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From the Editor



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The level and the quality of papers in the journal has improved greatly. In addition we are receiving contributions from most countries in the region and from all over the world. In this issue the papers deal with various topics from mental health to HIV infection to surgical management.

An intervention study was carried out in Saudi Arabia to measure the effect of mental health training program on the ability of PHC physicians to detect and manage mental illnesses. The authors structured a course which ran over 4 days. A follow up was arranged to see the effect of training. The authors noted that a shorter-term mental health-training program didn't enable PHC physicians to detect minor mental health problems. Therefore they recommend an advanced and long-term mental health-training course focusing on the practical application of identifying mental illness among PHC patients.

A paper from Kuwait reported on local experience in the surgical management of post carbuncle soft tissue defect in diabetic patients. The author analyzed results of the treatment of 27 patients with a carbuncle of various locations. It was shown that both skin grafts and local flaps are good alternatives in the coverage of such defects. However skin flaps provide better cosmetic appearance than skin grafts.

A paper from Iraq looked at the impact of therapeutic doses of paracetamol on serum total antioxidant capacity (TAC) and malodialdehyde (MDA) levels were studied in asthmatic patients. A total of 43 asthmatic patients were enrolled in the study. Acetaminophen usage led to a significant reduction in FEV1 in asthmatic patients more than in the control group and asthmatic patients not receiving acetaminophen. The authors concluded, that acetaminophen usage leads to reduction in serum TAC and increase in lipid peroxidation and consequently this oxidative stress contributes to asthma progression and decrease in lung function. N-acetylcystine administration may restore these changes.

A review paper from Canada reports on the pre-participation evaluation of the athlete. The authors presented a synthesized pre-participation evaluation that identifies medical conditions that may limit participation, predispose to injury or illness, evaluate risky behaviors, counsel on health-related issues, and ideally evaluate fitness level and performance.

Towards Quality and Accreditation in Health Professions Education in Iraq - Accreditation in Health Professions Education

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Abstract

The health professions in Iraq in general include physicians, dentists, pharmacists, nurses and lab technicians. The documents prevail that the already existing health system is based on curative side and shifted toward hospital orientation. The total number of health centers in Iraq according to the latest reports prevail the presence of 1285 health centers among which only 50% have a health professional. There are 20 colleges of medicine in Iraq, seven colleges of nursing, 10 colleges of dentistry and 8 colleges of pharmacy in addition to 6 technical colleges and 20 colleges of sciences which take the responsibility for supporting health care services and delivery. We are in great need to reform our health professional education through following the global standards toward unity of agreed standards. Tikrit college of medicine has followed since 1987, competency based education programs/problem based learning. This paper provides a comparison to evaluate Iraq's experience against global standards. The WFME recommends the following set of global standards in basic medical education. The standards are structured according to 9 areas with a total of 36 sub-areas. The TUCOM (Tikrit University College of Medicine) was established many years before the production of the WFME standards (1988). Nevertheless, it is a valuable exercise to compare and evaluate the college's performance against these global benchmarks.

1. Mission and Objectives

1.1 STATEMENTS OF MISSION AND OBJECTIVES

In the self-study of TUCOM the statement of mission was not adequately addressed. Looking into the main curriculum document, it appears that a statement of mission does exist however; however the self-study has ignored it. As for the institutional objectives TUCOM has 5 clearly stated objectives, addressing 5 main issues. These are:

- Role of the college in improving the health of the targeted population,
- Preparation of competent and responsive graduates to manage individual, family, and community health problems
- Adoption of educational program focusing on priority and primary health care
- Adoption of life-long learning and assessment strategies.
- Focusing on population health

The self-study concentrated only on the educational objectives and ignored other institutional objectives like role in research, providing services, social accountability and contributing to professional development. Aldabbagh (2003)

Suggestion: the ignored areas should be revisited and well addressed

1.2 PARTICIPATION IN FORMULATION OF MISSION AND OBJECTIVES

The self-study mentioned the participation of a few stakeholders who participated in the formulation of mission and objectives. These included university authorities, international organizations and staff from the Ministry of Health. However, the study ignored the contribution of important stakeholders like: community leaders, students and professional organizations.

Suggestion: As part of a routine periodic revision all stakeholders are to be approached and actively involved

1.3 ACADEMIC AUTONOMY

Medical education in Iraq is totally run under the patronage of the ministry of higher education and scientific research. The medical school is almost totally funded by two types of governmental budgets; a yearly regular budget and a project-based developmental budget. Both budgets are granted according to a request from the college based on real needs and future projection. All academic departments and centers participate in such an exercise based on the requirement of implementing the curriculum. Once the budget is granted the college authority is autonomous in distributing and spending the allocations according to priorities. However such an arrangement depends on the financial status of the government revenues and budgets could vary accordingly. In recent years, TUCOM as well as all other medical schools in Iraq started to compete in attracting foreign students to be enrolled against paying tuition fees in hard currencies. The greater part of such income is used by the college for developmental purposes. (TUCOM curriculum document)

Suggestion: Accordingly TUCOM should make the best of its innovative educational program to attract more funds.

1.4 EDUCATIONAL OUTCOME

The competencies at graduation are clearly defined in the TUCOM curriculum document. The level of performance of these competencies at graduation are closely related to the job description for the two years foundation residency program that each graduate should pass before being allowed to start any kind of practice and postgraduate training. It is also unique to note that the competencies include all those required by a general practitioner with emphases on primary health care and family medicine in addition to all other clinical disciplines. **Suggestion:** In future revisions of educational program, the graduates' competencies should be revisited to align with the new development in professional practice and health system development including postgraduate training schemes.

2. Educational Programme

2.1 CURRICULUM MODELS AND INSTRUCTIONAL METHODS

TUCOM is the first medical school in Iraq to introduce problem-based learning curriculum and still the only one among the 19 operating medical schools at the present time. The curriculum document clearly defines and describes the learning strategies based on the following characteristics (TUCOM document)

- Community oriented program responding to priority health needs.
- Full integration of subjects and disciplines at both horizontal and vertical levels
- Students-centered learning
- Curriculum is divided into 3 phases : healthy life, pathogenesis and clinical and primary care clerkship
- Organ-system modules.
- Self-learning strategies and assignments.
- Competency-based students' assessment.
- Community-based training in and outside college campus.

Suggestion: In future revisions the problem-based learning methodologies should be modernized to match the new developments in learning strategies including the case presentation curriculum (CPC) with the use of clinical flow charts and scripts. Meanwhile, new advances in e-learning should also be considered

2.2 SCIENTIFIC METHOD

The program adopted by TUCOM is based on analysis of common problems. Also the six years program contains a curricular research project assignment in 4 years (years 2-5) where groups of student learn by doing scientific thinking and research methodology that usually has each project ending in producing a scientific, publishable article.

Suggestion: An in-depth evaluation of the program is needed to identify strengths and weaknesses.

2.3 BASIC BIOMEDICAL SCIENCES

The first 3 years of the program are devoted to address basic medical sciences in integrated modules, based on health problems. It is usually claimed by opponents of the PBL program that graduates of such program are somehow deficient in basic knowledge. However several research studies showed that PBL graduates are better in applying knowledge in their professional practice.

Suggestion: Further studies are needed to examine this issue

2.4 BEHAVIOURAL AND SOCIAL SCIENCES AND MEDICAL ETHICS

The curriculum document does not show clearly separate modules on behavioral sciences. It is apparent that such elements are deeply embedded within the whole curriculum. For example the weekly student self-evaluation and group peer evaluation are based on behavioral performance of students. Such exercise provides students with actual practicing of behavioral and ethical issues.

Suggestion: A comprehensive analysis of the curriculum is

needed to identify the behavioural and ethical practices experienced by the students during their 6 years of the study and to add what would be seen as missing elements.

2.5 CLINICAL SCIENCES AND SKILLS

The students are given the opportunity to get in contact with the community including patients as early as the first week of the program. In addition all training in hospitals, primary health care centers and community setting is done from a systematic and pre determined list with clear students' objectives and tasks. However, many of the clinical teachers go beyond the schedule training to concentrate on their personal interests.

Suggestion: Strict supervision and monitoring of students training outside teaching facilities under the control of the college is needed to ensure systematic training with full use of standard operation procedures (SOPs) and checklists.

2.6 CURRICULUM STRUCTURE, COMPOSITION AND DURATION

The six year curriculum follows the natural history of health and disease. It starts with promotive and protective health and passes through the stage of early detection of disease and the history of pathogenesis to prepare the student for the interventional stage of diagnosing, managing and rehabilitating individuals, families and communities. During all these stages special emphasis is made on community priority health problems and targeting the state of population wellbeing.

Suggestion: As population health is dynamic by its nature, new challenges are to be periodically followed up and to be incorporated into the curriculum on regular bases.

2.7 PROGRAMME MANAGEMENT

In TUCOM the curriculum committee and its structural curriculum unit is headed by the dean. In addition to secretary and administrative staff, the committee is composed of members representing different academic departments and the coordinators of each year. The committee is responsible for managing all the learning and student assessment activities. Departments are only responsible for teaching and training of students according to the schedules and time-tables organized and supervised by the curriculum committee.

Suggestion: Continuous evaluation of the work of the committee is needed to ensure efficiency and effectiveness.

3. Assessment of Students

3.1 ASSESSMENT METHODS

Students' learning outcome is to be measured using two strategies. Formative assessment is used for feedback and continuous development. Students are verbally fed-back at the end of every week during the face-to-face peer and tutor evaluation at the end of each problem. At the same interval, each student reports on the week's learning achievement. The report is reviewed by tutor and written feedback is provided and discussed if necessary. The second strategy is the summative method for scoring, passing and ranking.

First, Continuous assessment (10%): This assessment takes place during almost all learning activities in the form of quizzes,

peer evaluation (negative marking only), reporting, attitude, tasks during field, practical and clinical sessions.

Secondly, End-of-Block Assessment: At the end of each block, there is one integrated MCQ paper (10%) and a 10-15 stationed OSCE (10%).

Final Assessment at the end of the year, a grand block/subject is assessed through assessing two blocks together using an integrated single paper of MCQ (20%) and an integrated OSCE (20%). So, final marks for each subject are calculated as Continuous Assessment in 2 blocks (10% \times 2) + End -of-Block Assessment (20% \times 2) + Final Assessment (40%) = 100%. The criteria for passing any part of the assessment is to score at least 50%. All assessments are organized and conducted by the curriculum committee and in collaboration with the concerned department. Accordingly the test questions are evaluated before and after the test and students are given a feedback.(TUCOM curriculum document)

Suggestion: New technologies should be looked for to enhance and ensure validity, reliability and objectivity of the test.

3.2 RELATIONSHIP BETWEEN ASSESSMENT AND LEARNING

The aim of assessment is to be always based on the educational objectives. Teachers and trainers are asked to submit several questions and training tests based on the specific objectives they followed during teaching and training. The curriculum committee will evaluate the material submitted and choose the final sets to be administered for the students' assessments. All tests, theoretical and practical, are based on sets of integrated subjects. However, during the last few years several teachers in different departments started to administer subject based quizzes and mini-tests.

Suggestion: Strengthening of the integrated assessment is of a high priority to maintain and ensure a close relationship between assessment and learning objectives.

4. Students

4.1 ADMISSION POLICY AND SELECTION

The policy for admission to higher education institutes is uniform for all institutes in Iraq. This policy is based on competitive application for enrollment in different colleges based on demand and number of seats. The major criteria are the academic scoring in the secondary school final examination after 12 years schooling. However, enrollment in medical schools in particular is conditioned on passing a special interview selection by a special committee headed by the dean to ensure characteristics other than the academic record. The role of this exercise is unfortunately a limited one.

Suggestion: New and decisive role should be given to the interview plus introduction of new psychological and social tests.

4.2 STUDENT INTAKE

Students' intake is decided annually by the ministry of higher education and scientific research and is tied to the national need, as submitted by the ministry of health. In general terms, not all capacities at the college are seriously considered. The college is usually consulted on the already decided number of

the student intake and an approximate number is compromised between the different colleges so that the total national number of intake is made.

Suggestion: Exact number of intake in the college is to be determined and maintained, according to the real capacity and size of teaching and training opportunities available.

4.3 STUDENT SUPPORT AND COUNSELLING

Limited support and counseling is available as part of a national policy. Some support is provided in respect of housing, transport and cafeteria services. Social and psychological counseling is unavailable.

Suggestion: This important aspect of support to the students should be seriously considered. Also, financial support and grants should be extended to cover students with distinction as was done prior to 2003.

4.4 STUDENT REPRESENTATION

In TUCOM the student union is active in several ways. Each year the central committee is formed of two representatives from each year, freely elected by all students. One representative of students is present as a member in the college council and one in each department council. In addition the student union establishes each year several committees in different activities in arts, athletics, poetry, literature and other non-curricular activities.

Suggestion: Such activities need to be supported financially, logistically, and morally.

5. Academic Staff/Faculty

5.1 RECRUITMENT POLICY

A central policy exists at the national level. However, eligible staff can choose to submit their application to each medical college and will be considered according to their qualification and experience. Each application will be considered by the college according to the vacancies available and approval of university and ministry of higher education authority.

Suggestion: Provided that scientific criteria is met, the college should have a policy to be given the right and authority, to recruit the needed staff and decide the appropriate salary and motivation without submitting the application for approval by the university and the ministry.

5.2 STAFF POLICY AND DEVELOPMENT

As part of career development, each member of staff should pass a course in principles of medical education during the first two years of service. In order to be promoted to the title of professorship, staff members should pass through three stages of promotion with certain criteria to be met, including teaching, research and service, with annual appraisal.

Suggestion: Because of the shortage of qualified candidates willing to work in the medical college, the ratio of teachers to students varies from one department to another. Salary scale and motivations should be reconsidered to encourage qualified people to work in different departments of the college. Also incentives should be given to encourage attracting qualified staff from the ministry of health to train medical students.

6. Educational Resources

6.1 PHYSICAL FACILITIES

The learning, training and teaching activities are conducted in two places:

1. Inside college campus, includes:
 - Lecture halls, small group face to face discussion rooms.
 - Practical laboratories.
 - Skills laboratories.
 - Computer laboratories.
 - Computer-Assisted Interactive Learning Laboratory.
 - Audio-Visual laboratory.
 - Library.
 - Teacher-Student contact.
2. Outside college campus and includes: Tikrit teaching hospital, primary health care centers and other community settings.

Suggestion: The learning environment for the students should be improved by regular updating and extension of the facilities to match developments in educational practices.

6.2 CLINICAL TRAINING RESOURCES

Basic standard:

The medical school must ensure adequate clinical experience and the necessary resources, including sufficient patients and clinical training facilities.

- 420-bed Tikrit General Teaching Hospital belonging to Ministry of Health.
- Primary Health Care Centers in Tikrit City (3 in number) and in Tikrit suburbs and rural surroundings (4 in number)
- Community settings including both urban and rural housing.
- Other settings including schools, factories, farms and clubs.

Suggestion: Students should be provided with support to get training outside Tikrit, for example in Baghdad specialized hospitals.

6.3 INFORMATION TECHNOLOGY

The computer interactive lab provides excellent opportunities for students and staff to use simulated training programs and internet connection.

Suggestion: To update and to increase the number and improve the quality of the information technology facilities at regular periodic bases.

6.4 RESEARCH

TUCOM is the only medical school in Iraq that adopts a curricular research program extending over four years (years 2,3,4,5). Groups of students plan, choose topics, implement, data collect and analyze, discuss and write a publishable field interventional research. Each year this curricular research is presented by the students in front of an examining committee with a continuous appraisal and scoring by a faculty staff supervisor. The resulting overall score system has a pass or fail mark for each student.

Suggestion: Continuous monitoring and evaluation of all projects by the supervising committee is needed.

6.5 EDUCATIONAL EXPERTISE

The college employs an educationalist who acts as a member and adviser to the medical education unit in the college. The unit plans, implements and evaluates the medical education activities. These activities include a weekly journal club on medical education, staff development workshops (at least one a year) and publication of research on medical education.

Suggestion: Activities and publications related to medical education need to be more encouraged and motivated. Research in medical education should be treated in a similar way to scientific and clinical research in the process of promotion.

7. Programme Evaluation

7.1 MECHANISMS FOR PROGRAMME EVALUATION

The curriculum includes a strategy to evaluate the programme through the following activities (internal and external):

1. End-of-block evaluation where the Block Committee meets and evaluates the performance and reports back to the Educational Development Committee chaired by the dean.
2. Tutors report back evaluation remarks to the Block Committee at the end of each week.
3. The College Council discusses educational events with evaluations under a fixed item of agenda.
4. Year Committee evaluates problems and performance at the end of each year and feedback to the Educational Development Committee.
5. External evaluation by invited experts from outside the college. The college, for example, was visited several times by the late Professor Jacobus Greep (Maastricht), Late Professor Zohair Nooman (Suez Canal), Professor Othman K. Othman (Gezira), Professor Wagdi Talaat and others.
6. The college organizes workshops for evaluation and performance improvement.
7. The staff are encouraged to conduct research to evaluate educational process and outcomes for publication in journals and in a special serial document every 5 years entitled "Programme Evaluation Studies" (TUCOM, 2000).
8. The Educational Development Committee regularly conducts studies to evaluate graduates (Alsheikh et al 1999). (TUCOM.) (2000)

Suggestion: Program evaluation should always and periodically, be revisited and generated to ensure new blood in the life of the college

7.2 TEACHER AND STUDENT FEEDBACK

Teacher annual appraisal is done in two ways; firstly through the supervisor and secondly through students. Feedback from both is given to the teacher on the one hand and to the medical education unit and college council on the other hand.

Suggestion: Expansion of the process of feedback needs to be elaborated

7.3 STUDENT PERFORMANCE

Student performance is poorly dealt with.

Suggestion: This is a very important subject that needs attention as it leads to significant results

7.4 INVOLVEMENT OF STAKEHOLDERS

This is poorly dealt with as program evaluation is only sent to the university and the ministry of higher education.

Suggestion: To be seriously revisited.

8. Governance and Administration

8.1 GOVERNANCE

The governance of the college is well documented by law and roles

8.2 ACADEMIC LEADERSHIP

The dean leads the college activities and chairs the medical education committee and unit and college council with clear authority, delegation and job description of heads of departments and members of committees.

8.3 EDUCATIONAL BUDGET AND RESOURCE ALLOCATION

The total budget of the college is allocated according to uniform chapters including clear parts devoted for education.

8.4 ADMINISTRATIVE STAFF AND MANAGEMENT

The college is regarded by law as an independent administrative entity headed by the dean and other senior managers. The educational process is at the top of the college priorities.

Suggestion: The administrative staff should be motivated and link to educational achievements.

8.5 INTERACTION WITH HEALTH SECTOR

This is a very important aspect. TUCOM is very closely related to ministry of health for example:

- Dean is member of the national health planning board chaired by the minister of health
- Chief medical officer of the governorate is a vice chairman of the college council
- Dean is vice chairman of the governorate board of health care facilities
- Dean is chairman of the governorate board of continuing professional development (CPD).
- All training of students takes place in health facilities belonging to the ministry of health.

9. Continuous Renewal

The college performs a comprehensive program evaluation every five years. Both external and internal experts participate in this exercise. A special document is produced on such occasion. In addition, the ministry of higher education conducts an annual performance evaluation for the college covering inputs, process, and outputs. According to the result of this annual appraisal all colleges of higher education are ranked according to specialty and the first three colleges in each profession is declared and awarded a certificate of excellence.

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Effect of Acetaminophen and N-Acetylcystine on biochemical markers in asthma

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Abstract

Concurrent with the use of acetaminophen, a large increase in asthma, particularly in the pediatric population, has been reported. The impact of therapeutic doses of paracetamol on serum total antioxidant capacity (TAC) and malodialdehyde (MDA) levels were studied in asthmatic patients. A total of 43 asthmatic patients were enrolled in the study; 24 of them were afebrile and not receiving acetaminophen, and 19 were febrile and received acetaminophen 3 gm / day from 0 – 7 days and 3 gm / day on 10th and 14th days. TAC serum mean was significantly lower in asthmatic patients receiving acetaminophen than that in asthmatics not receiving the drug and the control group. In contrast, MDA mean serum level was significantly higher in the asthma group receiving acetaminophen than that in asthmatic patients not receiving the drug and the control group. Acetaminophen usage led to a significant reduction in FEV1 in asthmatic patients more than in the control group and asthmatic patients not receiving acetaminophen. The above antioxidant activity of acetaminophen was corrected following administration of N acetylcystine. In conclusion, acetaminophen usage leads to a reduction in serum TAC and an increase in lipid peroxidation and consequently this oxidative stress contributes to asthma progression and decrease in lung function. N-acetylcystine administration may restore these changes.

Introduction

The prevalence of asthma in the United States has risen by 75% in the last 3 decades, with a particularly marked increase in children < 5 years of age (160%). [1] The reason for the surge in prevalence is unclear. A number of hypotheses have been proposed, including increased environmental exposures to “synthetic” materials and indoor allergens, decreased exposure to bacteria and childhood illnesses (the “hygiene” hypothesis), the increasing prevalence of obesity, changes in diet and antioxidant intake, increased exposure to cockroaches, changing meteorological patterns, and decreased use of aspirin [2-8]. In addition, cytokine imbalance or dysregulation occurring as a result of environmental exposures during infancy and early childhood is hypothesized to induce lifelong T-helper type 2 (allergic) dominance over T-helper type 1 (nonallergic) responses. T-helper type 2 dominance increases the risk for atopic diseases, including asthma. While most studies have focused on the effects of these factors after birth, some have suggested sensitization in utero [6,7,9].

A link between acetaminophen and bronchoconstriction was originally suggested in a case report of an aspirin-intolerant patient as early as 1967 by Chafee and Settupane [10]. Recently, with the rise in asthma prevalence, there has been renewed interest in the role of acetaminophen [11]. Concurrent with the use of acetaminophen, a large increase in asthma, particularly in the pediatric population, has been reported [11].

Various epidemiologic and quasi experimental studies have suggested a link between both therapeutic and overdose ingestion of acetaminophen and bronchoconstriction in certain individuals. Across European countries, asthma rates ecologically associated with acetaminophen use [12], have also been seen at the individual level. In a large population-based, case-control

study [13] of young adults, daily and weekly use of acetaminophen was strongly associated with asthma. The relationship was much stronger for severe asthma. Aspirin avoidance did not appear to account for the positive results, as the association was found in those taking only acetaminophen as well as in those taking both analgesics.

A report found that increased frequency of acetaminophen use in 1990 to 1992 was associated with a subsequent risk of physician diagnosis of new-onset asthma diagnosed between 1990 and 1996 [14]. The risk of wheezing was increased twofold in 30-to 42-month-old children whose mothers frequently used acetaminophen prenatally during weeks 20 to 39 of gestation [15].

N-acetylcystine (NAC), a precursor of reduced glutathione (GSH), has been in clinical use for more than 30 years, primarily as mucolytic. In addition to its mucolytic action, NAC is being studied and utilized in conditions characterized by decreased GSH or oxidative stress [16]. Because of its hepato-protective activity, intravenous and oral administration of NAC have been used extensively in the management of acetaminophen poisoning [17].

NAC exhibits direct and indirect antioxidant properties. Its free thiol group is capable of interacting with the electrophilic groups of ROS [18].

NAC reduced H₂O₂-induced damage to epithelial cells in vitro [271] and NF-κB activation in some cells [19]. In addition to its effects on PMNs, NAC also influences the morphology and markers of oxidative stress in red blood cells (RBCs) [20]. Treatment with NAC may alter lung oxidant/antioxidant imbalance and reduced O₂– production by alveolar macrophages and decreased BALF PMN chemiluminescence in vitro [21]. Treatment with NAC resulted in a considerable reduction in elastase

activity, in both the bronchoalveolar cavity and plasma, related to its property of scavenging HOCl [18].

Bleas et al [22] reported that Oral NAC exerts an antioxidant protective effect and attenuates pulmonary inflammation induced by antigen exposure in experimental asthma. In addition, oxidative stress stimulates mucin synthesis in airways, a process that is inhibited by NAC [23]. It has been reported that oral NAC reduces BHR to 5-hydroxytryptamine and the augmented eosinophil numbers elicited by allergen exposure in actively sensitized rats [22].

Enhancement of antioxidant defense mechanisms, therefore, seems a rational therapeutic option. Antioxidant therapy, including NAC, has been reported to be useful in the treatment of acute lung injury [24]. Understanding of the key elements of the redox control mechanism of IL-1B induced eotaxin and MCP-1 expression and production by HASMC, may indicate a new strategy in controlling airway inflammation [20,25]. Bleas et al [22] study provides some in vitro evidence that NAC, an antioxidant agent that has been used for many years as mucolytic drug, could also be useful in the treatment of more chronic inflammatory diseases such as asthma. It is not known, at the present time, whether NAC is capable of producing a beneficial effect in controlling the airways inflammation in-vivo. However, if NAC, a relatively harmless molecule, is able to exert an anti-inflammatory effect, this can be used in combination with existing, potent, but potentially more harmful, drugs. This hypothesis, however, needs further investigation [26]. Oxidative stress may increase the risk of asthma, contribute to asthma progression and decrease lung function. Previous research suggests that use of acetaminophen, which hypothesized to reduce antioxidant capacity in the lung, is associated with an increased risk of asthma. The above research outcome measures were epidemiological and clinical parameters. The purpose of this study was to evaluate the effect of acetaminophen on serum total antioxidant capacity and lipid peroxidation and the protective effect of N-acetylcysteine in asthma. The study was approved by the ethics committee of our college, and written consent was obtained from all participating subjects.

Materials and Methods

Study Population:

The impact of therapeutic doses of paracetamol (BP 500 mg tablet, SDI, Samara) on serum total antioxidant capacity and malodialdehyde levels, were studied in asthmatic patients. A total of 43 asthmatic patients were enrolled in the study; 24 of them were afebrile and not receiving acetaminophen, and 19 were febrile and received acetaminophen 3 gm/ day from 0 - 7 days and 3 gm / day on 10th and 14th days. Venous blood samples collected from all patients in the two groups on day 15th of their enrollment in the study. Serum TAC and MDA were determined and compared between the two groups and to healthy control findings. N acetylcysteine (BP 600 mg tablet Azupharma, GmbH, Germany), a drug with antioxidant properties, was investigated for its beneficial therapeutic effects in preventing oxidative stress induced by acetaminophen in asthma. Thus the drug was given in a dose of 600 mg twice daily for 4 weeks to the above two groups and at the end of treatment course serum collected for determination of TAC and MDA.

The subjects included in the study were outpatients from the Asthma and Allergy Centre or Samara General Hospital outpatients Clinic. The diagnosis of asthma was performed by specialist physician and was established according to the National Heart Blood and Lung Institute / World Health Organization (NHLBI/WHO) workshop on the Global Strategy for Asthma [27]. Patients were excluded if they were smokers, if they had respiratory infection within the month preceding the study, a rheumatological illness, malignancy, diabetic, heart failure, history of venous embolisms, coronary heart disease and liver or kidney disease.

At enrollment, they all underwent full clinical examination, pulmonary function test, and blood sampling. Normal volunteers were also enrolled in the study as a healthy control. None of them had any previous history of lung or allergic disease and were not using any medication. They had a normal lung function test (FEV1 > 80%) and negative skin allergy test. General stool examination was performed for all patients and control to exclude parasitic infections. The sampling was performed during the period from May 2004 to December 2005. All samples were collected at morning following overnight fasting. The study was approved by the ethics committee of our college and written consent was obtained from all participating subjects.

Determination of Total Antioxidant Capacity (TAC):

The method for serum TAC determination was as previously described by Kampa M et al [28]. In brief, in each tube 400 µl of crocin and 200 µl of serum sample were pipetted. The reaction was initiated with the addition of 400 µl of prewarmed (370C) ABAP (5 mg/ml), and crocin bleaching was made by incubating the plate in an oven for 60 – 75 minutes. Blanks consist of crocin, serum samples and phosphate buffer (400, 200, 400 µl respectively) were run in parallel. The absorbance was measured at 450 nm. A standard curve of the water soluble synthetic antioxidant Trolox, prepared prior to use, ranging from 0 – 10 µg/ml was equally assayed under the same conditions.

Determination of Malodialdehyde:

As the index of lipid peroxidation, serum MDA concentration was determined by measuring the thiobarbituric acid reactive substances (TBARS) according to the spectrophotometric method of Janero [29]. The TBARS was determined using OXITEK TBARS Assay kit from Zeptomatrix Company.

A 100 ul of sodium doedecyl sulfate was added to the tubes that contain either serum sample or standard and mixed thoroughly. Then 2.5 ml of thiobarbituric acid/ buffer reagent was added down the side of each tube. The tube was covered and incubated at 95 o C for 60 minutes. The tube was then removed and cooled to room temperature in an ice bath for 10 minutes. After cooling the samples centrifuged at 3000 rpm for 15 minutes. The supernatant was removed from samples for analysis. The absorbance of supernatant was measured at 532 nm. Determination of MDA equivalent in µmol/ l in samples was by interpretation from standard curve.

Lung Function Test:

Computerised spirometer (Autosphiror, Discom-14, Chest Corporation, Japan) was used for measurement of FEV1 of the patients at their enrollment in the study and when indicated according to study design.

Statistical Analysis:

The values are reported as mean \pm SD and 95% confidence interval. For statistical analysis between groups paired t test was used. Pearson test was used for correlation analysis. The levels of each marker were compared between the study groups and control group, using SPSS computer package. P values of < 0.05 were considered significant.

Results

TAC serum mean was significantly lower in asthmatic patients receiving acetaminophen ($623 \pm 216 \mu\text{mol/l}$) than that in asthmatics not receiving the drug ($876 \pm 253 \mu\text{mol/l}$; $P < 0.005$) and control group ($1074 \pm 207 \mu\text{mol/l}$; $P < 0.0001$) (Table.1). MDA mean serum level was significantly higher in the asthma group receiving acetaminophen ($7.23 \pm 2.82 \mu\text{mol/l}$) than that in asthmatic patients not receiving the drug ($4.39 \pm 1.84 \mu\text{mol/l}$; $P < 0.005$) and control group ($2.24 \pm 0.26 \mu\text{mol/l}$; $P < 0.0001$). Acetaminophen usage led to a significant reduction in FEV1 in asthmatic patients (82 ± 6) more than in control group (101 ± 5 ; $P < 0.005$) and asthmatic patients not receiving acetaminophen (96 ± 4 ; $P < 0.0001$). (Table.1)

Thus acetaminophen usage leads to reduction in serum TAC and increase in lipid peroxidation and consequently this oxidative stress contributes to asthma progression and decrease in lung function. The oxidation index was 11.61 in asthmatic patients receiving acetaminophen and this was double that in asthmatic patients not receiving the drug (5) and about 6 times that of control group.

The chronic ingestion of therapeutic doses of acetaminophen depletes serum antioxidant capacity in asthmatic patients as this study indicated. NAC has antioxidant properties and was used effectively for treatment of acetaminophen poisoning. Thus in this study we investigated a possible beneficial effect of NAC when combined with acetaminophen in asthmatic patients. The drug was given in a dose of 600 mg twice daily for the previous two asthmatic groups for 4 weeks and after that TAC and MDA were measured (Table.2). The results indicated that NAC led to a significant increase in TAC ($P < 0.05$) following the treatment course in asthmatic patients not receiving acetaminophen ($986 \pm 118 \mu\text{mol/l}$). However, the increase in TAC serum levels was with higher significance ($P < 0.025$) in asthmatic patients group receiving combined acetaminophen and NAC ($804 \pm 294 \mu\text{mol/l}$).

MDA serum levels decreased significantly ($P < 0.0005$) in asthmatic groups receiving acetaminophen and NAC ($4.62 \pm 1.14 \mu\text{mol/l}$). However the use of NAC by asthmatic patients not receiving acetaminophen led to decrease of serum MDA, but with lower significance ($P < 0.05$). Another interesting finding in this study was that NAC led to significant increase in FEV1 ($P < 0.0001$) in asthmatic patients receiving acetaminophen combined

with NAC. Oxidative index reduced to half (5.75) following treatment with NAC in the acetaminophen receiving group. However, NAC improved significantly FEV1 ($P < 0.001$) in asthmatic patients not receiving acetaminophen. Thus NAC administration to asthmatic patients effectively restores serum TAC and MDA to nearly normal levels. Therefore we suggest

the use of combined therapy of acetaminophen and NAC to reduce the impact of acetaminophen on antioxidant defense in asthmatic patients.

Discussion

Asthma prevalence has increased dramatically since the 1970s and currently affects 5-8% of the population [1]. Concurrent increases in asthma related to hospitalization and mortality suggest that the change in asthma prevalence did not result from greater diagnosis and detection alone [27], although, asthma related hospitalization and mortality appear to have declined since 1995 with the more widespread use of inhaled corticosteroids [30].

Various hypotheses have been proposed to explain the rise in asthma prevalence, including those relating to changes in early life antigen exposure [31] and to the obesity epidemic [32,33]. The rise in the prevalence and severity of asthma, however, also coincided with a large increase in the use of acetaminophen in the 1970s and 1980s [9].

This substitution of acetaminophen for aspirin was not evaluated in randomized trials [14]. By contrast, ibuprofen was recently compared with acetaminophen for pediatric febrile illness in a large randomized, double blind clinical trial [34]. Among the subgroup of 1879 children with asthma, asthma related outpatient visits were significantly lower in the ibuprofen arm, and asthma hospitalization was non significantly reduced compared with the acetaminophen [34]. The trial did not include a placebo control, therefore it is uncertain whether ibuprofen decreased or acetaminophen increased asthma morbidity. Alternatively, the finding may have been due to chance [35].

An increase in asthma risk related to acetaminophen use, was suggested by a population based case control study [13]. The study was limited, however, by the case control design in which the diagnosis of asthma preceded ascertainment of acetaminophen use [35]. Recently, analysis of data from prospective study, examined if acetaminophen use was associated with a new physician diagnosis of asthma among participants not previously diagnosed with asthma [35]. They reported that their findings confirm and extend the findings of prior cross sectional studies of asthma and acetaminophen use. In a cross countries trial in Europe, consumption of acetaminophen was ecologically associated with the prevalence of wheeze, diagnosed asthma and BHR [12]. In addition, to the ecological findings, a population based, case controlled study from UK showed a dose dependent relationship between acetaminophen use and asthma [13]. The association was much stronger for severe asthma. Aspirin use was equally common among cases and control subjects. Although, aspirin avoidance was slightly more common among cases than the control subjects, the magnitude of the difference in that study was not large enough to explain the association of acetaminophen and asthma. Acetaminophen use in late pregnancy was associated with an increased risk of wheeze among offspring [13,35].

A recently reported study [15] is another development in the story of how acetaminophen consumption may be a potential risk factor for developing asthma and atopy. The authors

demonstrated a positive association between acetaminophen use in late pregnancy and subsequent asthma, wheezing and elevated serum IgE antibodies in 6 year old children. The data are consistent and build upon earlier observation of the same cohort demonstrating that frequent use of acetaminophen in late pregnancy is associated with increased risk of wheeze in the offspring aged 3 years old [13].

Sheehan et al [15] adds to the existing literature on acetaminophen and asthma that has developed since the report of the same research group in 2000 [13]. Another study reported from the USA, which indicated that taking acetaminophen for more than 14 days per month, had a 60% greater risk of incident asthma than those who never used acetaminophen [35]. Recently, data from New Zealand again demonstrated that current use of acetaminophen was associated with two fold increase in the prevalence of wheeze in children aged 6-7 years, with a smaller increase in wheeze in children who received acetaminophen in the first year of their life [36].

Association between acetaminophen consumption and asthma in adults may result from aspirin avoidance, or from the use of acetaminophen for asthma symptoms or for symptoms arising from the use of asthma medications [36]. The advantages of Sheehan studies in which the association is between maternal consumption and infant or child symptoms is that these alternative explanations are likely to operate [36]. Maternal asthma or allergy may still confound the association, as it may be associated with both asthma in the child and preferential acetaminophen use [36]. However, in the most recent study, the relationship persists after adjustment for maternal asthma [15].

All the above mentioned studies that suggest a link between acetaminophen use and development of asthma are epidemiologic studies. To our knowledge, only one study reported [37] that determines the effect of regular intake of acetaminophen on serum antioxidant capacity in healthy volunteers. It reports that chronic ingestion of maximum therapeutic doses of acetaminophen depletes serum TAC in healthy volunteers in as few as 14 days. It shows a trend toward reduced TAC over time. Another study investigated the effect of acetaminophen use on glutathione and antioxidant status in febrile children receiving repeated supra therapeutic doses [38]. TAC of serum and erythrocyte glutathione concentration were reduced in the group receiving supra therapeutic acetaminophen doses.

In the present study the association between acetaminophen use in asthmatic patients and changes in their serum TAC and MDA as parameters of oxidative stress was evaluated. Serum TAC significantly lowers in asthmatic patients receiving acetaminophen than in asthmatics not receiving the drug and control subjects. In addition, MDA serum levels were significantly higher in the asthma group receiving the acetaminophen than in asthmatics not receiving the drug and the control group. FEV1 of asthmatic patients reduced significantly after treatment with acetaminophen and it was significantly lower than that for asthmatic patients group not receiving the drug and that of the control group.

The acetaminophen use in asthmatics as this study indicated, leads to a reduction in serum TAC and increase in lipid peroxidation

and consequently these oxidative stresses contribute to asthma progression and decrease in lung function. The oxidation index was two fold higher in the asthmatic group receiving the drug than in the asthmatic not receiving acetaminophen and about six times than that of the control group. Acetaminophen related bronchospasm has been reported for at least 39 years in a subset of patients with asthma [10]. Acetaminophen provokes bronchospasm in up to 35% of patients with stable, aspirin sensitive asthma [11,39,40]. Reactions generally are milder than seen after aspirin challenge and occur with a high, but clinically relevant, dose of acetaminophen. Acetaminophen related bronchospasm also has been demonstrated in some patients of no history of aspirin sensitive asthma. The mechanism for this phenomenon is unclear, but may involve glutathione [11]. Acetaminophen decreases the level of glutathione in the liver, kidneys and lungs [41,42]. These decreases are dose dependent. Overdose levels of acetaminophen are cytotoxic to pneumocyte and cause acute lung injury, whereas nontoxic, therapeutic doses produce smaller, but significant, reductions in glutathione levels in type II pneumocytes and alveolar macrophages [43].

Oxidative stress in asthma occurs from the production of ROS in the lung by inflammatory cells. ROS causes contraction of airway smooth muscle and release of leukotrienes and other secondary inflammatory mediators, leading to BHR and bronchoconstriction [44]. The importance of glutathione pathway in asthma is reinforced by the finding that polymorphisms in glutathione - s- transferase are associated with increased susceptibility to pediatric asthma and with slowed lung function growth in childhood [45].

If the association between acetaminophen consumption and asthma is causal, then as well as identifying a new risk factor for asthma, the proposed mechanism of this biological effect provides further support for the hypothesis that an imbalance of oxidant / antioxidant equilibrium influences susceptibility to developing asthma, with glutathione metabolism [46] in particular appearing to have a pivotal role. It is hypothesized that the mechanism by which acetaminophen would increase the risk of asthma is through depletion of reduced glutathione leading to a decrease in pulmonary antioxidant defenses [14,15].

Evidence that administration of therapeutic doses of acetaminophen can influence oxidative status is available with the finding of this study and the recent reports of a decrease in TAC [37], and if this effect is replicated in the lungs then it is likely that they would be more susceptible to oxidative insults [47]. As the purpose of the lungs is to permit transfer of gases including oxygen, they are exposed to higher concentrations of oxygen than other tissues, and hence are more at risk of oxidant induced injury and thus require antioxidant defenses to prevent permanent tissue damage [47]. The data from the present study and Shaheen et al [15] contribute to the hypothesis that oxidant / antioxidant equilibrium is important with regard to asthma, a concept that has developed over the past 20 years. The extent to which a high oxidant load is causally associated with asthma rather than being a secondary consequence of the inflammatory processes that accompany asthma remain unclear [47]. However, the data from the aforementioned perspective studies that exposure to a drug with pro - oxidant qualities such as acetaminophen increases the risk of subsequent asthma, are

supportive of the more general hypothesis that a greater oxidative burden has a causal role in the pathogenesis of asthma [47].

Host antioxidant defenses may also be modified by the environment and are also considered potentially important with regards to asthma [48]. Those with lower endogenous antioxidant capacity as assessed by dietary intake [49], or serum markers of dietary antioxidants [2] are more likely to have incident or prevalent asthma, although studies have been inconsistent. The more pertinent measurement of lung antioxidant status has proven to be difficult to measure, but the non invasive measurement such as the use of exhaled markers of pulmonary disease [50] have also demonstrated increased oxidative activity in those with asthma compared with those without. More invasive techniques such as BAL have demonstrated reduced levels of antioxidants such as vitamin C, vitamin E and urate, with higher concentrations of glutathione in those with asthma compared with those without the disease [51,52]. One interpretation of these observations is that the increased oxidative burden associated with asthma results in a reactive increase in the lung antioxidant capacity in the form of increased pulmonary glutathione [50], while subsequently depleting systemic antioxidant reserves as reflected in lower levels in the blood.

In vitro studies demonstrating that oxidative stress results in increased expression of the pro inflammatory transcription factors, nuclear factor KB and activator protein-1, provide one possible mechanism of how oxidative stress may promote an inflammatory condition such as asthma at cellular level [47].

As the concept that oxidant / antioxidant balance may influence the development of asthma becomes more established, the potential for prevention and therapeutic intervention needs to be established. These would aim to reduce the risk of developing asthma or modify the severity of the disease. As reported there was a link between frequent use of acetaminophen and asthma incidence and severity [15]. In addition, administration of the drug to normal individuals, led to reduction in TAC [37]. In febrile non-asthmatic children acetaminophen administration reduced TAC, GSH, SOD and increased aspartate aminotransferase activity significantly [38]. Although, the chronic ingestion of therapeutic dose of acetaminophen in asthmatic patients depletes serum TAC, as this study indicated.

N acetylcystine is an antioxidant drug commonly used in clinical practice [53], especially for the treatment of acetaminophen poisoning. On the basis of the above mentioned facts the time has come to evaluate the use of combination of NAC with acetaminophen in asthmatic patients. Thus their combination leads to a significant increased in serum TAC, accompanied with significant reduction in MDA serum levels. Also, the combination of both drugs cause significant improvement of FEV1 and reduction of oxidation index. Two possible antioxidant mechanisms have been proposed for this thiol containing antioxidant [53]. Firstly, NAC may have direct free radical scavenging properties. ROS may react with NAC resulting in the formation of NAC disulphide [18,40]. Secondly, and of more importance, NAC may also exert its antioxidant effects indirectly by facilitating GSH biosynthesis [21]. A reduction in the levels of various markers of inflammatory activity, such as

ECP, lactoferrin and antitrypsin was found after administration of NAC [54]. Treatment with NAC resulted in a considerable reduction in elastase activity, in both the BAL fluid and plasma, related to its property of scavenging HOCl [18].

Oral administration of NAC before antigen exposure of a sensitized rat, a widely used experimental model for asthma, resulted in attenuation of antigen induced augmented lipid peroxidation and altered glutathione status, suppression of the nuclear factor Alfa levels and enhanced inducible nitric oxide synthase, intracellular adhesion molecule - 1, and mucin MUC5AC expression that follows allergen exposure and a marked decrease in airway hyperresponsiveness, bronchoalveolar lavage fluid eosinophil number and exudation after antigen challenge [22]. Other animal studies [55,56] reported that NAC administration reduces serum and plasma MDA levels, plasma NO and increases plasma SOD, CAT, GSH and GPX. In addition, NAC administration was with modulatory effect on genes [19,57].

Reactive oxygen species are involved in the activation of several mitogen activated protein kinases (MAPK), key players in the production of several cytokines [54]. NAC decreased the expression of eotaxin and monocyte chemotactic protein -1 in human airway smooth muscle cells. Also NAC decreased the IL-1B induced production of ROS, as suggested by a reduction in the 8- isoprostan production [54]. The potential therapeutic value of antioxidants including NAC awaits support from controlled clinical trials that evaluate oral versus inhaler route of administration.

N acetylcystine is a thiol compound with antioxidant properties [89] that reduces the lung damage produced by oxidant stress in different experimental models and exerts beneficial effects in pulmonary diseases in which oxidant stress appears pathogenetically relevant [26]. In experimental models of allergic asthma, antioxidant, and anti inflammatory and anti hyperresponsiveness effect of oral NAC was observed [22,58]. Allergen challenge of the peripheral airways in atopic asthmatics has been demonstrated to produce immediately, significant amounts of ROS released locally from eosinophils and other inflammatory cells [59]. Blesa et al [22] reported that antigen challenge causes increase in lipid peroxidation levels and decreased GSH/GSSH ratio, confirming the existence of oxidative stress. An increase in GSSH and decrease in GSH level in epithelial lining fluid early after antigen challenge has been reported recently in asthmatics [60]. Oral treatment with NAC is efficient at attenuating the augmented lipid peroxidation and GSSH levels, and reversing the decreased GSH/GSSH ratio, confirming its antioxidant properties in this animal model [22].

Since the presence of oxidative stress was demonstrated for rat models of allergic asthma, activation of a number of inflammatory elements reported to be oxidant sensitive, including transcription factors like NF-kB and cytokines such as TNF Alfa; and expression of gene like iNOS, intracellular adhesion molecule -1 (ICAM-1) and MUC5AC were sought [17,19,22,25,57,61]. Furthermore, treatment with an antioxidant should attenuate these activated factors as well as prove beneficial against the typical features of experimental asthma such as airway hyperresponsiveness, eosinophilia and exudation.

NF- κ B is considered as a pivotal transcription factor in chronic inflammatory diseases and very sensitive to oxidants as well as other stimuli [19]. Augmented activation of NF- κ B has been demonstrated in the airways and inflammatory cells of asthmatic patients as well as in experimental asthma [19]. The antioxidant properties of NAC may contribute directly to its inhibitory effects on NF- κ B activation [22]. Alternatively, NF- κ B activation may result from the release of TNF α , which induces generation of ROS [50].

TNF α is a proinflammatory cytokine that has been implicated in the pathogenesis of asthma and considered a potential target for therapeutic intervention. This increased TNF α level was attenuated in NAC treated animals, a finding consistent with the suggestion that GSH status regulates TNF α production in vivo and with the inhibition by NAC of the increase in TNF α observed in various studies [17,19].

The ICAM-1 gene contains NF- κ B binding sites and its expression is oxidant sensitive [57]. The expression of airway and endothelial ICAM-1 are enhanced by TNF α and other inflammatory cytokines [57]. Therefore, various elements may contribute to the enhanced expression reported by Blesa et al [22] and the inhibition found for NAC would be consistent with other reports [62,63].

Mucus overproduction is often observed in airway inflammation and contributes to airway obstruction in asthma. Recent work indicates that

oxidative stress stimulates mucin synthesis in airways particularly synthesis of MUC5AC [23]. Treatment with NAC blocked this early expression of MUC5AC. These results confirm that oxidative stress appears important in the excessive production of mucin airways, and antioxidants are effective at suppressing the enhanced expression of mucin genes in experimental asthma [58].

Consequential to these inhibitory effects of antioxidant treatment on transcription factors, inflammatory cytokines and genes, there should be experimental evidence of beneficial effects of NAC on characteristic features of allergic asthma. NAC was effective at reducing both BHR and the elevated BALF eosinophil numbers [22]. Several lines of evidence suggest that the production of oxygen radicals is implicated in the airway response to allergen [46]. Thus the antigen induced hyper-responsiveness was found to correlate significantly with the increases in oxygen radicals release from BALF cells in sensitized animals [48].

The oxidant transcription factor NF- κ B appears relevant to eosinophilia in allergic asthma [19]. Also, cell trafficking into inflammatory sites depends on the sequential expression of cell adhesion molecules, which are modulated by oxidant species; in particular, ICAM-1 is important for induction of BHR in vivo as well as eosinophil migration into inflamed lung [57]. Therefore, the reduced BHR and eosinophilia produced by NAC may also be related to its antioxidant properties.

In conclusion, oral administration of NAC attenuates the oxidative stress induced by acetaminophen in asthmatic patients. In keeping with these results the reported findings from several

studies in animal models indicated that NAC 1) attenuate antigen induced lipid peroxidation and altered glutathione status, 2) suppression of NF- κ B activation, mucin MUC5AC expressions, ICAM-1, elevated tumor necrosis factor α levels, 3) a marked decrease in BHR and BALF eosinophil number and exudation after allergen challenge. These results confirm that oxidative stress may contribute to the pathogenesis of asthma. The potential therapeutic value of antioxidant including NAC awaits support from controlled clinical trials.

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Table 1. Effect of acetaminophen on serum total antioxidant capacity and malondialdehyde in asthmatic patients.

Variable	Asthma - No acetaminophen 24 Patients	Asthma - Acetaminophen 19 Patients	Control - 50 Subjects
TAC $\mu\text{mol/l}$			
Mean	876	623	1074
SD	253	216	207
95% CI	769-984	519-726	1015-1133
MDA $\mu\text{mol/l}$			
Mean	4.39	7.23	2.24
SD	1.84	2.82	0.26
95% CI	3.62-5.16	5.88-8.58	2.16-2.30
FEV1			
Mean	96	82	101
SD	4	6	5
95% CI	94-98	79-85	99-103
Oxidation index	5	11.61	2.08

P value < TAC MDA FEV1

No acetaminophen Vs Acetaminophen 0.005 0.005 0.0001

No acetaminophen Vs Control 0.02 0.01 0.0001

Acetaminophen Vs Control 0.0001 0.0001 0.005

Table 2. Therapeutic effect of N- acetylcysteine on serum TAC and MDA induced by acetaminophen.

Variable	Asthmatic afebrile - No acetaminophen - 24 Patients			Asthma febrile - Acetaminophen - 19 Patients		
	Pretreatment	Post-treatment	P	Pretreatment	Post-treatment	P
TAC $\mu\text{mol/l}$						
Mean	876	986	0.05	623	804	0.025
SD	253	118		216	294	
95% CI	769-984	936-1035		519-726	663-945	
MDA $\mu\text{mol/l}$						
Mean	4.39	3.63	0.05	7.23	4.62	0.0005
SD	1.84	0.74		2.82	1.14	
95% CI	3.62-5.16	3.32-3.94		5.88-8.58	4.07-5.17	
FEV1						
Mean	96	103	0.001	82	98	0.0001
SD	4	7		6	8	
95% CI	94-98	100-106		79-85	94-102	
Oxidation index	5	3.68		11.61	5.75	

The pattern of accidental drug poisoning in children

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Key words: Accidental drug poisoning, children, risk factor

Abstract

Objectives: To review the pattern of drug poisoning in children in regard to age, sex and type of drug ingested, and the circumstances that lead to poisoning which, hopefully lead to fruitful conclusions.

Methods: This is a retrospective study that involved all children who were admitted to pediatric ward or the intensive care unit at Princess Haya military hospital as cases of drug non-deliberate poisoning. The studied group involved children aged below 14 years, during the period from 2004 to 2006. All cases were reviewed and studied referring to their medical records.

Results: The data showed that, the majority of cases occurred in children between the age group 1-6 years; males recorded a higher rate than females. Acetaminophen was the most frequently ingested drug. No fatality as well, was recorded. The only case which was registered to be deliberate selfharm was excluded from the study.

Conclusion: Drug poisoning is a major health problem; prevention should involve a multidisciplinary approach including family education, particularly the seriousness of drug poisoning and the preventive measures that should be taken. A national poison center is crucial, that could conduct further valuable studies in collaboration with other medical authorities.

Introduction

With the explicit stretching of health services in Jordan provided by different health provisions, one expects an escalated risk of drug poisoning due to increased availability (1), A rich medical literature surrounding this issue is found.

Poisoning per se is considered to be a common medical emergency in childhood particularly in the preschool age group worldwide (2); the severity and frequency of poisoning is reduced by different preventive measures, however, we still need more effective and safer means of prevention as well as treatment (3).

Methods

Given the lack of poisoning incidents registry in this hospital, the author retrospectively collected and reviewed all medical records of children who were diagnosed and admitted as cases of drug poisoning to princess Haya military hospital in Aqaba - a city south of Jordan, with a population of around 200,000 - during the period from February 2004 to February 2006. All cases were admitted to the pediatric ward or intensive care unit.

Age, sex, type of drug ingested, and history of the circumstances that lead to poisoning were recorded. Toxicological screenings of blood or urine were not executed. The study excluded cases of poisoning caused by all other substances. Munchausen's by proxy syndrome and subjects above 14 years of age were also excluded (hospital policy regards pediatric age group as up to 14 year of age).

Results

The sample involved a total of 56 children (n=56). Thirty-two (57%) of them were males and twenty four (43%) were females. Male: female ratio was 1.3:1. The youngest child in the studied sample was aged 10 months, while the eldest aged 13 years. However the proportion of age groups within the sample varied, most of the cases occurred in younger age group, the commonest age group was that aged less than six years n= 44 (78.5%), while the older age group from eleven to fourteen years constituted the least n= 3 (5%), Table 1.

It was also found that Acetaminophen was the most frequent drug involved accounting for (12.5%) of cases ,which is comparable to the findings in studies done worldwide(2,4,5) , to be followed by different antibiotics (10.7%) and antihistamine preparations (7.1%). Aminophlline recorded the least in the list, Table 2.

The average hospital stay was one to three days. Only two cases were rushed to the intensive care unit due to their critical condition. No deaths were recorded.

Table 1. Non-deliberate drug poisoning according to age groups.

Age (years)	Male n	Female n	Total	
			n	%
<1	3	2	5	(8.9%)
1-3	11	7	18	(32%)
4-6	12	9	21	(37.5%)
7-10	5	4	9	(16%)
11-14	1	2	3	(5.3%)

Table 2. Drugs involved in nondeliberate poisoning:

Drug	n	%
Acetaminophen	7	12.5
Antibiotic	6	10.7
Antihistamine	5	8.9
Vitamin preparation	5	8.9
Anticonvulsant	4	7.1
Ibuprofen	4	7.1
Cough preparation	4	7.1
Oral hypoglycemic agent	3	5.3
Antidepressant	3	5.3
Antihypertensive	3	5.3
Iron	3	5.3
Benzodiazepine	2	3.5
Cardiac drugs	2	3.5
Topical agent	2	3.5
Salbutamol	2	3.5
Aminophylline	1	1.7

Discussion

The proportion of such medical emergencies in the pediatric hospital admissions in our retrospective study reached 3.7%, despite the fact that this study dealt with poisoning due to drugs only while most literature focused on poisoning due to medicinal and non-medicinal agents. However, such conditions seem to be major health issues as the incidence sequelae, are considered to be quite high (6). The highest risk age group in our sample was found to be those aged less than six years, which is globally agreed upon in regard to poisoning by different agents. (2, 4, 7) Most researchers thought that such findings could be attributed to the exploratory nature of the developmental stage in this age group (1, 8). One point of interest is the temptation of the flavoring additives, the coloring, and the attractive smell that some children may think drugs are candies. (9) Some parents prompt resentful children to take medications, telling them that it is a delicious candy (8). Most medications are unfortunately dispensed in non child-proof containers, a fact that should be considered with care in future.

The author believes such explanations are applicable in this study sample. Other factors are also important, such as the easy reach children have to medications, leaving children unattended for a relatively long period of time, availability of medications, the improvement of medical services and coverage of larger groups of populations that made drugs more available.

Some researchers found the family size to be a determinant factor in increased risk of incidence (8), a similar finding applied to this study. This study found that 57.1% of children came from large sized families (five or above). The author couldn't find any particular data in regard to the family circumstances passed through (pregnant mother, death of a family member, divorce, new comer, illness of a sibling, change of residence etc, that may increase the incidence of accidental poisoning, while some researchers did find so (10, 11). The educational level of the caregivers (8) and the presence of an adult with chronic medical illness within the family (7) that may be considered as risk factors were not studied by the author which was a limitation of this study.

As formerly mentioned, analgesic, antipyretic and antibiotic

preparations were incriminated to be the commonest causative drugs; they seem to be the most dispensed medications to children given the fact that infectious conditions are common and unfortunately, as the author believes, some physicians tend to over prescribe antibiotics.

The relative ease in reaching emergency services enabled such condition to be handled early. Most cases reached casualty within less than two to three hours after the ingestion of the drug and only two cases warranted ICU admissions. Despite the fact that the study wasn't primarily interested in methods of parent's discovery of poisoning, most cases were discovered accidentally i.e. lips or clothing soiled with treatments, empty or reduced amount in medication containers, presence of child witness, etc. Less commonly children were discovered after developing significant features of poisoning.

Conclusion

Accidental drug poisoning in children is conspicuously a crucial health concern to all health workers and pediatricians in particular, pharmacy industry and lay community. There has been a generous medical literature concerning preventive and safety measures surrounding this issue. The author believes that adoption of such measures should be continuously refined see Box 1. Further in-depth studies will add more to our knowledge and alertness. The author is aware that the national poison control center has been recently established in Jordan, affiliated to Jordan University Hospital, however, this centre needs to be more advocated to refer to expert advice and collaboration.

Box 1. Safety measures:

- Keep all medications in a secure cabinet out of reach of children and use Child-resistant proof containers.
- Keep medications in the original containers and discard all residual or expired drugs.
- Never interchange dosages among different drugs.
- Avoid calling drugs candies.
- Education of parents and lay community, pediatricians, family doctors, and GP's awareness.
- Don't take your medications in front of children.

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The pre-participation evaluation of athletes

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Abstract:

The pre-participation evaluation of the athlete deals with the epidemiological group with which most physicians do not have the opportunity to deal, that is the “healthy” and physically active population between age 10 and 30. Even though the likelihood of significant medical conditions being found in this group is relatively uncommon, it is not rare. Specifically speaking the concern is exercise-related sudden death and significant musculo-skeletal disability, but also issues of increased likelihood of injuries, alcohol and drug abuse, suicide, mood disorders, pregnancy, and sexually transmitted diseases are also key to the appropriate evaluation and counseling of this group (1-4).

The intent of this article to present a synthesized pre-participation evaluation that identifies medical conditions that may limit participation, predispose to injury or illness, evaluate risky behaviors, counsel on health-related issues, and ideally evaluate fitness level and performance. This will include a focused history, physical examination, and the appropriate indications for laboratory testing. We will also discuss those medical conditions that might disqualify an athlete from specific athletic participation.

Screening History

The first question is an attempt to deal with current infections, illnesses, and medical conditions that require active medical management. Examples of these include diabetes and asthma. The next few questions deal with those conditions that may play a factor in the future health of the athlete or may require further evaluation. Particular attention is paid to musculo-skeletal conditions that may not have completely resolved or are recurrent. Musculo-skeletal conditions are the most common disqualifiers for athletic participation (5). Examples of this include recurrent patellar subluxation or incompletely treated shoulder dislocation. Family history is an opportunity to screen for premature death, disabling cardiovascular disease, or genetic abnormalities like Marfan syndrome or hypertrophic cardiomyopathy. Medications and substance abuse provides clues on ongoing medical conditions, their management, the patient’s compliance, their understanding of drugs and their effect on sport, and the opportunity to discuss nutritional supplements. Nutrition and fitness evaluation is an excellent chance to educate and provide preventative health information. Immunization records’ importance is obvious. And finally, the review of systems includes screening questions for cardiac, respiratory, neurological, muscular, gynecological, and dermatological problems.

A special note is made at this juncture regarding problems more prevalent with female athletes. Screening questions are included to uncover the female athletic triad of amenorrhoea, eating disorders, and osteoporosis. Female athletes are considerably more prone to stress fractures (6). Also, patello-femoral syndrome, anterior cruciate ligament injuries, foot disorders, and mitral valve prolapse is more common in female athletes (7).

Pre-Participation Physical Examination

Important issues will be highlighted only. Blood pressure should be evaluated in relation to the patient’s age, height and weight (please refer to appropriate norms). Visual acuity and field testing is important. Cardiovascular examination should focus on conduction abnormalities, valvular abnormalities, and signs of hypertrophic cardiomyopathy. This may signal further

laboratory evaluation (see below). Respiratory evaluation should note signs of asthma, but remember exercise-induced asthma will not be evident at rest. Abdominal evaluation should look for organomegaly. There should be a check for hernias even though they are not disqualifiers. The musculoskeletal evaluation should focus on those areas of previous injury and rehabilitation. This is the most critical section and may prompt further evaluation since it is the most frequent disqualifier. Finally, a skin check should look for those conditions that are infectious and can temporarily prevent participation in sports with direct skin-to-skin contact like wrestling. Examples of skin conditions include herpes, impetigo, and tinea corporis (1-5).

Laboratory Evaluations

Krowchuk reviewed the use of pre-participation laboratory tests in 1997 and recommended that urinalysis, complete blood counts, and serum ferritin levels have poor yields in asymptomatic and healthy patients and that these tests do not affect participation significantly to warrant their expense (8). Routine screening electrocardiograms (EKG) is not recommended by the American Heart Association (9), however in selective individuals it can be quite useful (1-5). Those individuals with “red-flagged” family and personal history or physical signs would be served well to have an EKG. Those individuals that have signs and symptoms associated with Marfan syndrome or congenital or acquired heart disease may be better served with an echocardiography study and/or exercise stress testing (10). Common sense will determine further evaluation of incompletely rehabilitated musculo-skeletal conditions.

Specific Medical Conditions and Sports

EYE CONDITIONS

The main issue here is those athletes that have only one functioning eye with better than 20/40 corrected vision, should be evaluated by an ophthalmologist. As well, it would be pertinent to have protective eyewear in those sports that allow, them such as basketball, and contraindicate involvement in sports with projectiles and collision, like shooting or boxing (15).

CARDIOVASCULAR CONDITIONS

Hypertrophic cardiomyopathy contraindicates sports participation, especially highly resistive activities like weight lifting. A complete evaluation by a cardiologist or a sports medicine specialist is required. The presenting symptomatology includes exertional dyspnoea, angina, palpitations, and syncope. Signs include hypertension, and mid-systolic ejection murmur. An abnormal EKG shows left ventricular hypertrophy, and Q waves in the inferior and anterior leads. Critical factors include severe hypertension, ventricular tachyarrhythmias, and suspected coronary artery disease (1-5, 11).

Mitral valve prolapse (MVP) is not absolutely contraindicated, but does require further evaluation by a cardiologist or sports medicine specialist. It is the most common cause of mitral regurgitation in young adults. It can also coexist with tricuspid valve prolapse in about one third of individuals. Common presenting symptoms include cardiac palpitations and chest pain. On examination, there is often an individual with low blood pressure, low body weight, pectus excavatum, joint laxity, and a mid-systolic click that may be followed by a late systolic murmur. The EKG can be normal or may show inverted T waves in the inferior leads. Critical factors include symptomatic dysrhythmias and mitral regurgitation (1-5, 12).

Congenital aortic valvular stenosis is not absolutely contraindicated, but does require evaluation by a cardiologist or sports medicine specialist. The valve is usually bicuspid. Males predominate and typically present with exertional syncope. The precordial exam shows a harsh systolic murmur with radiation to the carotid arteries. A click and thrill are often found. Critical factors include dysrhythmias and (pre) syncopal episodes (1-5).

Congenital long QT syndrome is a hereditary ventricular repolarization abnormality. The most common presentations include cardiac arrest, seizures, and syncope related to high exertional circumstances like marathons. An EKG with a corrected QT for heart rate greater than 0.50 seconds and perhaps a double humped T wave or negative U waves help make the diagnosis. Women have the greatest incidence of cardiac events with this abnormality especially at heart rates greater than 100bpm (1-5, 13).

Marfan syndrome is an autosomal dominant condition with an equal male to female ratio. There are, classically, blue sclera, arachnodactyly, arm span greater than height, and aortic root dilatation leading to aortic insufficiency. Auscultation reveals a diastolic blowing murmur, and water hammer pulse (rapidly disappearing). The EKG reflects left ventricular enlargement. Critical factors include aortic aneurismal dissection and rupture (1-5, 14).

MUSCULOSKELETAL CONDITIONS

As we have mentioned earlier, this is the most common category that leads to restriction from sport (5). The most common joints include the knee and the ankle (16). The athlete must be able to use the joint in all aspects of the sport with which he is intending involvement. As well, there should be no effusion, full range of motion and at least 80 percent of normal strength in the effected joint (1-5).

CONVULSIVE DISORDERS

There are no contraindications to involvement in sport (even contact sports) with well-controlled convulsive disorders. However, if the sport involves high risk like climbing or scuba diving, a consultation with a neurologist or sports medicine specialist should be considered. Athletes with poorly controlled seizures, frequent occurrences, bizarre forms of psychomotor epilepsy, or unusual post convulsive states, should be withheld from collision, contact or projectile sports like weight-lifting (17).

HEAD AND NECK

Concussions have been the topic of controversy for many years (18). Recently, the Canadian Academy of Sports Medicine is working on a census statement on return to play after concussion. As best as my present awareness allows they have suggested that the symptoms of concussion, that is headache, dizziness, amnesia, decreased alertness, nausea, mental difficulty, sensory changes, and visual disturbances, should be resolved for at least a week and not evident during activity for full clearance.

The persistence of some of these symptoms is denoted as "post-concussion syndrome" and this is a contraindication to return to play. The reasoning behind this is the propensity to have a fatal second impact while recovering from the first concussion, leading to significant brain damage (19). Subsequent concussions require neurologic or sports medicine specialist consultation.

"Burners" or "Stingers" are related to brachial plexus pulling or cervical nerve root impingement. To return to sport after these injuries requires full range of motion of the neck and freedom from radicular pain (20).

SPECIAL CIRCUMSTANCES

Exercise-induced asthma requires pre-participation beta agonist prophylaxis and does not disqualify the athlete from any sport (1-5).

Heat-related illness requires appropriate counseling and the avoidance of extreme temperatures and adequate hydration (1-5).

Sickle cell trait has no contraindications to any sport, but does require counseling regarding adequate hydration and acclimatization to various altitudes (17). Sickle cell disease is contraindicated from collision and contact sports (17). Acute infection is generally contraindicated from all sports (1-5).

Conclusions

We have discussed those medical conditions that might disqualify an athlete from specific athletic participation. We have also included a focused history and physical examination through a well-developed screening form. With this knowledge, it will be easier to identify those medical conditions that may limit participation, predispose to injury or illness, evaluate risky behaviors, and counsel on health-related issues.

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Renal scarring and vesico-ureteric reflux in childhood urinary tract infection

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Key words: Reflux nephropathy, renal scarring, vesico-ureteric reflux (VUR), urinary tract infection (UTI).

Abstract

Background: Renal scarring is a serious but preventable complication of urinary tract infection (UTI) in children. The damage is usually irreversible. However, not all children with UTI and vesico-ureteric (VUR) will develop scarring but the majority of children with renal scars have a history of UTI.

Objective: This study was done to show the incidence of renal scarring in children with UTI with or without VUR.

Methods and results: 69 children, aged 1 year & 8 months to 8 years & 5 months, with UTI were included in the study. Urinary tract ultrasonography, voiding cysto-urothography and dimercapto-succinic acid scan were done for all children to detect urinary tract abnormalities, vesico-ureteric reflux and renal scarring. Renal scars were found in 15 children (21.7%) and VUR in 23 out of 53 (43.4%). All children were normotensive and had normal renal function.

Conclusion: Renal scarring should be looked for in all children with UTI with or without VUR.

Introduction

Urinary tract infection (UTI) is a frequent problem in infants and children. In Jahra area, the overall incidence of UTI is 5.5% (1). Vesico-ureteral reflux (VUR) has been reported in 35-40% of children with UTI; and renal scarring may be seen in 9.5-38% of those with reflux (2). In children with a history of recurrent UTI, renal scarring is even more common; it may reach up to 25% (3, 4).

Renal reflux can result in renal scarring, renal insufficiency, rennin-mediated hypertension and end-stage renal disease (5). There is abundant clinical and experimental evidence that UTI and VUR is important in the pathogenesis of renal scarring (6, 7). Bacteria can reach the kidney from the bladder by the reflux, especially when bladder wall inflammation is co-existing, leading to formation of cortical micro abscesses and development of renal scars. However, it has been shown that antibacterial treatment can arrest or prevent the development of scarring (8).

As reflux nephropathy is irreversible, the objective of this study was to determine the frequency of renal scars and evaluate reflux in children with established UTI attending Pediatric Outpatient Department in Al-Jahra Hospital, Kuwait.

Patients and Methods

Sixty-nine children with proved UTI were included in this study. Sixty-seven were females and two were males. Their ages ranged from 1 year and 8 months to 8 years and 5 months. Details of presentation, treatment and patient's and family history were obtained. Further information was obtained from parent's interview when necessary. All underwent renal ultrasonography and micturition cystourethrography (MCUG) as a part of initial evaluation. Dimercapto Succinic Acid (DMSA) scans

were obtained initially and 4-6 months after the last episode of pyelonephritis. Grading of VUR was based on the International Reflux Committee classification (9). Renal Scars grading was based on Goldarich and co-workers grading system (10).

All patients were treated with appropriate antibiotic therapy and remained on prophylaxis as indicated. They were followed up and urine routine, urine culture & sensitivity, renal function tests, blood pressure measurements and growth parameters were checked regularly.

Results

Of the 69 patients who did DMSA scan (Table 2), 12 had scars on initial diagnosis and 3 developed them 4-6 months later (21.7%). Their ages ranged from one year and eight months to eight years and five months. One was male and 14 were females. The male patient was circumcised. Forty-five patients (65%) had history of recurrent UTI (Table 1). E.coli was the cause of infection in all patients, except one who had Klebsella. The scars were more common in the left kidney (60%). In 11 patients the scars were in the upper lobe of the kidney (73.3%) and 4 in the lower lobe (26.7%). Clinically they were normotensive and had normal growth and development.

Varying grades of vesico-ureteral reflux (VUR) was detected in 23 patients out of 53 (Table 3), who did MCUG (43.4%); 14 with grade I, 4 with grade II, 3 with grade III and 2 with grade IV reflux. Fourteen patients had bilateral reflux and 9 had unilateral reflux. Reflux grade 1, and scars stage I & III were the most prevalent sequelae following UTI. Of the fifteen children with renal scars 9 had VUR; 7 with grade I reflux and 2 with grade II. Ultra-sound of abdomen showed congenital anomalies in 3 (33.3%), one with congenital polycystic kidney, one with congenital multicystic kidney and the third with congenital left hydronephrosis (Table 3).

Discussion

Reflux nephropathy is known to be a major cause of renal failure in children. Renal scintigraphy with dimercaptosuccinic acid (DMSA) is a valid diagnostic tool for confirming the presence of acute pyelonephritis as well as for documenting the presence of renal scarring. Its sensitivity and specificity are more than intravenous pyelography; IVP (11&12). Only 40% of our patients with proved renal scarring showed changes on IVP. However, the routine use of DMSA scan during the acute illness is not considered necessary (13). In our study, 15 out of 69 studied children with UTI had renal scarring (21.7%). Other authors showed different results. Szlyk et al (14) found that 38% of their patients had renal scars, while Polito et al (15) reported 37%. The low incidence of renal scarring in our cases may be due to early treatment of our patients as there is evidence that delay in diagnosis and treatment of UTI can contribute to the development of renal scarring (16 & 17).

Risks of hypertension and chronic renal failure are higher with diffuse scarring (18). Hadi et al (2) showed that hypertension occurred in 7.1% of their patients over a 6-year period. In our study, none of our patients suffered from hypertension. However, a long period of follow-up is necessary to verify the occurrence of this complication.

Vesico-ureteral reflux (VUR), has been identified as a risk factor for the development of UTI and renal scarring. Dick et al (2) showed that 62.5% of their patients with VUR had renal scarring. Lana et al (20) reported that 60% of girls and 44% of boys in the first year of life with VUR and UTI had renal scarring. Others showed similar results (21). In our study, only 9 patients out of 15 with renal scarring (60%) had VUR (Fig. 1). This proves that; although VUR is a risk factor for development of renal scarring, the lesion can still develop without VUR. This may be due to intra-renal reflux facilitated by the flat papillae in the kidney. Bacteria can also reach the kidney through transient reflux occurring with severe UTI and bladder wall inflammation, or by binding to epithelial cell surface in some children with specific blood groups.

Radiologists often report various degrees of dilatation of the collecting system of the kidney in patients with UTI on renal ultrasonography (22). However, in our study the ultrasound findings were not predictive of VUR and VCUg was necessary to rule out VUR, regardless of renal ultrasound findings. A similar conclusion was noted by S Mahant et al (22). Davey and colleagues (23), as well, found that the frequency of VUR in children with mild renal pelvic distension did not differ significantly from that in children without distension on renal ultrasound.

Conclusion

Our study suggests that incidence of renal scarring is high (21.7%) in children with UTI and that absence of VUR is not protective, as renal scarring can occur without VUR. We recommend early diagnosis and aggressive treatment of children with UTI. We also recommend performing DMSA scan for all children with UTI, especially in younger ages and in those with high grade VUR.

Table 1. children with recurrent UTI

	Once	2-3 times	> 3 times	Total
Male	1			1
Female	24	8	12	44
Total	25	8	12	45

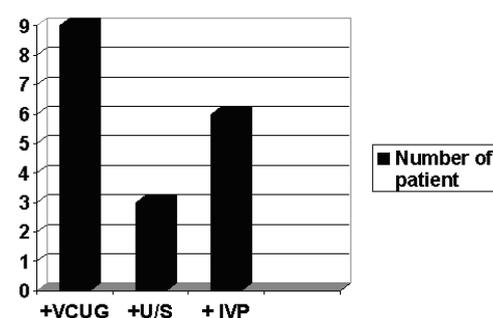
Table 2. Findings of DEMSA scan in 69 patients with UTI

Score	< 2 yr	> 2 yr	Total	%
Stage I	2	6	8	11.6
Stage II	2		2	2.9
Stage III	3	2	5	7.2
Total	7	8	15	21.7

Table 3. Findings of MCUG study in 53 patients with UTI

Grade	< 2 yr	> 2 yr	Total	%
Grade I	2	12	14	26.3
Grade II	3	1	4	7.6
Grade III	1	2	3	5.7
Grade IV	2	0	2	3.8
Total	8	15	23	43.4

Figure 1. Results & other imaging studies in 15 patients with proved Renal Scars.



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Effect of mental health training program on primary-care physicians' skills, eastern province, S.A

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Key words: Mental illness, training course, File audit, evaluation, PHC physicians, Saudi Arabia

Abstract

Objective: To measure the effect of mental health training program on the ability of PHC physicians to detect and manage mental illnesses.

Method: It is an intervention study carried out in Dammam Sector, Saudi Arabia. The course was implemented in June 1999, and ran over 4 days. A random sample of 31 PHC physicians was selected. The area of study was divided into five clusters, from which ten physicians were selected randomly to evaluate their skills in diagnosis and pattern of management of mental disorders in PHC settings. File audit was used through the period of six months prior, and six months after the course, in order to evaluate the training effect on the physicians' performance. Every physician acted as his/her own control.

Results: The total number of psychiatric cases detected by the ten physicians during the first 6-month period was 20 cases out of about 60,000 PHC patients. Following the course, during the last six-month period, 21 psychiatric cases were detected (3.5 cases in every 10,000 patients). According to the results, the trained physicians were able to diagnose more generalized anxiety disorder, social phobia, and sexual disorder, at the expense of non-specified mental disorders. The majority of cases were referred to psychiatric clinics.

Conclusion: A shorter-term mental health-training program didn't enable PHC physicians to detect the minor mental health problems. There is a need for an advanced and long-term mental health-training course, focusing on the practical application of identifying mental illness among PHC patients.

Introduction

Mental illness is frequent in the primary health care (PHC) setting; about 20-40% of PHC patients suffer from diagnosable mental disorders^{1,2}. A similar percentage was found among Saudi PHC patients³. Most of these are cases of depression, anxiety, or somatoform disorder^(4,5). They mostly present with more physical than with psychological complaints^{6,7}, and are usually associated with a significant degree of disability⁸.

There is evidence suggesting that, despite the high prevalence of these mental illness, they frequently pass unrecognized by the PHC physicians^{2,4,9}. Higgins (1994) conducted a meta-analysis of extensive literature over 25 years performed in PHC settings to find that 33-79% of mentally ill patients had not been recognized by their physicians¹⁰. A study conducted in Al-Khobar showed that 21.7% of adult male PHC patients suffered from some mental illness, of which 80% were undetected⁵. Another in Riyadh also showed low identification index of the PHC physicians (33%)¹¹.

Experience shows that brief training programs can substantially upgrade the PHC physicians' knowledge and attitudes towards these disorders^{12,13}. Most studies consider programs of two weeks or more are cost effective and appropriate^{14,15}. Recognition of such patients is vitally important in order to reduce the suffering of individuals and the futile consumption of public resources¹⁶.

The aim of the present study was to measure the change in PHC physicians' skills resulting from a short mental training course for the detection and management of common mental disorders in PHC settings.

Method

This is an intervention study carried out in Dammam Sector, Eastern Province, Saudi Arabia. The course was implemented in June 1999, and ran over four days. A random sample of 31 PHC physicians out of 191 physicians working in 111 PHC settings was selected. All the recruits had no previous exposure

to post-graduate training in psychiatry and never worked as a physician in any psychiatric facility.

To evaluate the PHC physician's skills, the area of study was divided into four clusters. Dammam and Khobar each represented a cluster, Qatif and Safoa, as a cluster. Ras-tanoora, Jubail and Bqaq represented the fourth cluster. Thirty-three percent from each cluster was randomly selected as the representative sample of 10 physicians.

The course was structured accordant with the national program to improve the PHC physicians' skills in the field of mental health care. It contained assessment and management of the common mental health problems in the community e.g. depression, anxiety, somatization, as well as mental problems in children and young people, the basic psychiatric medication, and the referral system. A variety of teaching methods were employed, including brief lectures/demonstrations, videotapes, small group workshops, discussions and role-play. The workshops were facilitated by experienced psychiatrists and were conducted in small groups.

All files of presumably mentally ill patients were evaluated, of whom each 10 physicians had seen during the six months prior to the course and six months after the course and register in the registration books. File audit was used to estimate the detection rate and patterns of management before and after the training intervention. Every candidate acted as his/her own control. The difference between the quantity and quality of management achieved by each candidate in the Post-intervention from those obtained in the Pre-intervention periods would be the outcome product of the training course on that particular subject. At the end of the intervention course, a self-administered questionnaire was distributed to the trainees, consisting of seven questions. For each question, the responses were made on a five-point scale ranging from completely unfavorable (scoring one) to completely favorable (scoring five).

Results

The study sample was composed of 31 PHC physicians. Of these 16 (51.6%) were men and 15 (48.4) were women. Twenty (64.5%) were Saudi, 6 (19.4%) from other Arab countries, and 5 (16.1%) were non-Arabs. Their ages ranged from 26 to 49 years with a mean + SD of 34.24+ 7.47. Their professional service in PHC settings ranged from 1 to 20 years (mean 4.81+ 5.19). Six of the trainees (19%) were not exposed to undergraduate psychiatric training. Twenty percent had been exposed to 4 weeks or less, and 71% of them exposed to more than 4 weeks. Ten PHC physicians (30%) of the trainees were selected to evaluate their practical performance; 4 were men physicians (40%) and 6 women (60%).

Each PHC physician saw an average 40 patients per working day. Roughly he/she was seeing 12,000 cases per year. The total number of psychiatric cases detected by all the ten physicians during the 6-month period preceding the course was just 20 cases out of about 60,000 PHC patients (3.3 cases out of 10,000 patents). This detection rate has not been affected by the training course, for the total number of detected cases during 6-month period following the courses was almost the same (21 cases).

Table 1 shows the recorded different psychiatric diagnosis before and after the intervention. The trained PHC physicians were able to diagnose more of generalized anxiety disorder, social phobia and sexual disorder, at the expense of less of non-specified mental disorders. They diagnosed 17 cases out of the all-detectable cases (85%) before the intervention and diagnosed 20 cases (95%) after the intervention.

Most of the diagnosed patients were referred to psychiatric clinics. A small proportion of the patients were referred to non-psychiatric clinics e.g. medical or pediatric clinics. The management forms were reassurance and non-psychiatric medication. These were given to 20% of the mentally ill patients in the pre-program period and 24% in the post-program. Psychiatrists prescribed all anti-depressive drugs previously. In the pre-course period no patient had a follow-up appointment at PHC settings, but after the post course two patients had follow-up with their PHC physician.

All physicians who took part in the sample felt that it was necessary to have a mental training program. Thirty-two percent of them felt that they were average in psychiatric knowledge before the intervention. After the intervention only 3.2% of the trainees had the same feeling, while the rest had the feeling that their level had improved (see Table 2).

Discussion

Despite the high prevalence of mental illnesses in PHC settings, physicians were not able to detect most of these cases. Each physician discovered on average only two cases annually. Moreover, there are a number of physicians who had never diagnosed any case, neither before nor after the training. This means that most mentally ill patients do not get real benefit from their visits to PHC settings. This is deplorable in view of the fact that, most of these minor psychiatric morbidity cases if detected and identified early could be appropriately managed by PHC physicians, if only they are given a little instruction in this field.

None of these physicians had adequate undergraduate or post-graduate encounters with psychiatric patients. Many of them may be wary of becoming involved in mentally ill patients' care, preferring to adopt a minimalist role and deal only with physical complaints. As most patients usually present with physical symptoms, somatically oriented physicians are more likely to miss the concomitant psychological features. Besides the stigma of mental illness, which is still so strong in this culture might influence the physicians' readiness to label their patients as such. Whereas the PHC physicians have in their pharmacies a wide a range of drugs for treating somatic symptoms, they are offered no psychotropic drugs whatsoever. Presumably, their reluctance to document psychiatric diagnosis in their registration books is partly due to the strength of habit, or the presence of co-morbidity with a more chronic medical condition to which they are more equipped to offer help.

Although the studied PHC physicians did not diagnose significantly more psychiatric cases after their course, they became more definite about the diagnosis than before. Additionally, some began to give appointments for follow-up. These findings

indicated that if these courses were modified in quality and quantity, they could provide a good out-come. This is supported by Joukamaa et al findings that the ability of PHC physicians' detection for psychiatric cases was significantly associated with postgraduate long-term psychiatric training and qualification as a specialist in general practice (Family Medicine)². So, short the training period of the course, lack of psychiatric medication, and the absence of continuous medical education might play a role in the failure of the physicians' improvement.

However, many psychiatric training programs for PHC physicians were able to improve the trainees' ability to diagnose and manage mentally ill patients¹⁸⁻²⁰. When we compare our findings with that achievement, there were very important differences in the methodology of the evaluation process; they had used screening tools i.e. General Health Questionnaire (GHQ) before the intervention, not file audit, and asked the PHC physicians to assess in advance the patients' emotional status^(17,18). This design could increase the doctors' awareness of mental illness and make them ask their patients about related symptoms and signs. Also, the distribution of the GHQ to the patients before the interview may alert the patient to psychological complaints which he or she might not have otherwise discussed with the doctors spontaneously. In some studies the participants had already been exposed to mental health training before the intervention, despite that they recommended the requirement to further training in the basic skill set¹⁹.

Conclusion

A shorter-term mental health-training program didn't enable PHC physicians to detect and manage mental health problems. It appears that there is a need for an advanced program, preferably a long-term mental health-training course that focuses on practical application of correctly identifying mental illnesses. Also, we recommend further efforts to lift the physicians' skills such as to establish a referral clinic with specialists who are interested in primary mental health care within PHC settings. Hoping to build good communications between the PHC physicians and the specialists through consultations, may promote primary mental health care.

Table 1. The Mental Illness Diagnosis Before & After The Intervention course, Dammam Sector, Saudi Arabia.

Diagnosis	Pre-intervention	Post-intervention	Total (%)
Depression	4	2	6 (14.6)
Gen. Anxiety	1	6	7 (17.1)
Depression & Anxiety	3	1	4 (9.8)
Social phobia	0	3	3 (7.3)
Enuresis	4	4	8 (19.5)
Sleep disorder	3	1	4 (9.8)
Sexual disorders	1	2	3 (7.3)
Non-specific	4	2	6 (14.6)
Total	20	21	41

Table 2. Trainees' Assessment Of The Short Mental Training Course, Dammam Sector, Saudi Arabia.

	Not favorable--\ /----Favorable					Mean
	1	2	3	4	5	
Achievement of the course objectives	0	1	4	19	7	4.0
Difficulty of contents	0	1	6	14	10	4.1
Learning	0	0	7	12	12	4.2
Application	0	1	8	9	13	4.1
Time spent	3	6	10	7	5	3.2
Organization	0	4	13	13	1	3.4
Enjoyment	0	1	3	11	16	4.4

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Strategies to assist HIV positive women experiencing domestic violence in Nigeria

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Abstract

Background and objective: Partner notification is encouraged for safer sex practices to minimize HIV infection, but PLWHA reports violence after disclosure. Most surveys focusing on violence and HIV/AIDS concentrate on identifying women with violence but do not encourage the participation of such women in planning feasible interventions to reduce violence. Study aimed to use participatory reservation approach (PRA) to assist PLWHA to plan interventions to reduce domestic violence against them.

Methods: PRA was used to enable PLWHA plan intervention to reduce domestic violence. Data was collected through 12 focus group discussions and interview guides with a sample of 96 PLWHA in a network of PLWHA. Data was analyzed quantitatively and qualitatively using simple percentages.

Results: Domestic violence was experienced by both sexes. Domestic violence was perceived from different experiences including mutual exclusion or restriction from participating in social functions after disclosure. Out of 45(46.9%) PLWHA that disclosed their status, 36(40%) experienced violence. Interventions suggested for reducing violence included theater plays in public places, providing job opportunities and others.

Conclusions: Results showed PRA as an efficient and cost effective method of planning strategies to reduce violence among PLWHA. Training programmes on risks of violence on HIV infection is needed for both sexes.

Introduction

People living positively with HIV/AIDS (PLWHA) especially women are likely to face risks of being beaten, chastised and other violence. In Nigeria, the Demographic Health Survey (2003) states that only 24% of married teenage women ever discussed their HIV status with their husbands. HIV Counselors encourage partner notification to promote safer sex practices and reduce further infection [1]. But most times, PLWHA report domestic violence after disclosure [2,3,4].

Most health surveys targeted at PLWHA including [5] have primarily focused on effects of violence on HIV/AIDS with little or no effort to include PLWHA when planning interventions for them. Nigerian demographic health surveys are therefore designed to determine the prevalence of violence among PLWHA so as to enable policy planners to plan effectively. Policy planners and programme operators of these surveys are of the view that knowing more about demographics of PLWHA would enable them to plan adequately for interventions to improve their life. These kinds of survey could be problematic in that they aim to isolate social determinants of violence and cut-off levels without involving inputs from PLWHA who experience violence.

Moreover, most of these surveys have been house-to-house. They could be expensive, time consuming, and may result in poor services and/or sustainability. These kinds of surveys have been reported as counterproductive especially when services are not followed up [6].

Study involved PLWHA in initiating feasible interventions to reduce domestic violence against them using participatory reservation approach (PRA). PRA framework as used in the study provoked PLWHA participation PRA is an important approach derived from agricultural surveys that have potentials for more effective sustainability [6]. PRA involves using affected people as active analysts of their own situation and to set priorities on how to change their situations.

PRA has a defined methodology and systematic learning process that stresses changes in behaviour and attitude of individuals through group inquiry and interaction. It is an important tool for planning, and evaluating health programmes as well as for identifying support in service delivery and gaining access to potential influences to community change [7,8]. This framework was used because it recognized views of PLWHA and empowered them to have a sense of ownership to suggested intervention processes.

It also enabled the author to gather information from PLWHA with participatory method procedures.

In Nigeria, social perceptions of domestic violence are viewed in context of cultural practices and beliefs in communities. Some communities see domestic violence as an incurable disease [9] while others see it as social problem influenced by religion, socio-economic status, and educational background [10]. These cultural beliefs and perceptions affect how PLWHA are treated as well as socially accepted in society. Negative attitudes of society toward HIV infection influence acceptance of PLWHA [11] and this gives rise to stigmatization of PLWHA [12,13].

Therefore determining how PLWHA with different cultural backgrounds perceive domestic violence could be a good indicator in assessing effectiveness of PRA in planning interventions to minimize violence.

Objectives

- To use PRA to assist PLWHA identify strategies to minimize domestic violence against them.
- To note conditions that encourage PLWHA disclosure of their HIV status.
- To identify factors that influence domestic violence against PLWHA

Method:

Study used qualitative research method. This method helped to access PLWHA perceptions of domestic violence thereby facilitates their participation. Focus group discussions were used to explore views of each PLWHA on relevant interventions. Methodology in using the PRA framework is to initiate interventions that would transform society’s negative attitudes and behaviour against PLWHA so as to attract changes that PLWHA in the situation would regard as improvement.

The researcher is of the view that interventions suggested by PLWHA using PRA would create more impact than others. The role of author in this study was to assist PLWHA to achieve the desired change using the interventions they suggested.

Study population:

Study was conducted with a total sample of 96 PLWHA in a network of PLWHA. The sample consisted of (56 females and 40 males) between the ages of 22-65 years.

Network of PLWHA was used because of the difficulty in identifying PLWHA in society. People are not willing to disclose names and addresses of PLWHA and PLWHA themselves are not disposed to disclose their sero-status. Moreover, the network is made up of PLWHA whose sero-statuses are already known.

Men were included in the study because they were thought to have valuable experiences and understanding that would enable them to suggest practical strategies for reaching other men in society. It was also to note the extent to which male PLWHA also experience violence.

Ethical considerations:

Permission to conduct the study was obtained from the President

of the network of PLWHA in the State. His approval enabled the researcher to collect information from participants. Instruments used for study did not request the participants to write their names or anything to identify them. In addition, statements of confidentiality were given. Participants were given briefs on objectives of the study. Permission to tape-record the session was made and guaranteed.

Data collection:

Two methods of data collection, focus group discussion and interview guides were used. Interview guide was administered for illiterates and self-administered for literates. In all, 10 focus group discussions were conducted. Each focus group had 9-10 PLWHA. Focus group discussions were conducted through a trained moderator. All discussions were conducted in the local language to enable participants, even illiterates, to take active part in discussions. All discussions were tape-recorded. Participants were encouraged to talk freely among themselves. PLWHA were invited through their President to their regular meeting place. Open-ended and closed-ended questions characterized the format of the instruments.

Data Analysis

Focus group discussions were recorded, transcribed, and translated. Transcript notes were read and cross-checked. Recording equipment used was checked regularly to determine its reliability. Data were coded according to themes, and categorized. Analyses of data were manually done using qualitative and quantitative methods with simple percentages. For clarity, all related information was pooled together and reported.

Findings:

Demographic variables of the sample:

The age distribution of the PLWHA varied. More than half, 49(51%) of the sample were between the ages of 29-42 years (see Table 1).

Table 1. Age distribution of the PLWHA

Age distribution	Frequency
22 - 28 years	13 (13.5%)
29 - 35 years	26 (27%)
36 - 42 years	23 (24%)
43 - 49 years	14 (14.6%)
50 - 56 years	15 (15.7%)
57 years and above	5 (5.2%)
Total	96 (100%)

Findings on the marital status of the sample show that a good number of them, 49(51%) are married. (See Table 2).

Table 2. PLWHA by marital status

Marital Status	Frequency
Married	49 (51%)
Separated /divorced	18 (18.8%)
Widowed	21 (21.9%)
Single	8 (8.3%)
Total	96(100%)

For level of schooling, the sample was made up of 8(8.3%) as illiterates, 47(49%) with primary education six and secondary, while 41(42.7%) have tertiary education. Also, 59(61.5%) live in rural areas and 37(38.5%) live in urban areas. In all, 15(15.6%) of PLWHA made up of (11 females and 4 males) had sero-status discordant families.

Perceptions of domestic violence:

Domestic violence was perceived by PLWHA from three viewpoints; as physical, emotional and social problems. Finding shows that most PLWHA perceived domestic violence from the viewpoints of their experiences. However, during the focus group discussion, PLWHA from the rural areas could not see rape and/or extramarital sexual relationships as serious violence against them unlike those from the urban areas. In this study, participants saw domestic violence as a functional breakdown rather than by related causes. Table 3 contains various perceptions of domestic violence.

Table 3. PLWHA perceptions of domestic violence

Perceptions	Supporting data
Physical problems	Quarrelling, beating, battering, flogging, inflicted injury, chastisement, and fighting
Emotional problems	Neglect, stigmatization, isolation, rejection, humiliation, inequity and scolding
Social problems	Attempted murder, rape, extramarital-sex, ejection from matrimonial home, separation and/or divorce, lack of financial support,

Identified PLWHA with domestic violence:

One unique finding in this study is that both male and female PLWHA experienced domestic violence. A total of 65(67.7%) PLWHA experienced violence ranging from chastisement, flogging, beating, discrimination, use of abusive words, to attempted murder, but this was more on those who disclosed their sero-status than others. The finding shows that the main challenges PLWHA faced include whether or not to disclose their HIV status, who to disclose to, and if they eventually disclose, what the consequences would be. Out of 96 PLWHA studied, 35(36.5%) of them disclosed their sero-status to close relations and friends. Using the report of one PLWHA, "when my church pastor learned of my HIV status, he excluded me from church activities especially holy communion and he told other church members about my status and since then, I have never attended church functions." Another crucial finding in the study was the confusion of the PLWHA on whether or not to get married. The result of the focus group discussion showed that a good number of the PLWHA, especially the singles had the zeal of getting married and raising their own families.

Factors and/or conditions that increased violence:

PLWHA identified five factors and/or conditions that encouraged violence. Table 4 contains the details.

Table 4. Factors that increase violence

Factors	Response category
Negotiating for condom use	38(39.6%)
Constant demand for financial support	21(21.9%)
Suspicion of sexual promiscuity	27(28.1%)
Constant episodes of ill-health	18(18.8%)
Refusal to have sex	12(12.5%)

Among the factors listed by PLWHA, negotiation for condom use was the commonest cause of violence against them. Using reports of five PLWHA, "once the issue of using a condom for sex is raised, there would be suspicion that the person has been going out with others. And from that time onwards, there will be no more peace." One important finding in this study is that both male and female gave this report, showing that violence occasioned by use of condom cuts across all sexes of PLWHA.

Another factor that influenced violence was demanding of financial assistance. Using the reports of three PLWHA, "there will be peace as long as one does not demand for money either for food or for drugs." Regrettably, a good number of the PLWHA complained of no meaningful means of livelihood and the few that had jobs reported setbacks in their respective businesses as a result of constant episodes of ill health.

Suggestions on strategies to reduce domestic violence:

There was an overwhelming desire on the part of PLWHA to suggest things that could discourage domestic violence. To express this desire, a good number of the PLWHA freely made suggestions, and justified the reasons why each suggested strategy is considered realistic and important for reducing domestic violence. This justification is considered strength to the study. Table 5 contains the summary of the suggested interventions.

Table 5. PLWHA and suggested strategies to minimize domestic violence

Suggested strategies	Frequency n=96
Theatre plays in public places (churches, markets, schools) to highlight the plights of PLWHA	54 (56.3%)
Providing job opportunities to encourage financial independence	69(71.8%)
Using male peer group to sensitize communities on their responsibilities	25 (26%)
Using influential adults to organize workshops/seminars on enlightenment in communities	44 (45.8%)
Using communication devices (media, town criers, radio, etc.) to create awareness on benefits of disclosure	19 (19.8%)
Giving regular counseling to family members	28 (29.2%)
Total	180 (100%)

*** Multiple choices

From this Table, encouraging financial independence and organizing theater programs in markets, churches and other public places were the popular strategies suggested. PLWHA stressed that providing them with job opportunities would increase their income generating potentials thereby reduce over dependence on others, thereby reduce unnecessary use of uncomplimentary words on them by relations. Further, PLWHA explained that theater plays would be beneficial if the programmes concentrate on information on gender sensitivity, skills for anger management, and decision-making. According to them, the essence of the strategy is to reach individuals of various classes in the society. PLWHA's suggestion on the need to use male peer groups to sensitize the communities was aimed at encouraging gender equity as well as creating situations that would enable females to express their problems openly. The idea PLWHA gave for advocating use of influential adults to organize workshops/seminars in communities is to enable influential adults to sensitize individuals on the effects

of violence on HIV infection. These suggestions point towards practical ways and opportunities PLWHA perceived would reduce domestic violence.

Discussion

The study shows that PRA is useful in identifying PLWHA with domestic violence. However, there were discrepancies on what constituted domestic violence. While PLWHA from urban areas viewed rape and extramarital sex as domestic violence, PLWHA from rural areas did not. They saw extramarital sexual relationships as men's way of life. From perspectives of social, physical, and emotional problems, PLWHA viewed domestic violence in terms of restricted activity and participation in social functions. This finding agrees with that of [4,5] that stigmatization and rejection dominated life experiences of PLWHA, and that they view their life along this way. This implies that stigmatization (restrictiveness) is a major concern of PLWHA, especially females.

Surprisingly, male PLWHA who are traditionally major decision makers, also experienced domestic violence like females. This finding suggests that social welfare of these males like that of females is neglected. However, the fact that both sexes experienced violence is a significant finding. This finding underlies challenges that each sex had.

Two popular strategies dominated suggestions of PLWHA. These are providing job opportunities to encourage financial independence 69(71.8%), and organizing theatre plays in public places 54(56.3%). These suggestions reflected challenges PLWHA encountered in their life experiences.

One unique benefit of this study is that PRA encouraged consensus among PLWHA. It ensured cohesiveness and flow of quality information. Similar findings were reflected in the study of [14].

The time span for this study was limited. There was no time allotted for evaluating and monitoring the outcome of all interventions suggested. However, it could be noted that using PRA approach proved fast and inexpensive way of identifying practical activities for reducing domestic violence against PLWHA. The speedy nature of identifying problems using PRA was also highlighted in the studies by (1, 6, 14). It could be argued that using PRA in this study served as an educational intervention method. PRA enabled PLWHA to have a better understanding of interventions that are capable of minimizing violence as well as their roles in the sustainability of interventions suggested. Study showed that 36.5% of PLWHA disclosed their HIV status. This figure is higher than that of 24% found in Nigeria by [5]. This increase in proportion of PLWHA who disclosed their sero-status is of advantage to HIV prevention and could be partly due to the increased number of people who are recently joining the network of PLWHA where they attract care and support from each other. The commonest factor that encouraged domestic violence among PLWHA was negotiation for condom use. Negotiation for condom use occasioned suspicion for sexual promiscuity. This finding is disturbing because of negative reactions that followed the word 'condom' among participants. Participants complained of experiencing violence on mere mention of condom use. This attitude might have partly stemmed from traditional belief that

condom use is synonymous with sexual immorality. This could be partly why a good number of PLWHA took risks of having sex without a condom. The finding that negotiation for condom use encouraged violence agrees with the findings of [4].

The fact that PLWHA lacked financial support shows the extent to which relations and others provide care and support. Expecting PLWHA with no meaningful means of livelihood to support self and other dependents, is arguably domestic violence. This trend of argument is in line with that of [3,11], that abandonment falls under the ambit of domestic violence. Instigating violence against PLWHA just because of spells of ill-health would further expose them to untold hardship. The best approach to improve health of PLWHA is to provide them with good nutrition and also make treatment facilities accessible and affordable.

Conclusion

From types of domestic problems PLWHA encountered, and interventions they suggested, it could be safe to assume that they were exposed to traumatic situations. Including theatre plays in public places among strategies to reduce violence had some advantages. Theatre plays are broad-based with some feasible psychological undertone (debriefing), needed in conflict management. It may not be an illusion to state that theatre plays promoted coherence in PLWHA social interactions. Findings point to clear need for counseling and health education which would emphasize benefits of conflict management, condom use, and disclosure of HIV status. To ensure community involvement and sustainability of the programme, the suggested strategies should be integrated into the primary health care system.

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Surgical Management of Post Carbuncle Soft Tissue Defect in Diabetic Patients

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Abstract

Skin carbuncle is a necrotizing infection of the skin and subcutaneous tissues, composed of a cluster of furuncles, usually due to *Staphylococcus aureus*, with multiple drainage sinuses. People with diabetes are more likely to develop carbuncles. Broad-spectrum antimicrobial agents, in conjunction with surgical intervention, are often necessary to eradicate these infections. In this study we present our local experience in the surgical management of post carbuncle soft tissue defects in diabetic patients. The results of the treatment of 27 patients with a carbuncle of various locations were analyzed retrospectively. Twenty-seven patients had surgical reconstruction of a large post carbuncle soft tissue defect with split thickness skin grafts (63%) and local transposition flaps (37%). Both skin grafts and local flaps are good alternatives in the coverage of such defects. However skin flaps provide better cosmetic appearance than skin grafts.

Introduction

Carbuncle is an infection of cutaneous and subcutaneous tissue that consists of a cluster of boils (1-4). The infection can occur when a cut, wound, friction, pressure, or moisture forces the bacteria deeper into the skin or hair follicle. Carbuncles are often found on the back of the neck, shoulders, hips and thighs, and they are especially common in middle-aged or elderly men. Commonly, the causative agent is *Staphylococcus aureus* (4). Also, with a diagnosis of carbuncle, it is important to consider whether there is an underlying condition causing carbuncle, such as diabetes mellitus (5-10). The elevated serum glucose levels of diabetics affect traditional host defenses, predisposing these individuals to infectious processes. The diabetic patient is also faced with disturbance of their immune systems which can alter host defense mechanisms and increase the risk of infection (10). Infections in diabetics can be severe and life-threatening, and only through the prompt recognition and treatment of these disorders can morbidity and mortality be avoided.

Appropriate treatment principles consist of adequate surgical drainage of pus, excision of all necrotic tissues and adequate coverage with broad spectrum antibiotics.

In certain cases where there are large soft tissue defects following surgical debridement of the localized skin infection, direct surgical closure is not possible. In this case surgical closure requires either skin grafting or local transposition of nearby skin flaps. Choice of surgical tissue coverage depends on the soft tissue size, location, and involvements of major body vital structures. Split thickness skin grafts are simple and heal faster. Patients, however are not always satisfied with their aesthetic skin results. Localized skin flaps provide a better choice for skin and soft tissue coverage of post carbuncle defects.

Methods & Results

The data consists of all diabetic patients transferred and

admitted from 2002 till 2006 with a diagnosis of post carbuncle soft tissue defect. There were 27 patients; 19 male (70%) and 8 female (30%). The average age was 52 years old. The post carbuncle soft tissue defect was larger for direct primary closure, as shown in Figs 1-4. The most common bacterial organism was *Staphylococcus aureus*. In a few patients, mixed bacterial organisms were seen with gram negative and methicillin resistant *Staphylococcus aureus* (MRSA). Each patient received a full course of intravenous broad spectrum antibiotic, based on the organism sensitivity laboratory results. Split-thickness skin grafting was performed in the majority of cases (63%) (Fig 3) whereas local transposition skin flaps was performed in (37%) (Fig 4). All skin grafts and local skin flaps healed without significant healing complications.

Discussion

Skin carbuncle is a skin infection larger than a boil and with several openings for discharge of pus. The main causative organism of carbuncle is by a bacterium, *Staphylococcus aureus*, which infects an area under the skin or in a hair follicle. (1-3) Carbuncles occur more often in men because of their more extensive body hair growth (4). A differential approach to choice of surgical method with consideration of the degree, phase and localization of inflammation is preferable. Early and radical surgery, antimicrobial drugs, and infusion therapy, provide up-to-date and adequate treatment. All of these infections are typically diagnosed by clinical presentation and treated empirically. If antibiotics are required, one that is active against gram-positive organisms such as penicillinase-resistant penicillins, cephalosporins, macrolides, or fluoroquinolones should be chosen. Children, patients who have diabetes or patients who have immunodeficiencies are more susceptible to gram-negative infections and may require treatment with a second- or third-generation cephalosporin.

Diabetes mellitus is believed to increase susceptibility to infectious diseases (5-9). The effects of hyperglycemia per

se on infectious disease risk are unknown and the influence of diabetes on infectious disease outcome is controversial. The production of humoral antibody appears intact, defective function of the polymorphonuclear leucocytes has been demonstrated (9-10).

Successful treatment of infections in the diabetic requires early and exact diagnosis, the exhibition of the correct antimicrobials, the treatment of the diabetic state and associated disorders and prompt surgical intervention where required. Good control of blood glucose in diabetic patients is a desirable goal in the prevention of certain infections and to ensure maintenance of normal host defense mechanisms that determine resistance and response to infection (10).

In certain cases, large soft tissue defects exist following surgical excision of the carbuncle. Such defects require soft tissue coverage, once the infectious process has settled. Split thickness skin grafts serve as a simple quick surgical solution for certain defects, however, local flaps can cover such defects effectively with better cosmetic results than split thickness skin grafts.

Conclusion

Carbuncle in diabetic patients can result in significant soft tissue defects of the involved skin region. Following proper diagnosis and management, surgical reconstruction of such defects can be simple with skin grafts. However, transposition of local skin flaps gives better durable soft tissue coverage with better cosmetic outcome.

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Fig 1. Skin carbuncle-nape of the neck



Fig 2. Multiple skin carbuncle - Back



Fig 3-a Chest carbuncle



Fig 3-b Chest carbuncle following closure with skin graft



Fig 4-a Back carbuncle- Outline of Limberg transposition skin flap



Fig 4-b The soft tissue defect after closure with local transposition flap

