale is categorized into five subscales namely: Active Avoidance Coping, Problem-Focused Coping, Positive Coping, Religious coping and Denial. The high score on each subscale indicates more use of that particular coping strategy and low score indicates less use of that coping strategy. Data was analyzed through SPSS-18. Descriptive statistics were used to describe the data. Independent Samples t-test was used to compare scores between two groups. P-value < 0.05 was considered as significant.

Results

A total of 130 adolescent children, 50 from depressed parents group and 80 from non-depressed parents group were included in the study. Age of the adolescent children ranged from 12-18 with mean value of 14.86 and the age range of parents ranged from 30-64 with the mean value of 43.97. Among 130 adolescent children fifty percent were boys (65) and fifty percent were girls (65) (See

Table I). Significant differences were found on Avoidance Coping, Problem-focused Coping, Positive Coping and Religious coping. Adolescent children of depressed parents used more avoidant coping strategy (M= 19.53) as compared to adolescent children of non-depressed parents who used more problem-focused (23.16) and positive coping strategies (16.01). Significant differences were also noted on religious coping strategy. The adolescent children of depressed parents used less religious coping style (5.68). The detailed results are presented in (Table II). The results also showed significant gender differences in the coping strategies of boys and girls. The girls scored higher on avoidant coping (M= 20.23) and religious coping (M= 6.74) as compared to boys whose frequently used coping strategy is problem-focused (M= 16.40). No gender differences were noted on positive coping (see Table III).

Table I: Demographic Characteristics of Sample (N=130)

Variables	f	Percentage	Mean (SD)
Adolescent Data			
Adolescent Children of Parents with Depression	50	38.46%	
Adolescent Children of Parents without Depression	80	61.54%	
Age			14.86 (2.00)
Gender			
Boys	65	50.0%	
Girls	65	50.0%	
Parent Data			
Father age			43.15(2.81)
Mother age			37.53(2.44)
Father education			12.94(1.81)
Mother education			11.16(1.77)
Family monthly income			31500 (9551.13)

Discussion

It is well documented in literature that children of psychiatrically disturbed parents face more challenging and stressful environment than the children of non-disturbed parents. Especially children of depressed parents are two to five times more likely to develop behavior problems compared to children of non-depressed parents.[12] Often this stress is intensified by faulty and unhealthy coping

Table II: Mean, SD, and t-value of Adolescent Children of Depressed and Non-depressed Parents on Subscales of Brief COPE (N = 130)

	Adolescents (Depressed Parents) (n = 50)		Adolescents (Non-depressed parents) (n = 80)				95% CI	
Coping Style	M	SD	M	SD	t(128)	p	LL	UL
Active Avoidance	19.53	4.978	17.60	4.853	2.166	.032	3.684	.166
Problem-focused	20.92	4.571	23.16	4.101	2.902	.004	3.772	.713
Positive	12.86	2.232	16.01	3.495	5.690	.000	4.249	2.056
Religious	5.68	1.867	6.81	1.450	3.871	.000	1.711	.554
Denial	5.05	1.231	5.04	1.142	.046	.963	.437	.417

Note. CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit

Table III: Mean, SD, and t-value of Boys and Girls on Subscales of Brief COPE (N = 130)

	Boys (n = 65)		Girls (n = 65)				95% CI	
Coping Style	M	SD	M	SD	t(128)	p	LL	UL
Active Avoidance	17.34	4.525	20.23	5.068	3.432	.001	4.560	1.225
Problem-focused	16.40	3.468	13.20	2.538	6.003	.000	2.797	.243
Positive	22.94	4.069	21.66	4.668	1.662	.099	4.255	2.145
Religious	6.02	1.875	6.74	1.450	2.460	.015	1.305	.141
Denial	5.00	1.061	5.09	1.320	.440	.661	.508	.323

Note. CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit.

efforts that increase conflict in the family making children vulnerable to use dysfunctional patterns to deal with their environment. Keeping in view the literature it was hypothesized that children of depressed parents would exhibit significantly different coping strategies as compared to children of non-depressed parents. The findings of the present research are consistent with the past studies. The results indicated difference in the mean scores of adolescent children of depressed and non-depressed parents on the subscales of Brief COPE. The adolescent children of depressed parents reported more maladaptive coping strategies including active avoidance coping as compared to adolescent children of non-depressed parents. The adolescent children of depressed parents reported more use of active avoidance coping. On the other hand, adolescent children of non-depressed parents

reported more use of problem-focused coping, positive coping and religious coping that are parents as socialization role in Pakistani culture puts primary responsibility on them for home care thus they are more subjected to the challenges associated with their parents' psychopathology. The findings of the present study imply that the social context has an important relevance regarding gender differences in coping strategies of adolescents and must be kept in mind while conducting future studies. However, the findings of the present research could be culture specific, and more research is required to examine it in depth on a larger sample for validation and verification of this work.

Conclusion

The findings from the present study have shown that adolescent children of depressed parents use dysfunctional and maladaptive coping strategies. Gender differences revealed that adolescent girls use more dysfunctional strategies such as active avoidance coping strategy. These findings can provide us a direction to further explore the family dynamics in shaping such behaviors for effective psychotherapeutic interventions in the long run.

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MEDICAL
EDUCATION

ORIGINAL ARTICLE

Learning Styles of Final Year MBBS Students Taught Through Problem Based Learning Strategy Over a Period of Five Years

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ABSTRACT

Objective: To identify the influence of problem based learning strategy on the learning styles of final year medical students who have been taught through the student centered teaching curriculum over a period of 5 years.
Study Design: A descriptive study.
Place and Duration of Study: The study was conducted at Islamic International Medical College in April 2013.
Materials and Methods: Learning styles of students of final year medical students of Riphah International University taught in an integrated student centered curriculum over 5 years of medical school were identified by using the Learning Style Orientation Inventory.
Results: A total of 90 students were recruited in the study, out of which 40 % were males and 60% were females. 51.1% were observational learners, 15.55% were experiential learners, 11.1% were structured learners. The least number of students were discovery (4.44%) and group learners (3.33%).
Conclusion: Our study shows inclination towards group learning in only 8.8% students (both preference and mixed methods) all of which were females. Maximum students still preferred to be observational learners who are passive dependent superficial learners and not open to new experiences and analytical thinking. These findings suggest that further research to look for factors that can inculcate deeper learning habits in the students is needed.

Key Words: *Learning styles, Student centered learning, Problem based learning, Final year medical students.*

Introduction

The challenges faced by doctors in this modern era of medical practice have become diverse. Researchers in medical education are becoming increasingly aware of the use of variety of teaching methods that may ultimately improve the retention of ever increasing knowledge along with development of problem solving skills and adaptability to new situations.[1,2,3] Teaching methodologies are designed to increase retention of knowledge, enhance integration and application of concepts to the clinical contexts. To achieve expertise in clinical skills, a medical student is required to develop problem solving skills, intrinsic drive to analyze and apply knowledge and develop self directed learning habits.[4] Such high order cognition requires students to use a diverse array of learning styles and strategies chosen to suit a certain learning situation. Problem based learning has been implemented differently in different medical curricula as adjunct or alternative to traditional didactic teaching.[5,6,7] Problem Based learning was first introduced at McMaster University in 1960, using problems or case as stimulants for students to find solutions.[8,9] Learning is student centered occurring in small groups of 8-10, led by a facilitator. The focus of learning is a problem selected to enhance the curricula and becomes a means to stimulate a learning process. The group meets twice weekly. They attempt to find explanation to phenomena, events or cases, correlating them in the given problem and building up on their previous knowledge. Students generate questions and find answers on their own. The solution may be single or multiple and students are given the opportunity to use all possible sources of information. This teaching approach helps students to develop motivation for self directed learning, collaboration, communication, problem solving and critical thinking skills [10,11,12] which are important for the training of medical students appropriate to meet the demands of modern medical practice.[13] Riphah International University has recently adopted a student centered curriculum in the medical school. They have introduced problem based learning, small group discussions and case based learning as an adjunct to the traditional didactic system of lecturing. This study aims to identify the influence of student centered curriculum with use of problem based learning strategy on individual learning preferences of final year medical students at the end of a 5 year teaching program. There are a number of

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varieties of theories and models for measuring learning styles of students. Cassidy has mentioned that it is difficult to choose any specific instrument for evaluation of student's learning styles.[9] We have selected the Learning Style Orientation Inventory (LSOI) designed by Annette J. Towler and Robert L. Dipboye.[14] This instrument defines five different learning styles namely discovery, group learning, experiential learning, structured and observational learning styles. The survey was conducted by using the "Learning Style Orientation Measure". It allows identification of learning preferences in relation to their teaching environment. It consists of a 54 item questionnaire. 14 items are assigned to discovery style, 7 items to group learning, 13 items to experiential learning, 11 items to structured learning and 9 items to observational learning.

- **Discovery learners** enjoy a broad range of learning situations like interactional lectures and active reflective activities promoting abstract thought and deal with complex issues.
- **Group learners** enjoy group activities with others enhancing group dynamics and collaborative learning, stimulating group activities with one on one discussion. Each individual takes his own responsibility to learn for the group to work effectively. It is one of the methods of collaborative in depth learning with teaching and learning going on simultaneously among the students.
- **Experiential learners** enjoy taking initiative and like to experience practically. They enjoy learning in role plays and simulations and do not feel comfortable with passive learning.
- **Structured learners** rely on their own information processing strategies for effective learning to occur. They prefer to impose their own structure of learning in situations.
- **Observational learners** are passive learners dependent upon external cues to help them learn. They require concrete direct experiences which are provided and planned by the authorities in the form of didactic lectures, field trips, video films etc. They do not enjoy activities requiring active learning strategies for analytical and logical critical thinking. They are not open to new experiences and do not do well in learning situations that are autonomic and student centered. They are more likely to be dependent superficial learners.

Materials and Methods

The undergraduate program of Riphah International University is a 5 years Bachelor in Medicine and Surgery. It is implementing an integrated modular system incorporating student centered learning strategies like problem based learning and small group discussions along with traditional didactic teaching. This batch had studied through the modular system in which each module incorporated at least 2 to 3 PBL sessions making a total of 8 to 10 PBL each year over a four year modular teaching program. Final year comprised of clerkships in various clinical specialties. This study is a cross sectional survey inducting final year medical students through non-probability convenience sampling who have been taught through the student centered medical curriculum. The information was collected by inducting the final year MBBS students after consent who filled the LSOI proforma. The data was collected, scored, analyzed and interpreted by the researchers. The survey was conducted by using the "Learning Style Orientation Measure". It allows identification of learning preferences in relation to their teaching environment. It consists of a 54 item questionnaire. 14 items are assigned to discovery style, 7 items to group learning, 13 items to experiential learning, 11 items to structured learning and 9 items to observational learning.

Results

Out of 90 students, 36 (40%) were males and 54 (60%) were females. Maximum number of students were found to be observational learners making a total of 46 (51.1%). These were followed by 14 (15.55%) experiential learners and 10 (11.1%) were structured learners. Group and discovery learners were least in number with 3 (3.33%) and 4 (4.44%) each in these groups (Table I). Among the male students 17 (47.22%) were observational learners and 9 (25%) were experiential learners (Table II). Females showed the same pattern with 29 (53.7%) being observational learners and 17 (30.9%) experiential learners. In contrast to male students who had no preference for group learning, only 3(5.5%) preferred group learning. 2 (3.7%) were

discovery learners and 5(9.25%) were structured and experiential learners each among females. (Table III) Mixed modality learning was identified in 3 (8.3%) males and 10(18.5%) females.

Table I: Learning styles of all final year students (n= 90)

Learning styles	No (90)	Percentage
Discovery	4	4.44%
Group	3	3.33%
Experiential	14	15.55%
Structured	10	11.11%
Observational	46	51.1%
Mixed methods	13	14.44%
Total	90	100%

Table II: Learning style distribution of male students (n= 36)

Learning styles	No (36)	Percentage
Discovery	2	5.55%
Group	0	0%
Experiential	9	25%
Structured	5	13.88%
Observational	17	47.22%
Mixed methods	3	8.33%
Total	36	100%

Table III: Learning style distribution of female students (n= 54)

Learning styles	No (54)	Percentage
Discovery	2	3.70%
Group	3	5.55%
Experiential	5	9.25%
Structured	5	9.25%
Observational	29	53.70%
Mixed method	10	18.51%
Total	54	100%

Discussion

Problem based learning has turned out to be a widely used educational approach in the last decade. It has been incorporated with the belief that it adds to key attributes to the training of doctors who need to be equipped to meet the demands of modern medical practice. According to Barrows and Tamblyn and Dolmans and Schmidt, problem based learning enhances the retention, integration and application of knowledge of basic sciences to the clinical sciences along with development of essential skills for problem solving, developing independent study habits and self directed learning, enhancing intrinsic interest in the subject.[4,10] PBL graduates develop a more patient centered approach with better interpersonal skills required for a good doctor-patient relations developing a more humanistic and holistic attitude to medical practice.[15] The results of our study show a predominance of observational learners (51.1%) among the students. The more striking aspect is such a low percentage of group learners i.e., 5.55% as single preference and 9.25% with mixed preference. All group learners were females.

Problem based learning has time and again been associated with improved in depth learning with development of conceptual understanding, problem solving, critical thinking and self directed learning.[16,17,18] However, our results show a predominance of observational surface learners after studying in a student centered environment. Groves has documented similar results in her study where she has reported a change from deep learning towards a more surface approach over her study period with significant decreases in learning scores.[13] Novak et al has also noted an increase in avoidant behavior and decrease in active participation among groups in pharmacy students after going through a PBL curriculum.[19] "Stress" has been implicated as an important factor that can result in failure of PBL teaching methods.[20] Discomfort between students and facilitators may also be one factor as not only students but facilitators also have to adjust their teaching styles to the new teaching modalities.[19] Furthermore, factors like new teaching environment, excessive work load and a robust subject matter in medicine can also be important determinants for success of student centered small group learning.[14,21] Medical curricula are content heavy with a lot of pressure to acquire large amount of knowledge. This may trigger the shift towards more superficial learning styles against a more conceptual and time consuming approach.[13] One more aspect that needs to be explored in this context is the type of assessment used to assess conceptual

understanding and critical thinking. It is believed that assessment drives learning. If the assessment is not

ORIGINAL ARTICLE

Early Community and Hospital Contact of Undergraduate Medical Students; Innovating the MBBS Curriculum through DCH (Doctor, Community and Hospital) Module

Masood Anwar, Rehan Ahmed Khan

ABSTRACT

Background: Transition from traditional to integrated curriculum has been very slow in Pakistan. However in the last few years there has been tremendous increase in the number of medical schools. Early clinical and community exposure is one of the key factors in generating interest of medical students in learning the clinical aspect of the basic sciences. For this purpose 'DCH module' was incorporated in the first 3 years of the medical curriculum at Islamic International Medical College.

Objective:

- To develop and implement DCH module for early clinical exposure of MBBS students.
- To determine teachers' and students' perceptions of about its influence on the overall learning of medicine.

Study Design: Action Research.

Place and Duration of Study: Islamic International Medical College from Jan 2011 to Jan 2014.

Materials and Methods: Initially Wise man approach was used to develop the module. However modifications were brought into the module applying the United Nations approach of designing a curriculum. The module has been incorporated in the curriculum, aligning it with the last 2 years of intensive clerkship of a five year MBBS program.

Results: Significant improvement has been observed by the faculty, in students' approach about dealing with the clinical context of the basic sciences. It has also resulted in better communication skills and their reasoning approach in PBL sessions.

Conclusion: Early clinical exposure enhances the interest and understanding of medical students of the basic sciences. It lays the foundation of the students towards a professional and clinical approach in dealing with patients, which is in addition to better integration of basic sciences with clinical sciences.

Key Words: *Students' perceptions, Learning, Community exposure.*

Introduction

Ever since the publication of Flexner's report[1] a major paradigm shift has occurred in Medical Education. The emphasis has shifted from “teaching by teachers” to “learning by students”. This obviously could not be achieved without reforming the curricula from traditionally “teacher centered” to modern “student or learner centered”.[2] The process of shifting has been rapid in North America and Europe with almost 100% Medical Schools having implemented the shift. But unfortunately, developing countries have lagged miles behind. While there are no geographical boundaries between diseases and health care, there are marked differences in standards of health professional's education and health care standards. Lancet Commission was set up to study the problem recommended mobilization of knowledge for health professionals of all countries so that they are not only locally responsive but also globally connected with ultimate purpose of providing high quality health care to all.[3] Now the developing countries are faced with the uphill task of reforms in few years which was completed by developed countries in 100 years.The process is both human and material resource intensive, making it further difficult for developing countries. It is therefore imperative the each country shall accomplish this goal in its “local context”, making best use of available resources.[4] In Pakistan, process of reforming medical curriculum was initiated in 2009 when a selected cohort of Medical Schools, considered to be better equipped with required knowhow were allowed by Pakistan Medical and Dental Council to develop and implement new curricula.[5] Islamic International Medical College is one of these medical schools. Over the last five years, an integrated curriculum with emphasis on learning and is student centered has been developed and implemented. One of the key

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directional elements in its development was the postulate that early clinical and community exposure is one of the key factors in generating interest of medical students in learning the clinical aspect of the basic sciences.[6] The rationale of exposing the beginner to healthcare delivery system(s) at the start of their medical career is that this early exposure to patients and community will stimulate among students critical thinking of health issues in general and common diseases in particular leading to acquisition of multidisciplinary integrated knowledge of these issues and diseases. Learning in an urban, suburban or rural community designed to enable the student to gain an understanding of the relationship of the health and disease, multi sectorial engagement in community development, community health problems and their solution under a primary health care program will help the student to overcome his/her own feeling of hesitance from patients and hospital environment.[7] This adaptation will contribute to develop a strong desire in the students to solve the problems of the patients and to learn medicine. For this purpose 'Disease Community and Health (DCH) module' was incorporated in first three and a half years aligning first two spirals with last one year of intensive clerkship.

Materials and Methods

For the purposes of this module a community-based learning activity is defined as an activity that takes place within a community or in any of a variety of health service settings at the primary or secondary health care level, where community is observed and followed up over a period of time. Initially the wisemen approach was used to develop the module.[8] A group of 3 qualified Medical Educationists, under the guidance of Dean Faculty of Health and Medical Sciences, developed the draft of contents, learning methodology and implementation plan. The main emphasis was laid on student's early exposure to community and hospital patients and teaching communication skills. Using United Nations approach8, it was then presented to all heads of clinical departments to provide their in-put. They were advised that while suggesting modifications, they shall take into consideration the UNICEF document[9], Lancet Commission recommendations3 and competencies described in Tomorrow's Doctor[10] and Scottish Doctor.[11]The document was then discussed in Faculty Board. The module was then finalized by the same group of Medical Educationalist but this time they were assisted by senior faculty of Community Medicine Department. The content, learning outcomes, assessment methodology was decided in several meetings. The final draft was then presented to the curriculum committee and approved for implementation. The module has been incorporated in first three years of the curriculum, aligning it with the last 2 years of intensive clerkship of a five year MBBS program. The initial impact of module was assessed after one year.

Results

The Module

The DCH module developed has the following main features (competencies).

Knowledge

- Student will be able to know the structure of primary, secondary and tertiary health care systems.
- Student will be able to know the common complaints with which the patients present in various departments of the hospital.
- Students will be able to understand the basic components of history taking and examination and their importance diagnosing a clinical problem.
- Students will be able to understand environmental and behavioral aspects of common medical problems in the community.
- Students will be able to search for and implement measures to modify the population habits and environment responsible for common diseases in the community.

Skills

- Students will be able to take history in a proper sequence that is relevant to patients attending a specific clinical department.
- Students will be able to demonstrate steps in clinical examination of patients attending a specific clinical department.
- Students will be able to identify population behavior and environmental factors responsible for common diseases in the community.
- Students will be able implement preventive measures in the population to reduce the

burden of common diseases and record the outcome.

Attitude

- Students will be able to demonstrate communication skills while taking history from the patients.
- Students will be able to demonstrate bed side manners while examining patients.
- Student will be able to communicate with the population and persuade to implement proposed measures for decreasing the disease burden.

Module Implementation

Each entry in our Medical School comprises 100 students. The class was divided into 6 batches with equal number (16) of students in each batch. Initially each batch was rotated in each of the major clinical departments to acquire skills in history taking and basic clinical examination. Both skill lab and actual patients were utilized for this purpose. They were then rotated to community settings, basic health units (BHU) and Lady Health Worker's centers. The sessions are planned one full day in each fortnight. The batch 2013 has completed its first year. In second year, the students groups will be allotted a set of households in identified suburban and rural communities to study their health issues/habits, suggest and implement modifications. Towards the end of third year they will study the outcome of interventions and submit a written report.

Faculty's Observations

To assess the impact of this innovation of the curriculum, a focus group of clinical teachers were invited to discuss their observations regarding the module itself, its implementation and impact on student's learning. Summary is as under:

a. They were unanimous in expressing satisfaction about the contents and design of the module.
b. Majority suggested increasing the skill lab component and simulated patient introduction to improve communication and clinical skills.
c. They were unanimously satisfied in effective ness of the module.
d. Majority was of the opinion to increase the duration of the module.

Students' Perception

A questionnaire was distributed to the second year students (who have completed one year of this module) to know their perception of this module. The results are reported in table I.

Table I: Students' Perception

PERCEPTION	GOOD	ADEQUATE	POOR	DON'T KNOW
Community exposure	35%	33%	32%	0%
Patient exposure	25%	50%	20%	5%
Learning communication skills	20%	40%	40%	0%

Discussion

A curriculum, in fact, is systematic packaging of competencies that are to be acquired by a learner through organized learning activities.[9] These competencies may vary from place to place depending upon social, cultural, ethnic and economic status of the population. Ideally a curriculum should include what the society envisages as important for teaching and learning. This vision of the society is developed usually by professional bodies constituted for this purpose taking in consideration local requirements, available resources (including human resource) and health structure. These bodies could be local (Governments), Regional or Global e.g. WHO, UNESCO etc. is vision in the light of research, need analyses, available resources and gap analyses. Obviously these are going to differ from one to other society. In case of medical education, as there are neither geographical boundaries for health professionals to work nor for the disease to travel, there is also a requirement for curriculum to be holistic and global in its contents.[3,7] The DCH module of our curriculum was developed keeping above factors in mind. In Pakistan the curricular change is still in its infancy therefore there is not only dearth of trained and motivated faculty to implement the reforms but there is also a fair amount of resistance from senior faculty members and officials. This resulted in some gaps in module designing and implementation as evident from faculty select group review discussion. This is not unusual and has been subject of several expert reviews.[4] It only requires constant monitoring and modifications as suggested by experts.[12] Like any other developing country there are two extremes in health care delivery. On the one side are state of the art tertiary care hospitals which

are well equipped and have well educated and well trained faculty, while on the other side extremely basic health units often lacking in essential equipment, man power and finances. The irony of the fact is that only a very small number of patients benefit from hospitals, which are also teaching hospitals for medical schools while majority looms with basic health unit or private practitioners. Moreover the students do not get opportunity of seeing many patients and diseases in their actual environment.7 Introduction of this module has certainly stimulated students learning as expected and is evident from their critical responses. Student's perceptions were elicited only in three areas, considered to be the key elements of this module. These are community exposure, patient exposure and communication skills. In all 60-75% students have shown satisfaction (good or adequate). However there are 25-40% students who are not satisfied. This is primarily because for almost all non-faculty mentors involved it was the first experience. This difficulty is also recorded in literature.4 We expect that with some training and experience they will be able to make these exposures more fruitful learning activity for the students.

Conclusion

DCH module has been able to achieve its objectives but there is still room for its improvement in the light of faculty and student's comments. Non-faculty mentors involved in its implementation also require some training. True impact of the module can only be assessed on its completion.

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LETTER TO THE EDITOR

Surgical Site Infection

Surgical Site Infection (SSI) accounts for 15% of all nosocomial infections.[1] Post surgical infection leads to higher readmission, increased length of postoperative hospital stay which drastically escalate expenses and jeopardize health outcomes.[2] In majority of SSI cases, the pathogen source is the native flora of the patient's skin, mucous membranes, or hollow viscera.[3] Many factors influence surgical site wound infection which broadly comprises of factor relating to surgery, patient and sterilization techniques. Among them, duration of surgery, tissue handling and level of bacterial burden are important and most significant risk factors. Fewer bacteria are required to produce an infection in the presence of necrotic tissue, foreign bodies, hematomas, seromas and poor tissue perfusion.[4,5] There is also a considerable variation in infection rate according to the type of surgery performed, surgical technique, skin preparation and timings of wound closure.[4] Antibiotic prophylaxis has also a positive impact after certain types of surgical procedures. Many other factors have also been identified as having an effect on the potential for infection. Healthcare professionals should consider these before, during and after surgery. The modern surgical techniques and the use of prophylactic antibiotics have reduced the risk of surgical site infection significantly .[6,7,8]

The classification for operative wounds (clean, clean-contaminated, contaminated and dirty) based on the degree of microbial contamination which was developed by the US National Research Council group in 1964 is still used.[1] The simplicity of this system of classification has resulted in it being widely used to predict the rate of infection after surgery and help to reduce the prevalence of SSI. In past, before the routine use of prophylactic antibiotics infection rate was 1-2% for clean, 6-9% for clean-contaminated, 13-20% for contaminated and about 40% for dirty woundsl.[1,8] Since the introduction of routine prophylactic antibiotics, infection rates in all wounds and especially in clean contaminated and contaminated groups have reduced drastically.[1,7,8]

Prophylactic antibiotics are used according to type of surgical wound and hospital antibiotic protocols. The hospital antibiotic protocol is usually developed and reviewed regularly according to the native flora, present trends in microorganisms causing wound infection and their sensitivity pattern. Literature review shows extensive work on Surgical Site Infection (SSI) or nosocomial infections suggesting responsible factors, guidelines to minimize infection rate and antibiotic protocols. This topic has been widely studied and discussed extensively in literature and there is a consensus that the use of prophylactic antibiotics has significantly reduced the incidence of surgical wound infection.[1,2,6,7,8] Now majority of health institutions all over the world follow the almost same wound classification and guidelines for the use of prophylactic antibiotics before surgery. In spite of the use of prophylactic antibiotics, SSI are still a real risk of surgery and represent a substantial burden of disease for both patients and healthcare services in terms of morbidity, mortality and economic cost. Changes in definition have focused attention on infection of the surgical incision, and factors associated with SSIs are now being studied with a view to limiting the risk of infection. In our country, majority of hospitals have no hospital based antibiotic protocols. There is lack of regular institutional audits showing present trend in micro-organisms responsible for surgical site infection or other nosocomial infection and their sensitivity pattern. There is a dire need to conduct institutional based regular audits or studies to see the pattern of micro-organism and their sensitivity responsible for wound infections. In the light of these audits or study data, the hospital should develop its own guidelines and antibiotic protocols. To minimize the incidence of SSI, instead of conducting repeated studies on the role of prophylactic antibiotics in SSI, having almost no new contribution to the field, there is a need to work for the hospital based guidelines and antibiotic protocols.

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CORRIGENDUM

In an original article titled **"Effects of Active Self Propelled Wheel Chairs versus Regular Standard Wheel Chairs on Quality of Life in Paraplegic Population"** published in JIIMC Vol 9, No. 2, July 2014 the sequence of the names of authors was written as Syed Shakil-ur-Rehman, Ikram Ali, Asghar Khan, Fozia Sibtain. The correct sequence is as follows: 1) Ikram Ali 2) Asghar Khan 3) Syed Shakil-ur-Rehman 4) Fozia Sibtain.