

Application of Fine Needle Aspiration Biopsy and Immunohistochemical Diagnostic Markers in the Identification of Oral Primary B-cell Lymphoma

Abdelraheem R. Elgendy, Mohamed H. Salama, S.Karthiga Kannan

The Level of Readiness to Make Changes towards Reaching and/or Sustaining a Healthy Weight among Male Students of Qassim University

*Ahmad A. Alrasheedi , Rayan A. Alrebdi , Muath M. Alneghaimashi, Yasser A. Altwaijry,
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**Obstructive Sleep Apnea Among People With Type 2 Diabetes in Saudi Arabia:
A Cross-Sectional Study**

Algeffari M, Alkhamis A, Almesned A, Alghammas N, Albulayhi S, AlGoblan A

**IN THE NAME OF ALLAH,
THE MOST GRACIOUS,
THE MOST MERCIFUL**

Kingdom of Saudi Arabia
Ministry of Education
Majmaah University



MJHS

Majmaah Journal of Health Sciences

A Referred Academic Journal Published by the
Publishing and Translation Center at Majmaah University

Vol. 6 No. (2) September, 2018 - Muharam 1440 ISSN: 1658 - 645X



Publishing & Translation Center - MU

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Majmaah Journal of Health Sciences

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Editorial

From Editor's Desk.....



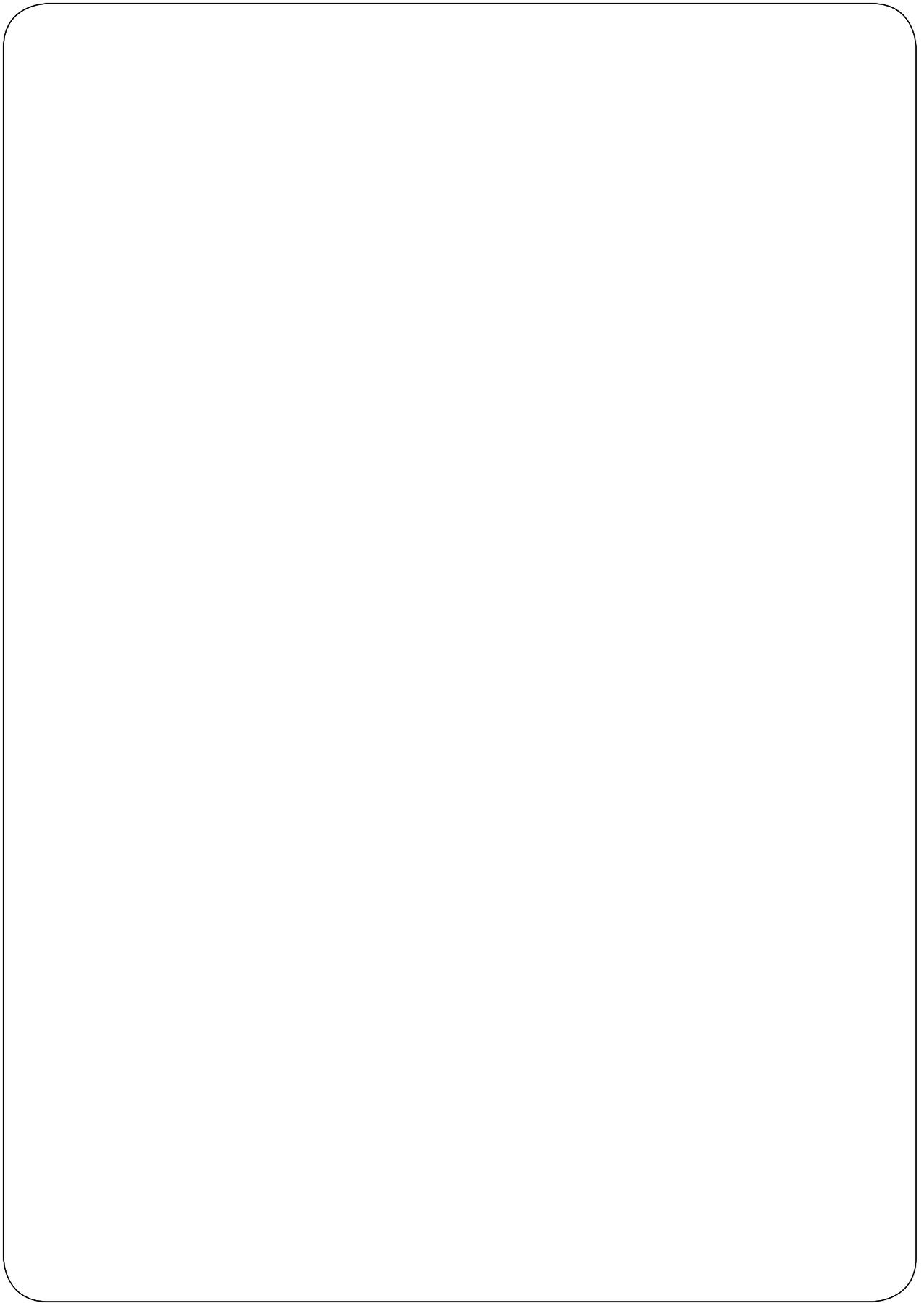
It's a great pleasure once again to reach you all through the 12th issue of MJHS. Let me start by expressing my gratitude to our beloved Rector Dr.Khalid Bin Saad Al Meqrin and Vice Rector for Post graduate Studies and Scientific Research Prof.Dr.Mohammad Bin Abdullah Al-Shaaya for the trust endowed upon me.

I am very much satisfied with our online submission platform EJ manager, small hurdles of handling the software program by editorial members, reviewers and authors were addressed promptly and further improvements will be made. Glad news is that our journal is at the verge of getting indexing in WHO approved list of journal, and soon our journal will get its place in it. Thanks to the editorial team for their continued hard work and perseverance.

On behalf of the editorial board I assure that we will continue to work hard for improving the quality of the journal and strive to make this as a reputable academic platform for authors in and outside Kingdom to exhibit their scientific skills.

Dr.Khalid Bin Mohammed Alabdulwahab

Editor in Chief



Contents

Editorial v

Letter to Editor

Gaps in curricula of medical schools: some neglected topics

Awad Mohamed Ahmed, Hatem Mohamed 1

Original Article

Application of Fine Needle Aspiration Biopsy and Immunohistochemical Diagnostic Markers in the Identification of Oral Primary B-cell Lymphoma

Abdelraheem R. Elgendy, Mohamed H. Salama, S.Karthiga Kannan 10

The Level of Readiness to Make Changes towards Reaching and/or Sustaining a Healthy Weight among Male Students of Qassim University

*Ahmad A. Alrasheedi, Rayan A. Alrebdi, Muath M. Alneghaimashi,
Yasser A. Altwaijry, Salem A. Alayed, Basil M. Alharbi* 22

Obstructive Sleep Apnea Among People With Type 2 Diabetes in Saudi Arabia: A Cross-Sectional Study

Algeffari M, Alkhamis A, Almesned A, Alghammas N, Albulayhi S, AlGoblan A 32

The Effect of Extracorporeal Shock Wave Therapy for Patients with Diabetic Frozen Shoulder

Mohamed K. Seyam, Ezzat E. Moubarak, Abdul Rahim Shaik 40

Prevalence & Perception of CAM Usage in Majmaah, Kingdom of Saudi Arabia

*Syed Yousaf Kazmi, Waqas Sami, Saud Ibnsaut Alharbi, Meshaal almeshaal,
Anas Alzahrani, Fahad Alyousif, Osama Alenezi* 50

Contents

| | |
|-------------------------------------|-----------|
| Publication Guidelines | 62 |
|-------------------------------------|-----------|

Letter to Editor

Gaps in Curricula of Medical Schools: Some Neglected Topics

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Abstract

In this paper we discuss that some important teaching topics are usually missing in curricula of medical schools. Examples taken were medical humanities, religious practices of importance to health and disease, euthanasia and domestic violence. The rationale of introducing these topics to undergraduate curricula and possible barriers were discussed. The is supplemented with two tables contain suggested components for sample lectures in Ramadan fasting as a religious practice of significant impact on health, and another sample lecture on domestic violence. Curricular reforms are needed to include these 'neglected' topics in curricula, and also to establish training programmes for doctors in the internship periods. The national bodies responsible of organizing and accrediting schools and programmes should ensure including the 'neglected' topics in curricula of medical and allied programmes.

Keywords: medical education, curricular reforms, medical humanities, euthanasia, religious practices, domestic violence

Introduction

It is noticed that some topics are either not included in curricula of medical schools, or not properly taught, despite their significant importance to health and disease. The result is that generations of doctors feel unprepared or incompetent to handle some health problems. Examples of such topics include euthanasia, domestic violence, medical humanities

المخلص

في هذه الورقة يناقش المؤلفون مسألة اهمال تدريس بعض الموضوعات التدريسية في كليات الطب. من امثلة هذه الموضوعات المهملة الانسانيات الطبية والعنف الاسري و تأثير بعض الشعائر الدينية مثل صوم رمضان على الصحة و القتل الرحيم. الورقة تناقش مبررات ادخال هذه الموضوعات لمناهج الكليات الطبية، كما تقدم مقترحات هيكلية لمحاضرات في بعض تلك الموضوعات. هناك حوجة ماسة لاجتراح تغييرات منهجية في كليات الطب للتعامل الايجابي بما يختص بتدريس تلك الموضوعات المهملة.

كلمات مفتاحية: التعليم الطبي، النسانيات الطبية، العنف الاسري، القتل الرحيم

and impact of some religious practices on health (e.g. Ramadan fasting) on health and disease. This may lead to hindrance of providing therapeutic and preventive care to these problems. Even more, lack of screening of a problem like domestic violence leads to its escalation and sustainability of victims' abuse.¹ Some studies indicated the importance of doctors' teaching in modulating unhealthy

lifestyles.²

The barriers usually stated for ignorance of these topics include time constraints in an overwhelmed curricula, the negative view of some curriculum designers toward these topics as ‘irrelevant’ or even outside the scope of medical education, lack of training or interest of teachers in such topics and tendency to defer these topics to the internship period.³

Curricular reforms are needed to include the ‘neglected’ topics, and also to establish training programmes for doctors in the internship periods. The medical councils (or national bodies that organize medical education and practice) should encourage medical schools to perform the relevant curricular education and reforms. Development of capacity of teachers to handle the new topics is useful to fill the gaps.

Medical Humanities

Medical humanities are a set of human and social sciences, and arts that have applications relevant to medical practice, including cultural studies, philosophy, religion, literature, history, theology, anthropology, health laws, ethics, visual arts, and psychology.⁴ The term ‘humanities’ is used interchangeably to include also social sciences such as sociology and anthropology. By now medical humanities are well integrated in curricula of medical schools in North America, Europe and Australia for more than four decades. Even more, some universities has started postgraduate programmes in medical humanities.⁵

Medical educators who advocate inclusion of humanities in curricula provide

convincing reasons. Students (future doctors) should be sensitive and have an open attitude to issues such as gender differences, sexual orientation, and cultural diversity.⁶ Some skills that are useful for better practice are usually learned from study of humanities including observation (arts), critical thinking (philosophy), empathy, analysis, initiation and leading simple negotiations (literature), deep knowledge of human experiences, and acceptance and understanding the differences and ambiguity (cultural studies).⁷ Impact of culture on health, illness and self-reactions to body is well established. There is an increasing recognition of apparently social problems such as domestic violence as ‘public health concerns’ and their investigations need some knowledge of humanities tools.⁴ Teaching on cultural diversity should focus on initiating and improving the communication between doctors and patients, and not as a way to avoid legal consequences of miscommunication and misunderstanding.⁸

In fact, a simple act such as providing a Muslim patient a special meal to break his religious fasting may send a good message of respecting the religious differences.⁹ Students are better reminded that the ‘normal’ that is decided by a dominating group in a society, may mean oppression for other groups in the same nation.⁶ Religious studies (a good symbol of human diversity) promote the student’s knowledge of the impact of the patient’s spirituality on his views on health and disease issues. Some religious practices, e.g. fasting may have effects on health and need some

effort to exert caution to avoid any harm on health. At times, there is a need to assess how students' beliefs may affect his future medical practice.¹⁰ Of course it is illogical to seek biological explanation of disease from religions, but we focus on impact of religious beliefs, and practices on health care. For example, alcohol is strictly prohibited in the Islamic religion; there is a question on how a Muslim doctor can advise a non-Muslim patient on this issue.

One of the humanities that have a significant importance is philosophy. Study of philosophy sharpens the thinking skills needed for analysis of concepts, critique of ideas and sound reasoning.¹¹ These skills are useful in both medical study and practice. For example, philosophy helps in understanding the concepts of health and disease, and help to better reading and interpreting the patients' experiences and their views on health and disease, in the light of their sociocultural status. It is better that philosophy is taught integrated into the relevant items and themes in the curricula e.g. as philosophical points in the problem based learning topics, and not as traditional lectures on its classical abstract questions of philosophy such as epistemology or metaphysics.¹¹

There are barriers of inclusion of medical humanities into curricula of medical schools in many parts in the world. The most important barrier is the negative view of some students and educators on medical humanities that they may take them away from the study of 'real medicine', or that it make no

difference when doing their practice.¹² They believe that doctors are required only to be clinically competent. There is lack of staff training, or even familiarity with terms of humanities. The over-reliance on technologies alone may leads to diversion from "human" skills in practice.⁸

Some solutions can be applied to initiate and promote the status of teaching humanities in medical schools. Students should be encouraged to accept multiculturalism as a positive value. They will then enjoy learning about, and tackling patients of diverse cultures. Thus, eliminates a source of misunderstanding and secure good health care. A good course design may change the negative attitudes of students toward humanities teaching, with a flexible teaching and assessment methods. The resisting staff can be assured by that teaching of humanities would be just an 'adjunct', and not at the expense of the core of medical study. The curricular designers are required to focus on evidence-based materials rather than opinions. There is a need to develop postgraduate programmes (in liaison with relevant programmes of humanities and social sciences in other schools of the university) to train a generation of teachers with interest and good capabilities to introduce themes of humanities in their teaching.⁹ The accrediting bodies of higher education institutions should encourage the medical schools to include new topics on their curriculum including humanities.

Impact of Religious Practices on Health:

Ramadan Fasting As an Example

As an example of applicability of religious studies in medical practice, we will take Ramadan fasting as an example. Ramadan fasting is one of the five pillars of the Islamic religion, where the adult Muslim is required to abstain from foods, drinks, medications, smoking and sex from dawn to sunset for one month every year.¹³ The children, the sick, the pregnant and lactating ladies and the travelers are exempted from fasting, but many of them insist to fast including, sometimes, the fragile elderly. Ramadan as a month constitutes 8.5% of the total age of the Muslim. Ramadan has effects on the health status of persons with acute and chronic diseases.¹³ Although, from the religious point of view, the decision to fast is individual, but the role of the doctor is to advise the patients (especially with chronic diseases) on any potential risks due to fasting so as to make it a safe practice. To provide an informed advice, the doctors should be aware to the basic facts on Ramadan, both religious, and its impact on health and disease.

There is an increasing interest of the academia and medical profession with health-related aspects of Ramadan fasting. Up to December 2016, the PubMed had revealed around 700 articles on impact of Ramadan on chronic diseases.¹⁴ The EPIDAR (epidemiology of diabetes and Ramada) study on impact of Ramadan on diabetic patients involved 11,173 Type 2 and 1070 Type 1 diabetic patients during Ramadan.¹⁵

Despite the interest of research centers in

Ramadan studies, but the situation in medical schools is different. Ramadan fasting is almost not covered in medical schools curricula, even in Muslim countries, despite its profound impact on health and diseases. The rationale strongly exists for inclusion of Ramadan fasting in both undergraduate curricula and training programmes of continuing medical education. Travelling around the world is easier nowadays so that many Muslims may attend Ramadan in a non-Muslim country; at the same time there are many Muslim communities in non-Muslim countries, some of them are sick and may need medical consultations regarding safety of Ramadan fasting. So the non-Muslim health personnel may benefit from a teaching stuff on Ramadan. In some Muslim countries such as the Gulf countries, a considerable portion of the health personnel are non-Muslim, that they deal with Muslims patients who may need consultations regarding Ramadan fasting. So they need to have some knowledge about religious and health related issues associated with Ramadan fasting.

Table 1 contains points suggested for a sample two hour lecture on Ramadan fasting for undergraduate medical students.

Table 1 Previous studies

Suggested points for a sample lecture on Ramadan fasting for undergraduate students

| | |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Basic facts on Ramadan | Who are required to fast, and who are exempted from fasting; Duration of Ramadan, duration of fasting hours per day. |
| Physiology of Ramadan fasting: | Hydration status, changes in glucose, lipids, uric acid, urea, creatinine, sodium, potassium, haematology, gastrointestinal functions...etc |
| Ramadan and the sick: | Impact of fasting on selected common disease, e.g. diabetes, dyslipidaemia; the informed decision of not to fast for persons with some diseases such as renal failure; disease that may need some precautions on fasting; minor tolerated symptoms such as mild headache due to deprivation of caffeine or nicotine. |
| Guidelines for a safe fasting: | Decision of safety of fasting; ill persons reminded of the religious allowance not to fast, patients with chronic diseases should consult their doctor shortly before Ramadan to decide on safety of their fasting, and what precautions needed in case of fasting; dietary requirement for both the healthy and ill person. |

Euthanasia

Euthanasia is rooted back to the Hippocrates age (borne 460 before the Christ) who stated in his Oath that giving deadly drugs to patients is forbidden. There are deficiencies in undergraduate teaching on euthanasia; some medical schools do not include it in their curriculum, and some focus only on teaching factual theoretical knowledge and concepts of bioethics including euthanasia. This teaching format may not be as appropriate, as methods like case-based teaching or debate initiation for this issue which has no a yes/no response to many of its problems.

performed by the first author (AMA) had confirmed the desire of undergraduate students to engage in the current international debate on the issue of euthanasia.^{16,17,18} One of these studies was performed among final year medical students in the oldest Sudanese medical school, with a response rate of nearly three quarters of the participants who were divided between opponents majority and supporter minority for euthanasia. The opponents stated reasons such as religious beliefs, fear of misuse if legislated and unethicity of this act.¹⁶

Those who supported euthanasia stated reasons such as saving dying patients intractable sufferings, and respecting persons' autonomy and dignity.¹⁶ It is needless to say that the current opposition of students to euthanasia should not preclude its inclusion as a teaching topic. The situation may change in a coming day.

As a sensitive and ambiguous issue, teaching of euthanasia need some requirements. It should be taught from a neutral stand, away from the personal views of teachers. Clear definitions of relevant terms should be used, avoiding confusing terminologies.¹⁹ Innovative teaching formats that encourage interaction, problem solving and debate initiation are more useful than the traditional lectures that cover the knowledge domain only. The student (future doctor) must learn a rational approach to handle euthanasia as an issue 'full' of uncertainties and ambiguities that he or she must be tolerant to.²⁰ Even the assessment methods may need to be modified to suit a debatable issue like euthanasia that has no yes/no responses to many of its aspects.

Domestic Violence

Domestic violence (DV) is an overwhelming public health problem throughout the world. One in ten women in North America is battered by her intimate partner.²¹ In Turkey, the prevalence of DV is ranged between 34 and 58.7%.²² A study done by the first author in Sudan revealed a DV incidence of 41.6%.²³

Not a few doctors bear the belief that DV is not a health problem. But why DV is a

health problem? Domestic violence results in a wide range of health problems, organic, mental and sexual.²⁴ Up to 1-2 out of ten women attending emergency departments may have problems rooted to.²⁵ Also some apparently unexplained problems such as chronic pains, fatigue, headache, anxiety or sleeping disorders may be due to DV.²⁴ Biological effects of pregnancy, drug addiction, problem alcohol drinking may increase the risk of violence in families.

Health care of abused victims suffers many deficits. Health carers believe that DV is a rare, purely social problem, and thus, case identification is not their role.²¹ A survey done in Sudan indicated the low knowledge and preparedness of health personnel to manage DV cases.²⁶ What is worse is that some health personnel may share the same negative societal values against the abused women (deserve to be punished by husbands).²² The low (or even no) place of DV in curricula results in suboptimal capabilities of graduating doctors to deal with the abused women. Some studies had reported that health professionals including doctors are not well prepared to meet the requirements of care of abused women, and even do not know what simple questions to ask to identify the possibly abused woman.²⁷ Sixty per cent of the Canadian health professionals in one study reported that they never received education on DV.²⁷ A survey in 116 North American medical schools revealed that 53% of them did not offer training in DV. Ten years later, another survey revealed that 40% of them do not offer training on DV.²⁷ Even

in the few schools that offer training in DV there are some shortcomings.²⁷ The content of the teaching material is incomplete, time dedicated is scanty and instruction methods are inappropriate.²⁷ In many schools there is an interdepartmental competition for instruction time (and what is relevant and irrelevant from their own point of view), leaving DV and some other topics such as medical humanities “marginalized” in schools’ curricula.

Domestic violence is rarely (if ever) included in medical schools’ curriculum in many parts in the world, so the doctors and other health personnel are not taught or trained to identify, support or refer DV victims.²⁸ Training of medical students on DV enhances the preparedness and confidence on dealing with DV cases.²⁷ The unprepared doctor may harm victims by minimizing their sufferings and increasing their sensation of entrapment.²⁶ It should be made clear to the curriculum designers that the health care professionals are obliged to care the victims of DV like other patients. An easy and time saving way to face the ‘traditional minds’ in schools is to incorporate DV in the problem based ‘scenarios’ in the relevant body systems. There is a need for studies to investigate the knowledge and attitude of doctors on DV as a step toward designing an appropriate course for both under- and postgraduate studies.²² Some educators advocate that teaching of DV adopt a case finding or diagnostic approach, that is similar to the core curriculum of clinical medicine, and this may enable doctors to deal with a large sectors of victims that suffer health sequelae

of DV in silence, and usually ‘misdiagnosed’ by inexperienced doctors. Table 2 shows suggested components of a sample lecture on DV for undergraduate student, suitable for medical and other allied health disciplines

Table 2
Suggested points for a sample lecture on domestic violence for undergraduate students

| |
|-------------------------------------------------------------------------------------|
| •Definition of domestic violence |
| •Why domestic violence is a health problem |
| •Who batters who in domestic violence |
| •Causes, risk factors and immediate triggers of violent events in domestic violence |
| •Patterns of domestic violence |
| •Possible responses of the abused wife |
| •Health sequelae of domestic violence |
| •Major lines of management of domestic violence cases |
| •Steps in prevention of domestic violence |
| •What is expected of scientific research |

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Original article

Application of Fine Needle Aspiration Biopsy and Immunohistochemical Diagnostic Markers in the Identification of Oral Primary B-cell Lymphoma

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Received on 23.3.2018; accepted on 12.9.2018

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Abstract

Objectives: The current research aimed to evaluate the role of fine needle aspiration biopsy (FNAB) and CD3, CD20 and CD45 in the identification of oral primary diffuse large B-cell lymphoma (DLBCL).

Materials and methods: This is a descriptive clinical study. Ten patients clinically diagnosed as DLBCL in a tertiary level hospital in Qassim, Saudi Arabia; were included. Fine needle aspiration and incisional biopsies were taken from each patient and processed in the appropriate manner. Histopathological confirmation was done using haematoxylin and eosin stained specimens. Other sections were taken for the immune-histochemistry using a standard strept-avidin-biotin peroxidase procedure and monoclonal antibodies, including CD3, CD20 and CD45.

Results: The obtained results showed positivity of FNAB in 7 cases and three cases were inconclusive. Strong positive immune reaction was revealed with CD20 and CD45, while CD3 was negative in all studied cases.

Conclusion: These findings indicated the diagnostic significance of FNAB, CD20 CD45 and CD3 in proper diagnosis of oral DLBCL. More research is necessary for predicting the prognostic importance of these molecular markers in oral lymphomas.

Key words: B-cell lymphoma, CD3, CD20, CD45, FNAB.

أهمية استخدام خزعة الابر الدقيقة وبعض الدلالات الهستوكيميائية في التشخيص السليم لسرطان الغدد الليمفاوية الفموية الأولى من النوع-ب الملخص

هدفت الدراسة الى استعراض أهمية استخدام خزعة الابر الدقيقة وبعض الدلالات الهستوكيميائية (سي دي-3 وسي دي-20 وسي دي-45)، في التشخيص السليم لسرطان الغدد الليمفاوية الأولى الفموية من النوع-ب. تم اختيار 10 مرضى للمشاركة في الدراسة تم تشخيصهم اكلينيكيًا بسرطان الغدد الليمفاوية الفموية الأولى من النوع-ب. تم أخذ خزعات جراحية وخزعات الابر الدقيقة من الفم وتم تجهيزها معملًا بالشكل المطلوب لإعداد الشرائح النسيجية اللازمة للفحص المجهرى الداعم للتشخيص السليم، وكذلك الشرائح النسيجية المعالجة مناعياً لعمل فحص مجهرى مناعى لكلا من سي دي-3 وسي دي-20 وسي دي-45.

خلصت الدراسة إلى أهمية استخدام خزعة الابر الدقيقة وبعض الدلالات الهستوكيميائية (سي دي-3 وسي دي-20 وسي دي-45) في التشخيص السليم لسرطان الغدد الليمفاوية الفموية الأولى من النوع-ب، مع أهمية عمل دراسات أخرى لرصد دور تلك الدلالات النسيجية التشخيصية في التنبؤ بالمرض.

الكلمات المفتاحية: تشخيص سرطان الغدد الليمفاوية الأولى من النوع-ب، سي دي 3، سي دي 20، سي دي 45، خزعة الابر الدقيقة

Introduction:

Primary oral lymphomas are scarce and among different types diffuse large B-cell lymphoma (DLBCL) is the most widely recognized type.^[1] DLBCL is prognostically typed as subgroups like germinal center B-cell like (GCB) and non-germinal center B-cell like (non-GCB) lymphomas based on gene and immunohistochemical expression.^[2]

DLBCL is the highly prevalent subtype of non-Hodgkin's lymphoma (NHL) and is one among the five common malignant tumors, representing 30 to 40%. It occurs in bone marrow, gastrointestinal tract (GIT) and also in intraoral sites.^[3] Though, the rate of oral primary DLBCL has not been previously listed in the literature.^[1-4] The onset of DLBCL is usually occurs between 50-70 years of age with a slight male predilection than females.^[5] In the oral cavity lesions usually occur in palate or maxillary vestibule as ulceroproliferative mass with symptom like pain, difficulty in eating.^[6-8]

Diffuse proliferation of large neoplastic B cells with the same nuclear dimension of macrophage or larger than lymphocyte is the diagnostic criteria for DLBL.^[9-11] It is a heterogeneous group of neoplasm characterized with inconstant genetic, immunophenotypic and clinical specifications that sometimes lead to misdiagnosis. Thus, the need for diagnostic parameters such as Fine needle aspiration biopsy (FNAB), CD45, CD3 and CD20 will be helpful in differentiation and in definite diagnosis of DLBCL from other

variants.^[12-14]

FNAB could play a vital role in the diagnostic workup for neoplastic and non-neoplastic oral lesions. It is non-expensive, less invasive, has more predictive value and provides rapid diagnosis and therefore could replace the open biopsy and avoid its potential complications.^[15-16] Many scientific researchers have documented the efficacy of FNAB in establishing the correct diagnosis of lesions in the head and neck region.^[17-23] FNAB is considered as an important tool in the initial diagnosis of Hodgkin's lymphoma (HL) and Non-Hodgkin's lymphoma (NHL) in many studies, only few reports explored the prospective of FNAB for diagnosis of intraoral lesions, particularly oral lymphomas.^[24-29]

CD3 is a co-receptor molecule. Protein tyrosine kinase (PTK) along with the T-cell receptors (TCRs) forms TCR/CD3 complex that plays a role in the signal transduction on antigenic stimulation.^[30-35] CD3 molecules are located on 11q23 and 1q22 gene loci and are characteristically expressed on the surface of matured T lymphocytes. This could explain the possibility of using CD3 marker for differentiating between T and B lymphocytic lesions.^[36-38] Many investigators described aberrant expression of specific T-cell antigen, CD3 in DLBCL in variable ages.^[39-44] CD20 or L26 is a transmembrane-embedded, non-glycosylated phosphoprotein of 33-37 KD, located on 11q12 gene locus and typically expressed on the surface of the precursors and matured B lymphocytes.^[45] It plays a critical role in regulating the transmembrane conduction of Ca in

B lymphocytes and regulate its proliferation and differentiation.^[46] Many studies reported the effective role of CD20 in identification of B-cell derived neoplasms.^[47-52] Many similar studies documented the CD20 expression in B-cell lymphomas.^[49-53]

CD45 or Leukocyte Common Antigen (LCA) is a monoclonal antibody that can be used to identify leukocyte cellular surface marker protein using immunohistochemistry in formalin-fixed paraffin-embedded human tissues.^[54] In leukemia and NHL most of the neoplastic B and T lymphocytes will be stained and the neoplastic myeloid and erythroid cells are not stained.^[55-59] Other reports showed that CD45 is a reliable marker for tissues in paraffin block fixed with formalin and can be a pan lymphocyte reliable marker for lymphomas.^[30,31,54-59] The current research was done to assess the use of FNAB, CD3, CD20 and CD45 in proper diagnosis of oral primary DLBCL.

Materials and Methods:

The present descriptive research was carried out in the dental out patients department of King Fahd Specialist Hospital (KFSH) Al-Qassim, Saudi Arabia. Patients were screened for oral primary DLBCL from January 2016 to January 2017. Ten patients including both male and females were included and the fine needle aspiration was performed in the clinic of Histopathology/Cytopathology Unit of Prince Faisal Oncology Center, Buraidah, Al-Qassim, Saudi Arabia. The study was approved by the Institutional ethical committee. A written willingness was

obtained from all participants included in this research.

Patient details including age, sex, site of involvement and clinical characters were obtained from the medical records. Povidone-iodine solution was used for preparation of the lesion site. The FNAB was done with 21–25 gauge needle with a 20-ml syringe without local anesthesia. The needle was inserted inside the lesion and aspirated after a pass, again the needle was inserted in a different direction and the procedure was repeated. The aspirated content was spread over a glass slides and 95% ethyl alcohol was used to fix for hematoxylin and Eosin (H &E) staining and air dried for Leishman staining. Proper diagnosis was made based on the cytological findings. An incisional biopsy was taken from each patient and all tissue specimens were fixed separately in 10% neutral formalin solution and then processed as paraffin wax blocks. Thin tissue sections of 5 μ m thick from the paraffin wax blocks are made and stained with haematoxylin and eosin (H & E) for histopathologic analysis and confirmation of diagnosis in all cases. Cytopathological diagnosis was correlated with the histopathological diagnosis.

Other sections 4 μ m thick were taken from the specimen blocks and processed for immunohistochemistry using a standard strept-avidin-biotin peroxidase procedure,^[50] and monoclonal antibodies including CD3, CD20 and CD45 at a dilution of 1:100. The chromogen substrate for development of the peroxidase activity was 3, 3' Diaminoben-

zidine (DAB). The universal kit, the monoclonal antibodies and the chromogen were purchased from DAKO, glostrup, Denmark. Tissue sections were counterstained with Mayer's haematoxylin, dehydrated and cover slipped with a permanent mounting medium. To evaluate the immune-histochemical staining grades, at least 10 high power fields throughout the tumor population exhibited cytoplasmic staining sections were examined in each case. Immunoreactivity by more than 10% of the tumor was considered positive and if 10-25% of tumor cell get stained it is considered as weak positive staining, 26-50% is mild, 51-75% is moderate and 76-100% is strong. Statistical analysis of the obtained data in all studied cases was performed by using the Chi-square test to evaluate the predictive or significant value of FNAB, CD3, CD20 and CD45 in proper diagnosis of oral primary DLBCL.

Results:

Clinical Characteristics:

Among the participants six patients were males and four were females. Patients were ranging in age from 45 - 65 years. All studied cases showed clinically diagnosed tumors of different intraoral sites, including floor of the mouth (2/10 cases), posterior tongue (2/10 cases), soft palate (2/10 cases), retro molar area (2/10 cases), buccal mucosa (1/10 case) and maxillary vestibule (1/10 case). Intra-oral examination of nearly all involved sites showed slowly growing painless soft tissue mass of variable size without ulceration or other surface changes. Participants

had no signs of other diseases in the body.

Fine Needle Aspiration Biopsy:

Ten cases of intraoral DLBCL were evaluated by FNAB before histopathological examination. Seven (70%) cases were cytologically diagnosed as DLBCL and three cases (30%) were inconclusive or atypical, but all were found to be true DLBCL on histological examination (Figure 1).

Histopathological Examinations:

Evaluation of H&E stained slides from each specimen was independently carried out. Agreement was reached in all 10 cases, showing classic morphologic features of DLBCL. Sections showed neoplastic lymphoid tissue containing sheets of diffuse large, round or oval shaped atypical lymphoid cells with big round nuclei, prominent nucleoli with basophilic cytoplasm (Figure2). A few immunoblasts and scattered mature lymphocytes were also seen throughout the lesion.

Comparative analysis of FNAB with Histopathologic Features:

It was interesting to note that all of DLBCL lesions reported in FNAB matched with the histopathological findings of DLBCL. While three inconclusive cases with FNAB also showed the histopathological features of true DLBCL.

Immunohistochemical Findings:

Immunohistochemical results of all tissue samples of this study are summarized in table1. Immunoreactivity was independently assessed by the investigator to reach agreement on all examined cases. The immunohistochemical expression of CD3 monoclonal

antibody was negative in all 10 specimens (Figure 3). On the other hand, immunostaining of CD20 immune marker revealed strong positive cytoplasmic membrane staining of tumor cells in all studied cases (Figure 4). CD45 expression was obviously evident in all cases of this study as indicated by presence of strong positive cytoplasmic membrane localization of the neoplastic cells (Figure 5). CD3, CD20 and CD45 immune markers were significantly associated in all studied cases (Figure 6).

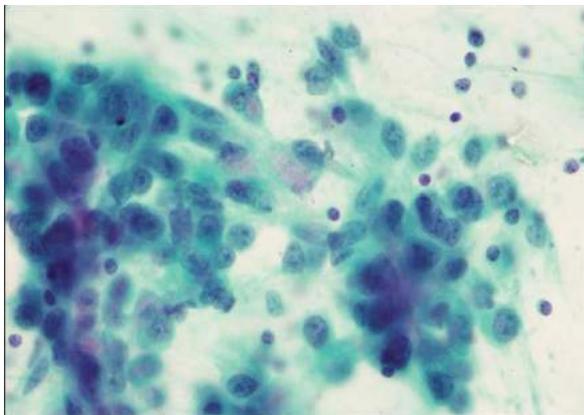


Figure (1): FNAB showing large, round and oval shaped atypical lymphoid cells with large round nuclei, prominent nucleoli and basophilic cytoplasm. (Leishman stain, X 200)

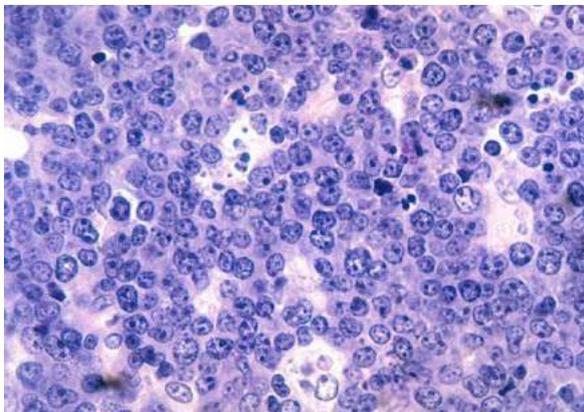


Figure (2): DLBCL showing diffuse large, round and oval shaped atypical lymphoid cells with large vesicular round nuclei, prominent nucleoli and basophilic cytoplasm with few immunoblasts scattered throughout the lesion. (H&E stain, X 200)

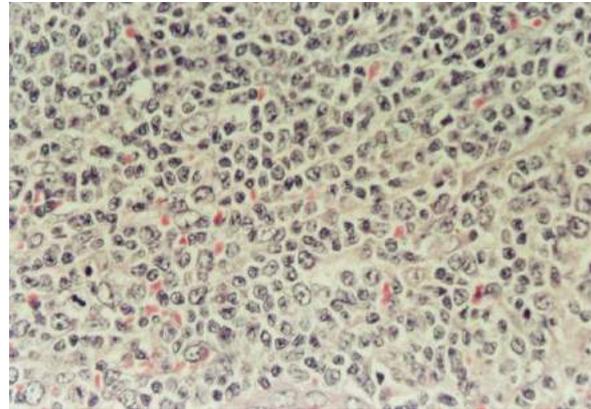


Figure (3): Immunohistochemical expression of CD3 showing negative staining of the abnormal lymphoid cells (strept- -avidin -biotin tech., X200)



Figure (4): Immunohistochemical staining of CD20 showing strong positive staining of atypical lymphoid cells (strept- -avidin -biotin tech., X200)

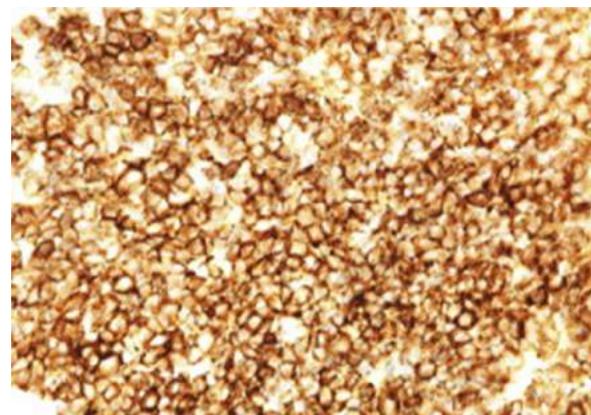
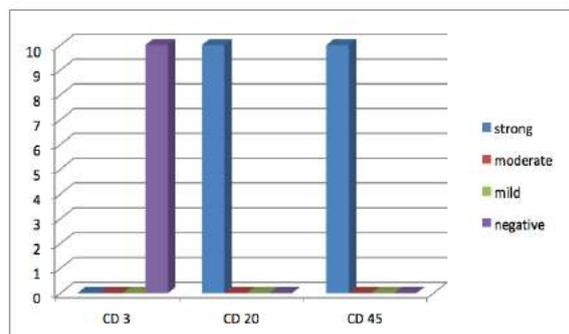


Figure (5): Immunohistochemical staining of CD 45 showing strong positive cytoplasmic reaction of atypical lymphoid cells (strept- -avidin -biotin tech., X200).

Figure (6): Diagram showing immunohistochemical expression of CD3, CD20 and CD45 immune markers in oral DLBCL



Discussion:

Hodgkin's lymphoma (HL) and non-Hodgkin's lymphoma (NHL) are the two types of lymphomas, the malignant neoplasm arising from lymphoid tissue.^[53] DLBCL is one of the most common subtypes of NHL. The biology of DLBCL has been clarified greatly by studying their morphologic findings, antigenic features and immunologic properties. New reagents (such as monoclonal antibodies), new techniques (such as immunohistochemistry) and new instruments have significantly enhanced the understanding of DLBCL.^[60,61] Correlation of clinical and immunologic findings is crucial at arriving at correct diagnosis of not only DLBCL, but also in all lymphomas.^[62-63]

The current research depicts the significant role of FNAB and some monoclonal antibodies, including CD3, CD20 and CD45 in definite diagnosis of oral DLBCL. FNAC/FNAB is a relatively less-invasive and valuable procedure that provides helpful information about neoplastic and non-neoplastic

intraoral and oropharyngeal lesions. In the current study ten cases of intraoral DLBCL were evaluated by FNAB before histopathological and immune-histochemical examinations. Seven cases (70%) were diagnosed as DLBCL and 3 cases (30%) were inconclusive or atypical, but were found to be DLBCL on histological examination. This finding indicated that the precision of the FNAB method in proper diagnosis of DLBCL. According to Florentine et., al FNAB results have accuracy similar to those of the regular biopsy.^[64] Similar studies described the importance of FNAB in establishing the diagnosis of oral and oropharyngeal lesions with high grades of sensitivity, specificity and accuracy.^[17-29]

The immunohistochemical expression of anti-CD3, a protein tyrosine kinases (PTK) with the T-lymphocytes receptors (TCRs) forming TCR/CD3 unit that is concerned with the signal transmission on antigenic stimulation, in all 10 DLBCL cases studied was negative. Our results agreed with the findings of many investigators, who demonstrated the negative immunoreactivity of anti-CD3 in neoplasms of T-cell types.^[65-70] However, such CD3 specificity was also confirmed in the third and fourth international workshops and conferences on human leucocytes differentiation antigens.^[71-73]

It has been widely accepted that advances in cellular immunology have provided insight into the normal pathways of lymphocytes development and the cellular origin of lymphoid neoplasms. Also, with the development of monoclonal antibodies directed

against cell-surface antigens that distinguish B and T lymphocytes at defined differentiation stages, it become apparent that the immunohistochemical expression of CD20, a trans-membrane embedded, non-glycosylated phosphoprotein of 33 to 37 KD, expressed throughout the B-cell life, was strongly positive in all studied cases of oral DLBCL.^[74] This finding explains the possibility of uses of CD20 as a reliable marker for distinguishing B-cell lymphoproliferative diseases from T-cell diseases. Consistent with this context, many previous studies reported the positive expression of CD20 in virtually all cases of B-cell disorders. Thus, CD20 expression is of greater diagnostic value than other markers for distinguishing tumors of B-cell origin as oral DLBCL.^[74-78]

Finally, Immunohistochemical expression of CD45 / LCA in all intraoral DLBCL cases of this study demonstrated strong positive cytoplasmic immunoreactivity of the neoplastic lymphoid cells. This finding was in agreement with that of many other studies performed on DLBCL of non-intraoral locations.^[54-59] Thus, it is generally accepted that the expression of LCA in neoplasms of lymph nodes and extra nodal sites of the oral cavity is an excellent indicator of cellular origin and it should be used for this purpose.

In conclusion, the current research showed the importance of FNAB and immunohistochemical identification of CD3, CD20 and CD45 for a specific diagnosis of oral DLBCL. Although the clinical and therapeutic significance of their expression in DLBCL

is still not fully understood, further research is necessary to confirm the prognostic importance of these molecular markers particularly in oral lymphomas.

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Original article

The Level of Readiness to Make Changes Towards Reaching and/or Sustaining a Healthy Weight Among Male Students of Qassim University

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Received on 31.5.2018; accepted on 8.9.2018

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Abstract:

Objectives: To estimate the distribution of the stages of change, which categorize the progression towards reaching and/or sustaining a healthy weight among male students of Qassim University.

Methods: A cross-sectional study was performed among male students of Qassim University during the 2016-2017 academic year. A random sample was carried out with an estimated sample size of 297. The data were obtained from a self-administered questionnaire. The weight and height of each study participant were measured by the researchers.

Results: Among the 264 male students who agreed to participate, 46% were within a healthy weight range while 6.9%, 21.4%, 21.8% and 4.8% were underweight, overweight, obese and morbidly obese, respectively. About 72.3% of the students were in the preparation, action, or maintenance stages (i.e. advanced stage) of reaching or maintaining an ideal weight, especially those who were of healthy weights, overweight or obese. Logistic regression was performed to ascertain the effects of the study variables on the likelihood that participants were in the advanced stage and revealed statistically significant association only for the importance level of reaching and/or sustaining the healthy weight and the adherence to regular exercise.

Conclusion: A large proportion of the students were in the advanced stage of reaching or maintaining an ideal weight. Only about half of the participants had a healthy body weight. Educational programs should be designed and implemented at all educational levels and in the community for raising the level of readiness for lifestyle changes aimed at reaching and sustaining a healthy weight.

Key words: Obesity, overweight, healthy weight, stage of change, Qassim University

المخلص

الأهداف: تقدير مستوى الاستعداد لإجراء تغييرات في نمط الحياة للوصول و / أو الحفاظ على وزن صحي بين الطلاب في جامعة القصيم.

الطريقة: تم إجراء دراسة مقطعية بين الطلاب في جامعة القصيم خلال العام الدراسي 2016-2017. حيث تم أخذ عينة عشوائية بحجم تقديري 297. وتم الحصول على البيانات من خلال استبيان يجيب عليه الطالب. وتم قياس الوزن والطول لكل مشارك في الدراسة من قبل الباحثين.

النتائج: 264 طالباً وافقوا على المشاركة في البحث ، كان 46% من الطلاب في نطاق الوزن المثالي بينما كان 6.9% و 21.4% و 21.8% و 4.8% يعانون من نقص الوزن وزيادة الوزن والسمنة والسمنة المفرطة على التوالي. حوالي 72.3% من الطلاب كانوا في مراحل الإعداد أو العمل أو المحافظة (أي المرحلة المتقدمة) للوصول إلى أو للحفاظ على الوزن المثالي، خاصة أولئك الذين كانوا ذوي أوزان صحية أو يعانون من زيادة الوزن أو السمنة. تم إجراء الانحدار اللوجستي للتأكد من آثار متغيرات الدراسة على احتمال أن المشاركين كانوا في المرحلة المتقدمة من تغيير نمط الحياة وتم اكتشاف الارتباط إحصائياً فقط للمتغيرات التالية: مستوى أهمية الوصول إلى و / أو الحفاظ على الوزن الصحي و أيضاً الالتزام بممارسة التمارين الرياضية بانتظام.

الخلاصة: كانت نسبة كبيرة من الطلاب في مرحلة متقدمة من الوصول إلى أو الحفاظ على الوزن المثالي. فقط حوالي نصف المشاركين كان لديهم وزن صحي. ينصح بالعمل على تنفيذ البرامج التعليمية والتوعوية في جميع المراحل التعليمية وكذلك في المجتمع لرفع مستوى الاستعداد لتغيير نمط الحياة بهدف الوصول إلى وزن صحي والحفاظ عليه.

الكلمات المفتاحية: السمنة، الوزن الزائد، الوزن الصحي،

مرحلة التغيير، جامعة القصيم

Introduction:

Obesity is defined by the World Health Organization (WHO) as the abnormal or excessive fat accumulation in the body, as measured by body mass index (BMI), and represents a major risk to human health. Obesity is a problem not only in high-income countries, but is now significantly on the rise in low- and middle-income countries [1]. Elevated BMI is a risk factor for many diseases including cardiovascular diseases (mainly heart disease and stroke), type 2 diabetes mellitus, hypertension and osteoarthritis. Obesity has also been shown to play a role in some cancers (e.g. endometrial, breast, ovarian, gallbladder, kidney and colon) [2].

Worldwide, the percentage of adults with BMIs of 25 kilogram (kg)/meters² (m) or more increased between 1980 and 2013 from approximately 28.8% to 36.9% in males, and from 29.8% to 38.0% in females [3]. The Kingdom of Saudi Arabia (KSA), Kuwait, Qatar, and the United Arab Emirates recently joined the list of top ten countries worldwide for obesity [4]. In the KSA, recent surveys have estimated that 28% of men and 44% of women are obese. Around 38% of men and 27% of Saudi women are overweight [5]. Younger populations are not immune to this epidemic; college students are frequently exposed to unhealthy behaviors that lead to weight gain [6]. In a study conducted in the KSA, 21.8% and 15.7% of male University students were found to be overweight and obese, respectively [7].

Helping patients change their behavior

is a very important role for every physician. Behavioral changes and lifestyle modifications are useful for disease prevention and long-term disease management. Transtheoretical Model of Change, also known as the Stages of Change model should be well understood [8]. Five stages of change have been developed for a variety of behaviors. The five stages of change are pre-contemplation (stage at which there is no intention to change behavior in the foreseeable future), contemplation (the stage at which people are thinking about the change in the next six months), preparation (the people are intending to take action in the next month), action (individuals are currently modifying their behavior) and maintenance (actively work to prevent relapse) [9, 10]. In one study, a large proportion of primary care patients were at preparation, action and maintenance stages of change to lose weight, improve diet, and increase participation in regular exercise [11].

The purpose of the current study was to estimate the distribution of the stages of change (SOC), which categorize the progression towards reaching and/or sustaining a healthy weight among male students of Qassim University (QU) in Qassim Region of the KSA.

Methods:

A cross-sectional study was used to analyze male students of QU during the 2016-2017 academic year. Inclusion criteria included male students registered in the academic year 2016-2017. Excluded from this study were students with any disability, students

who underwent surgery that limits their current activity, and students of the College of Physical Education because exercise is mandatory in their curriculum.

A random sample was used in which five colleges from QU were randomly selected: College of Islamic Studies, College of Engineering, College of Business and Economics, College of Pharmacy and College of Medicine. The researchers were distributed among these five colleges to collect the data from February through March 2017. The estimated sample size was around 270, assuming that the lowest prevalence of pre-contemplation stage among QU students was 25% with a confidence interval 95% and desired precision of 0.05. After factoring in a non-response rate of 10%, a total number of 297 participants was estimated to be required for this study.

Data were collected using a questionnaire developed based on the study variables with the help of experts from Family and Community Medicine Department of QU. The distributed questionnaires were self-administered by the participants. The participant's weight and height were measured with light clothes without shoes. Weight was recorded to the nearest 0.5 kg and height was taken to the nearest centimeter. BMI was calculated as the ratio of the weight in kg to the square of height in meter [1]. BMI was considered underweight if $< 18.5 \text{ kg/m}^2$, healthy if $< 25 \text{ kg/m}^2$, overweight if $25 - 29.9 \text{ kg/m}^2$, obese if $30 - 39.9 \text{ kg/m}^2$ and morbidly obese if $\geq 40 \text{ kg/m}^2$ [1].

The study variables included age, na-

tionality, marital status, college, smoking status, co-morbidities, thinking about his current weight, awareness of the complications and the readiness to make changes to reach or sustain a healthy weight. Advanced SOC were defined as being in the preparation, action, or maintenance stages to reach and/or maintain a healthy weight. The participants were asked to rate the importance of reaching and sustaining a healthy weight from one (not important at all) to ten (most important thing), the same method was also applied to the confidence level. The importance and confidence level were classified as follows: scale from 1-3 was classified as low, 4-7 as medium and 8-10 as high importance/confidence. Adherence to physical exercise was defined as walking for at least 30 minutes for five days or more per week. The students were also asked to report other types of exercise. Following a healthy diet as advised by a dietitian or physician required adherence to five days per week or more. A pilot study was carried out with 30 subjects to allow for modification of the questionnaire before the collection of data.

Important information about the study was explained to the participants by the researchers. The participants were then asked to carefully read the consent form, before agreeing to participate in this study. The confidentiality of the participants was ensured. This research was approved by the regional research ethics committee of the Qassim region.

The Statistical Package for Social Sciences (SPSS, version 21) was used for data analysis. Results were described using means

with standard deviations for continuous variables and proportions for categorical variables. Chi-square test was used to assess the statistical significance of the difference in the percentage of the SOC to categorical variables. A logistic regression was performed to ascertain the effects of the study variables on the likelihood that participants were in the advanced SOC. A P value < 0.05 was considered to be statistically significant.

Results:

A total of 264 of male students participated in the study and 33 declined to participate (non-response rate of 11.1%). Table 1 shows the frequency of the study variables. More than half of the participants were 21-25 year-old and most were non-smokers (92.7%). Based on BMI, less than half of the students (45.2%) had a healthy weight. Nearly 48% of the participants had elevated BMI (≥ 25 kg/m²): 21.4% were overweight, 21.8% were obese and 4.8 % were morbidly obese.

Only 8% of the students reported health problems (asthma, joints pain, irritable bowel syndrome and hypersensitivity to penicillin). In regards to the students' perspectives on their body weight status, only 46.1% answered correctly. It was found that most of the study sample (84.6%) was aware of the complications and the consequences of obesity, which they reported to include: diabetes, hypertension, increased chance of blood clots, joint problems, cirrhosis, cancer, high cholesterol, irritable bowel syndrome, anemia

and difficulty walking. 72.3% of the students were in the advanced stages towards reaching or sustaining an ideal weight. Only 22.5 % of the students were engaging in regular exercise, whereas 34% of the students reported doing other types of exercise such as: core workouts, swimming, football, volleyball and bodybuilding.

Table 1: Study variables:

| Study variables | Frequency | Percent |
|--------------------------------------------------------------------------------|-----------|---------|
| Age (years): 15- 20 | 109 | 41.9 |
| 21-25 | 148 | 56.9 |
| 26- 30 | 3 | 1.2 |
| Nationality: Saudi | 246 | 94.3 |
| Non-Saudi | 15 | 5.7 |
| Marital status: Married | 8 | 3.1 |
| Single | 254 | 96.9 |
| Colleges: Islamic studies | 49 | 18.6 |
| Engineering | 49 | 18.6 |
| Business and Economics | 42 | 15.9 |
| Pharmacy | 55 | 20.8 |
| Medicine | 69 | 26.1 |
| Smoking status: Smoker | 16 | 6.1 |
| Non-smoker | 242 | 92.7 |
| Ex-smoker | 3 | 1.1 |
| BMI: under 18.5 | 17 | 6.9 |
| 18.5-24.9 | 112 | 45.2 |
| 25-29.9 | 53 | 21.4 |
| 30-39.9 | 54 | 21.8 |
| Over 40 | 12 | 4.8 |
| Co-morbidity: Yes | 21 | 8 |
| No | 241 | 92 |
| Weight status (self-reported): Underweight | 56 | 21.2 |
| Healthy weight | 92 | 34.8 |
| Overweight | 76 | 28.8 |
| Obese | 30 | 11.4 |
| Morbidly obese | 9 | 3.4 |
| Awareness of the complications: Yes | 219 | 84.6 |
| No | 40 | 15.4 |
| Level of readiness to reach or maintain a healthy weight: Maintenance | 76 | 29.2 |
| Action | 74 | 28.5 |
| Preparation | 38 | 14.6 |
| Contemplation | 36 | 13.8 |
| Pre-contemplation | 36 | 13.8 |
| Importance level of reaching or sustaining a healthy weight*: Less importance | 33 | 13.1 |
| Medium importance | 83 | 32.9 |
| High importance | 136 | 54 |
| Confidence level in ability to reach/sustain a healthy weight*: Low confidence | 32 | 12.7 |
| Medium confidence | 95 | 37.8 |
| High confidence | 124 | 49.4 |
| Adherence to regular exercise: Not | 200 | 77.5 |
| Yes | 58 | 22.5 |
| Other types of exercise: Yes | 87 | 34.0 |
| No | 169 | 66.0 |
| Adherence to Diet: Not | 212 | 80.3 |
| Yes | 52 | 19.7 |

Table 2: The stages of change for weight loss and/or maintenance by variables*:

| Study variables | Advance SOC | | P Value † |
|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|--------------------------------------------------------------------|-----------|
| | Yes | No | |
| Age (years): 15- 20 21-25 26- 30 | 73 (67.6%) 111(76%) 3 (100%) | 35 (32.4%) 35 (24%) 0 | 0.186 |
| Nationality: Saudi Non-Saudi | 176 (72.1%) 11 (78.6%) | 68 (27.9%) 3 (21.4%) | 0.431 |
| Marital status: Married Single | 6 (75%) 181 (72.1%) | 2 (25%) 70 (27.9%) | 0.608 |
| The college: Islamic studies Engineering Business and Economics Pharmacy Medicine | 34 (70.8%) 34 (70.8%) 32 (76.2%) 43 (78.2%) 45 (67.2%) | 14 (29.2%) 14 (29.2%) 10 (23.8%) 12 (21.8%) 22 (32.8%) | 0.689 |
| Smoking status: Smoker Non-smoker Ex-smoker | 11 (68.8%) 172 (72%) 3 (100%) | 5 (31.1%) 67 (28%) 0 | 0.535 |
| BMI: Under 18.5 18.5-24.9 25-29.9 30-39.9 Over 40 | 6 (40%) 88 (78.6%) 39 (75%) 26 (72.7%) 14 (48.3%) | 9 (60%) 24 (21.4%) 13 (25%) 10 (27.8%) 15 (51.7%) | 0.001 |
| Co-morbidity: Yes No | 15 (75%) 172 (72%) | 5 (25%) 67 (28%) | 0.501 |
| Thinking about their current weight: Underweight Healthy weight Overweight Obese Morbidly obese | 8 (47.1%) 78 (78.4%) 38 (74.5%) 37 (68.5%) 4 (33.3%) | 9 (52.9%) 24 (21.6%) 13 (25.5%) 17 (31.5%) 8 (66.7%) | 0.003 |
| Aware of the complications: Yes No | 166 (76.1%) 21 (52.5%) | 52 (23.9%) 19 (47.5%) | 0.003 |
| Importance level of reaching/sustaining a healthy weight‡: Less importance Medium importance High importance | 11 (34.4%) 52 (62.7%) 117 (86%) | 21 (65.5%) 31 (37.7%) 19 (14%) | 0.000 |
| Confidence level in ability to reach/sustain a healthy weight‡: Low confidence Medium confidence High confidence | 14 (43.8%) 65 (69.1%) 100 (80.6%) | 18 (56.3%) 29 (30.9%) 24 (19.4%) | 0.000 |
| Adherence to regular exercise: Yes No | 56 (96.6%) 129 (65.2%) | 2 (3.4%) 69 (34.8%) | 0.000 |
| Adherence to regular exercise other than walking: Yes No | 70 (81.4%) 113 (67.3%) | 16 (18.6%) 55 (32.7%) | 0.012 |
| Adherence to a healthy diet: Yes No | 47 (90.4%) 140 (67.3%) | 5 (9.6%) 68 (32.7%) | 0.000 |

* Chi-square test was used to assess statistical significance of the differences between the percentages of SOC according to the categorical variables

† P value < 0.05 was considered to be statistically significant.

‡ Scale from 1-3 was classified as low, 4-7 as medium and 8-10 as high.

More than 70% of students who had a healthy weight, overweight or obesity but less than half of underweight or with morbid obesity were in the advance SOC (Table 2). No significant associations were found between SOC and the age, nationality, marital status, smoking status, presence of co-morbidities or the colleges. Most students who reported high importance to or high confidence to reach or sustain a healthy weight were in the advance SOC and less for those who reported low importance or low confidence. Most student who were adherent to a healthy diet or regular exercise were in the advanced SOC. Most of the participants who were aware of the consequences of obesity had advanced SOC.

Table 3: Logistic regression analysis of variables associated with advanced stage of change:

| Variable | Odd ratio (95% confidence interval) | P value* |
|---------------------------------------------------------------|----------------------------------------|----------|
| Importance level of reaching or sustaining a healthy weight†: | | |
| Less importance | 1 | .021 |
| Medium importance | 4.39 (1.25-15.36) | <.0005 |
| High importance | 14.21 (4-50.43) | |
| Adherence to regular exercise: | | |
| No | 1 | .001 |
| Yes | 12.87 (2.74-60.51) | |

* P value < 0.05 was considered to be statistically significant.

†Scale from 1-3 was classified as low, 4 - 7 as medium and 8 -10 as high.

As shown in Table 3, the logistic regression model was statistically significant only for the importance level of reaching and/or sustaining a healthy weight and the adherence to regular exercise. The students who reported medium or high importance were 4.39 and 14 times more likely to be in advanced SOC, respectively.

Discussion:

The Trans theoretical Stages of Behavior Change Model describes the readiness to change unhealthy behavior as in smoking cessation [12-14] and, to a lesser degree, estimates the intention to lose weight [15, 16]. The current study found that nearly 72% of all students and 72.7-75 % of students whose BMI ranged from 25 to 39.9 were in the preparation, action, or maintenance stages for weight modification. These findings are slightly higher than what has been reported by the study on primary care patients [11]. Similar to the results reported here, 67.2% of overweight and obese adolescents in Malaysia were in the preparation, action, or maintenance stages of reaching their ideal weight [17].

A study on black women under the age of 40 with BMI over 25 reported that about 55% were in the preparation and action stages of losing weight, which was lower than this study [18]. In another study, obese workers were found in the following stages of weight change: pre-contemplation (4%), contemplation (45%), preparation (13%), action (21%), and (17%) maintenance; in total, 50% were

in the advanced SOC for weight management [19], which is also lower than this report. In one research study done on patients with either diabetes or hypertension, 70.8% reported being in the action or preparation stage for weight control [20]. Preparation was the most frequently reported stage for weight-related behavior among obese patients in primary care centers [21]. Because patients at the pre-contemplation and contemplation stages are mostly unmotivated to change their behavior [22], they are less likely to benefit from counseling on specific behavioral interventions.

The rate of obesity among male students at QU was found to be 26.6%. This is similar to the rate reported by one study that revealed that the prevalence of obesity among Saudi males was 28% [5]. In another study was published in International Journal of Health Science of QU, 81% of adults in the Riyadh region don't engage in any regular physical activity [5], which is line with what has been seen in the current study. The exercise results from this study are similar to one from United States of America that showed that high proportion of college students maintained low levels of physical activity [6].

The study presented here shows that about half of the students were within a healthy weight range while 21.4% were overweight, 21.8% were obese and 6.4% of students were underweight. The results were similar to other studies performed in the KSA: in QU (Rass Branch) most of the students maintained a healthy weight and the prevalence of being overweight and obese was 21% and 15.7%,

respectively, and 5% were underweight [7]. Most of the participants (77%) who were aware of the negative consequences of obesity were in the advance SOC, which is consistent with the results of previous report [11].

Strengths and limitations:

To our best knowledge, this is the first study carried out in QU which discussed the level of readiness to change to or maintain an ideal weight. Nevertheless, this study has some limitations. The study was conducted at one university and results may not be broadly applicable. All data were self-reported and results related to diet, exercise, weight, and SOC may be overly optimistic. We were also not able to use validated, objective instruments to assess these behaviors.

Conclusions:

It can be concluded that a large proportion of the students (72%) were in the advanced stage of reaching or maintaining an ideal weight. Only about half of the participants had a healthy body weight. Students should act to reach their ideal weight rather than only understanding the consequences of obesity (82.6%). Educational programs should be designed and implemented at all educational levels and in the community for raising the level of readiness for lifestyle changes aimed at reaching and sustaining a healthy weight.

Conflict of interest: none

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Original Article

Obstructive Sleep Apnea Among People with Type 2 Diabetes in Saudi Arabia: A Cross-Sectional Study

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Received on 7.6.2018; accepted on 9.9.2018

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Abstract

Objectives: Obstructive sleep apnea syndrome or obstructive sleep apnea (OSA) is a health condition commonly associated with glucose intolerance. The limited literature on this subject in Saudi Arabia prompted the conduct of this study, which aimed to determine the people diagnosed with type 2 diabetes mellitus (T2DM) in Saudi Arabia with at risk of OSA, and to determine its associated factors.

Methodology: A total of 201 adults, ages 25 or more with T2DM were examined from May 2015 to March 2016. Data was collected using the patients' demographic profile, medical history and clinical data, including results of their most recent glucose blood tests and HbA1C. The Berlin Questionnaire was used to determine the risk associated with OSA. All relevant risk factors were analyzed.

Results: The estimated risk of OSA determined from the samples was 44.3%. The risk of OSA was significantly more common in people who are obese than those who were overweight or normal. Furthermore, body mass index (BMI) and the duration of diabetes were independent predictors for OSA in a logistic regression model. On the other hand, factors such as age, gender, occupation, hemoglobin A1C, FBG, comorbidities, and the type of diabetes treatment were not found to be significant predictors for OSA.

Conclusions: Almost half of Saudi people with T2DM are associated with the risk of OSA, which may or may not be diagnosed. The risk of OSA was significantly correlated with increased BMI, neck and waist circumference, and duration of diabetes.

Key words: Apnea, T2DM, OSA, Saudi and sleep.

المخلص

الأهداف: متلازمة توقف التنفس الإسدادي أثناء النوم (OSA) هي حالة مرضية عادة ما تسبب اضطراب في جلوكوز الدم. وبسبب قلة الدراسات في هذا المجال في المملكة العربية السعودية، عزمنا في هذه الدراسة الى تحديد مدى خطورة الإصابة بمتلازمة توقف التنفس الإسدادي أثناء النوم (OSA) لدى مرضى السكري من النوع الثاني في المملكة العربية السعودية ومعرفة العوامل المصاحبة لذلك.

الطريقة: تم فحص ٢٠١ مريض سكري من النوع الثاني ممن أعمارهم فوق ٢٥ عام خلال الفترة بين مايو ٢٠١٥ و مارس ٢٠١٦. تم استخلاص البيانات الشخصية والسريية والتاريخ المرضي ونتائج اخر تحليل لسكر الدم والسكر التراكمي (التجسسي). تم استخدام استبيان برلين لتحديد خطر الإصابة بمتلازمة توقف التنفس الإسدادي أثناء النوم (OSA). تم عمل تحليل احصائي لمعرفة عوامل الخطورة المصاحبة لذلك.

النتائج: ان مستوى خطورة الإصابة بمتلازمة توقف التنفس الإسدادي أثناء النوم لدى السعوديين المصابين بالسكري من النوع الثاني يعادل ٤٤.٣٪. ويزداد الخطر شيوعاً بشكل ملحوظ لدى البدناء. بالإضافة، تبين من خلال التحليل الاحصائي ان كتلة الجسم ومدّة الإصابة بالسكري تشكلان عامل مهم في رفع معدل الخطورة.

الخلاصة: تبين من خلال الدراسة أن نصف السعوديين المصابين بالسكري من النوع الثاني لديهم نسبة عالية للإصابة بمتلازمة توقف التنفس الإسدادي أثناء النوم (OSA).

Introduction

The growing prevalence of obesity among populations in the world brings with it a range of other health conditions, such as diabetes mellitus. Reports have shown that prevalence rate of diabetes in Saudi Arabia is very high and is continuously increasing.^[1,2] A common form of diabetes is type 2 diabetes mellitus (T2DM) which is strongly associated with central obesity. Moreover, in addition to obesity, T2DM was also found to be related to obstructive sleep apnea syndrome (OSA), a condition where a patient experiences recurrent and intermittent episodes of hypoxia or a deficiency in oxygen during sleep. This is due to the failure of the upper airways which results in disturbance of sleep and more drowsiness during the day.^[3] Number of studies including epidemiological, cross-sectional performed on large-scale have shown that OSA is risk independent with the onset of T2DM.^[4] However, many others studies have shown that 15-30% cases of OSA patients are seen in patients with T2DM .^[4] Furthermore, it is also well reported that risk for the onset of OSA increases in people with T2DM^[5]

Over the past 10-15 years, interest on cardiometabolic derangements in OSA has been shown by number of investigators.^[6,7] People with T2DM have shown a strong association with central obesity.^[8] Several studies reported that OSA is associated with T2DM, insulin resistance and glucose intolerance but not associated with obesity.^[9] Investigations on OSA and T2DM in Arab populations, however, are limited, and this is one of the

first known studies to assess the risk of OSA in T2DM among Saudi population.

With this in mind, this study sought to assess the prevalence of people with T2DM at risk for obstructive sleep apnea and their associated risk factors using the Berlin Questionnaire (BQ).^[10]

Methods

The study was a cross-sectional investigation that involved Saudi Arabian people with T2DM ages 25 years and older. Data was collected from May 2015 to March 2016 at the Diabetes Center, King Fahad Specialist Hospital, Buraidah, Saudi Arabia. The study was approved by the Institutional Review Board, College of Medicine, Qassim University. All participants provided their consent to participate in the study. Trained medical students interviewed the patients in order to complete the demographic data and the Berlin Questionnaire, the primary instrument used to assess the risk for OSA. The patients' medical history covered the following information: disease duration, current treatment, smoking history, comorbidities, recent fasting blood glucose (FBG), and HbA1c levels. Height (cm), weight (cm), neck and waist circumference (cm/inch) and blood pressure (mmHg) were likewise recorded, and the body mass index (BMI) was calculated as weight (kg)/height (m²).

In the present study, the Berlin Questionnaire was used to determine the risk of OSA as described previously.^[10] Eleven items were identified, covering three domains related to the risk of obstructive sleep apnea.

These were as follows: snoring and sleep-related symptoms (category 1); awake-time sleepiness and drowsiness (category 2); and hypertension and/or BMI greater than 30 (category 3). The responses for each category were coded accordingly as present or absent, and the final scores ranging from 0 to 3 were determined. Subjects who registered positive scores in two out of the three categories were identified as having high risk of OSA. Patients did not meet the above criteria were scored low risk for OSA. The scale registered good reliability and validity was used as previously described for detecting Respiratory Disturbance Index, considered an indicator of obstructive sleep apnea.^[11,12]

Data were analyzed using Statistical Package of Social Studies (SPSS, Windows Version 18.0) and expressed as means (SD). Furthermore, a statistician was commissioned to perform the analysis to ensure a blind assessment of the results. Categorical variables were described using frequency distributions and presented as frequency (%). In order to recognize the potential risk of OSA, quantitative variables were also subjected to a two-sample T-test. The χ^2 Test and/or Fisher's Exact Test were used to analyze the qualitative variables, whereas high risk for OSA was predicted by logistic regression model. The same test was also used to assess the effect of risk of OSA on other study factors, including age, gender, occupation, smoking habit, race/ethnicity, disease duration, T2DM treatment, and BMI.

Results

In this study, the data were collected from 201 patients and their clinical characteristics of the patients are presented in Table 1. Mostly there were mostly middle-aged patients with average age of 53 years and were obese with average BMI of 31.2. About 50.3 percent of them were male, and almost half has dyslipidemia or hypertension. The average T2DM duration (\pm SD) was calculated to be 8.6 (\pm 5.5) years. More than half (62.2%) was treated with oral hypoglycemic agents, while several (34.8%) used insulin, either alone or in combination with other oral agents. The average (\pm SD) hemoglobin count was 8.7 (\pm 1.7).

Screening results using the Berlin Questionnaire revealed that 44.3% of the Saudi people with T2DM has high risk of OSA, which means nearly half of Saudi type 2 diabetics are at risk of having OSA and are needed for proper evaluation (Figure 1). The detailed characteristics of both studied groups are summarized in Table 2. Of those who are at risk, snoring was identified in 93.2% of the patients, and breathing pauses more than once a week were noticed in 18.6% of the patients. Noteworthy is the high percentage of drowsiness or the tendency to fall asleep during driving among 33.9% of the high-risk group. Furthermore, OSA was also significantly more common among obese patients (73%) than those classified to be overweight and normal (20.2% and 6.7%, respectively); $p \leq 0.001$ (Figure 2). The condition was also higher among people with very high HbA1c

than among people with only high and controlled HbA1c (46.1% and 37.1%, 16.9%; $p=0.362$). However, neither groups showed statistical significance.

A logistic regression model was applied for the prediction of OSA risk and plotted the correlation with factors, including age, gender, occupation, smoking habit, duration of diabetes, FBG, HbA1c, BMI and the type of diabetes treatment. The model was significant

Table 1: Clinical characteristics of the study population.

| Variable | mean (SD) |
|------------------------------|-------------|
| Age (years) | 53.3(9) |
| BMI (kg/m ²) | 31.2(5.8) |
| BP systolic (mmHg) | 148.3(77.3) |
| BP diastolic (mmHg) | 78(12) |
| Neck circumference (cm) | 39.4(3.2) |
| Waist circumference (inches) | 107.7(11.2) |
| Duration of Diabetes (years) | 8.6(5.5) |
| Gender (%Male) | 50.3 |
| Smoker (%) | 7.5 |
| Education: (%) | |
| Illiterate | 35.3 |
| Primary | 18.9 |
| Intermediate | 14.9 |
| Secondary | 16.9 |
| Undergraduate | 13.9 |
| Occupation: (%) | |
| Unemployed | 46.8 |
| Employer | 19.9 |
| Business man | 11.9 |
| Retired | 21.4 |
| Co-morbid: (%) | |
| Hypertension | 42.8 |
| Dyslipidemia | 57.2 |
| Bronchial Asthma | 9 |
| IHD | 5.5 |

SD, Standard Deviation; BP, blood pressure; BMI, body mass index; IHD, ischemic heart disease

at $p=0.002$. Of the factors investigated, a BMI of more than 30 was well correlated with an increased risk of OSA (OR=3.9; 95% CI=1.4, 7.8), and Diabetes of more than five years was classified as high risk (OR=3.1; 95% CI=1.3, 7.8). On the other hand, age, gender, occupation, HbA1c, FBG, comorbidities, smoking habit, and type of diabetes treatment were not identified as significant predictors of risk of obstructive sleep apnea.

Table 2. Baseline characteristics of people with or without obstructive sleep apnea (OSA).

| Variable | High Risk (n=89) | Low Risk (n=112) | P Value |
|-------------------------|------------------|------------------|---------|
| Age (mean (SD)) | 53.9(8.1) | 52.8(9.7) | 0.404 |
| Gender (%Male) | 51.7 | 49.1 | 0.716 |
| BMI (mean (SD)) | 32.9(5.8) | 29.8(5.4) | <0.001 |
| Hypertension (%) | 50.6 | 36.6 | 0.047 |
| Dyslipidemia (%) | 59.6 | 55.4 | 0.55 |
| Bronchial Asthma (%) | 11.2 | 7.1 | 0.315 |
| IHD (%) | 5.6 | 5.4 | 0.935 |
| Duration of Diabetes(%) | | | |
| 5< year | 9 | 24.9 | 0.837 |
| 5-10 year | 12.9 | 33.3 | |
| 10> year | 7.5 | 12.4 | |
| Type of treatment: (%) | | | |
| OHA | 80.9 | 75.9 | 0.058 |
| Insulin | 37.1 | 33 | |
| FBG (mean (SD)) | 10.3(3.9) | 9.6(4.1) | |
| Level of control (%) | | | 0.240 |
| Normal (130<) | 22.5 | 33 | |
| High (130>) | 76.4 | 63.4 | |
| HbA1c (mean (SD)) | 8.8(1.7) | 8.6(1.7) | |
| Level of control (%) | | | 0.362 |
| Controlled (7.0<) | 16.9 | 22.3 | |
| High (7.0-9.0) | 37.1 | 33 | |
| Very high (9>) | 46.1 | 44.6 | |

SD, Standard Deviation; BMI, body mass index; IHD, ischemic heart disease; OHA, oral hypoglycemic agents; FBG, fasting blood glucose

Figure 2: The Risk of OSA among different diabetic BMI subgroups.

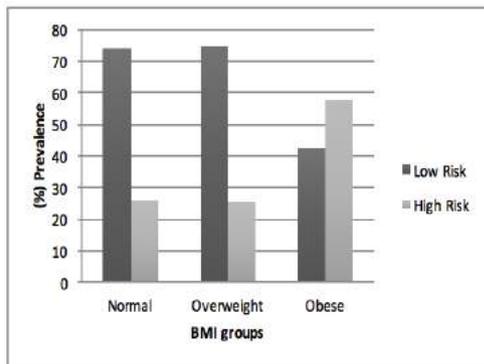
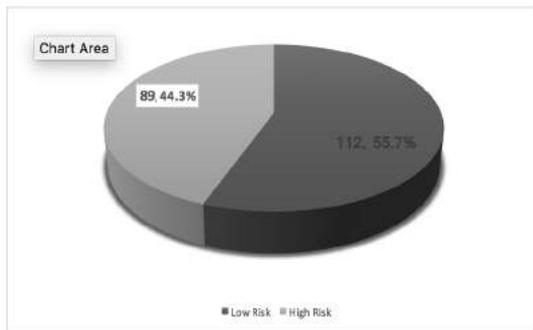


Figure 1: Risk of Obstructive Sleep Apnea among study population using the Berlin questionnaire (n = 201).



Discussion

Outcomes of the study indicate that the prevalence of OSA among type 2 diabetes mellitus was markedly higher than non-diabetic individuals in the general population of Saudi Arabia. Data gathered from the Berlin Questionnaire showed that 44.28 percent of the Saudi Arabia people examined were at “high” risk of OSA compared to the 33 – 39 percent of the general Saudi population. [13,14] Cass AR. et al, found a similar risk of OSA (48.6%) using Berlin Questionnaire in a family medicine center in USA. [15] Another data by Ioja et al used Berlin Questionnaire have reported 35% of people with type 1 diabetes mellitus and 31% of people with T2DM at

high risk of OSA. [16] Kalaktawi et al, using the STOP-BANG Questionnaire in a hospitalized patient at King Abdul-Aziz Specialist Hospital in Taif have reported that 57.9% were at mild risk, 26.9% were at moderate risk and 15.2% patients at severe risk for OSA. [17]

This corroborates the findings of other international studies that show that people with T2DM are more likely to also be at risk of OSA [18,19] The occurrence of OSA in people with T2DM has been documented to be as high as 59 percent, compared to 5 – 15 percent of the general population, underscoring the important association between these two conditions. However, methodological limitations in available studies did not allow for inferences to be made on the cause and effect, and therefore, limited the generalizability of the available data. Such issues notwithstanding, researchers from the Sleep Heart Health Study have found that even after adjusting confounders such as obesity and prevalent cardiovascular disease, middle-aged and older adults with a long case of T2DM have shown periodic breathing problems while sleep. While several epidemiologic studies have also reported an association between sleep-disordered breathing and the risk of OSA onset with age of the patients. [20,21] Other studies reported a highest occurrence of OSA in 60 year old patients and have reported to decline thereafter, a similar pattern found in the study. [22,23]

Furthermore, in contrast with the findings of other investigations, have shown insignificant correlation between OSA with gen-

der. Other investigations have found that men are more likely than women to have OSA with 2-3 times.^[21,24] It is also important to point out that studies are performed in previous decade which may indicated that the study was conducted on less obese population.^[24] The risk of OSA was also found to increase with the duration of diabetes. Data indicated that obstructive sleep apnea was significantly higher among people with more than five years of T2DM. Which is previously confirmed by similar study.^[25] In terms of lifestyle habits, other studies have shown that smoking may increase the risk of OSA.^[26] This, however, was not confirmed in the study due to the relatively small sample size.

Present study fully supported to the view that T2DM has correlation with increased risk of OSA. It is worthy to note that not all people with T2DM showed a typical risk OSA profile, therefore further studies are recommended that will show more screening for OSA among people with T2DM. Moreover, we also suggested to include clinicians in the recommended study as they are more aware of the risk of prevalence of OSA in the people with T2DM. It is also important to point out that lack of awareness among clinicians of the risk and prevalence of OSA in people with T2DM directly or indirectly caused improper diagnosis of OSA that also effects on inappropriate treatment of OSA. Improved recognition and treatment of OSA among people with T2DM is an important step to improve the patient health outcome. In conclusions, the present study shows that

prevalence rate of obstructive sleep apnea is very high in men with type 2 diabetes as compared with the non-diabetic men in the general population of Saudi Arabia. Given the strong association between these two conditions, screening for OSA among Saudi Arabian with T2DM is important as an effective treatment of OSA, as well as to address sleep apnea-related symptoms and to improve diabetes control and management.

Declaration of interest

Authors declare no conflicts of interest.

Acknowledgements

The authors acknowledge all the physicians and nurses at Buraydah Diabetes Center for their help. The study was not supported or funded by any institutes or pharmaceutical company.

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Original Article

The Effect of Extracorporeal Shock Wave Therapy for Patients with Diabetic Frozen Shoulder

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Received on 03.3.2018; accepted on 06.9.2018

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ABSTRACT

Title: The Effect of Extracorporeal Shock Wave Therapy for Patients with Diabetic Frozen Shoulder

Background: Diabetes Mellitus (DM) is a combination of chronic disorders that affect many systems in individuals which requires self-management education and support to prevent acute and long-term complications. Frozen Shoulder (FS) is a common complication among patients with Diabetes Mellitus and tendency to become chronic is high because of inflammation and fibrosis of shoulder capsule.

Aim: To evaluate the effect of extracorporeal shock wave therapy for patients with diabetic frozen shoulder.

Materials and Methods: Thirty patients with diabetic frozen shoulder were included in the study and they were divided into two groups. Group A consists of 15 patients (9 male and 6 female) and they were treated with extracorporeal shock wave therapy and therapeutic exercises for five weeks. Group B consists of 15 patients (10 male and 5 female) and they were treated with traditional physical therapy which consists of 3MH ultrasonic therapy, infrared and therapeutic exercise for five weeks. Shoulder Pain and Disability Index (SPADI) and Digital Goniometer were used as outcome measures to evaluate the pain and functional activities and degree of movements respectively.

Results: Both group A and B showed significant improve-

المستخلص

العنوان: تأثير العلاج بالموجات التصادمية على مرضى السكري الذين يعانون من الكتف المتجمد

التمهيد: داء السكري هو مزيج من الاضطرابات المزمنة التي تؤثر على العديد من أجهزة الجسم والتي تتطلب تدعيم وتعليم الإدارة الذاتية للأشخاص لمنع حدوث مضاعفات حادة وطويلة المدى. يعتبر الكتف المتجمد من المضاعفات الشائعة بين مرضى داء السكري، ويميل إلى أن يصبح مزمنًا بسبب التهاب وتليف كبسولة الكتف.

هدف البحث: تقييم تأثير العلاج بالموجات التصادمية على مرضى السكري الذين يعانون من الكتف المتجمد.

طريقة البحث: شارك في الدراسة ثلاثون مريض بالسكري يعانون من الكتف المتجمد وتم تقسيمهم إلى مجموعتين. تكونت المجموعة (أ) من 15 مريضًا (9 ذكور و 6 إناث) وتم علاجهم باستخدام بالموجات التصادمية والتمارين العلاجية لمدة خمسة أسابيع. وتكونت المجموعة (ب) من 15 مريض (10 ذكور و 5 إناث) وتم علاجهم بالعلاج الطبيعي التقليدي الذي يتكون من العلاج بالموجات فوق الصوتية والأشعة تحت الحمراء والتمارين العلاجية لمدة خمسة أسابيع. تم استخدام مؤشر آلام الكتف والعجز (SPADI) ومقياس الزوايا الرقمي كوسائل قياس لتقييم الألم والأنشطة الوظيفية ومدى حركات مفصل الكتف على التوالي. **النتائج:** أظهر كلا المجموعتين (أ) و (ب) تحسنًا كبيرًا مع وجود فروق ذات

ment ($P=0.0001$) in reducing the shoulder pain, increasing the functional activities and range of movements of shoulder joint. However group A showed good Improvement Ratio (IR = 91.26%) in reducing the shoulder pain, increasing the functional activities and range of movements of shoulder joint compare to the group B (IR = 81.81%).

Conclusion: Extracorporeal shock wave therapy and therapeutic exercises were effective in reducing the shoulder pain, increasing the functional activities and range of movements of shoulder joint for patients with diabetic frozen shoulder.

Key words: frozen shoulder, extracorporeal shock wave therapy, therapeutic exercise, diabetes mellitus.

دلائل إحصائية ($P = 0.0001$) في الحد من آلام الكتف، وزيادة الأنشطة الوظيفية وزيادة مجال حركة مفصل الكتف. وبالإضافة الي ذلك، أظهرت المجموعة (أ) نسبة تحسن مرتفعة (نسبة التحسن = 91.26%) مقارنة بالمجموعة (ب) (نسبة التحسن = 81.81%)

الخلاصة: العلاج بالموجات التصادمية والتمارين العلاجية كانت فعالة في الحد من آلام الكتف، وزيادة الأنشطة الوظيفية وزيادة حركات مفصل الكتف لمرضى السكري الذين يعانون من الكتف المتجمد.
الكلمات الدالة: الكتف المتجمد، العلاج بالموجات التصادمية، التمارين العلاجية، داء السكري.

Introduction

Diabetes Mellitus (DM) is a metabolic disease that increases the glucose in blood due to the defects in production of insulin, effect of insulin or both. The chronic hyperglycemia of diabetes is associated with progressive gradual damage, impairment, and insufficiency of many organs, exceptionally the nerves, muscles, joints, and blood vessels.¹

DM is a combination of chronic disorders that need persistent health care with multi-dimensions risk-reduction strategies beside control of hyperglycemia. Although there are many patients acquire self-management education and support in preventing acute and long term complications and considerable interventions in improving DM outcomes, still the complications appear in many patients.² A systematic literature review identified 540 studies on the prevalence of diabetes conducted between the period of 1990 and 2015. Using an analytic hierarchy process, 196 sources from 111 countries were selected and it was estimated that in 2015 there were 415 million people with diabetes aged 20–79 years.³

Frozen Shoulder (FS) is a musculoskel-

etal disorder characterized by thickening of joint synovial membranes and attachment of glenohumeral joint surfaces which leads to gradual progression of decreasing in range of movements of flexion, abduction and external rotation of shoulder joint along with increasing shoulder pain. Due to inflammation and fibrosis of the shoulder joint, there is decreased shoulder girdle flexibility and elasticity that makes difficult in performing everyday activities. The severity of FS depends on the age of patients and the duration of DM.⁴ The actual cause of frozen shoulder has not been well defined. Certain studies have explained about the role of aging in decreasing blood supply to tendons, ligaments and joint capsule which causes degeneration of articular tissue leading to local necrosis.⁵ A meta-analysis study showed that there is a strong relationship between DM and FS and the prevalence of DM in FS was found 30% (95% CI 24-37%).^{6,7}

There are different techniques and mechanisms in physical therapy for treating diabetic frozen shoulder which include mobilization techniques, manual therapy, thermotherapy, psychotherapy, electric percutaneous nerve treatment, ultrasound therapy and taping ther-

apy. However Extracorporeal Shock Wave Therapy (ESWT) is a new treating method and not been used effectively for treating diabetic frozen shoulder. ESWT is a non-surgical treatment method. The therapeutic effect of ESWT is to aid revascularization, stimulation and reactivation of the bones and connective tissues healing, which lead to controlling pain and regain the functions.^{8,9} ESWT was used to treat many musculoskeletal diseases such as calcific tenosynovitis and plantar aponeurosis.⁵ However there are few studies have been found for treating diabetic frozen shoulder with ESWT. Therefore, our study is aimed to find the effect of extracorporeal shock wave therapy on diabetic frozen shoulder patients, and also to compare the efficacy of ESWT with traditional physical therapy techniques.

Materials and Methods

Thirty patients with diabetic frozen shoulder were recruited from the out-patient's clinic of orthopedic and rehabilitation at Zagazig University Hospital by using convenience sampling method for the study from May 2016 to February 2017. The subjects included for the study were: subjects ambulated without assistance and history of DM not less than 10 years, the age of subjects was from 40 to 59 years, having frozen shoulder not less than six months. The subjects excluded for the study were: traumatic frozen shoulder, rheumatoid arthritis, recurrent subluxation of shoulder, cervical radiculopathy, history of previous surgery of the shoulder, history of cancer, and bleeding disorders. Random assignment of patients was conducted in two

stages: firstly; researcher screened potentially eligible patients and report all patients who fulfilled the inclusion criteria of the study. Secondly, the patients were randomly divided into two groups: Group A and Group B. Random process involved opening an opaque envelope prepared with random number generation using Excel to generate the allocation sequence by an independent person (registration clerk) who was not involved in any part of the study.

Group A consists of fifteen patients and they were treated with ESWT and therapeutic exercises for two sessions in a week for five weeks. ESWT probe was applied at anterior and posterior sides of the shoulder joint every session approximately 1200 shocks at intensity 0.2 mJ/mm² till reach to the maximum threshold of pain tolerance in addition to mobilization and therapeutic exercises. Group B consists of fifteen patients and they were treated with 3MH ultrasonic therapy, infrared and therapeutic exercise for two sessions in a week for five weeks.

In order to find the effect of ESWT on diabetic frozen shoulder patients, and to compare the efficacy of ESWT with traditional physical therapy techniques on patients with diabetic frozen shoulder, a self-administered questionnaire – Shoulder Pain and Disability Index (SPADI) was used. It consists of 13 items in 2 domains; pain (5 items) and disability (8 items), scored on a visual analog scale, ranging from 0 to 100 (0 = no pain/no difficulty and 10 = worst pain imaginable/so difficult) required help. Each item score is

equally weighted, then added for a total percentage score from 0 to 100 (0 = best and 100 = worst).¹⁰ Calibrated electro goniometer was used to measure the range of movements of shoulder joint.

Ethical clearance to conduct the study was obtained from Ethical Committee of Scientific Research, Zagazig University. After explaining the purpose of the study, an informed written consent was obtained from the patients on voluntary basis.

Data were analyzed by using Statistical Package for Social Sciences; SPSS Inc., Chicago, IL, USA, version 22 software. Differences were assumed significant at p-value

<0.05. Variables were described in terms of mean and standard deviation. Paired sample t-tests were used for intra-group comparisons (within groups) while Independent t-test was used to find the differences between group A and B.

Results

The demographic data of all the participants in each group were shown in Table (1). There were no differences between the demographics of the patients between group A and group B. The results showed that both groups had similar characteristics regarding age, weight, height, BMI, duration of diabetes, p-value > 0.05.

Table 1. Demographic data of the both groups (group A and group B)

| Item | Group (A) (9 male and female 6 X ± SD | Group (B) (10 male and 5 female) X ± SD | t-value | P-Value | Significance |
|------------------------------|------------------------------------------------|--------------------------------------------------|---------|---------|--------------|
| | | | | | |
| Age (Years) | 45.34±8.7 | 46.26±8.1 | - 0.301 | 0.761 | NS |
| Weight (kg) | 78±5.3 | 79.06±8.4 | - 0.411 | 0.68 | NS |
| Height (cm) | 168.5±0.04 | 169.4±0.06 | -0.411 | 0.68 | NS |
| BMI (Kg/m ²) | 27.54±2.65 | 27.61±3.09 | -0.061 | 0.951 | NS |
| Duration of Diabetes (years) | 14.87±2.77 | 13.73±2.31 | 1.224 | 0.231 | NS |

Table (2) showed the statistical analysis for the mean values of SPADI for intra groups (with in groups) and inter groups. In both groups (A and B) pre and post treatment results were appeared statistically significant (p < 0.05). However, the Improvement Ratio (IR) for group A was (91.26%) whereas the

IR for group B was (81.81%). The pre-treatment values showed no significant difference between both groups (p >0.05) whereas there was statistically significant in post treatment between both groups (p < 0.05) as shown in figure (1).

Table 2. Comparison between intra and inter group (pre and post) treatment regarding (SPADI):

| Groups | SPADI | IR | MD | t-value | p-value | Sig. |
|----------------|-------------|-------|------|---------|---------|------|
| | X± SD | | | | | |
| Group A(pre) | 6.86 ±0.91 | 91.26 | 6.26 | 25.253 | 0.0001 | S |
| Group A (Post) | 0.60 ± 0.51 | | | | | |
| Group B (Pre) | 6.6 ±1.05 | 81.81 | 5.4 | 25.256 | 0.0001 | S |
| Group B (Post) | 1.2 ± 0.67 | | | | | |
| Group A(pre) | 6.86 ± 0.91 | --- | 0.26 | 0.731 | 0.461 | NS |
| Group B(pre) | 6.6 ± 1.05 | | | | | |
| Group A (Post) | 0.6 ± 0.51 | --- | -0.6 | -2.750 | 0.01 | S |
| Group B (Post) | 1.2 ± 0.67 | | | | | |

SPADI: Shoulder Pain and Disability Index, IR: Improvement Ratio X: Mean, SD: Standard Deviation, MD: Mean Difference, S: Significant, NS: not Significant.

Figure (1): Inter-group difference regarding SPADI.

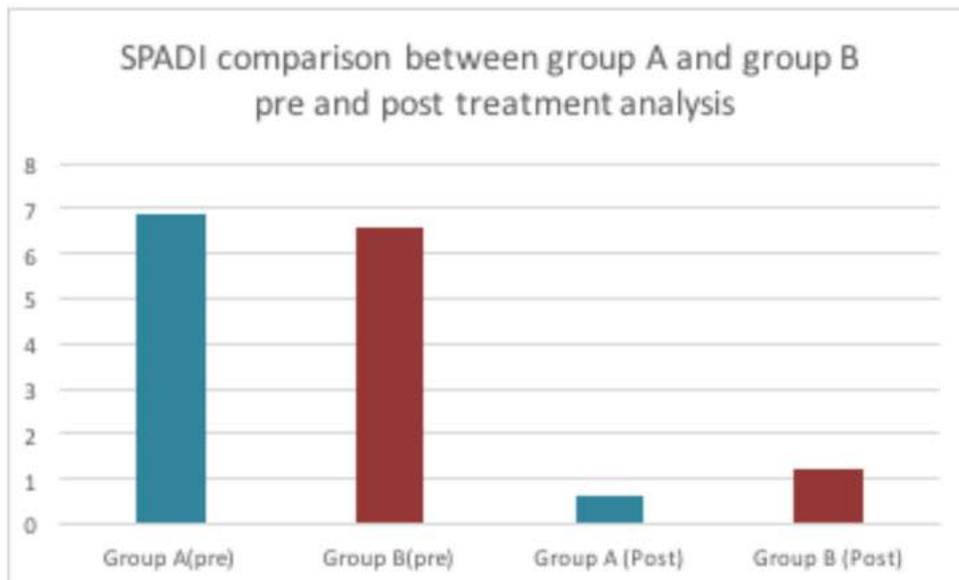


Table (3) showed the statistical analysis for the mean values of shoulder ROM for flexion, abduction and external rotation for intra-groups (with in groups) pre and post treatment. Both A and B groups were showed significant difference between the pre and

post treatment measurements ($p < 0.05$). The IR for group A in shoulder flexion, abduction and external rotation was 57.95%, 73.87% and 53.10% respectively, while the IR for group B in shoulder flexion, abduction and external rotation was 44.84%, 61.34% and 51.20% respectively.

Table 3. Intra-groups comparison for pre and post ROM of shoulder joints.

| Groups | ROM | Pre | Post | IR | MD | <i>t</i> -value | <i>p</i> -value | Sign. |
|---------|---------------|--------------|-------------|-------|--------|-----------------|-----------------|-------|
| | | X ±SD | X ±SD | | | | | |
| Group A | Flexion | 109.87±23.35 | 173.53±6.41 | 57.95 | -63.67 | -12.24 | 0.0001 | S |
| | Abduction | 100.26±7.02 | 174.33±5.21 | 73.87 | -74.07 | -39.22 | 0.0001 | S |
| | Ext. Rotation | 29±5.64 | 44.4±0.73 | 53.10 | -15.4 | -10.69 | 0.0001 | S |
| Group B | Flexion | 110±21.38 | 159.33±13.5 | 44.84 | -49.33 | 44.84 | 0.0001 | S |
| | Abduction | 100.53±13.5 | 162.2±12.5 | 61.34 | -61.67 | 61.34 | 0.0001 | S |
| | Ext. Rotation | 28.26±3.9 | 42.73±2.12 | 51.20 | -14.47 | 51.20 | 0.0001 | S |

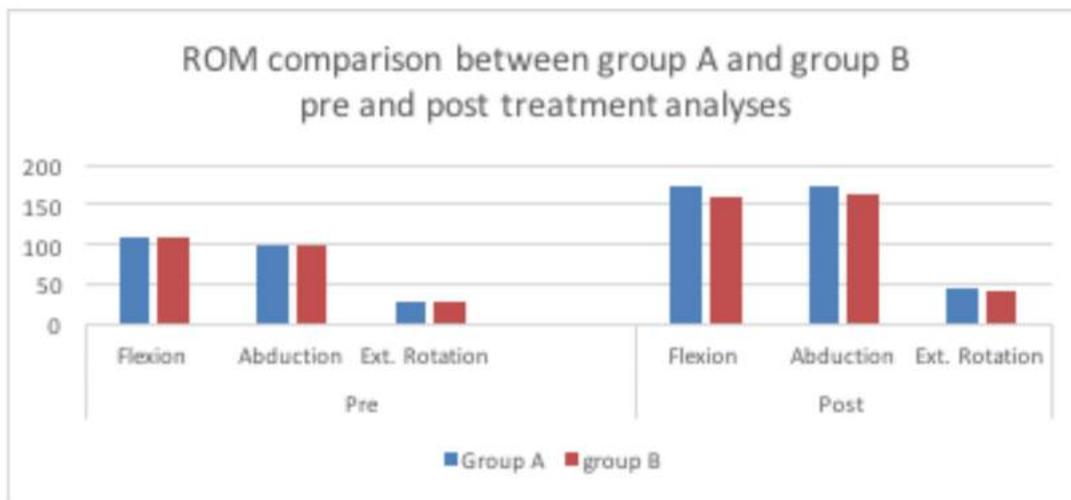
ROM : Shoulder range of motion, IR: Improvement Ratio, X: Mean, SD: Stander Deviation, MD: Mean Difference, S: Significant

Inter-groups comparison of pre and post shoulder ROM for flexion, abduction and external rotation mean values were illustrated in table (4) and figure (2). The pretreatment values showed no significant difference between both groups ($p > 0.05$), whereas there was statistically significant difference was found in post treatment ($p < 0.05$).

Table 4. Inter-groups comparison of pre and post shoulder joint ROM.

| | Degree of ROM | Group A X ±SD | Group B X ±SD | MD | T Value | p Value | Sign. |
|-------------|---------------|------------------|------------------|--------|------------|------------|-------|
| Pre | Flexion | 109.87±23.35 | 110±21.38 | - 0.14 | - 0.01 | 0.98 | NS |
| | Abduction | 100.26±7.02 | 100.53±13.5 | - 0.27 | - 0.06 | 0.94 | NS |
| | Ext. Rotation | 29.00±5.64 | 28.26±3.86 | 0.74 | 0.41 | 0.68 | NS |
| post | Flexion | 173.53±6.41 | 159.33±13.47 | 14.21 | 3.681 | 0.001 | S |
| | Abduction | 174.33±5.21 | 162.2±12.49 | 12.13 | 3.47 | 0.002 | S |
| | Ext. Rotation | 44.41±0.73 | 42.73±2.12 | 1.671 | 2.87 | 0.01 | S |

Figure (2): Inter-group difference regarding shoulder ROM.



Discussion

DM has adverse effect in range of motion of the shoulder joint leading to increasing pain and disability of the shoulder joints. The pathology is very difficult to manage and may last for months, progressing into Frozen Shoulder. ESWT is a new technology using acoustic shockwaves to break up the shoulder

adhesions, so it is a tool for physiotherapist to treat the chronic, painful conditions of musculoskeletal disorders.

Tighe et al., evaluated 88 patients with DM for detecting the presence of FS and they found FS in 34 patients (38.6%). The study revealed that the main age for occurrence of FS in diabetic patients was between 40 and

70 years .¹¹

Olimpio et al., studied the effect of ESWT on twenty patients with non-calcifying supraspinatus tendinopathy NCST. They divided the patients into ESWT and sham groups. In the ESWT group, patients were received 3000 shockwaves shoots at 0.068 mJ/mm² of the energy flux density, with interval rest 7 days. Results showed significant improvement in the total Constant and Murley Score (CMS) and its subscales in comparison with the baseline values. The ESWT group revealed significant higher scores for CMS pain and ROM when compared to the second group. They recommended using low energy ESWT to treat patients suffering from NCST, at least in short-term.¹²

Our study showed that the treatment of diabetic frozen shoulder was improved by using ESWT in reducing the shoulder pain and disability (SPADI) from 6.86 ± 0.91 to 0.60 ± 0.51 with IR equal to 91.26%. Statistically significant improvement of IR was found in ROM of shoulder flexion, abduction and external rotation with 57.95%, 73.87% and 53.10% respectively.

The current study was supported by a prospective, randomized, controlled, single-blind clinical trial, conducted by Chen et al., found that the ESWT showed significant improvement from the fourth week in total Constant Shoulder Score (CSS) and Range of Motion (ROM) parameter of the CSS in adhesive capsulitis.¹³

Park et al. noted that when ESWT was used to treat frozen shoulder patients for two

sitting in a week for six weeks with mean age 54.2 ± 5.7 years and it was showed significant decrease pain in both Visual Analogue Scale (VAS) and Patient-Specific Functional Scale (PSFS).¹⁴

The other study found that ESWT was effective in reducing the pain by a sound wave effect which produces fine, repetitive stimuli that can be dispersal through soft tissues without energy dissipation.¹⁵

Babak et al., study found satisfactory improvement in SPADI and shoulder motion ($p < 0.05$) after four weeks and twice per week application of ESWT. They concluded that ESWT has positive effects on acceleration of the healing process of frozen shoulder.⁴ As per arthroscopic findings, adhesions occur more in the descendent fold and surrounding synovium, therefore, stimulation from anterior and posterior directions is more effective rather than the lateral direction.

Coinciding with above study, the current study showed improvement in reducing the pain on anterior and posterior aspects of the shoulder joint and improving the function of shoulder joint after application of ESWT. Both groups (A and B) showed significant difference ($p < 0.05$), however the post treatment results were showed ESWT was more effect ($p = 0.01$) than traditional physical therapy.

Durante et al. evaluated patients with analogous conditions. In group A, patients received combination of ESWT plus physio-kinesiotherapy while group B received only physio-kinesiotherapy. The ESWT was done for anterior and lateral portion of shoulder

joint by 2500 shocks with intensity of 0.07 and 0.11 mJ/mm², twice in a week, for two weeks. Follow up was done for patients after 6 months. About 30% of the patients in group A showed excellent response comparing to 10% in group B. ¹⁶

Ludger Gerdesmeyer et al., studied the effect of high energy, low energy and placebo ESWT effect in 144 patients with chronic calcifying tendonitis of the rotator cuff. The study aimed to compare the changes in by the pain VAS and size of calcified deposits at 3, 6, and 12 months after treatment. The high-energy group received 1500 shockwaves at 0.32mJ/mm² per treatment for 2 sessions. The low energy group received 6000 shockwaves at 0.08mJ/mm² per treatment for 2 sessions. They concluded that both high and low shock wave therapy has a positive effect on improve the shoulder pain, shoulder functions and reduce the size of calcification. ¹⁷

Conclusion and Recommendations

The study concluded that ESWT is tolerable, feasible, and effective in treatment of FS and considered to be a valid alternative method to steroids injection for treatment of Diabetic frozen shoulder patients. ESWT also more effective than traditional methods of physical therapy treatments in reducing disability and pain and increasing the shoulder joint range of motions. However, these findings need to be confirmed by more sample size, non-diabetic frozen shoulder patients and follow up assessment for function of the shoulder joints.

Source of Support: Nil

Conflict of Interest: Nil

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Original Article

Prevalence & Perception of CAM Usage in Majmaah, Kingdom of Saudi Arabia

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Received on 01.05.2018; accepted on 11.9.2018

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ABSTRACT

Background: Complementary & alternative medicine is very popular among people due to it being cheap, readily available, religious and cultural associations, and having the least side effects. In KSA, so far, no study on CAM usage in public has been conducted in Majmaah governorate.

Objective: The objectives of the study were to determine the prevalence and perception of CAM usage among the general population of Majmaah city KSA.

Methods: The study was conducted from January to March 2016 on 208 individuals. A self-reporting questionnaire was filled in by the participants of both genders above 15 years of age.

Results: The prevalence of CAM usage was 66.3%. The primary type of CAM practice was herbal remedies (68.4%) followed by Hijamma (25%) and acupuncture (4.4%). There was no statistical association between CAM usage and gender, age, or nationality. However, the level of education had a linear relationship with the use of CAM. The majority of participants who used CAM were more than 35 years (n=60, 43.7%) and the main reason for CAM use was the treatment

انتشار وفحص استخدام الطب التكميلي والبديل في المجعة ، المملكة العربية السعودية

الملخص:

خلفية

الطب التكميلي والبديل يحظى بشعبية كبيرة في المجتمع كونه رخيص ، متوفر ، متوافق مع المفاهيم العفائية و الثقافات المحلية ، ولديه أقل الآثار الجانبية. في المملكة العربية السعودية هنالك قلة في الدراسات المتعلقة باستخدام الطب التكميلي والبديل في المجتمع بمحافظة المجعة.

الاهداف

هدفت الدراسة إلى تحديد مدى انتشار وتصور استخدام الطب التكميلي والبديل بين عامة السكان في مدينة المجعة بالمملكة العربية السعودية.

طريقة البحث

أجريت الدراسة من يناير إلى مارس ٢٠١٦ على ٢٠٨ شخص. تم ملء استبيان الإبلاغ الذاتي من قبل المشاركين من كلا الجنسين فوق ١٥ سنة من العمر.

النتائج

كان انتشار استخدام الطب التكميلي والبديل (٦٦,٣٪) . النوع الأساسي لممارسة الطب التكميلي والبديل كان العلاجات العشبية (٦٨,٤٪) تليها الحجامة (٢٥٪) والوخز بالإبر (٤,٤٪). لم يكن هناك ارتباط إحصائي بين استخدام الطب التكميلي والبديل والجنس أو السن أو الجنسية. ومع ذلك كان لمستوى التعليم علاقة احصائية مع استخدام الطب التكميلي والبديل. غالبية

of chronic ailment and body pains (33% & 13%).

Conclusion

Majority of participants exercise and advocate CAM in Majmaah city. Therefore, physicians should also encourage safe CAM practices in patients.

Keywords: Complementary medicine, Alternative medicine, Prevalence, Saudi Arabia

المشاركين الذين استخدموا الطب التكميلي والبدل كانوا أكثر من ٣٥ سنة (العدد = ٦٠ ، ٤٣،٧٪) والسبب الرئيسي لاستخدام الطب التكميلي والبدل لعلاج الأمراض المزمنة وآلام الجسم (٣٣٪ و ١٣٪).

الخلاصة

غالبية المشاركين يمارسون ويدافعون عن الطب التكميلي والبدل في مدينة المجمعة. ولذلك ينبغي للأطباء أيضاً تشجيع المرضى لممارسات الطب التكميلي والبدل الآمنة.

الكلمات المفتاحية: الطب التكميلي ، الطب البديل ، الانتشار ، المملكة العربية السعودية

INTRODUCTION

The term Complementary & alternative medicine (CAM) is a broad one. It includes therapies and procedures not covered in the traditional allopathic medicine. Thus, a substantial number of locally and internationally acknowledged treatment modalities and practices come under this umbrella. Complementary medicine is the form of therapy that is used in conjunction with the conventional allopathic medicine; whereas alternative medicine is the one that is used in place of allopathic medicine.¹ Complementary medicine is popular both in developed and developing world. According to WHO, around 80% of the population in the developing countries use complementary medicine.² The CAM includes varied and divergent therapeutic modalities including well-known acupuncture, herbs, chiropractic, massage therapy, homeopathy, Unani medicine, dietary supplement including honey, lemon, ginger, specific teas, probiotics, fish oil, fatty acids, etc. Also included in this form of treatment are expressive therapies like dance, music, art, writing therapy, and faith healing like prayer, recitation of Quran, spiritual healers, yoga, etc., and the list is never ending due to distinct cultural

differences.

A few decades back, the idea of CAM was envisaged by the conventional allopathy as useless and ineffective means of treatment. However, despite negativism shown by the allopathy, the CAM industry has not only survived but has bloomed with an estimated annual worldwide market of US\$ 60 Billion.^{3,4} In the USA alone, the CAM usage increased from 33.8% in 1990 to 42.1% in 1997⁵. Similarly, another study by CDC in 2007 revealed that in the USA, the CAM usage was approximately 40% among adults in the past one year.¹ Data from studies conducted in the western world suggests that around half of the population has used some form of CAM in their lifetime. For example, 48% of the residents in Australia, 49% in France, and up to 41.1% in UK citizen use CAM practices to address their health problems.^{6,7,8}

In KSA, various studies have been conducted about CAM usage in selected cohorts.^{9, 10, 11} Few observational studies carried out in the populace of different areas in KSA showed a higher prevalence of CAM usage in this part of the world. For example, two studies conducted in the general population in Riyadh and Qassim regions showed CAM usage

of 85% and 74% respectively.^{12,13} No study has been carried out so far that looks into the prevalence of CAM usage by the inhabitants of Majmaah city, KSA. Therefore, we conducted a study to determine the prevalence of complementary and alternative medicine usage, and its perception among the general population of Majmaah city.

MATERIALS AND METHODS

Definition:

We used the National Center for Complementary and Alternative medicine (NC-CAM) definition of the terms complementary and alternative medicine. Accordingly, the term complementary medicine means if a non-mainstream practice is used together with conventional medicine, it is regarded as “complementary.” Whereas if a non-mainstream practice is used in place of conventional medicine, it is considered “alternative”.¹⁴ This definition was used to explain the participants during filling of the questionnaire by the researchers.

Study type and setting:

This was a cross-sectional study conducted at Majmaah city. Al Majmaah is a city and governorate of Riyadh province. It is located in north-eastern part of KSA with a population of approximately 45,000 and area of about 30,000 square km.

Study participants:

All Saudis and non-Saudis above 15 years of age belonging to both genders of Majmaah city were included in the study. The minimum age of 15 years was selected to rule out all the minors who could not use

any form of CAM by their own choice. No pre-determined quota for participation in this study was fixed regarding gender, age, or nationality; the number was dependent upon the convenience of participation.

Inclusion and exclusion criteria:

Individuals directly involved in CAM profession were excluded, and so were children younger than 15 years. The participants were verbally asked about the city of residence, and any person who was non-resident of Al Majmaah city was excluded. All people were included in the study irrespective of the socioeconomic status, health status, nature of the job, education status. However, these parameters were noted in the study.

Duration of study:

The study was of three months duration, starting from the first of January until 31 March 2016.

Sample size:

The sample size of 250 was calculated using the level of precision formula keeping in view that 85% of the population will answer the question.¹⁵

Study setting and plan:

The study was conducted at general markets, hospitals, educational institutions (schools, colleges), and general public parks. The researchers were divided into three groups. One research group visited King Khalid Hospital Al Majmaah and other private hospitals, the second group visited general parks and markets, while the third group visited schools and colleges. It was ensured

that none of the individual's participation was duplicated.

Study questionnaires:

A study questionnaire comprising 11 questions pertaining to CAM usage and perception was self-developed and subsequently validated by checking its psychometric properties, the reliability of the questionnaire was 0.71 which was checked by Cronbach alpha showing that it is acceptable.

The first part of the questionnaire included demographic information like age, gender, nationality, and educational status. The second part included the questions related to CAM practices. The majority of the questions were closed-ended (Yes/ No or ticking most likely responses) while few were open-ended. The issues included in the questionnaire asked about the awareness, usage, type, reason, & frequency of CAM practice, use of CAM alone or with conventional allopathy medication, experience of unwanted side effects of CAM, efficacy of CAM, whether CAM was cheaper, willingness to recommend CAM to others, and finally the source of CAM treatment (authorized/ unauthorized).

Verbal consent was taken after explaining the purpose of the study. The participation was purely voluntary. The identity of the participant was kept confidential. Participants were encouraged to reply to all the questions. However, the partially filled responses were still included in the study.

Ethical approval:

Ethical approval was taken from Majmaah Research Institutional Ethics Com-

mittee of Basic & Health Science, Research Center Majmaah.

Data analysis:

The data collected from the study questionnaire was entered in IBM SPSS Statistics. Mean, median, and the standard deviation was used for quantitative data while frequencies were used for qualitative data. Chi-square test was used for comparative statistics of demographic variables with different variables of the questionnaire. A p value of <0.05 was taken as a statistically significant relationship.

RESULTS

Out of 250 planned samples, 208 returned the filled questionnaire (28 refused to participate, 11 did not return the questionnaire, while three responses were found to be duplicate and hence excluded from the study). The response rate in our study was 83.2%. The mean age of the participants in this study was 27.15 years (range 15-64 years) while the median age was 23 years (standard deviation ± 12.04). Out of 208 samples, 131 participants were males, and the majority of respondents were Saudi national (n=182). Regarding educational background, out of 208 participants, only 7 (3.4%) were illiterate while more than half of our samples (n=112) had the qualification of middle school (Table-1).

| Demographic data | Number | Percent |
|-----------------------------------|--------------|-------------|
| Age | | |
| Range (years) | 15-64 | |
| Mean & Standard deviation (years) | 27.15 ±12.04 | |
| Gender | | |
| Male | 131 | 63% |
| Female | 77 | 37% |
| Total | 208 | 100% |
| Nationality | | |
| Saudis | 182 | 87.5% |
| Expatriates | 26 | 12.5% |
| Total | 208 | 100% |
| Educational level | | |
| Elementary | 11 | 5.3% |
| Middle | 112 | 53.8% |
| University | 78 | 37.5% |
| Illiterate | 7 | 3.4% |
| Total | 208 | 100% |

In our questionnaire, the first question was “Do you know what Complementary & Alternative Medicine is?” One hundred and ninety-seven out of 208 participants, (94.7%) stated that they had the knowledge of CAM, whereas 11 participants (5.3%) had no idea about it. The second question was “Have you ever used CAM?”, 136 out of 208 participants responded positively about using “CAM” at least once in their lifetime, whereas 61 participants (33.7%) had never used it. Therefore, in our study, the prevalence of CAM usage was 66.3%.

| Q No | Question statement | Response | |
|------|---------------------------------------------------------------|------------|-----------|
| | | Yes n (%) | No n (%) |
| 1 | Do you know what “Complementary & Alternative Medicine” is? | 197 (94.7) | 11 (5.3) |
| 2 | Have you ever used “CAM”? | 138 (66.3) | 70 (33.7) |
| 6 | Do you think “CAM” is effective? | 127 (93.4) | 9 (6.6) |
| 8 | Did you experience any “unwanted” effects while using “CAM.”? | 15 (11) | 121 (89) |
| 9 | Do you find “CAM” cheaper than allopathy medicine? | 106 (77.9) | 30 (22.1) |
| 10 | Would you recommend “CAM” to someone? | 120 (88.2) | 16 (11.8) |

About the third question “How frequently do you use CAM?”, sixteen respondents replied that they usually used CAM, 52 used it often, while 68 used it rarely. About the reason of CAM use, the majority (n=53) used it for chronic medical conditions while twenty-six (16%) used CAM because it was effective (Table-3).

| Q No | Question statement Usually* n (%) | Responses (n=136) | | | |
|------|--------------------------------------|-------------------|----------------------------|------------|-----|
| | | Often† n (%) | Rarely‡ n (%) | | |
| 3 | How frequently do you use “CAM”? | 16 (11.8) | 52 (38.2) | 68 (50) | |
| 4 | Why do you use/do not use “CAM”? | Responses | | | |
| | | Reasons | | | |
| | | 1 | Chronic medical conditions | 53 | 33% |
| | | 2 | Because it works | 26 | 16% |
| | | 3 | Pain management | 21 | 13% |
| | | 4 | Custom | 17 | 11% |
| | | 5 | Convenience | 16 | 10% |
| | | 6 | No reason | 14 | 9% |
| | 7 | Religious beliefs | 13 | 8% | |
| | | Total | 136 | 100 | |

Usually means once in a week*

Often means once in a month†

Rarely means once in a year or fewer‡

About the type of CAM use, the majority reported the use of herbal remedies (n=93, 68.4%) followed by Hijaama (n=34). The details are shown in Table-4.

| Q No. | Question statement | Type of CAM modality used | Number | Percent |
|-------|--------------------------------|---------------------------|------------|------------|
| | | Herbal | 93 | 68.4% |
| 5 | What kind of “CAM” do you use? | Hijama | 34 | 25% |
| | | Acupuncture | 6 | 4.4% |
| | | Others | 3 | 2.2% |
| | | Total | 136 | 100 |

In reply to the question, “Do you use “CAM” alone or with prescribed or non-prescribed drugs?” sixty-three out of 136 CAM users (46.3%) had taken allopathic drugs alongside CAM therapy, and 73 (53.7%) had received this type of practice alone (Table-5).

| Q No | Question statement | Responses (n=136) | |
|------|--------------------------------------------------------------------|-------------------|-----------------------------|
| | | Alone n (%) | With prescribed drugs n (%) |
| 7 | Do you use “CAM” alone or with prescribed or non-prescribed drugs? | 73 (53.7%) | 63 (46.3%) |

The majority of the respondents thought that CAM was effective (n=127, 93.4%), while nine participants (6.6%) thought CAM to be equivocal or non-effective. A majority of the respondents (n=121, 89%) reported no side effects with this form of treatment. Although CAM therapy is considered safe, it is not without side effects. Pneumothorax due to acupuncture, dermatitis and allergic conditions by the use of herbal ointments have been reported in the literature.¹⁶ About 77.9% (n=106) participants believed that CAM therapy was cheaper than conventional allopathy medicine, and one hundred and twenty (88.2%) were of the opinion that they would strongly recommend CAM to their fellow colleagues (Table-2). The majority of the participants (n=65, 47.8%) obtained CAM treatment from homemade remedies, followed by herbal shops (n=46), and 25 got it from authorized facilities (18.4%) (Table-6).

Out of a total of 197 participants who knew about CAM, 136 (69%) had used CAM while 61 participants (31%) had not used CAM even once in their life. The maximum number of participants who used CAM belonged to age group >35 years (n=60) while the highest figure for non-users of CAM treatment belonged to the age group 15-20 years (n=38) (Table-7).

Out of those 136 participants who used CAM, 63 (46.3%) were middle school attendant, and 61 (44.9%) were university licentiates while in the group who did not use CAM, 42 (68%) were middle school attendant, and 15 (24.6%) were university attendant (Table-7).

In this study, no significant association was observed between gender and the use of CAM (P=0.197). Out of 136 participants who had used CAM, 91 (66.9%) were male while in the group who hadn't used CAM, 35

| No. | Question statement | Place of CAM usage/ practice | Number | Percent |
|-----|----------------------------------------|------------------------------|------------|------------|
| 11 | From where do you get/ practice “CAM”? | Homemade | 65 | 47.8% |
| | | Herbal shop | 46 | 33.8% |
| | | Authorized facilities | 25 | 18.4% |
| | | Total | 136 | 100 |

(57.4%) were male (Table-7). Similarly, no significant association was observed between nationality and the use of CAM (P=0.953). Out of 136 participants who had used CAM,

120 (88.2%) were Saudis, and 16 (11.8%) were expats while the ratio of Saudis to expats in the second group who hadn't used CAM, it was 88.5% and 11.5% respectively (Table-7).

| Table 7 Correlation of CAM usage with different variables | | | |
|-----------------------------------------------------------|------------------------|------------|-------|
| 1. CAM usage & Age | | | |
| | Have you ever used CAM | | Total |
| Age (years) | Yes n (%) | No n (%) | |
| 15-20 | 40 (29.1%) | 38 (62.2%) | 78 |
| 21-35 | 36 (26.2%) | 17 (27.6%) | 53 |
| >35 | 60 (43.7%) | 6 (9.6%) | 66 |
| Total | 136 | 61 | 197 |
| 2. CAM usage & Education level | | | |
| | | | |
| Education level | | | |
| Illiterate | 4 (2.9%) | 2 (3.3%) | 6 |
| Elementary school | 8 (5.9%) | 2 (3.3%) | 10 |
| Middle school | 63 (46.3%) | 42 (68.9%) | 105 |
| University | 61 (44.9%) | 15 (24.6%) | 76 |
| Total | 136 | 61 | 197 |
| Pearson Chi Square =9.07, p=0.028 | | | |
| 3.CAM usage & Gender | | | |
| | | | |
| Gender | | | |
| Male | 91(66.9) | 35(57.4) | 126 |
| Female | 45 (33.1) | 26 (42.6) | 71 |
| Total | 136 | 61 | 197 |
| Pearson Chi Square =1.661, p=0.197 | | | |
| 4. CAM usage & Nationality | | | |
| | | | |
| Nationality | | | |
| Saudi | 120 (88.2%) | 54 (88.5%) | 174 |
| Non-Saudi | 16 (11.8%) | 7 (11.5%) | 23 |
| Total | 136 | 61 | 197 |
| Pearson Chi Square =0.003, p=0.953 | | | |

DISCUSSION

The theoretical description of CAM is extensive and encompasses scores of healing domains and practices prevalent in a particular culture or practiced worldwide. CAM practices include two main types; natural products (honey, herbs, etc.) and mind-body medicine (yoga, chiropractic, acupuncture, etc.). As per the European definition of CAM, many treatment modalities are being utilized by the conventional healthcare, and there is a gray zone between the two forms of treatment.^{17,18} In our study, the prevalence of CAM use was 66.3%. This is comparable to other studies in the world with the prevalence of 50% in Tokyo, Japan in 2002¹⁹, 47% in the USA in 2002⁵, 48.5% in Australia in 1996.⁶ Studies from KSA revealed higher levels of CAM usage prevalence, for example, a study carried out in Riyadh region in 2008 in a household survey, showed that around 73% of population utilized some form of CAM.²⁰ Another study on 518 sample size in the Riyadh region revealed prevalence percentage of 84.6%.¹² In yet another study conducted in 2011 on a sample size of 1160 individuals in Qassim district, the prevalence of CAM usage was 74% overall.¹³ The reason of low CAM usage compared to other studies in KSA could be due to the fact that the vast modalities used in CAM may not have been known to the general public and also our researchers might not have time to explain all CAM practices to the participants.

The study population in our study were all citizen of Majmaah city of both genders

with age limit of more than or equal to 10 years and above. In our study, there was disproportionate of male and female participants with 131 male compared to 71 female. This difference was probably due to less number of visits by our male researchers in the educational campuses of the female. In public places like markets, souqs, parks, etc. the proportion of male and female was almost equal. Despite this difference, our results showed that there was no statistical difference between the use of CAM and gender ($p=0.197$). This is in contrast to a general observation that the CAM usage is more prevalent among female compared to male due to access to the advertisement and availability of time to avail such practices.^{21,22}

In our results, there was a statistically significant difference between the CAM users and the level of education ($p=0.028$) to those who did not use CAM. It is evident from Table-7 that middle school and university degree holders used CAM more than the illiterate and those with primary level education. This is explainable due to the fact that educated class is more aware of the benefits and shortcomings of both traditional and conventional medicine. Similarly, the leading age group involved in the use of CAM was >35 years ($n=60$, 43.7%) in comparison to the age group of 15-20 years who did not use CAM ($n=38$, 62.2%). This is in contrast to western studies that revealed that CAM usage was more prevalent among young children and adolescents.^{23,24} In the western world, it is understandable as young children and teenag-

ers start to make independent decisions about their health and fitness, and thus they turn towards such form of therapies.

All participants who used CAM, the majority used the CAM rarely (n=68), while 16 reported using CAM usually (once a week). The main reason of CAM use was the treatment of chronic ailment (n=53), e.g., hypertension, acne, hyper or hypothyroidism, insomnia, fatigue, body aches, etc. (The breakup data not shown). Chronic pain especially backache was also the main reason to use CAM (n=21). It is clear that the treatment of a chronic backache is quite expensive and requires different surgical as well as rehabilitation therapies.

Herbal remedies were the most common type of CAM used by our participants (n=93), followed by Hijamma (n=34), and acupuncture (n=6). These findings are in accordance with findings by Norah et al.²⁰ where the herbal practice was the primary mode of CAM therapy in the Riyadh region. In another study by Abdulaziz A et al. on patients of liver disease visiting at tertiary care hospital Riyadh, the primary mode of CAM use by patients with the liver disorder was honey, followed by herbs.⁹

One of our interesting findings was that the majority of the respondents admitted that CAM was cheaper modality (77.9%). As the healthcare system is free for the resident Saudis, still they considered CAM as inexpensive. The reason could be that all those who visited the private hospitals might have compared the treatment cost of allopathy to the CAM. About

the effectiveness of CAM practice, 93.4% responded that CAM was an effective practice. The logical explanation could be that Saudi Arabia is a religious Islamic country and Prophetic medicine has deep historical roots in its culture.

Similarly, the majority of the CAM users depended upon homemade therapies (n=65, 47.8%), while a call to herbal shops was the second most visited source (n=46), and 25 attended authorized facilities for CAM. Lack of advertisement and ignorance of such services could be the reasons for a small number of visits to authorized CAM facilities by our respondents.

LIMITATIONS OF STUDY

Our study had a small sample size that could result in type 2 error. Moreover, the gender representation was also not the reflection of the population. This was due to traditional norms that restricted the access of our male researchers to collect data from the female students studying in various educational institutes.

In our study, we did not put a time bar for CAM usage. This could result in recall bias. Another study should be conducted with time limits to resolve the problem of recall bias. Our study was cross-sectional, and the participants had to self-report the information which could result in reporting bias. This study was limited to one city of Al Majmaah, and hence our findings could not be extrapolated to other parts of KSA.

CONCLUSION

Complementary and alternative medi-

cine is a major component of a healthcare system worldwide that has gained widespread acceptance in the general population. The prevalence of CAM usage is high in KSA that is also supported by the present study. The majority of the people of Majmaah city use and advocate the CAM treatment. Physicians should acknowledge this fact and encourage their patients to use safe CAM practice from authorized sources.

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GUIDELINES FOR MANUSCRIPT PREPARATION

A. TYPES OF MANUSCRIPTS

I. ORIGINAL MANUSCRIPTS

Manuscripts submitted in this category are expected to be concise, well organized, and clearly written. The maximum length is 5000 words, including the abstract, references, tables, and figure legends. The maximum length is 5000 words, including the abstract, references, tables, and figure legends.

- The structured abstract must not exceed 250 words.
- The title must not exceed 130 characters.
- A maximum of 4 tables and 4 figures is allowed.
- References should not exceed a maximum of 100.
- The abstract must be organized as follows:
 - Background & Aims
 - Methods
 - Results
 - Conclusions
- Do not use abbreviations, footnotes or references in the abstract.
- An electronic word count of the abstract must be included.
- Three to ten key words at the end of the abstract must be provided.

The manuscript must be arranged as follows:

- Title page
- Abstract
- Introduction
- Materials and methods (or Patients and methods)
- Results
- Discussion
- Acknowledgements
- References
- Tables
- Figure legends
- Figures

Acceptance of original manuscripts will be based upon originality and importance of the investigation. These manuscripts are reviewed by the Editors and, in the majority of cases, by two experts in the field. Manuscripts requiring extensive revision will be at a disadvantage for publication and will be rejected. Authors shall be responsible for the quality of language and style and are strongly advised against submitting a manuscript which is not written in grammatically correct English. The Editors reserve the right to reject poorly written manuscripts even if their scientific content is qualitatively suitable for publication. Manuscripts are submitted with the understanding that they are original contributions and do not contain data that have been published elsewhere or are under consideration by another journal.

II. REVIEW ARTICLES

Review articles on selected clinical and basic topics of interest for the readers of the Majmaah Journal of Health Science will be solicited by the Editors. Review articles are expected to be clear, concise and updated.

- The maximum length is 5000 words, excluding the summary, references, tables, and figures.
- References should not exceed a maximum of 150.
- The inclusion of a maximum of 4 high-quality tables and 4 colored figures to summarize critical points is highly desirable.
- Review articles must be accompanied by a title page and a summary.

- Reviews should include at least one Key Point Box, with a maximum of 5 bullet points, that briefly summarizes the content of the review.

Review articles are reviewed by the Editors and may be sent to outside expert reviewers before a final decision for publication is made. Revisions may be required.

III. EDITORIALS

This section consists of invited brief editorial comments on articles published in the Majmaah Journal of Health Science

The length of an editorial should not exceed 1500 words, excluding references.

- A maximum of 1 table or 1 figure is allowed.
- References should not exceed a maximum of 20.
- A title page must be provided.

IV. CASE REPORTS

Case reports would be only accepted if they represent an outstanding contribution to the Etiology, pathogenesis or treatment of a specific condition.

- The maximum length is 3000 words, including the summary and references.
- A maximum of 2 tables and 2 figures is allowed.
- References should not exceed a maximum of 15.
- A title page must be provided.

V. LETTERS TO THE EDITOR

Letters to the Editor will be considered for publication if they are related to articles published in recent issues of Majmaah Journal of Health Science. Occasionally, Letters to the Editor that refer to articles not published in Majmaah Journal of Health Science will be considered.

The length of a Letter to the Editor should not exceed 800 words.

- A maximum of 1 table or 1 figure is allowed.
- References should not exceed a maximum of 10.
- No more than 4 Authors may appear in the author list.

VI. COMMENTARIES

International commentaries will be solicited by the Editors only.

- Commentary articles should not exceed a maximum of 800 words, excluding tables or figures.
- A maximum of 1 table or 1 figure is allowed.
- References should not exceed a maximum of 10.
- A title page must be provided.

B. MANUSCRIPT SUBMISSION

ORGANIZATION OF THE MANUSCRIPT

- The submitted manuscript must be typed double-spaced throughout and numbered (including references, tables and figure legends). Preferably using a "standard" font (we prefer Times/Arial 12).
- For mathematical symbols, Greek letters, and other special characters, use normal text. The references must be in accordance with the Vancouver reference style (see References).
- Approved nomenclature for gene and protein names and symbols should be used, including appropriate use of italics (all gene symbols and loci, should be in italics) and capitalization as it applies for each organism's standard nomenclature format, in text, tables, and figures.
- Full gene names are generally not in italics and Greek symbols are not used. Proteins should not be italicized.
- Improperly prepared manuscripts will not be entered into the peer review process and will be sent back to the author for correction.

TITLE PAGE MUST CONTAIN:

- A title of no more than 130 characters.

- Running title (not to exceed 60 characters)
- Names of the Authors as it should be published (first name, middle initial, last name)
- Affiliations of all authors and their institutions, departments, or organizations (use the following symbols in this order to designate authors' affiliations: *, †, ‡, §, ¶, ||, #, **, ††, ‡‡, §§, ¶¶, || ||, ##).
- Name, address, telephone and fax numbers, and electronic mail address of the corresponding Author.
- Electronic word count.
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- Conflict of interest.
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Animal trials: Manuscripts reporting experiments using animals must include a statement giving assurance that all animals received human care and that study protocols comply with the institution's guidelines. Statistical methods used should be outlined.

Human trials: Manuscripts reporting data from research conducted on humans must include a statement of assurance in the methods section of the manuscript reading that:

1. Informed consent was obtained from each patient included in the study and
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Randomized controlled trials: Any paper that is a randomized control trial should adhere to the guidelines that can be found at the following web-site: www.consort-statement.org. The checklist should be printed out and faxed to the Editorial office at the time of submission. The trial registration number must be included on the title page of the manuscript reporting a registered clinical trial. Failure to do so will prevent entry to the peer review process.

Drugs and chemicals: Drugs and chemicals should be used by generic name. If trademarks are mentioned, the manufacturer's name and city should be given. All funding sources supporting the work, either public or private, especially those from pharmaceutical companies, must be provided.

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REFERENCES

References must be in accordance with the Journal of Hepatology reference style. References are ordered as they appear in the text and citation numbers for references are placed between "brackets" ("[]") in the text as well as in the reference list.

Authors should be listed surname first, followed by the initials of given names (e.g. Bolognesi M). If there are more than six authors, the names of the first six authors followed by et al. should appear.

Titles of all cited articles are required. Titles of articles cited in reference list should be in upright, not italic text; the first word of the title is capitalized, the title written exactly as it appears in the work cited, ending with a full stop. Journal titles are abbreviated according to common usage, followed by Journal years, semicolon (;) before volume and colon (:) before full page range (see examples below).

All articles in the list of references should be cited in the text and, conversely, all references cited in the text must be included in the list.

Personal communications and unpublished data should be cited directly in the text by the first Author, without being numbered. Please make sure you have the latest, updated version of your reference management software to make sure you have the correct reference format for Majmaah Journal of Health Science.

An example of how references should look within the text:

"HVPG was measured by hepatic vein catheterization using a balloon catheter according to a procedure described elsewhere [14, 15] and used as an index of portal hypertension [16]."

An example of how the reference list should look:

[14] Merkel C, Bolognesi M, Bellon S, Zuin R, Noventa F, Finucci G, et al. Prognostic usefulness of hepatic vein catheterization in patients with cirrhosis and esophageal varices. *Gastroenterology* 1992;102:973-979.

[15] Groszmann RJ, Wongcharatrawee S. The hepatic venous pressure gradient: anything worth doing should be done right. *Hepatology* 2004;39:280-282.

FIGURES

A maximum of 4 figures is allowed

(This can be modified if needed by Editorial board).

- Figures will be often, but not always, re-designed by graphic designers. By signing and transferring the Copyright Agreement to MJHS, the author gives permission to the graphic designers to alter the visual aspect of any figures, tables, or graphs. The scientific content of figures will not be altered. Please provide this information with your covering letter.
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- Two standard widths are used and figures should fit in one (8.5 x 23.5 cm) or two (17.5 x 23.5 cm) columns
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- • Furthermore, panel lettering should be in Arial bold 14 pt, capitalized and no full stop (A, B) while lettering in figures (axes, conditions), should be in Arial 8 pt, lower case type with the first letter capitalized and no full stop. No type should be smaller than 6 pt.

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- Figure legends should be listed one after the other, as part of the text document, separate from the figure files.
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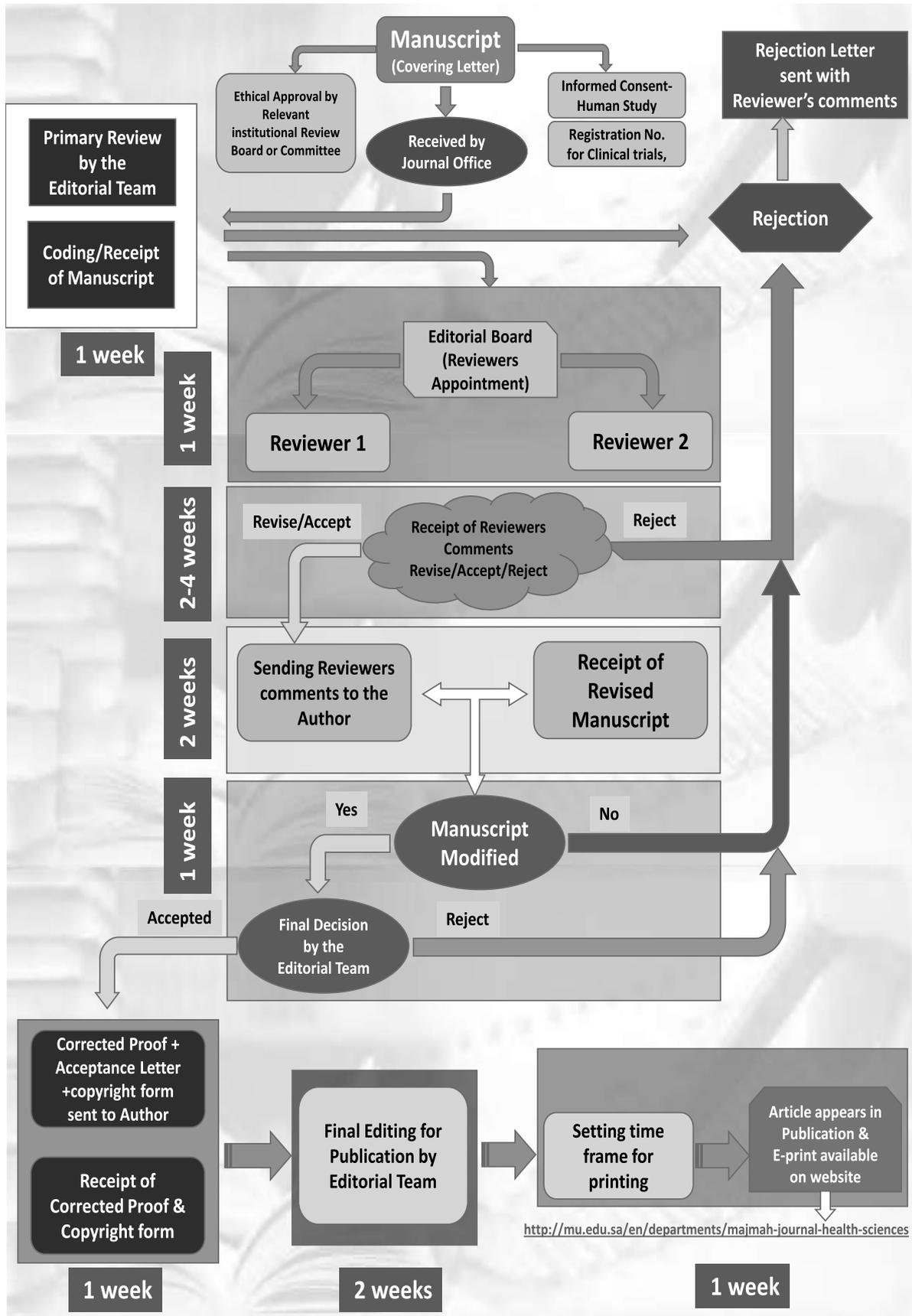
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Complex analyses should be performed with the assistance of a qualified statistician. Unqualified use of such analyses is strongly discouraged. The underlying assumptions of the statistical methods used should be tested to ensure that the assumptions are fulfilled.

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