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From the Editor

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This is the last issue this year. The journal has surpassed all expectation and become the leader of family medicine literature in the region. The editorial board and the production team are highly satisfied with the outcome of this journal.

We look forward to continuously working with authors in order to publish their work and to propagate the field of family medicine. From early 2012 we will be providing to authors and readers a range of statistics including national and regional readership, (currently 600,000/ month), Impact Factor, H Index. The MEJFM and other medical journals are also currently going into several large medical databases and indexes to maximize readership of your articles.

In this issue various papers deal with topics from all over the world.

A cross sectional descriptive study paper from Saudi Arabia looked at perceived personal, social, and environmental barriers to healthy eating among young overweight and obese Saudi women. Questionnaires were filled out by 302 overweight and obese patients. They examined 10 barriers. The authors concluded that overall, the study showed descriptive analysis to the perceived barriers to healthy diet among adult overweight and obese women. Such barriers can be overcome by development of individualized healthy diet programs and implementation of behavioral and social approaches for encouragement of a healthy diet.

A prospective paper from Jordan looked at the value of color Doppler studies of the umbilical, middle cerebral and uterine artery in predicting the perinatal outcome of high risk pregnancies. Perinatal outcomes and Doppler studies were worse in the high risk group. Women in the high risk group delivered more by cesarean section (75% Vs 25%). The author's advise color Doppler ultrasound can be useful in predicting perinatal outcome in high risk pregnancies.

A cross sectional paper from King Abdullah University Hospital, Jordan University of Science and Technology, looked at Radiological Bone Assessment in the Evaluation of osteoporosis in Jordan. The assessment was done using BMD measurements. The study classified 13.2% of the studied women as osteoporotic. The authors concluded that total BMD had a strong negative correlation with age and positive correlation with body composition and the decline in BMD was more in lumbar spine than that in the femur. They recommended increased awareness of women for the importance of early and frequent assessment of their BMD and lunching of screening program for all women over 45 yrs of age for early detection of osteopenia or osteoporosis and early intervention to prevent the risk fracture.

A cross-sectional study from Algeria looked at the prevalence of childhood obesity. The study was performed from February through to May 2008 on 428 school children (218 boys and 210 girls) aged 8-15 years in the urban area of Sidi-Bel-Abbes. According to the IOTF, French and CDC references, the overall prevalence rates of overweight among the whole studied population was 7.94, 7.71 and 7.23%, respectively. The authors concluded that the prevalence of overweight and obesity in the Algerian children is considered to be high, and therefore represents a major public health problem which requires a preventive intervention in order to avoid future health consequences during adulthood.

A paper from Turkey looked at Digital clubbing and metabolic syndrome. The study included 224 cases (104 with clubbing), totally. The mean age of clubbing cases was 49.2 years, and there was a male predominance (81.7%) among them. The authors concluded that there are direct relationships between clubbing and prevalence of smoking, COPD, CHD, and PAD, probably due to the atherosclerotic effects of smoking. Whereas BMI, weight, FPG, systolic and diastolic BPs and prevalence of DM are inversely related with clubbing, probably due to suppressor effects of smoking on appetite.

A second paper from Saudi Arabia looked at H1N1 Influenza A infection. The authors stressed that influenza reached an epidemic proportion in 2009. Oseltamivir (oral inhibitors) is used for the treatment and prevention of H1N1 influenza A infection. In order to answer the question how effective oseltamivir is in treating/preventing H1N1 influenza oseltamivir use in treating and or preventing Novel influenza, the authors discussed some point of care resources and EBM to answer the above mentioned questions.

A descriptive study was carried out to analyze the Saudi Board Family Medicine Training curriculum in relation to the six continuum of the SPICES model. The Saudi Board Family Medicine (SBFM) residency training program was started in Saudi Arabia under the umbrella of the Saudi Commission for the Health Specialties whose curriculum is designed to accomplish all requirements of recent trends in methods of teaching of medical education. The results indicates that the SBFM residency training program has included lots of innovative medical education approaches while designing their curriculum .The curriculum is more towards the left of the SPICES specification. Some shortcomings found the need to be more towards the right like community-based approach and for elective parts. The authors concluded that the Family Medicine Residency program curriculum is an integrated curriculum and more towards the left of the SPICES spectrum .The concept of this paper has been the adoption and in particular understanding of facts, concepts and ideas while planning reviewing or evaluating of curriculum for any post graduate program.

Perceived personal, social, and environmental barriers to healthy eating among young overweight and obese Saudi women

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Abstract

Background: Obesity is a serious and chronic medical condition associated with a wide range of life-threatening disease and resulting in enormous financial costs being born by health-care systems and the community itself. In an effort to reverse the current global epidemic of overweight and obesity, strategies to encourage healthy eating have been promoted in many countries. In order to develop appropriate and effective obesity prevention strategies for young women it is important to understand the barriers they perceive in attempting to reduce their weight and to examine perceptions of a range of personal, social and environmental barriers to healthy eating.

Objectives: To identify the range of perceived personal, social and environmental barriers to healthy eating for weight reduction among young Saudi overweight and obese women and to determine how these barriers varied by socio-demographic status and socio-economic status.

Design: Cross sectional descriptive study.

Method: 302 patients were requested to fill in a questionnaire. It identified personal data, body weight and barriers for healthy diet among adult overweight and obese women.

Results: Questionnaires were filled in by 302 overweight and obese patients. We examined 10 barriers. The main barriers reported by women related to a need of special prepared, separated food from family (62.3%), lack of information, skills to plan and prepare a healthy diet (61.2%), easy availability of fast food (56%), lack of time to prepare healthy food because of family commitments (55%), lack of motivation to eat healthy diet accounted for 56.6%, cost of healthy food accounting for 48%, lack of family, friends encouragement and support (49.4%) and 42.7% of ladies consider overeating was related to social stressors, as important barriers.

Conclusion : Overall, the study showed a descriptive analysis to the perceived barriers to healthy diet among adult overweight and obese women. Such barriers can be overcome by development of individualized healthy diet programs and implementation of behavioral and social approaches for encouragement of a healthy diet. Key words : weight reduction, obesity, barriers, diet.

Introduction

Obesity is a serious and chronic medical condition associated with a wide range of life-threatening diseases and resulting in enormous financial costs being born by health-care systems and the community itself (1). The World Health Organization (WHO) reported 800 million people suffer from under-nutrition, while more than 1 billion adults suffer from over-nutrition, with at least 300 million of them obese (2).

According to the most recent National Health and Nutrition Examination Survey (NHANES III, 1988 to 1994), (3,4) between one third and one half of U.S men and women 20 years and older are overweight; nearly one fourth are clinically obese. Women in the United States with low incomes or low education are more likely to be obese than those of higher socioeconomic status (4).

In Saudi Arabia, obesity and overweight are well known risk factors for coronary artery disease (CAD), and is expected to be increasing in the Kingdom of Saudi Arabia (KSA) particularly among females.(5)

Overweight and obesity (BMI > 30) has increased at a dramatic rate worldwide. Many epidemiological studies have demonstrated a close relationship between obesity and morbidity and mortality from cardiovascular disease. (6)

In an effort to reverse the current global epidemic of overweight and obesity, strategies to promote healthy eating have been promoted in many countries.

Most existing studies examining perceived barriers to healthy eating have focused on the general population, (7) with few specifically considering the perceived barriers

faced by young women are likely to differ from those faced by other groups, such as by men or older women.

In order to develop appropriate and effective obesity prevention strategies for young women it is important to understand the barriers they perceive in attempting to control their weight and to examine perceptions of a range of personal, social and environmental barriers to healthy eating among young women.

Method

A cross sectional and descriptive study. A total of 302 women aged 16-60 years with BMI >=25 were randomly selected from the Primary Health Care Specialty Clinic in the National Guard Hospital.

Participant's inclusion criteria:

· Age (16-60) years
· Saudi females
· BMI >=25 based on classification system of overweight and obesity by BMI which was developed by the World Health Organization Obesity Task Force.
· Those who are eligible.

Data collection procedure:

· The data was collected in a questionnaire, which was designed by the researcher based on literature review and peer reviewed by a consultant in family medicine. It was an interview - assisted face-to-face questionnaire. The questionnaire for the study was prepared in English and was translated into Arabic with a covering letter in which the nature of the study was clarified, and by personal contact.

The questionnaire included the following:

· **Socio-demographic data**
· **Body weight**
· **Co morbidities**
· **Perceived barriers to healthy eating** :

Young women's perceptions of barriers to healthy diet were assessed using a list of barriers. Participants were asked "how important are the following as barriers to you for a healthy diet.

Patients' characteristics	Frequency (%)
Age (years)	
16-30 years	119 (39.4%)
31-45 years	123(40.7%)
46-60 years	60(19.9%)
Occupation	
Housewife	248(82.1%)
Employee	22(7.3%)
Student	32(10.6%)
Residency	
City	289 (95.7%)
Village	12 (4.0%)
Desert	1 (0.3%)
Education level	
Illiterate	97 (32.1%)
Primary school	49 (16.2%)
Intermediate school	52 (17.2%)
High school	60 (19.9%)
University	44 (14.6%)
Level of Family income	
<2500 S.R	47 (15.6%)
2500-5000 S.R	133 (44.0%)
5000-10000 S.R	99 (32.8%)
10000-15000 S.R	16 (5.3 %)
>15000 S.R	7 (2.3 %)
Kind of living place	
Flat	88 (29.1%)
Villa without courtyard	171 (56.6%)
Villa with courtyard	33 (10.9%)
Duplex	10 (3.3 %)
Body mass index	
25 - 29 kg/m2	71 (23.5%)
30 - 34 kg/m2	107 (35.4%)
35 - 39 kg/m2	73 (24.2 %)
40 - 55 kg/m2	51 (16.9%)
Associated Co-morbidities	
Diabetes mellitus	62 (20.5%)
Hypertension	48 (15.9%)
Hyperlipidemia	60 (19.9%)
Hypothyroidism	43 (14.2 %)
Osteoarthritis	84 (27.8 %)
Depression/anxiety	47 (15.6 %)
Bronchial asthma	35 (11.6%)

Table 1: Socio-demographic characteristics of study sample

These barriers were based on a review of the literature investigating barriers to healthy eating in other population groups. These items were classified into those relating to personal, family, social, and environment factors.

Response options for all barrier items were:

Not a barrier, A somewhat important barrier and A very important barrier.

Statistical Analysis:

All data was entered in the computer and analyzed by using SPSS (Statistical Package for Social Science) Version 12 statistical software. Initially, descriptive analyses were performed to describe the proportion of women related to a very important barrier. The difference between groups was calculated by using chi-square test. The significance was defined by $p<0.05$.

Perceived barriers to healthy diet	Not a barrier	Important barrier	I don't know	Total
Not having the motivation to eat a healthy diet.	126 (41.7 %)	171 (56.6%)	5 (1.7%)	302 100%
Not having enough information, skills to plan, shop to prepare or cook healthy foods.	110 (36.4%)	185 (61.2%)	7 (2.3%)	302 100%
Not being able to buy healthy foods that are inexpensive.	149 (49.3%)	145 (48%)	8 (2.6%)	302 100%
Not having time to prepare or eat healthy foods because of their job.	233 (77.2%)	60 (19.9%)	9 (3.0%)	302 100%
Believing that healthy diet is not delicious.	180 (59.6%)	115 (38%)	7 (2.3%)	302 100%
Overeating related to stressors depression, or anxiety.	162 (53.6%)	129 (42.7%)	11 (3.6%)	302 100%
Lack of encouragement, and support to eat healthy diet from family and friends.	148 (49.0%)	149 (49%)	5 (1.7%)	302 100%
Need special prepared food, separate from family.	107 (35.4%)	188 (62.3%)	7 (2.3%)	302 100%
Not having time to prepare healthy foods because of family commitment.	31 (43.4%)	166 (55%)	5 (1.7%)	302 100%
Easy availability of junk and fast food.	123 (40.7%)			302 100%

Table 2: Frequency of Perceived Barriers to eat healthy diet

Results

Data was obtained by interviewing 302 overweight or obese adult Saudi females attending the Primary Health Care Specialty Clinic in the National Guard hospital.

Sociodemographic data is shown in Table 1 - opposite page.

Age of the patients ranged between 16-60 years (mean 36), the majority of them were less than 45 years. Overweight subjects were 23.5 % (BMI 25-29.9 kg/m2), while 35.4% had grade 1 obesity (BMI 30-34.9 kg/m2), 24.2% had grade 2 obesity (BMI 35-39.9 kg/m2) and only 16.9% were morbidly obese (BMI > 40 kg/m2).

More than one third of our patients were illiterate and more than two thirds were housewives accounting for 82.2% while the minorities were employees accounting for 7.3% and students (10.6%). Most of our patients were residing in urban communities accounting for 95.7% while only 4% were residing in rural communities.

More than half of patients were living in a villa without a courtyard accounting for 56.6% and 29.1% were living in a flat. The majority of them had family income less than 5000 SR accounting for 60 %.

About 189 patients (62.6%) had co-morbidities. Among those patients, 189 patients (20.5%) had diabetes mellitus, 48 patients (15.9%) had hypertension while 60 patients (19.9%) had hyperlipidemia; 43 patients (14.2%) had hypothyroidism, 84 patients had osteoarthritis (27.8%), 35 patients (11.6%) had bronchial asthma and 47 patients (15.6%) had depressive, anxiety or social stressors.

Perceived barriers to healthy diet : We examined 10 barriers as shown in Table 2 which represents perceived barriers to healthy eating. The main barriers reported by women related to a need for special prepared, separated food from family, accounting for 62.3%, lack of information, skills to plan and prepare for a healthy diet accounting for (61.2%), easy availability of fast food (56%), lack of time to prepare healthy food because of family commitments (55%), lack of motivation to eat healthy diet accounting for 56.6%, cost of healthy food accounting for 48%, lack of family, friends encouragement and support (49.4%) and 42.7% considered overeating, which was related to social stressors, as important barriers.

Socio-demographic data	Not having the motivation to eat a healthy diet			
	Not a barrier	Important barrier	I don't know	P Value
Age (years)				
16-30 years	30	86	3	0.000
31-45 years	61	61	1	
46-60 years	35	24	1	
Occupation				
Housewife	115	132	1	0.000
Employee	2	18	2	
Student	9	21	2	
Education level				
Illiterate	52	45	0	0.000
Primary school	30	18	1	
Intermediate school	21	31	0	
High school	15	43	2	
University	8	34	2	
Level of Family Income				
<2500 S.R	24	23	0	0.000
2500-5000 S.R	63	69	1	
5000-10000 S.R	34	64	1	
10000-15000 S.R	3	10	3	
>15000 S.R	2	5	0	
Associated Comorbidities				
Hypertension	27	21	0	0.011

Table 3: Association of sociodemographic data with not having the motivation to eat a healthy diet

Socio-demographic data	Need specially prepared food, separate from the family			
	Not a barrier	Important barrier	I don't know	P Value
Age (years)				
16-30 years	40	77	2	0.034
31-45 years	38	81	4	
46-60 years	29	30	1	
Education level				
Illiterate	41	54	2	0.002
Primary school	17	30	2	
Intermediate school	18	33	1	
High school	23	35	2	
University	8	36	0	
Level of Family Income				
<2500 S.R	24	21	2	0.006
2500-5000 S.R	46	84	3	
5000-10000 S.R	32	65	2	
10000-15000 S.R	4	12	0	
>15000 S.R	1	6	0	
Associated Comorbidities				
Hypothyroidism	15	26	2	0.056
Osteoarthritis	28	51	5	0.002

Table 4: Association of sociodemographic data with Need for specially prepared food, separate from the family

Socio-demographic data	Not having time to prepare or eat healthy foods because of family commitment			
	Not a barrier	Important barrier	I don't know	P Value
Age (years)				
16-30 years	40	77	2	0.001
31-45 years	50	70	3	
46-60 years	41	19	0	
Occupation				
Housewife	118	125	5	0.000
Employee	3	19	0	
Student	10	22	0	
Education level				
Illiterate	59	37	1	0.000
Primary school	25	24	0	
Intermediate school	18	32	2	
High school	18	41	1	
University	11	32	1	
Level of Family Income				
<2500 S.R	25	19	3	0.014
2500-5000 S.R	64	68	1	
5000-10000 S.R	36	62	1	
10000-15000 S.R	5	11	0	
>15000 S.R	1	6	0	
Associated Comorbidities				
Diabetes mellitus	36	26	0	0.052
Hypertension	37	11	0	0.000
Hyperlipidemia	35	23	2	0.011
Osteoarthritis	51	32	1	0.002

Table 5: Association of sociodemographic data with not having the time to prepare or eat healthy foods because of family commitments

Association of the socio-demographic data with the most perceived barriers to a healthy diet :
It was noticed there was a significant relation between socio-demographic data and the most perceived barriers to a healthy diet as shown in Tables 3,4,5,6.

Discussion

The most urgent challenge to nutritional health for the 21st century is addressing the epidemic of obesity. Obesity and overweight are well known risk factors for coronary artery disease and are expected to be increasing in the Kingdom of Saudi Arabia (KSA) particularly among females(5).

In order to develop appropriate and effective obesity prevention strategies for young women it is important to understand the barriers they perceive in attempting to reduce their weight and to examine perceptions of a range of personal, social and environmental barriers to healthy eating among young women.

The results of our study showed that the prevalence of overweight and obesity among young women were higher among middle aged, illiterate, housewives, those residing in urban communities, in villa without courtyard and those with low income.

These findings are consistent with those of previous studies showing that getting married, with lower educational level, lower socioeconomic status, and residing in urban areas, were associated with high prevalence of overweight and obesity. (8)

Findings of our study showed that young women tended to rate personal factors as key perceived barriers to healthy diet, followed by environmental factors with family factors rated as less important.

These findings are consistent with results of previous studies, who determined the main perceived barriers among people trying to eat a healthy diet in the 15 member states of the European Union (EU) were time and taste factors.(9)

Socio-demographic data	Easy availability of junk and fast food			
	Not a barrier	Important barrier	I don't know	P Value
Age (years)				
16-30 years	24	90	5	0.000
31-45 years	59	59	5	
46-60 years	40	20	0	
Occupation				
Housewife	114	127	7	0.004
Employee	5	15	2	
Student	4	27	1	
Education level				
Illiterate	66	29	2	
Primary school	22	27	0	0.000
Intermediate school	13	37	2	
High school	15	42	3	
University	7	34	3	
Associated Comorbidities				
Diabetes mellitus	39	22	1	0.001
Hypertension	33	15	0	0.000
Hyperlipidemia	33	27	0	0.052
Osteoarthritis	48	34	2	0.005

Table 6: Association of sociodemographic data with easy availability of junk and fast food

Relation of the socio-demographic data with the perceived barriers to healthy diet:
There were differences in the distribution of responses about perceived barriers according to sociodemographic characteristics.

Age differences:
Middle aged and elderly females, those with lower educational level and with lower socioeconomic level, and who were housewives were those who more often reported difficulty in eating specially prepared, separated food from family, and cost, lack of motivation and lack of time to prepare or eat healthy foods because of family commitments as the more important barriers.

While the youngest age group aged less than 30 years, with high educational level and high income are more likely to consider lack of time to prepare a healthy food because of family commitments, lack of motivation, difficulty in eating specially prepared, separated food from family and availability of junk food as more important barriers.

Lack of time because of family commitments is a more common important barrier than lack of time because of jobs among the young highly educated job carrying females. It might be because cooking a healthy meal would take up a lot of their spare time which they perceive as impossible in relation to their job or lifestyle.

About 32% of women from lower socioeconomic levels regarded price as their main difficulty when trying to eat a healthier diet. This may be due to the fact that this group may regard the cost of food as prohibitive to eating a more healthy diet. Thus, it is necessary to ensure that foods which are included in a healthy diet are not too expensive or perceived as such.

Conclusion

Overall, the study showed descriptive analysis to the perceived barriers to healthy diet among adult overweight and obese women. Such barriers can be overcome by development of individualized healthy diet programs and implementation of behavioral and social approaches for a healthy diet.

Recommendations

Such barriers can be overcome by:
1- Develop individualized healthy diet programs which are tailored to the individual's specific interests, preferences, and readiness for change. These programs teach participants the behavioral skills needed to incorporate a healthy diet program into daily routines and can lead to greater patient compliance.
2- Focus on behavioral and social approaches for adapting to a healthy diet by teaching widely applicable behavioral management skills and by structuring the social environment in ways that provide support for people trying to initiate or maintain behavior changes and create social and interpersonal interaction that supports healthy diet habits.
3- Referral to a registered dietitian, who has weight-management experience, is often necessary to ensure that appropriate nutritional counseling is provided.

Limitation of the study:
1- This study is basically dealing with military-dependant, low educated, low socioeconomic women (50% were

illiterate and at primary school levels and 60% with low socioeconomic status) so, this sample size may not represent the whole Saudi community.
2- This study was done in a primary care unit; it will not represent the whole Saudi community so we recommended it to be done at household levels.

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Prevalence of overweight and obesity in 8 to 15 year-old children in Sidi-bel-Abbes, Algeria

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Abstract

Background and Objectives: The prevalence of childhood obesity has been dramatically increasing worldwide. This study was performed to estimate the prevalence of overweight and obesity in school children age 8 to 15 years in Sidi-Bel-Abbes (north-western region of Algeria).

Subjects and Methods: A cross-sectional study was performed from February through to May 2008 on 428 school children (218 boys and 210 girls) aged 8-15 years in the urban area of Sidi-Bel-Abbes. Overweight, obese and underweight patients were defined using three different international reference values for BMI: the International Obesity Task Force cut-offs (IOTF), the French references and the Centre for Disease Control (CDC) 2000 references.

Results: According to the IOTF, French and CDC references, the overall prevalence rates of overweight among the whole studied population was 7.94, 7.71 and 7.23%, respectively. Obesity affected 3.73, 3.73 and 4.43%, respectively. The girls had a higher prevalence of overweight than the boys did at all ages, while the latter had a higher prevalence of obesity.

Conclusion: The prevalence of overweight and obesity in the Algerian children is considered to be high, and therefore represents a major public health problem which requires a preventive intervention in order to avoid future health consequences during adulthood.

Key Words: obesity, overweight, children, prevalence, Algeria

Introduction

Overweight and obesity are considered as a major global public health problem observed in both sexes and in all age groups. (1) There is a relationship between childhood obesity and an increased risk for cardiovascular diseases, diabetes and several other co-morbidities in adulthood. (2)

An increasing rate of overweight and obesity in children has been observed in both developed and developing countries. In the United States of America, the prevalence of overweight and obesity was 14.4% and 17.2%, respectively, defined using age- and gender-specific cut-off according to the National Centre for Health Statistics (NCHS)/ Centre for Disease Control and Prevention (CDC). (3) In France, the prevalence of overweight and obesity among children aged 7 to 9 years-old (using the International Obesity Task Force -IOTF- values) was 18.1% and 3.8% respectively. (4)

Similarly, the prevalence in school children is 20% in United Kingdom and Australia, 15.6% in Thailand and 10% in Japan. (5,6)

In Arab and Middle East countries, a high prevalence has been reported from Saudi Arabia (23.1% for overweight, 9.3% for obesity and 2% for severe obesity in 5 to 18 years of age) and United Arabs Emirates (21.5% for overweight and 13.6% for obesity). (7,8) However, a low prevalence has been reported from Iraq (6% for overweight and 1.3% for obesity).(9)

It is well known that the BMI depends on age, even in childhood, and varies in both boys and girls. Furthermore, it is

considered as a suitable method of expressing body fat percentile of groups. (2,10) The 90th and 97th percentiles, are recommended by the European Childhood Obesity Group (ECOG) (11), and by the IOTF definition (12). However the UK (13) and France (14) use another references.

The present study, which took place in Sidi-Bel-Abbes (north-western region of Algeria), was aimed to determine the prevalence of overweight and obesity in a representative sample of children aged 8 to 15 years living in the urban area. The prevalence of overweight and obesity, among boys and girls, was compared, using age groups and using the international standards (IOTF values, French standards and CDC references).

Subjects and Methods

This cross-sectional study, which took place in the department of screening and school monitoring of Enadjah Secondary School, was carried out between February and May 2008, and covered a representative sample of 8-15 years old Algerian children. Six representative schools were selected reflecting the real distribution of the whole urban districts of the studied population. We did not collect data on socio-economic situation. We selected 428 school children (218 boys and 210 girls), who were examined by the school-physician during the academic year 2007-2008. Every year; from January to May, a medical examination of school children is planned in this department. Then, each child was examined by a general practitioner, a dentist and an appropriately trained nurse (research assistant).

The body weight and the height were measured by the nurse in the morning according to the WHO's recommendations. (15) The body weight (in kilograms) was measured to the nearest 0.1 kg in light indoor clothing, without shoes with a mechanic scale (Seca 761, Hamburg, Germany). Height was taken without shoes too. Students were facing directly ahead with feet together, and arms by their sides. The body height was measured in the nearest 0.1 cm using the stadiometer. We measured the distance from the floor to the highest point on the head. From weight and height, BMI was calculated as weight (kg) divided by height squared (m2).

The proportions of overweight and obese children among the participants were determined according to the BMI by gender and age, regarding cut-off points, suggested by Col et al. (2000), on the basis of the IOTF references. (16) These references are based on overweight outcome values (values equivalent to BMI over 25 kg/m2 and under 30 kg/m2 of adults) and obesity (values equivalent to BMI, equal or over 30 kg/m2 of adults). So, thinness and overweight were evaluated according to the French references published in 1982 and revised in 1991. (17,14) From these data, thinness and overweight are defined as follows: < 3rd percentile > 97th percentile respectively. However, the normal weight is between the 3rd and the 97th percentile.

In addition to the IOTF and the French references, children were classified as underweight (< 5th percentile), normal weight (BMI < 85th percentile), overweight (BMI>85th and <95th percentile), or obese (BMI > 95th percentile) using age and gender-specific reference growth charts from the CDC. (18)

Data were processed in Calimco version 2.0 (for French and IOTF references), and Epi Info version 3.5.1 (for CDC references). Means, standard deviation and frequency were calculated for the statistical analysis. Student's t-test was used to compare the mean results of the analysed variables and chi-square was used for comparison of frequencies. A p value below or equal to 0.05 was considered to be statistically significant. Data were analysed through SPSS version 17.0.

Results

A total of 428 school children in the age group 8-15 years were included in the study; 50.93% were boys and 49.06% were girls. The boys and the girls had approximately similar age and height distribution. The girls weighed widely more than the boys (p=0.013). Furthermore, their BMI was significantly higher than boy's (p=0.026) (Table 1 - next page). The Anthropometric characteristics of the whole sample (height, weight and BMI) are presented according to sex and age in Table 2 - next page. While means increased regularly by age for height and weight in both genders, no such clear trend appeared for BMI.

Age- and gender- standardized frequencies of obesity, overweight, normal weight and thinness, estimated according to the IOTF, French and CDC BMI references, are presented in Table 3. Using the IOTF references, the prevalence of overweight (obesity excluded) and obesity in all age groups was 7.94% and 3.73%, respectively. There was no significant gender effect on the prevalence of either overweight or obesity (2=3.720, P=0.156). The girls had a higher prevalence of overweight than the boys (4.15% vs. 2.80%). However, the boys had a higher prevalence of obesity (2.10% vs. 1.63%).

When the French references were used, we found that the prevalence of underweight, normal weight, overweight (obesity 1st degree) and obesity (obesity 2nd degree), was 3.96%, 84.57%, 7.71% and 3.73%, respectively. The gender had a significant effect on the anthropometric parameters (2=8.712, p=0.033). According to the French BMI cut-off points, 5.14% of all girls and 2.57% of all boys in the study were considered as overweight. Whereas, the corresponding values for obesity, among the boys and the girls, were 2.10% and 1.63%, respectively.

Nevertheless, according to the CDC estimations, the prevalence of underweight, overweight and obesity in all age children was 8.17%, 7.23% and 4.43%, respectively. But the gender had no significant effect on the anthropometric parameters (2=3.872, p=0.276).

	Boys (n=218)	Girls (n=210)	P-value
Age (years)	11.19±1.97 [8.09-15.90]	11.27±2.10 [8.01-15.99]	0.703
Height (cm)	142.64±11.67 [115-180]	144.61±11.85 [112-172]	0.084
Weight (kg)	35.92±10.28 [20-72]	38.59±11.73 [20-82]	0.013
Body mass index (kg/m2)	17.37±3.08 [12.63-32.22]	18.06±3.28 [10.81-29.05]	0.026

Data are presented as mean ± SD [Min-Max]

Table 1: Characteristics of study participants (n=428)*

Age (years) (girls/boys)	Height (cm)		Weight (kg)		BMI (kg/cm^2)	
	Girls	Boys	Girls	Boys	Girls	Boys
8 - <10 (65-70)	133.6±7.24 [112-150]	133.19±6.36 [116-148]	28.65±6.26 [20-53]	29.25±6.6 [20-57]	15.93±2.41 [10.81-24.2]	16.39±2.91 [12.81-32.22]
10 - <12 (87-80)	144.68±7.62 [127-165]	141.36±7.11 [115-160]	39.11±9.48 [26-72]	35.16±8.09 [22-70]	18.50±3.15 [13.85-28.12]	17.46±2.88 [12.63-27.34]
12 - <14 (25-43)	152.60±9.01 [137-170]	148.40±7.84 [135-172]	43.16±6.98 [30-61]	40.81±10.03 [29-72]	18.51±2.44 [14.67-25.51]	18.37±3.36 [13.7-28.95]
14 - <16 (33-25)	160.09±7.20 [145-172]	163.32±8.39 [148-180]	53.33±10.02 [34-82]	48.64±9.78 [31-70]	20.75±3.22 [13.62-29.05]	18.13±3.01 [12.9-27.34]

Data are presented as mean ± SD [Min-Max]

Table 2: Mean values ± SD for body weight, height and BMI in relation to age range

Opposite page: Table 3: Prevalence of overweight, obesity and thinness at different ages in girls and boys according to various references

Discussion

It has been shown that the BMI is the most valid indirect indicator of adiposity in children, adolescent and adults. (19, 20) The accepted BMI of 25 for overweight and 30 for obesity in adults is used to provide cut-off points at younger ages. However, the BMI is now generally accepted to be used to define obesity in children and adolescents clinically. Many specific BMI values for age and gender have been published. (21) During the pre-puberty period, numerous factors affect physical development, such as genetic, socioeconomic and educational influences. In addition, familial factors, physical activity and eating disorders are also concerned. (22) On the other hand, most differences in frequencies of overweight and obesity in younger ages are initially explained by the choice of the cut-offs. They are also related to the date of collection of the data, the country of origin, the study design and the smoothing method used. From 1953 to 1960 and till 1979, the French references have been established on the basis of longitudinal data. (18) The CDC references are based on the US data collected in the US in 1963-1965 and 1976 till 1980.(23) Mostly, during the 1980s, they are from cross-sectional data collected in six countries (Brazil, Great Britain, Hong Kong, the Netherlands, Singapore, and the United States) and the IOTF references are established and are recommended by some authors for international use. (16) The French, IOTF and CDC references used the LMS (Lambda, Mu, Sigma) methods. (24)

Few studies have reported on the prevalence of obesity amongst children in developing countries in which it has reached epidemic proportions. (25)

		IOTF references			French references				CDC references			
Age	Gender (n)	Not overweight or obesity	Overweight (obesity excluded)	Obesity	Underweight	Normal weight	Overweight (obesity 1st degree)	Overweight (obesity 2nd degree)	Underweight	Normal weight	Overweight	Obesity
8 - <10	Girls (65)	13.78 [59]	1.16 [5]	0.23 [1]	0.70 [3]	13.08 [56]	1.16 [5]	0.23 [1]	1.86 [8]	11.91 [51]	1.16 [5]	0.23 [1]
	Boys (70)	15.18 [65]	0.46 [2]	0.70 [3]	0.93 [4]	14.48 [62]	0.23 [1]	0.70 [3]	1.16 [5]	13.55 [58]	0.93 [4]	0.70 [3]
10 - <12	Girls (87)	16.58 [71]	2.33 [10]	1.40 [6]	-	16.58 [71]	2.33 [10]	1.40 [6]	0.70 [3]	16.12 [69]	1.86 [8]	1.63 [7]
	Boys (80)	16.35 [70]	1.40 [6]	0.93 [4]	0.46 [2]	15.88 [68]	1.40 [6]	0.93 [4]	1.16 [5]	15.42 [66]	1.16 [5]	0.93 [4]
12 - <14	Girls (25)	5.37 [23]	0.46 [2]	-	-	5.37 [23]	0.46 [2]	-	0.23 [1]	5.14 [22]	0.46 [2]	-
	Boys (43)	8.87 [38]	0.70 [3]	0.46 [2]	0.70 [3]	8.17 [35]	0.70 [3]	0.46 [2]	1.16 [5]	7.71 [33]	0.70 [3]	0.46 [2]
14 - <16	Girls (33)	6.54 [28]	1.16 [5]	-	0.23 [1]	6.30 [27]	1.16 [5]	-	0.23 [1]	6.30 [27]	0.93 [4]	0.23 [1]
	Boys (25)	5.60 [24]	0.23 [1]	-	0.93 [4]	4.67 [20]	0.23 [1]	-	1.63 [7]	3.97 [17]	-	0.23 [1]
All	Girls (210)	42.29 [181]	5.14 [22]	1.63 [7]	0.93 [4]	41.35 [177]	5.14 [22]	1.63 [7]	3.03 [13]	39.48 [169]	4.43 [19]	2.10 [9]
	Boys (218)	46.03 [197]	2.80 [12]	2.10 [9]	3.03 [13]	43.22 [185]	2.57 [11]	2.10 [9]	5.14 [22]	40.65 [174]	2.80 [12]	2.33 [10]
Chi-square test P<0.05		$\chi2=3.720$; df=2 ; P=0.156			$\chi2=8.712$; df=3 ; P=0.033				$\chi2=3.872$; df=3 ; P=0.276			

In Algeria, representative nationwide studies on the prevalence of overweight and obese children are not available yet. Moreover, some studies have used data from selected areas in Algeria and on small samples. The reported prevalence was 4.89% for overweight and 1.42% for obesity in Tébessa (Algeria). (26) On the other hand, the prevalence of overweight and obesity in Khroub (Algeria) was 10.9% and 4.0%, respectively. (27) For the studied region (Sidi-bel-Abbès), one study has been achieved during 2007 in 13 to 18 year old adolescents. It showed that the prevalence of overweight including obesity was 8.3% according to the IOTF references. (28) Our study showed that the overall prevalence of overweight and obesity was 7.94% and 3.73%, respectively according to the IOTF references; 7.71% and 3.73% according to the French references; and 7.23% and 4.43% according to the CDC references. The frequency of underweight varied from 3.96% (3rd percentile of the French references) to 8.17% (5th percentile of the CDC references).

As Flegal et al., (29) did on the US children; highest estimations were recorded using the CDC references. Reilly et al., (30) proved that when the IOTF references are used, obesity is often underestimated. Our results agreed with this observation, especially for the girls, where the prevalence of obesity reduced from 2.10%, when we use the CDC references, to 1.63%, when we use the IOTF and the French references.

The prevalence of overweight and obesity in our studied children is considerably lower than that found in Saudi Arabia,(7) Turkey,(31) Switzerland,(32) the USA, and Costa Rica, (3,33) but higher than that found in Yemen and Iraq and (34,9) somewhat, similar to the prevalence found in Malaysia.(35) These variations in the prevalence rates found in different countries worldwide and in different ethnic groups may certainly be due to environmental factors such as diet, physical activity, etc., which are the major contributors to increased overweight and obesity prevalence in children and adults.

It becomes very important for scientists to have an accurate idea about the prevalence of underweight, overweight, and obesity at different levels and in different countries, but also about different parameters which can influence these prevalence variations. Some reports from Turkey and Taiwan showed higher rates in boys than girls in the urban setting. (31, 36) On the other hand, results from Saudi Arabia and Kuwait showed the opposite trend. (37, 38) We found, in this urban studied population, higher rates of overweight among girls. Conversely, obesity was increased in boys using the IOTF and the French references.

It is commonly known that the living conditions in urban areas can affect the growth of children. The suburban and urban way of life is generally characterised by apartment life dominate changes in cultural factors such as fast food, sedentary lifestyles, and food preferences. Children usually spend their time after school playing computer games or watching television. The prevalence of childhood overweight and obesity is increasing in the developing countries and Algeria doesn't escape from this scourge. The construction of more generalized BMI references values is recommended and the time has come for an immediate effort to face the causes of overweight, obesity and thinness.

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Point of Care Literature Review: Oseltamivir for prevention and treatment of H1N1 Influenza A infection

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Abstract

H1N1 Influenza A infection has reached an epidemic proportion in 2009. Many countries all over the world reported not only cases but mortality as well. Most of the cases were mild, self limited, not complicated and did not need hospitalization. Oseltamivir (oral inhibitors) is used for the treatment and prevention of H1N1 influenza A infection, but how effective is oseltamivir in treating/preventing H1N1 influenza and in treating or preventing Novel influenza?

This paper discusses some point of care resources and different EBM resources to answer this question.

Why this series?

The idea behind EBM literature review is not to create new evidence but to show that physicians and health care providers are facing problems in decision making at the time it is needed, because of the diversity of the available evidence from EBM resources.

Many EBM secondary resources are available at the point of care to support direct patient care.
At the point of care, clinicians search EBM systems, clinical practice guidelines, EBM summaries synopsis and/or systematic reviews. Many filtered (secondary EBM resources) databases and systems are available to clinicians, like:

1. EBM systems: For example Uptodate and Dynamed. They are comprehensive information resources where one finds full topics (from history to treatment) but there are few a problems: firstly there is no full appraisal of the included primary articles; secondly, there is no decision (sometimes) of which treatment strategy to follow, thirdly, the variability of when they are updated.
2. Clinical practice guidelines: Many organizations develop guidelines (i.e. National Guideline Clearing House, NICE, SIGN, etc) but not all guidelines are developed based on evidence. When we search multi-search engines (i.e. tripdatabase), all guidelines addressing the same question will appear whether they are evidence based or not. The problem starts from this point: A number of guidelines are not EBM and others are not updated
3. Cochrane library and systematic reviews from other sources: Cochrane reviews are the best evidence if available, but there are two problems; the update of the reviews and the available number which doesn't cover the field of medicine.
4. Other resources like, ACP journal club and Clinical evidence: only cover selected articles. One of the benefits of EBM is to minimize the variation among practices and clinicians due to the availability of evidence! But this depends on which resource one has searched.

Reasons for such variation among secondary (filtered) resources are:
1. Variability of update timing: There is variation on the update of for example Uptodate (4 mo) and Dynamed (3 mo). Cochrane reviews are updated every 2 years. Unfortunately the proposed update timings are not followed strictly.
2. Not all Guidelines are evidence based (unfortunately, most available guidelines are expert opinion consensus).
3. Many secondary resources (e.g. Uptodate and Dynamed) include summaries from articles without appraisal.

A physician who is managing his patient in the clinic or the ward, and who wants to answer a clinical question, does not know which resource to search.

With the existence of the variability among the secondary resources, he will not find the same answer to his question when searching different EBM resources.

Introduction

In April 2009, the first cases of influenza A H1N1 were identified in Mexico and the United States and have since spread rapidly worldwide. [1-3] In June 2009, the World Health Organization (WHO) raised the pandemic alert to level 6, indicating widespread community transmission on at least two continents.

As of October 2009, there are about 400,000 confirmed cases and 5,000 mortalities due to pandemic H1N1 all over the world.[4]

WHO has classified Pandemic influenza A (H1N1) into:

Uncomplicated influenza[5]
Influenza-like illness (ILI) symptoms: Fever, cough, sore throat, rhinorrhea, headache, muscle pain, malaise, but not shortness of breath, no dyspnoea, Patients may present with some or all of these symptoms. Gastrointestinal illness may also present, such as diarrhea and/or vomiting.

Complicated or severe influenza[5]
. Presenting clinical (shortness of breath, dyspnoea, tachypnea, hypoxia) and/or Radiological signs of lower respiratory tract disease (e.g. pneumonia), CNS findings (e.g. encephalopathy), severe dehydration or presenting secondary complications, renal failure, multi-organ failure, and septic shock. Other complications can include musculoskeletal (rhabdomyolysis) and cardiac (myocarditis). [6, 7]

. Exacerbation of underlying chronic disease, including asthma, chronic obstructive pulmonary disease, chronic hepatic or renal failure, diabetes or other cardiovascular conditions. [8]

. Any other condition or clinical presentation requiring hospital admission for Clinical Management.

. Any of the signs of disease progression which are acute respiratory distress syndrome (ARDS), and prolonged intensive care unit (ICU) admission. [8, 9]

H1N1 virus surveillance of 2009 shows that the majority of those infected had a mild illness. [3, 10] Pandemic influenza A H1N1 2009 (also called Novel influenza) is transmitted from person to person by airborne droplets generated by coughing and sneezing of infected respiratory secretions.

Prevention of spread among humans includes use of WHO standard infection control measures against influenza. (12, 13)

In Saudi Arabia, where Hajj (pilgrimage) which is the largest diverse gathering worldwide at certain times in Mecca (around 3 million persons), has the potential of influenza transmission and outbreak.[14] Health plans should ensure the optimum provision of health services for pilgrims, and minimum disease transmission on their return home.

Transmission to household contacts decreased with the size of the household, from 28 percent in two-member households to 9 percent in six-member households. Susceptibility of transmission increased among young household contacts, but infectivity did not vary with age[11].

The neuraminidase inhibitors (NIs) are the drugs of choice for treatment of 2009 H1N1 influenza and influenza-like illness in both children and adults. NIs act by inhibiting the neuraminidase enzymes that are present in all influenza subtypes. Two NIs, oseltamivir and zanamivir, are available for clinical use. Oseltamivir, the most widely used NI, is an oral prodrug (oseltamivir carboxylate) [12-14]. As of late January 2010, >99 percent of influenza isolates circulating in the United States were pandemic H1N1 influenza A, the vast majority of which are sensitive to oseltamivir.

Clinical Scenario

Dr. Sami, a 38 year old, ER physician, married with 3 kids. They are 3, 7 and 10 years old. The 10 year old child has type I DM, the younger children are healthy. His wife is pregnant (in the second semester). One evening he had fever, general body aches and sneezing. He visited the employee health clinic where a nasal swab for influenza A (H1N1) was performed. Employee health clinic physician prescribed oseltamivir 75 mg once daily as prophylaxis until the swab result appears.

After 2 days influenza A (H1N1) was confirmed; oseltamivir dose increased to 75mg BID, and the Physician prescribed oseltamivir to his family as well.

Dr. Sami asked the Physician:
Would oseltamivir help me and my family?

Clinical questions raised are:
Is oseltamivir effective for treatment of laboratory confirmed influenza A (H1N1) and can household contacts use it as prophylaxis?

Search strategy:
Keywords used: Influenza, H1N1 Influenza, Influenza A, Oseltamivir, Tamiflu, antiviral

The author searched Tripdatabase, Pubmed, clinical queries, Cochrane library, WHO website, CDC website, NICE guideline, UpToDate and Dynamed.

Summary of the findings:

Dynamed:

Treatment
Indication for antiviral treatment is almost similar to CDC recommendations. It is indicated if influenza and symptom duration < 48 hours. Patients with confirmed or suspected influenza at high risk of complications and or hospitalized

(even if > 48 hours after symptom onset), any suspected influenza patient with warning symptoms or signs of lower respiratory tract illness (such as dyspnea, tachypnea or unexplained oxygen desaturation). Treatment should not wait for laboratory confirmation.

For those patients who are not hospitalized or in a high-risk group; generally, antiviral medications are not needed. Dose is similar in both CDC and Dynamed: oseltamivir 75 mg orally twice daily for 5 days.

Efficacy:
In healthy adults, oseltamivir efficacy for reducing influenza complications is not well established by published evidence (level 2 evidence) but oseltamivir may reduce antibiotic use and hospitalizations, and it may reduce mortality in hospitalized adults, reduce illness duration (by about 1 day) and hasten return to normal activity in previously healthy children with influenza, reduce complications and hospitalization in children with influenza and chronic medical conditions.

Antiviral prophylaxis
Post-exposure prophylaxis recommended for patients at high risk for influenza complications who have close contact with person with confirmed or suspected pandemic during infectious period (1 day before symptoms until 24 hours after fever ends), health care workers having unprotected close contact with person with confirmed or suspected pandemic and all residents (vaccinated and unvaccinated) in institutional settings.

Post-exposure prophylaxis not generally recommended for otherwise healthy adults or children.

UpToDate:

Pandemic Influenza H1N1 information available in Uptodate is based on CDC guidelines.

Recommendation
Patients with mild illness do not need to be tested or treated unless they have risk factors for complications.

Prompt initiation of antiviral therapy with oseltamivir for individuals with suspected or confirmed influenza infection who are at risk for complicated disease or have severe illness.

Treatment should be initiated as soon as possible. In patients who are more than mildly ill, we would initiate therapy even past 48 hours of symptoms.

Post-exposure prophylaxis: is considered for adults and children who have had close contact with a confirmed or suspected case and at high risk of complications and health care workers.

Prophylaxis is not indicated for otherwise healthy contacts.

Centers for Disease Control and Prevention (CDC) recommendations:

The CDC defines categories of illness into mild, progressive, and severe.

Treatment of H1N1 influenza A infection Novel influenza A (H1N1)
1. Treatment of severe complicated cases: Patients with confirmed or suspected Novel (H1N1) influenza who have severe, complicated (or at increased risk of complication), or progressive illness or who are hospitalized (adults dose: 75 mg twice daily for 5 days).

The at risk population are: Children younger than 2 years old, Adults 65 years of age or older, pregnant women and women up to 2 weeks postpartum, persons with certain medical conditions (e.g. asthma, chronic lung disease, heart diseases, diabetes, sickle cell anemia, kidney disease and liver disease).

2. Treatment of mild uncomplicated cases: Patients with mild, uncomplicated self-limited respiratory illness, can still benefit by reducing the duration of illness (if treatment is initiated within 48 hours after illness onset).

Antiviral prophylaxis
Persons who are a close contact of a person with suspected or confirmed 2009 H1N1 influenza during the infectious period (One day before fever begins until 24 hours after fever ends) who are at high risk for complications, health care workers and emergency medical personnel and pregnant women.

WHO recommendations for treatment of H1N1 influenza A infection

Recommendation 1:
Patients who have severe or progressive illness should be treated with oseltamivir. (Strong recommendation, low quality evidence). Treatment should be initiated as soon as possible. Higher doses up to 150 mg bid, and longer duration of treatment depending on clinical response may be considered.
Recommendation 2:
Confirmed or strongly suspected uncomplicated influenza not in (at risk) groups need not be treated with antivirals (Weak recommendation, low quality evidence).
Recommendation 3:
Uncomplicated influenza patients in (at risk) groups should be treated with oseltamivir or zanimivir. Treatment should be initiated as soon as possible (Strong recommendation, very low quality evidence).

WHO Chemoprophylaxis recommendations:
When the likelihood of complications of infection is high, oseltamivir might be used as prophylaxis for the affected persons, in individuals in (at risk) groups or health care workers. (Weak recommendation, moderate quality evidence)

Systematic Reviews:

BMJ has published 2 systematic reviews in 2009 regarding the use of neuraminidase therapy in adults (update of Cochrane review)[16] and children[17]. It is important to note that evidence relates to seasonal influenza: no data on benefits in H1N1 (swine) influenza are available. The updated Cochrane review[16] considered two broad benefits from treatment with oseltamivir: reduction of illness duration and reduction in risk of complications (mainly secondary infections). The important results are:

CDC, Dynamed And Uptodate	Treatment	Severe	Confirmed or suspected Severe Progressive complicated or at increased risk of complication or hospitalized cases Treatment is indicated, dose: (75 mg Bid for 5 days)	
		Mild	Generally not required. Clinical judgment is needed (at best, It may reduce duration of illness provided it is initiated within 48 hours)	
	Prophylaxis		Close contacts that are: (at high risk of complication, health care workers and pregnant women). **Dynamed** added: Residents in institutional settings.	
WHO	Treatment	Severe	Severe or progressive. Dose: consider higher doses (150 mg Bid for 10 day	
		Mild	At risk group	Treat
			Not at risk group	Don't treat
	Prophylaxis		When the likelihood of complications is high	

Table 1: Recommendations of Oseltamivir for prevention and treatment of H1N1 influenza A infection

1. Oseltamivir reduced the chance of symptomatic laboratory confirmed influenza by 61 percent (RR 0.39, 0.18 to 0.85) at 75 mg daily and 73 percent (0.27, 0.11 to 0.67) at 150 mg daily, but not influenza-like illness (RR 1.28, 0.45 to 3.66) in favor of placebo[16].
2. Post exposure prophylaxis against influenza for households (giving exposed people oseltamivir before symptoms develop) had an efficacy of 84 percent in one trial and 58 percent in another study (RR 0.16 and 0.42) which represents significant protection[16].
3. Oseltamivir shortened the duration of influenza-like illness (RR 1.20, 1.06 to 1.35) and reduced the symptoms of influenza modestly if taken within 48 hours of the onset of symptoms [16, 17] indicating that patients taking oseltamivir were more likely to have their symptoms alleviated by a given time point.
4. Oseltamivir shortened the median duration of illness by 21 hours, P<0.004. Median time to return to normal activities was 230 hours (9 days 14 hours) in the placebo group and 173 hours (7 days 5 hours) in the oseltamivir group. Oseltamivir shortened the median time to resumption of normal activities by 57 hours (2 days 9 hours), P=0.01.
5. Evidence is insufficient to answer the question about the effectiveness of oseltamivir on reducing the complications of lower respiratory tract infection, antibiotic use, or admissions to hospital RR 0.55 (0.22 to 1.35)[16, 17]
6. Oseltamivir increased the risk of nausea (OR 1.79, 1.10 to 2.93)[16] and vomiting[17].

An Internal Medicine Journal has published a systematic review on Aug. 2009[18]:
Extended-duration (4 weeks) zanamivir and oseltamivir use as chemoprophylaxis seems to be highly efficacious for preventing symptomatic influenza (RR) 0.26 [0.18 to 0.37] but not asymptomatic influenza (RR, 1.03 [0.81 to 1.30]. Adverse effects were not increased overall among neuraminidase recipients (RR, 1.01 [CI, 0.94 to 1.08].

NICE (National Institute for Clinical Excellence) Guidance[19]:
NICE published a systematic review which included 1,206 at-risk adults, defined as immunised or unimmunised community living people aged 65 years or older and adults and adolescents with chronic obstructive airways disease, asthma, and/or cardiac disease of sufficient severity to require regular outpatient medical care.

There was no significant reduction in risk of lower respiratory tract infections leading to antibiotic use in the at-risk intention to treat (ITT) population, although it was significant in those at-risk adults with confirmed influenza (12.2 percent vs 18.5 percent, NNT=16 [95 percent CI 9 to 89], P=0.02. Data in the manufacturer's Summary Product Characteristics (SPC) indicates that in influenza-positive patients with chronic cardiac and/or respiratory disease, the combined incidence of lower respiratory tract complications (mainly bronchitis) treated with antibiotics was 17 percent in the placebo group and 14 percent in the oseltamivir treated population, but this reduction was not statistically significant (P = 0.6). The SPC also says that in the influenza-positive elderly, oseltamivir significantly reduced the incidence of specified lower respiratory tract complications (mainly bronchitis) treated with antibiotics from 19 percent in the placebo group to 12 percent in the oseltamivir treated population (P=0.02).

Answering the specific questions raised in our clinical scenario from different point of care resources:

For Dr. Sami who has laboratory confirmed influenza, oseltamivir is recommended by all resources.

For Prophylaxis of the family members:
CDC, Dynamed, Uptodate and WHO (but not BMJ and NICE systematic reviews) differentiate between the high risk population and otherwise healthy population.

According to the systematic reviews all contacts of Dr. Sami will be considered for oseltamivir prophylaxis, while only high risk contacts will be considered in other resources.

Summary of the answers to the questions in the clinical scenario:
Oseltamivir 75 mg twice daily to be prescribed to Dr. Sami.

Prophylaxis is recommended for the following family members:
The pregnant wife, the 3 year old child and the diabetic 10 year old child (all of them are high risk groups)

Prophylaxis is not recommended for the 7 year otherwise healthy child.

Conclusions

Dynamed and Uptodate information is mainly based on CDC guidelines.

There is indirectness of recommendations from the resources included in this review (i.e. the data was from seasonal influenza studies, but applied to pandemic influenza A H1N1).

The systematic reviews did not answer all the questions related to treatment and prophylaxis.

Treatment of severe, progressive or complicated Novel influenza A (H1N1) is almost similar among the available resources (Table 1).

The recommendation of WHO is more explicit for treatment of mild cases (which constitutes the majority of infected cases) compared with CDC and Dynamed recommendations.

The two systematic reviews which were published at BMJ 2009, showed benefits of oseltamivir prophylaxis in reducing the chance of symptomatic laboratory confirmed influenza, which contradicts the WHO, CDC and Dynamed recommendations.

Extended-duration neuraminidase effectively prevents symptomatic influenza but not asymptomatic.

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Digital clubbing and metabolic syndrome

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Abstract

Background: Any relationship between clubbing and metabolic syndrome was studied.

Methods: The study was performed in the Internal Medicine Polyclinic.

Results: The study included 224 cases (104 with clubbing), in total. The mean age of clubbing cases was 49.2 years, and there was a male predominance (81.7%). There were significantly higher prevalences of smoking and chronic obstructive pulmonary disease (COPD) in the clubbing group (69.2 vs 41.6% and 27.8 vs 10.8%, respectively, p<0.001 for both). Although the body mass index (BMI), weight, and fasting plasma glucose (FPG) were lower in the clubbing group, the differences were nonsignificant probably due to the small sample size, although the negative effect of small sample size, and prevalence of type 2 diabetes mellitus (DM) was significantly lower in the clubbing group (12.5 vs 21.6%, p<0.05). Mean low density lipoprotein cholesterol and triglyceride values were higher in the clubbing group, non-significantly. Although both the systolic and diastolic blood pressures (BP) were lower in the clubbing group, the difference was only significant for systolic BP (127.6 vs 136.9 mmHg, p= 0.011). On the other hand, prevalence of coronary heart disease (CHD) and/or peripheric artery disease (PAD) were significantly higher in the clubbing group (7.6 vs 0.0%, p<0.01).

Conclusion: There are direct relationships between clubbing and prevalence of smoking, COPD, CHD and PAD, probably due to the atherosclerotic effects of smoking, whereas BMI, weight, FPG, systolic and diastolic BPs and prevalence of DM are inversely related with clubbing, probably due to suppressor effects of smoking on appetite.

Key words: Clubbing, metabolic syndrome, smoking

Introduction

Nail changes may help to identify some systemic diseases. Digital clubbing is a deformity of the fingers and fingernails that has been known for centuries. The exact cause of clubbing is unknown, but there are numerous theories as to its cause. Chronic tissue hypoxia, vasodilation, secretion of growth factors from the lungs, and other mechanisms have been proposed (1-4). Although many diseases may be associated with digital clubbing, the reports are mostly anecdotal. Prospective studies of patients with clubbing have not yet been performed, and hence there is no conclusive evidence of these associations. It may be associated with pulmonary and cardiac diseases that are featuring with chronic hypoxia (tuberculosis, bronchiectasis), gastrointestinal and hepatobiliary diseases (malabsorption, Crohn's disease, ulcerative colitis, cirrhosis), hypothyroidism, thymoma, thalassemia, and HIV infection (5-11). There is not any associated underlying disease in 60% of cases, so idiopathic clubbing can also occur (12). On the other hand, an association between certain metabolic parameters and obesity, hypertension (HT), type 2 diabetes mellitus (DM), coronary heart disease (CHD), peripheric artery disease (PAD), stroke, and eventually an increased all-cause mortality has been known for many years, and defined as the metabolic syndrome (13-15). The syndrome has become increasingly common in developed countries. For example, it is estimated that 50 million Americans have it (16). The syndrome is characterized by a group of metabolic risk factors including overweight, dyslipidemia, elevated blood pressure (BP), insulin resistance, and a prothrombotic and proinflammatory state instead of being a final disease, since it can be reversed completely with appropriate nonpharmaceutical approaches including lifestyle changes, diet, and exercise (17,18). We tried to understand the presence of any relationship between nail clubbing and metabolic syndrome in the present study.

Material and Methods

The study was performed in the Internal Medicine Polyclinic of the Mustafa Kemal University between March 2007 and May 2011. We studied all patients applying for any complaint. Their medical history including smoking habit, claudication, and already used medications was learnt, and a routine check up procedure including fasting plasma glucose (FPG), low density lipoprotein cholesterol (LDL-C), triglyceride (TG), and an electrocardiography was performed. Clubbing was diagnosed by determining ratio of the distal phalangeal diameter (DPD) to the interphalangeal diameter (IPD) which is required to be >1.0 and with the presence of Swamroth sign (12,19). Cases with a history of at least five pack-years cigarettes smoked were accepted as smokers. Cigar or pipe smokers were excluded. Body mass index (BMI) of each case was calculated by the measurements of the same physician instead of verbal expressions. Weight in kilograms is divided by height in meters squared (20). Office BP was checked after 5-minutes of rest in the seated position with a mercury sphygmomanometer (ERKA, Germany). Cases with an overnight FPG level of 126 mg/dL or greater on two occasions or already using antidiabetic medications were defined as diabetics (21). An oral glucose tolerance test with 75-gram glucose was performed in cases with a FPG level between 100 and 125 mg/dL, and diagnosis of cases with a 2-hour plasma glucose level of 200 mg/dL or higher is DM (21). Stress electrocardiography was performed in suspected cases, and a coronary angiography was obtained only for the stress electrocardiography positive cases. Color doppler ultrasonograpy of the arterial system in the lower extremities was obtained in cases with a history of claudication for the diagnosis of PAD. Chronic obstructive pulmonary disease (COPD) was diagnosed via spirometric pulmonary function tests in suspected cases. The criterion for diagnosis is post-bronchodilator forced expiratory volume in 1 second/ forced vital capacity of less than 70%. Eventually, the nail clubbing cases and age- and sex-matched controls were compared according to the prevalences of smoking, COPD, DM, CHD and/or PAD and mean values of pack-years, hematocrit, BMI, weight, FPG, LDL-C, TG, and systolic and diastolic BPs. Mann-Whitney U test, Independent-Samples t test, and comparison of proportions were used as the methods of statistical analyses.

Results

The study included 224 cases (104 patients with nail clubbing), in total. The clubbing cases were detected among 2428 cases (1384 females and 1044 males), in total. So the prevalence of clubbing was 1.3% in females, 8.1% in males, and 4.2% in both sexes. Characteristics of the study cases are summarized in Table 1. The mean age of clubbing cases was 49.2 years, and there was a male predominance (81.7%) among them. Parallel to the result, there was a significantly higher prevalence of smoking in the clubbing cases (69.2 vs 41.6%, $p<0.001$). The mean pack-year per smoker was similar in both groups (28.5 vs 28.0 years, $p>0.05$). Similarly, there was a significantly higher prevalence of COPD in the clubbing group (27.8 vs 10.8%, $p<0.001$). Although the mean hematocrit value was higher among the clubbing cases, the differerence was nonsignificant probably due to the small sample size (42.8 vs 41.4%, $p>0.05$). Similarly, although mean values of the BMI, weight, and FPG were lower in the clubbing group, the differences were nonsignificant probably due to the same reason ($p>0.05$ for all). But the prevalence of type 2 DM was significanlty lower in the clubbing cases (12.5 vs 21.6%, $p<0.05$). On the other hand, the mean LDL-C and TG values were higher in the clubbing cases, nonsignificantly ($p>0.05$) for both, although, both the systolic and diastolic BP values were lower in the clubbing group; the difference was only significant for systolic BP (127.6 vs 136.9 mmHg, $p= 0.011$). As one of the most significant results of the study, prevalences of CHD and/or PAD were significantly higher in the clubbing group (7.6 vs 0.0%, $p<0.01$).

Variables	Cases with clubbing	Control cases	*p*-value
Number	104	120	
Female ratio	18.2% (19)	18.3% (22)	ns*
Mean age (year)	49.2 ± 15.2 (21-81)	49.3 ± 16.2 (21-82)	ns
Prevalence of smoking	***69.2% (72)***	***41.6% (50)***	***<0.001***
Mean pack-years	28.5 ± 15.0 (5-65)	28.0 ± 17.7 (5-100)	ns
Prevalence of COPD†	***27.8% (29)***	***10.8% (13)***	***<0.001***
Mean hematocrit value (%)	42.8 ± 6.7 (25-59)	41.4 ± 5.2 (27-60)	ns
Mean BMI‡ (kg/m2)	26.4 ± 4.9 (16.1-40.5)	27.3 ± 4.6 (17.1-39.2)	ns
Mean weight (kg)	74.3 ± 14.0 (38-120)	77.9 ± 13.6 (45-116)	ns
Mean FPG§ (mg/dL)	113.7 ± 43.5 (73-301)	120.8 ± 40.8 (68-271)	ns
Prevalence of DM‖	***12.5% (13)***	***21.6% (26)***	***<0.05***
Mean LDL-C¶ (mg/dL)	130.0 ± 38.0 (10-237)	126.9 ± 35.7 (54-265)	ns
Mean triglyceride (mg/dL)	152.5 ± 79.3 (55-438)	143.4 ± 79.8 (49-383)	ns
Mean systolic BP** (mmHg)	***127.6 ± 25.6 (80-200)***	***136.9 ± 28.0 (80-220)***	***0.011***
Mean diastolic BP (mmHg)	88.0 ± 12.5 (60-120)	88.3 ± 12.2 (50-120)	ns
Prevalences of CHD and/or PAD****	***7.6% (8)***	***0.0% (0)***	***<0.01***

*Nonsignificant (p>0.05) †Chronic obstructive pulmonary disease ‡Body mass index §Fasting plasma glucose ?Diabetes mellitus Low density lipoprotein cholesterol **Blood pressure ***Coronary heart disease ****Peripheric artery disease

Table 1: Characteristics of the study cases

There were seven cases with CHD and one with PAD in the clubbing group, whereas no case could be detected in the control group with CHD and/or PAD.

Discussion

Metabolic syndrome is a collection of metabolic risk factors for many terminal diseases. Although there is not any universally accepted definition for the syndrome, it basically includes obesity (increased body weight, BMI or waist circumference), increased plasma glucose and insulin levels, low high density lipoprotein cholesterol, high TG, and high BP values (22,23). The already used definitions as a BP of 135/85 or 140/90 mmHg or above and a FPG of 100 or 110 mg/dL or above also include patients with DM and HT, but actually the syndrome is a collection of risk factors instead of the final diseases, and it is a reversible condition with appropriate nonpharmaceutical approaches. Whereas the diseases including HT, DM, CHD, PAD, and stroke are irreversible and final points which almost always require drug therapy to delay complications. For example in a previous study (24), prevalences of hyperbetalipoproteinemia, hypertriglyceridemia, dyslipidemia, impaired fasting glucose (IFG), impaired glucose tolerance (IGT), and white coat hypertension (WCH) showed a parallel fashion to excess weight by increasing until the seventh decade of life and decreasing afterwards ($p<0.05$ nearly in all steps). On the other hand, prevalences of HT, DM, and CHD always continued to increase by aging without any decrease ($p<0.05$ nearly in all steps), indicating their irreversible properties (24). So metabolic syndrome alone is a disadvantageous but reversible status but not a final disease, and after the development of one of the terminal diseases, the term of metabolic syndrome probably loses most of its significance, since from now on the nonpharmaceutical approaches will provide little benefit to prevent development of the others, probably due to cumulative effects of the risk factors on organ systems for a long period of time (25). So definition of the metabolic syndrome should include reversible metabolic risk factors such as overweight, hyperbetalipoproteinemia, hypertriglyceridemia, dyslipidemia, IFG, IGT, and WCH but not obesity, HT, DM, CHD, PAD, and stroke like terminal diseases. According to our opinion, obesity is one of the irreversible end points of the syndrome, too, since after the development of obesity, nonpharmaceutical approaches such as lifestyle changes, diet, and exercise will provide little benefit to heal obesity and to prevent its complications. The lower mean values of BMI, weight, FPG, and systolic and diastolic BPs and prevalence of type 2 DM in the clubbing group may be explained by the suppressor effects of smoking on appetite, since the prevalences of male sex, smoking, COPD and mean hematocrit value were all higher in the clubbing group in the present study. The lower LDL-C and TG values in the control cases may be explained by the already increased adipose tissue per taken fat in them, since the BMI and weight were higher in the control group in the present study. On the other hand, with the possible inhibitory effects of smoking on appetite, it should be included among the reversible components of the metabolic syndrome, since although there are lower mean values of BMI, weight, FPG, systolic and diastolic BPs and prevalence of type 2 DM in the clubbing group, the prevalences of CHD and/or PAD were significantly higher in the clubbing group due to atherosclerotic effects of smoking ($p<0.01$).

Clubbing remains an amazing sign, and its possible association with significant health problems is still an enigma. Moreover, the significance of diagnosing clubbing is not well established, but it often appears ahead of more specific symptoms. For example, only 40% of clubbing cases turned out to have significant underlying disease of various causes, while 60% had no medical problems on further investigations and remained well over the subsequent year in a previous study (12). Schamroth's window test is a popular test for the diagnosis of clubbing (19). When the distal phalanges of corresponding fingers of opposite hands are directly opposed, a small diamond-shaped 'window' is normally apparent between the nailbeds. If this window is obliterated, the test is positive and clubbing is present. Digital clubbing is characterized by bulbous enlargement of the distal phalanges due to an increase in soft tissue. Clubbing develops in the following steps; fluctuation and softening of the nailbed, loss of normal <165° angle between the nailbed and fold, increased convexity of the nail fold, thickening of the whole distal finger, and shiny aspect and striation of the nail and skin (26). The exact frequency of clubbing in the population is not known. A previous study found clubbing in 0.9% of all patients admitted to a department of internal medicine (12). Whereas the prevalence of clubbing was 4.2% in both sexes in our study, which should be searched with further studies. In the above study (12), 15 patients were diagnosed with clubbing among 1511 admissions, and 10 of them were males, and five were females. Only 33.3% of clubbing cases were females in the study (12), whereas this ratio was 18.2% in the present study, probably due to the higher prevalence of smoking in males (27), such a great gender difference was obtained among clubbing cases. So smoking takes the main role in the clubbing etiology by yet unknown mechanisms.

As a conclusion, there are direct relationships between nail clubbing and prevalences of smoking, COPD, CHD, and PAD, probably due to the atherosclerotic effects of smoking. On the other hand, the BMI, weight, FPG, systolic and diastolic BPs and prevalence of type 2 DM are inversely related with clubbing, probably due to the suppressor effects of smoking on appetite.

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SPICES Model perspectives for Saudi Board Family Medicine Program: Moving Away from the Sage on the Stage

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Abstract

Background: Evaluation is an essential part of any educational process and the focus of evaluation is for quality improvement. The Saudi Board Family Medicine (SBFM) residency training program was started in Saudi Arabia under the umbrella of the Saudi Commission for the Health Specialties whose curriculum is designed to accomplish all requirements of recent trends in methods of teaching for medical education. This study was carried out to analyze the current status of SBFM program curriculum in relation to the SPICES model. This study reflects findings on the SPICES model as a framework for both curriculum evaluation and curriculum reforms which can be implemented at any effective post graduate training program in the world.

Methods: This is a descriptive study carried out to analyze the Saudi Board Family Medicine Training curriculum in relation to the six continuum of the SPICES model (Student centered, Integrated, Community-based, Elective, and Systematic) and has also suggested strategies for any improvement.

Results: The results indicate that the SBFM residency training program has included lots of innovative medical education approaches while designing their curriculum. It is found that the curriculum is more towards the left of the SPICES specification. Some shortcomings were found that need to trend towards the right, like community-based approach and for elective parts.

Conclusion: The Family Medicine Residency program curriculum is an integrated curriculum and more towards the left of the SPICES spectrum. The concept of this paper has been the adoption and in particular understanding of facts, concepts and ideas while planning, reviewing or evaluating curriculum for any post graduate program.

Key words: Family Medicine, Post-graduate training, Curriculum evaluation, SPICES.

Student-centered learning	Teacher-centered learning
Problem-based learning	Information Gathering
Integrated	Discipline based-learning
Community based	Hospital based
Elective	Uniform / Standard
Systematic	Apprenticeship

Figure1: SPICES Model

Introduction

Post graduate training in Family Medicine was created around 30 years ago to address the needs of the country. Residency training presents an enormous opportunity for change within the healthcare system. Traditionally, the residency was a 3-year, supervised period spent in different clinical placements ranging from the major specialties to elective areas. The Family Medicine Program at present is a four year residency program. The Saudi Board in Family Medicine (SBFM) program was started in the Kingdom of Saudi Arabia under the umbrella of the Saudi Commission for Health Specialties (SCFHS), an organizing body for all postgraduate education programs in the Kingdom (1). This program is for four years as full time vocational training (2). The program is intended to produce competent family physicians who can serve the community, improve standard of services provided and to establish a more recognized career structure (3). This could be established by providing evidence based and up to date vocational training based on high quality medical education research findings (4). These research findings are referred to as "Best Evidence in Medical Education: (BEME), which guides us for the practice and evidence available to teachers in their practice (5).

Evaluation is an essential part of the educational process. The focus of evaluation is for quality improvement. Any medical organization requires evaluation as part of their quality assurance procedures (6).

The SPICES model is known as a useful framework for quality improvement in curriculum evaluation and curriculum reforms. This model was proposed by Harden and his colleagues in 1984. They identified six innovative approaches to consider when planning, developing or evaluating a curriculum. Each of these approaches is a continuum, with more recent developments located to the left and more traditional strategies to the right. It was suggested that by considering where a curriculum should fit on each of the six continua, would help it to be reviewed more effectively. This model also helps to plan and improve teaching methods and assessment (7). Many studies have been carried out to claim that the SPICES model can be used as a framework for both curriculum evaluation and curriculum reform, mostly at the undergraduate levels (8-12).Very little is done for postgraduate curricula evaluation, particularly at the local level (13). Features of the SPICES model are given in Figure 1.

The current descriptive study was carried out with the main objective to analyze the current status of the Saudi Board Family Medicine Curriculum in relation of the SPICES model, by giving examples of educational strategies employed.

Description of the Saudi Board Family Medicine Program:

The SBFM program curriculum starts with four months of "Introduction to Family Medicine" rotation where candidates learn family medicine basic concepts and principles and basic clinical skills. Then they cover the main medical branches namely; Internal Medicine, Obstetrics and Gynecology, Surgery, Paediatrics and Emergency Medicine, to complete two years of the program to be eligible to sit for the first part of the examination. In the third year the candidates cover the other sub-specialties such as Psychiatry, Ophthalmology, Orthopaedics, Dermatology, ENT, Radiology, and Community Medicine. The whole final (fourth) year candidates undertake Family Medicine Training. At the end of the four years of training, the residents sit for the final examination to certify as the fellowship of the SBFM (14). (Figure 2 - next page)

Different types of instructional methods are used in the program including interactive lectures, problem solving activities, small group discussion based on clinical cases, candidate led tutorials/seminars and in-patient and ambulatory set-up clinical teaching.

Methods

The SPICES model consists of six educational strategies which appear as a continuum from (i) student-centered v/s teacher-centered (ii) problem-based learning v/s information gathering (iii) integrated v/s discipline based-learning (iv) community-based v/s hospital-based learning (v) elective v/s uniform and (vi) systematic v/s apprenticeship-based teaching. The authors have reviewed the curriculum educational strategies in relation to these six continua, finding out that where these strategies stand on the SPICES model by placing arrows on the continuum of the six strategies. Also some suggestions were given for the improvements. All three authors have reviewed the curriculum independently, then the findings were discussed and agreed upon to be documented based on the SPICES model.

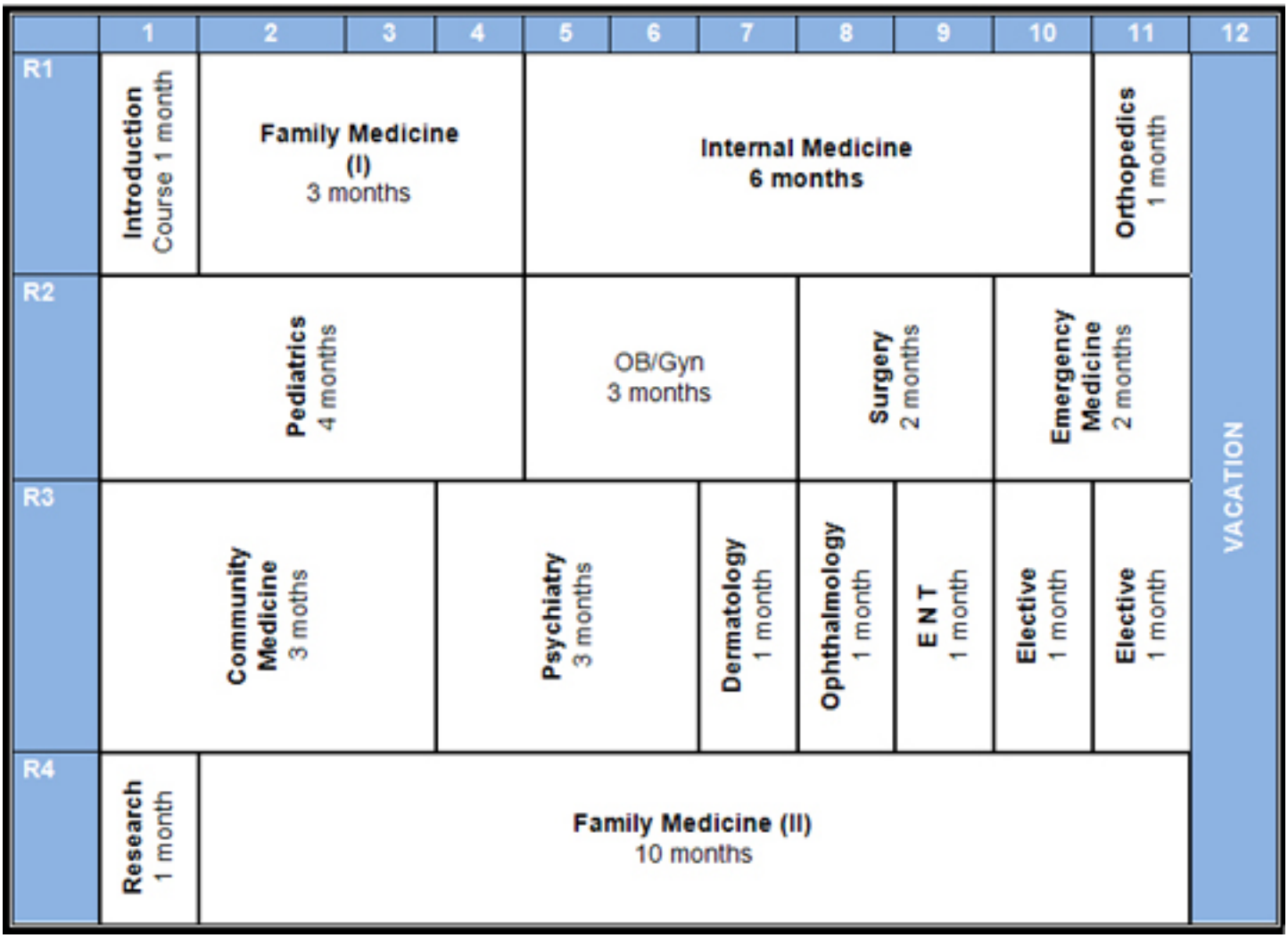

Figure 2: Four years Family Medicine Saudi Board Program Description

Results

Student centered v/s Teacher centered

The whole curriculum course objectives are defined by the Saudi Board Scientific Curriculum Committee, without any input from the program's graduates. The candidates have input in designing slots for 'Half Day Release Course' (HDRC) where they select the topics and identify their learning needs. In HDRC, trainees utilize small group teaching and learning methods. The candidates are given free time for Self Directed Learning (SDL). The clinical supervision also provides chances for the candidate to identify their learning needs and then they learn to prioritize their learning objectives. The assessment system in the program is more teacher-centered. We identify that the curriculum is not completely either Teacher-centered nor Student-centered but more in the middle part of the spectrum.

Problem-based v/s Information-gathering

The curriculum does offer some problems (clinical cases) during the learning process but it is not a problem based learning (PBL) strategy. The trainees are faced with real cases and problems within the clinic for which, later, they look for appropriate learning resources. During the case discussion with their facilitators in the clinic, they also get involved in the patient-problem scenarios and health care delivery problems with many ethical issues related to these cases. These strategies could be defined as case-based discussions. However, these activities are not sheer information gathering, nor more problem-based but more in the direction of orientation to the problems, and more problem oriented but not problem-based on its rigid definition.

Integrated v/s Discipline-based

The curriculum is trans-disciplinary and well integrated over the four years. The first year trainees are attached to Family Medicine Clinics initially for 4 months and then for 3 years they rotate to a range of specialties in the hospital and then again in the last 11 months they rotate back in the Family Medicine Clinics to apply as well as develop a multidisciplinary approach in which Family Medicine should be practiced.

In the program there is no isolation of the course, rather there is harmonization among facilitators. The trainers consult each other about the materials to be taught for the trainees. They also have formal and informal meetings for curriculum planning and application.

The other specialty departments have agreed to jointly teach the trainees. There is integration with Diabetic

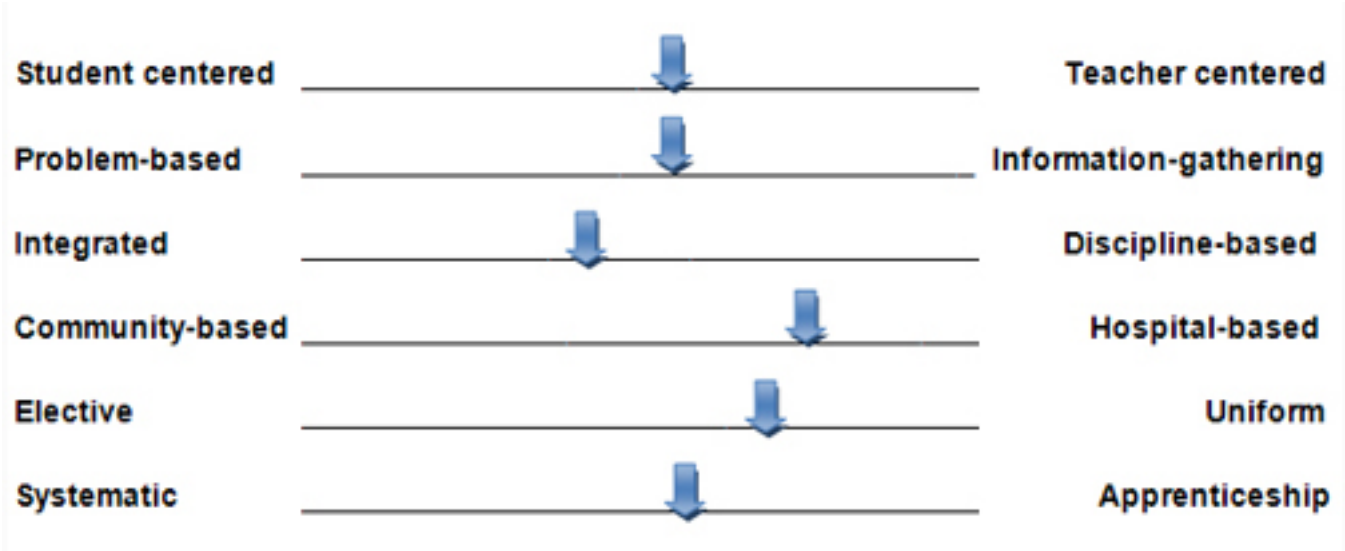

Figure 3: Evaluation of the SBFM using the SPICES continuum

Educators, Health educators, Physiotherapist, Nutritionist and Laboratory personnel. This gives a better chance for residents to learn more efficiently.

This shows that the curriculum is more integrated rather than discipline-based.

Community-based v/s Hospital-based
The curriculum has 3 months rotation in Community Medicine which covers Biostatics, Epidemiology Research Methodology, Maternal and child health, Health education, Health care management and care for the elderly. These important themes are taken more theoretically, and are formal lecture-based, and not practiced in the community.

'Community Rotation' in the program is neither Community-based nor Community-oriented in terms of objectives, content and resources.

Apart from the didactic session in the community topics, trainees work in the Primary Health Care centers which are community-based but many other centers are hospital-based and not in the community. They see a wide variety of conditions at a wide variety of stages and they learn about social and economic aspects of illnesses. While in Community-oriented education residents are taught according to the needs of the community. The program is for two and half years purely hospital-based and one and a half years purely for the family medicine setting which is somehow community-oriented education. Therefore the program is still more hospital based rather than community-based.

Elective v/s Uniform
The program has curricular flexibility and allows 2 month elective rotations at the end of the third year only. This enables trainees to explore further interests in more detail according to their needs and further enhance their training in a subspecialty of their interest. So this program is more uniform with a small portion, as an elective part.

Systematic v/s Apprenticeship
The training program is well defined and structured. The trainees are required to log the cases they encounter during the clinical sessions. They are given a checklist of required skills to be seen and managed. In this continuum the program is more of a systematic approach.

Discussion

Evaluation is an important part of any curriculum. There are general agreements on usefulness of the SPICES model in curriculum development, review and evaluation. This evaluation was carried out to gain an understanding of the current nature of the Family Medicine post graduate program. The study results indicate that the current position of the program represents a healthy trend toward the evolution of curricula and has included lots of innovative medical education approaches. The relevant core curriculum of SBFM has already been developed in 1995 through a cooperative effort of the scientific council of the Saudi Board of Family and Community Medicine. This curriculum has been revised in the year 2004 and now another draft is ready for discussion and implementation in the year 2012.

SBFM curriculum evaluation on the SPICES strategies found that these strategies are more toward the left of the spectrum. Nevertheless, areas like community based, and selection of the electives needs more effort to improve. The majority of the medical schools in the GCC countries are moving toward the more desirable aspects of the SPICES model (9). These strategies provide a much broader range of opportunities which can help trainees to acquire deeper understanding of a complete range of health and illness as well as contribution of social and environmental factors to the causation and prevention of illness. This approach also promotes a more patient-oriented perspective and helps to acquire more appropriate knowledge, skills and attitudes in any primary care setting (15).

There has been a shift in education theory to a more student-centered approach, from "sage on the stage to guide on the side". When the student-centered approach was

adopted in SBFM residency, and curriculum was compared with the SPICES model, it was found to be in the middle part of the spectrum. In one of the descriptive studies done in the medical school of GCC countries, it was found that most of the trainees are still maintaining traditional lecture methods, and reasons highlighted could be inadequate understanding or less awareness of innovations in medical education that have been taking place in recent years. In addition most teachers are traditionally educated and want complete control over students. Nowadays there is a growing concern among medical educators that conventional modes of teaching medical students neither bring out the right qualities in learners nor impart a life-long respect for learning (16).

The problem-based approach adopted in the SBFM curriculum is also well supported in the SPICES-model studies conducted elsewhere. The learners (student/trainees) learn better if the task is to solve problems relevant to their practice. It was seen that trainees learn better if they participate in interactive sessions on topics relevant and useful to them (17). Another study by Mifflin et al, found that students become better self directed learners because of their growing confidence in the Problem-based learning process(18).

In the SPICES model integration is represented as a continuous process with full integration at one side and discipline-based trainee on the other side and with intermediate steps between the two extremes. In Family practice both integration and holistic approaches are important (19). The SBFM residency program curriculum when incorporated within the SPICES framework also showed a clear shift from trainer-centered orientation to trainee-centered approach. Studies done elsewhere have also shown that by this approach both trainers and trainee regard each other as professional colleagues for whom teaching and training then works as a two-way process(20,21).
This integrated approach mentioned in the SPICES model helps in the training of tomorrow's Family Physician who enters medical practice with a holistic mind - set which emphasizes both the horizontal as well as vertical integration of the basic and clinical sciences. At the same time this approach also promotes lifelong learning skills through self directed learning (22). It was also pointed out that this integrative Family Medicine program creates a unique need and opportunity to develop specific competencies for trainees (23).

The SBFM curriculum was designed as a mean of implementing a community oriented learning program. Although, some of the training centers provide the training in the community the majority of centers are hospital-based. It is known that community-based learning helps residents understand more community related health issues instead of addressing curative regimens only. Active involvement of the residents in the learning process of Community-based education helps their ability to gain and utilize acquired knowledge as well as to solve problems, while developing collaborative skills, innovation skills, communication skills, critical reflection, teamwork and interpersonal relationships(24). It was also found that it is more difficult to understand community health problems via traditional tutorials without hands-on experience in the field. Several surveys and studies have confirmed that the curricular approach adopted by the SPICES model utilizes self directed and active involvement of trainees with continuity of care in the community, especially for the patients who are discharged from a hospital and who require health care assistance according to their needs (25).

When elective versus standard approach adopted in SBFM residency curriculum was compared with the SPICES model it was found to be more towards the standard spectrum. The elective option allows the resident to direct their studies in an area of interest to them. Harden (19) notes that electives are a way of coping with an over-crowded curriculum. This arises because as knowledge expands, it is not possible to cover everything, and in curriculum planning using electives may be a way to help trainees tackle areas where they feel they have interest, or deficiency. Electives provide a means for residents to take more responsibility for their own learning. This approach also increases the sense of ownership and brings an attitude of change in learners (26).

When the systematic versus opportunistic approach adopted in SBFM residency curriculum was compared with the SPICES model it was found to be more toward the systematic spectrum. The method of the course delivery adopted in the SBFM curriculum are like Random-case analysis; problem case analysis; case presentations; tutorials to cover core syllabus; sharing of experiences in small group discussions and video recording of patient's interviews for discussions, which will all help to provide systematic teaching and learning. Several surveys and studies have confirmed that by adopting a systematic approach on SPICES, the residents training could be more defined and structured, their competencies could be more defined and rationalized and ultimately teaching by the trainers could be more structured and organized.

Based on the evaluation of the whole curriculum document, some suggestions could be provided. The community based teaching needs improvement and more trainees' exposure to community services are required. Elective periods could be increased and distributed over all four years of the training period. There could be further improvement of systematic approach by introducing Portfolio development methods, which may require some logistic support and training of our trainers. A portfolio is particularly useful to assess and document skills related to practice-based learning and improvement. In addition, portfolio creation can assist residents in developing skills in self-assessment and self-directed learning (27).

Looking at the clinical and training challenges faced by the Family Medicine residency program in the Kingdom, we propose a curriculum approach that would train trainees with a combination of didactic and interactive learning strategies and documentation of clinical competency by Work place Based Assessment (WBA) in the form of either direct observation of resident skills or mini-CEX assessment. Mini CEX is a performance based evaluation method that can be used to assess selected clinical competencies and giving feedback to improve (e.g. physical examination, communication and interpersonal skills, professionalism) in the clinical training context (28).

In addition to this there is also a need to include a teaching skills program for Family Medicine trainees in the SBFM curriculum manual, which will also enhance the role of being an effective trainer for the future (29). Within the medical profession, residents act as mentors to their student colleagues and an inspiring reminder of personal potential for established physicians, education and efforts at the resident level will pay off in the healthcare system of the future as well as the present.

In conclusion, though our Family Medicine residency curriculum is an integrated curriculum and more towards the left of the spectrum, it has lots of innovative ideas and strategies. We are still in the process of changing in our teaching and learning strategies within our own available resources. The multi-stakeholder group working at a national level should look at the factors within the Family Medicine Residency program curriculum for further improvement.

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Radiological Bone Assessment in the Evaluation of Osteoporosis in Jordan

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Abstract

Introduction: Osteoporosis affects a large number of women at older age and is a risk of fragility fracture; osteoporosis may significantly affect life expectancy and quality of life. The diagnosis of osteoporosis can be made by measuring bone mineral density (BMD). The most popular method of measuring BMD is dual energy x-ray absorptiometry. Bone mass is influenced by many lifestyle factors, such as sex, aging and body composition (weight, height and body mass index).

Objectives: This study was carried out to study factors affecting BMD, such as age and body composition (weight, height and body mass index) among women.

Materials and Methods: This study is a cross-sectional study conducted at King Abdullah University Hospital, Jordan University of Science and Technology, College of Medicine. The study involved (515) female patients referred to the Department of Radiology from different specialties (Medicine, Orthopedics, Endocrine) for the diagnosis of osteopenia or osteoporosis for the period January 2005 to January 2010. BMD measurements were carried out using the Dual energy X-ray absorptiometry at both the lumbar spine [AP: L1-L4] and femoral hip (neck, trochanter).

Results: The study found that three quarters of the studied women were > 50 years of age with a mean of 56.9±12.0 years; 29.9% and 58.6% were overweight or obese respectively, with a mean BMI of 31.7 ±5.9 kg/m2, 41.9% and 13.2% of the studied women were classified as osteopenic and osteoporotic respectively, with a mean of total average T-score BMD of - 0. 3± 1.2 g/cm2. There was a statistically significant inverse relationship between age and total average BMD (P< 0.001), and there is a statistically significant inverse relationship between BMI and total average BMD (P< 0. 05).

Conclusion: The study classified 13.2% of the studied women as osteoporotic. Total BMD had a strong negative correlation with age and positive correlation with body composition [Weight (kg), Height (m), BMI ((kg/m2)] and the decline in BMD was more in the lumbar spine than that in the femur. The study recommended increased awareness of women for the importance of early and frequent assessment of their BMD and launching of a screening program for all women over 45 years of age for early detection of osteopenia or osteoporosis and early intervention to prevent the risk fracture.

Keywords: Osteoporosis, bone mineral density (BMD), absorptiometry, fragility fractures, body mass index (BMI).

Introduction

Osteoporosis has been defined as "a disease characterized by low bone mass and microarchitectural deterioration of bone tissue, leading to enhanced bone fragility and a consequent increase in fracture risk." (1) This disease affects a large number of the elderly and is a source of significant expense.(1) Osteoporosis is defined by the World Health Organization (WHO) as a bone mineral density that is 2.5 standard deviations or more below the mean peak bone mass (average of young, healthy adults) as measured by dual energy x-ray absorptiometry (DXA); the term "established osteoporosis" includes the presence of a fragility fracture. (1) The disease may be classified as either primary type 1 or type 2 and secondary osteoporosis. (1) Osteoporosis is most common in women after menopause, and is referred to as primary type 1 or postmenopausal osteoporosis. Given its influence in the risk of fragility fracture, osteoporosis may significantly affect life expectancy and quality of life. (3)

Osteoporosis itself has no specific symptoms; its main consequence is the increased risk of bone fractures. Osteoporotic fractures are those that occur in situations where healthy people would not normally break a bone; they are therefore regarded as fragility fractures. Typical fragility fractures occur in the vertebral column, rib, hip and wrist. The increased risk of falling associated with aging leads to fractures of the wrist, spine and hip. (3) In fact, the BMD and T scores correlate better with fracture risk than cholesterol levels correlate with heart attack risk or blood pressure correlates with stroke risk. (4) However, bone mass is a continuous measure of fracture risk; there is no threshold level at which a fracture will definitely occur. (5)

The diagnosis of osteoporosis can be made using conventional radiography and by measuring the bone mineral density (BMD). The most popular method of measuring BMD is dual energy x-ray absorptiometry (DXA or DEXA). (6, 7, 8)

Dual energy X-ray absorptiometry (DXA, formerly DEXA) is considered the gold standard for the diagnosis of osteoporosis. Osteoporosis is diagnosed when the bone mineral density is less than or equal to 2.5 standard deviations below that of a young adult reference population. This is translated as a T-score. The World Health Organization has established diagnostic guidelines. (7, 8)
A routine X-ray can suggest osteoporosis of the bone, which appears much thinner and lighter than normal bones. Unfortunately, by the time X-rays can detect osteoporosis, at least 30% of the bone has already been lost. In addition, X-rays are not accurate indicators of bone density. The appearance of the bone on the X-ray is often affected by variations in the degree of exposure of the X-ray film. (3)The National Osteoporosis Foundation, the American Medical Association, and other major medical organizations are recommending a dual energy X-ray absorptiometry scan (DEXA or DXA) for diagnosing osteoporosis. The test measures bone density in the hip and the spine, takes only five to 15 minutes to perform, uses very little radiation (less than one-tenth to one-hundredth the amount used on a standard chest X-ray), and is quite precise. It determines whether a patient has osteoporosis, and often, to what degree. Also it may be used to estimate a patient's risk of fracture, (4,9,10) and is used to follow therapeutic interventions or monitor a patient's response to therapy. (4,9,11) Density changes in the hip or spine occur faster or earlier, therefore densitometry will allow many more people access to bone densitometry and potentially diagnose osteoporosis before a traumatic fracture occurs. The accuracy of the bone mineral density test is high, ranging from 85% to 99%. (9)Bone mass is influenced by many lifestyle factors, such as sex, aging, body weight, nutrition and physical activity. (12,13)

Bone mineral density increases until around age 35 and then levels off until menopause. During the first six to eight years of menopause, there is a sharp decline in bone mineral density. It is estimated that between 1% and 5% of bone density is lost at this time. The higher a woman's overall bone density, the less she will be affected when she loses bone density at menopause. (9)

The relationship between BMD, weight, height and BMI were studied globally. In China, a study was carried out in 1998 to study this relation. It showed positive correlation between weight and it suggested that the effect of weight on BMD of postmenopausal women is significant, and lower weight is one of the dangerous factors. (12,14)Another study showed that overweight exerts mechanical stress on the bone and prevents aging-induced bone mineral density decrease (15,16,17) and fracture.(13) Another study showed that low BMI increases the risk for osteoporosis or may be a sign of a health problem.(18)

This study was carried out to study factors affecting BMD, such as age and body composition (weight, height and body mass index) among women referred to the Department of Radiology for the diagnosis of osteopenia or osteoporosis.

Materials and Methods

This study is a cross-sectional study conducted at King Abdullah University Hospital, Jordan University of Science and Technology, College of Medicine, which provides medical services for a population of 1.5 million. The study involved (524) female patients referred to the Department of Radiology from different specialties (Medicine, Orthopedics, Endocrine) for the diagnosis of osteopenia or osteoporosis for the period January 2005 to January 2010. Pregnancy and lactation were excluded. Nine women were also excluded because the measurements of BMD could not be performed for all the selected sites because of surgical operations for fracture. BMD measurement was performed for the remaining 515 subjects; the local research ethics committee approved the study protocol.

Measurement of BMD
BMD measurements were carried out using the Dual energy X-ray absorptiometry (DXA). Measurements at both the lumbar spine [AP: L1-L4] and femoral hip (neck, trochanter) were carried out.

Dual energy X-ray absorptiometry is considered the gold standard for the diagnosis of osteoporosis. Osteoporosis is diagnosed when the bone mineral density is less than or equal to 2.5 standard deviations below that of a young adult reference population. This is translated as a T-score. The World Health Organization has established the following diagnostic guidelines :(7,8)

- T-score -1.0 or greater is "normal"
- T-score between -1.0 and -2.5 is "low bone mass" (or "osteopenia")
- T-score -2.5 or below is osteoporosis

Body Mass Index (BMI) is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in meters (kg/m2). (18,19)

Data analysis
Data analysis was carried out by using Excel program and SPSS program version 15. Pearson Chi-Squared test was used as a test of significance; all analyses were two-tailed and a P-value <0.05 was considered statistically significant. Pearson's product-moment correlation coefficients were calculated to assess correlations among quantitative variables.

Results

The study involved 524 women. Nine women were excluded according to the exclusion criteria mentioned in the methodology, giving a response rate of 98.3%. Table 1 shows the general characteristics of the studied women. Regarding age, nearly three quarters of the studied women were > 50 yrs of age with a mean of 56.9±12.0 yrs (Table 1 and 2); 29.9% and 58.6% were overweight or obese respectively with a mean BMI of 31.7 ±5.9 kg/m2 (Table 1 and 3); 35.0% and 13.0% of women were classified as osteopenic and osteoporoic respectively according to the average T-score of L2L4 BMD with a mean T-score of L2L4 BMD of - 0.9 ±1.5 g/cm2 (Table 1 and 4). According to average T-score of femur BMD it is evident that 32.7% and 5.0% of the studied women were classified as osteopenic and osteoporotic respectively with a mean T-score of femur BMD of - 0.3 ± 1. 3g/cm2 (Table 1 and 4), but according to total average T-score BMD, 41.9% and 13.2% of the studied women were classified as osteopenic and osteoporotic respectively with a mean of total average T-score BMD of - 0. 3± 1.2 g/cm2 (Table 1 and 4).

Table 5 shows the distribution of the studied women according to total average T-score BMD and age. It is evident that there is an inverse relationship between age and total average BMD, where only 31.8% and 6.3% of women at the age of <50 yrs were classified as osteopenic and osteoporotic respectively compared to 47.2% and 16.8% women at the age of > 50 yrs, and the relationship was statistically significant (P< 0.001). Table 6 shows the distribution of the studied women according to total average T-score BMD and BMI. It is evident that there is a positive relationship between BMI and total average BMD, whereas BMI increases the total average BMD increases, as shown in the table that, 44.1% and 23.7% of women with normal BMI (BMI< 18.5 kg/m2) were classified as osteopenic and osteoporotic respectively compared to 41.7% and 13.2% of the obese women (BMI> 30 kg/m2) and the relationship was statistically significant (P< 0. 05).
Table 7 shows the correlation between total and regional BMD and age and body composition [Weight (kg), Height (m), BMI ((kg/m2)]. Negative correlations were seen between total and regional BMD and age and a positive correlation was seen between height, body weight and BMI with total and regional BMD.

Variable	Minimum	Maximum	Mean ±SD
Age (years)	22.0	89.0	56.9±12.0
Weight (kg)	35.0	136.0	77.6±15.1
Height (m)	1.3	1.8	1. 6 ±0.1
BMI (kg/m2)	16.7	54.5	31.7 ±5.9
Average BMD L2L4(g/cm2)	- 5.5	4.8	- 0.9 ±1.5
Average BMD L1L4 (g/cm2)	- 5.1	4.5	- 0.9 ±1.4
Average Femur BMD (g/cm2)	-7.8	3.3	- 0.3 ± 1. 3
Total average BMD (g/cm2)	-7.2	3.4	- 0. 3± 1.2

Table 1: General characteristics of the studied women

Age (years)	Frequency	Percent
<50	130	25.3
≥50	385	74.7
Total	515	100.0

Table 2: Age distribution of the studied women

BMI(kg/m2)	Frequency	Percent
Normal	59	11.5
Overweight	154	29.9
Obesity	302	58.6
Total	515	100.0

Table 3: Distribution of the studied women according to BMI

BMD (g/cm2)	L2L4	Femur	Total average
Normal	268 52.0	321 62.3	231 44.9
Osteopenia	180 35.0	168 32.7	216 41.9
Osteoporosis	67 13.0	26 5.0	68 13.2
Total	515 100.0	515 100.0	515 100.0

Table 4: Distribution of the studied women according to BMD T-Score in Lumbar spines, Femur and total average

Age (years)	Total average BMD (g/cm2)			Total
	Normal	Osteopenia	Osteoporosis	
<50	10 961.9%	56 31.8%	11 6.3%	176 100.0%
≥50	122 36.0%	160 47.2%	57 16.8%	339 100.0%
Total	231 44.9%	216 41.9%	68 13.2%	515 100.0%

Chi-Squared Tests= 33.71 df= 2 P< 0.001

Table 5: Distribution of the studied women according to Total average BMD and age

BMI(kg/m2)	Total average BMD (g/cm2)			Total
	Normal	Osteopenia	Osteoporosis	
Normal	1932.2%	26 44.1%	14 23.7%	59 100.0%
Overweight	68 44.2%	64 41.6%	22 14.3%	154 100.0%
Obesity	144 47.7%	126 41.7%	32 10.6%	302 100.0%
Total	231 44.9%	216 41.9%	68 13.2%	515 100.0%

Chi-Squared Tests= 9.375 df= 4 P< 0. 05

Table 6 Distribution of the studied women according to Total average BMD and BMI

	BMD(g/cm2)		
	Average L1-L4	Average Femur	Total average BMD
Age (years)	- 0.42 **	- 0.44 ***	- 0.44***
Weight (kg)	0.51 ***	0.38***	0.40***
Height (m)	0.47***	0.43***	0.41***
BMI (kg/m2)	0.30***	0.15*	0.18*

Values are Pearson product-moment correlation coefficient, * P< 0. 05, ** P< 0. 01, *** P< 0. 001

+ Regional BMD (Average L1-L4, Average Femur)

Table 7: Correlation between total and regional BMD+ and age and body composition

Discussion

Because osteoporosis affects a large number of patients with potentially significant morbidity and mortality, it is important to identify patients at risk so that physicians can effectively intervene. Low bone mass has been shown to be the biggest risk factor for fragility fracture (5), thus, the World Health Organization (WHO) defined osteoporosis by bone mineral density (BMD) measurement. Before this definition was applied in 1994, making a diagnosis of osteoporosis required the occurrence of a fragility fracture. (20) The redefinition allows for the prospective diagnosis of osteoporosis in asymptomatic patients before a fragility fracture occurs. (21) BMD measurement is a major concern of women because they fear future bone fracture.(1,22) DXA is considered the standard measurement of BMD.(1,23) In Jordan, a DXA device was introduced in 2001. This study examined the relationship between total and regional BMD and certain factors, such as age, body composition measured by height, body weight and BMI, in women referred by physicians for the diagnosis or exclusion of osteoporosis in King Abdullah University Hospital in North of Jordan.

Bone densitometry is the single best predictor of osteoporotic fracture risk (4,24) and is used to follow therapeutic interventions. (4,25) Because osteoporosis is a systemic disease, the risk of spine or hip fracture can be estimated from measurements obtained at peripheral measurement sites. (4,26) However, bone mass may be discordant at various skeletal sites within an individual patient. (27) Thus, the skeletal area of most interest for fracture risk is the most accurate measurement site. (28,29,30)Deciding which patients to consider for BMD measurement usually involves weighing various risk factors on an individual basis. Although the risk factors for osteoporosis are different from the risk factors for fragility fracture, both should be considered when examining a patient. Major risk factors for osteoporosis include female gender, increased age, low body mass index, history of fracture. (31,32)The National Institutes of Health (NIH) currently recommends using the individualized approach when deciding which patients should have BMD testing. Its Health Consensus Development Conference on Osteoporosis determined that there are insufficient data available for establishing screening guidelines on asymptomatic patients. The NIH does not recommend universal screening, in part because the number of women who would need to be evaluated to prevent one fracture would be very high. (28) The National Osteoporosis Foundation has recommended specific guidelines for selective screening. Some of these include loss of height in an elderly woman, long-term glucocorticoid therapy, and assessing the need for treatment in patients with estrogen deficiency.(33,34,35)

In our study, the decline in BMD was more in lumbar spine than that in the femur, which is similar to other reported studies which stated that the rate of decline in BMD was fastest in the lumbar spine,(36,37,38) than that of lower extremities. (12)

This study found a significant negative relationship between total and regional BMD and age, which is comparable to other studies which revealed that, as women get older there is a sharp decline in bone mineral density and the pre-menopausal group had significantly higher total body BMD as well as regional BMD than the post-menopausal group. (9,12,13)

Also this study found a significant positive relationship between body composition [Weight (kg), Height (m), BMI ((kg/m2)] with total and regional BMD which is comparable to other studies which stated that overweight exerts mechanical stress on the bone and prevents aging-induced bone mineral density decrease(15,16,17) and fracture.(33) This study found the majority of the studied women were overweight, so this is regarded as a protective factor for osteoporosis.

The limitations of our study are as follows. First, our study subjects were female patients referred to the Department of Radiology from different specialties (Medicine, Orthopedics, and Endocrine) for the diagnosis of osteopenia or osteoporosis, so selection bias of the subjects might exist. Secondly, we took the age cutoff point of 50 years; because of the reported variation in menopausal state.

In conclusion, the study classified 13.2% of the studied women as osteoporotic. The decline in BMD was more in the lumbar spine than that in the femur; age had a significant negative correlation with the total and regional BMD, and a significant positive relationship between body composition [Weight (kg), Height (m), BMI ((kg/m2)] with total and regional BMD. The study recommended increased awareness of women about the importance of early and frequent assessment of their BMD and launching of screening program for all women over 45 years of age for early detection of osteopenia or osteoporosis and early intervention to prevent the risk fracture.

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Do color Doppler studies predict perinatal outcome in high risk pregnancies?

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Abstract

Objectives: To study the value of color Doppler studies of the umbilical, middle cerebral and uterine artery in predicting the perinatal outcome of high risk pregnancies.

Methods: This is a prospective case control study conducted in our obstetrical department at King Hussein medical city, Jordan, between January 2009 and January 2010.

The study group included one hundred women with high risk pregnancy (PIH, IUGR or both), while the other hundred normal pregnant women were included in the control group. Doppler study of the mentioned vessels was done and then was correlated to perinatal outcome in both groups.

Results: Perinatal outcomes and Doppler studies were worse in the high risk group. Women in the high risk group were delivered more by cesarean section (75% Vs 25%). Babies in the high risk group had lower birth weight, Apgar score, and higher admissions to NICU compared to control group .P <0.001.

Conclusions: Color Doppler ultrasound can be useful in predicting perinatal outcome in high risk pregnancies.

Key words: high risk pregnancy, color Doppler, perinatal outcome

Introduction

The development of a good utero-placental circulation is essential for the achievement of a normal pregnancy. To facilitate this, remarkable changes occur in the maternal, placental and fetal vasculatures. (1) When this mechanism fails, abnormal vascular resistance patterns develop which lead to compromise of fetal well-being with a 6 to 10 times higher risk of perinatal mortality, morbidity, and impaired neurodevelopment.(2)

Doppler reveals changes of hypoxia at least a week before the non-stress test or the biophysical profile. It has therefore become the gold standard in the management of the growth-restricted fetus. (3, 4)

There is strong evidence that umbilical Doppler velocimetry correlates with perinatal outcome in a population at high risk. Further, knowledge of the Doppler data is associated with a reduction in the perinatal death rate while also lowering the frequency of medical interventions such as antenatal admission, labor induction, and cesarean section for fetal distress.(5)

Doppler velocimetry is a rapid non-invasive test that provides valuable information about the hemodynamic situation of the fetus and is an efficient diagnostic test of fetal jeopardy that helps in management of high risk pregnancy. The development of Doppler ultrasound evaluation of uteroplacental and fetoplacental circulation is one of the most important achievements of modern obstetrics. Abnormal Doppler findings are associated with fetal growth restriction and have been used as a screening test for fetal stress. Absent or reversed diastolic flow is a particularly ominous finding indicating extreme downstream resistance, placental dysfunction and fetal compromise.

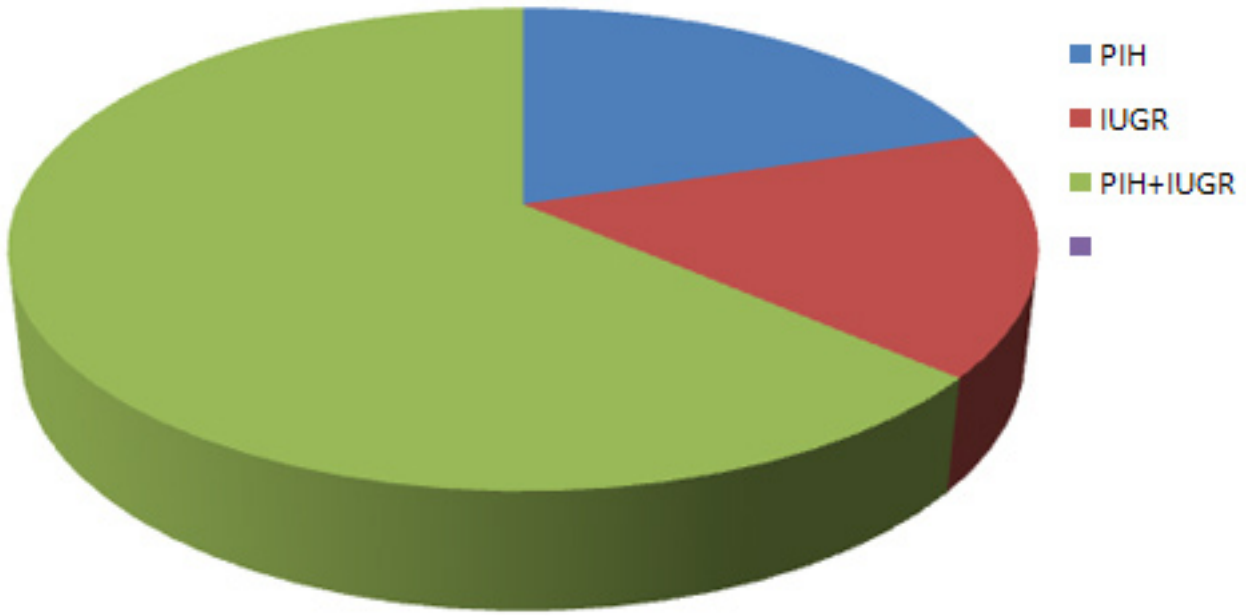

Figure 1: Categorization of high risk cases

Doppler evaluation of blood flow through cerebral vessels might be used to detect altered cerebral circulation before there is hypoxemia significant enough to alter the fetal heart rate pattern.

The uterine artery Doppler waveform is unique and increased resistance to flow and development of a diastolic notch has been associated with pregnancy induced hypertension.

The present study was conducted to evaluate the diagnostic value of various indices combined with Doppler ultrasound of (uterine artery, umbilical artery, middle cerebral artery) waveforms in high risk pregnancies.

Material and Methods

Over one year we prospectively studied two groups of women: The study group was a hundred women with high risk pregnancy, while the control group was 100 with normal growth of the fetus. The high risk pregnancy group were women with pregnancy induced hypertension alone (PIH,44%) or intrauterine growth restriction alone (IUGR,36%) or both (PIH & IUGR,20%) Figure 1.

For both groups, history, physical examination and growth ultrasound were recorded, followed by Doppler examination of the umbilical, uterine and middle cerebral arteries after 30 weeks of gestation. For the high risk group Doppler studies were done twice weekly and once for the control group. The following Doppler variables were studied and statistically analyzed: Pulsatility index (PI), Resistance index (RI), and S/D ratio.

The different parameters were determined as normal or abnormal for gestational age by using previous studies as reference values. The mode of delivery was tabulated whether vaginal or caesarean. Perinatal outcome of these pregnancies was also studied, in the form of perinatal death, mean Apgar, birth weight and admission to neonatal ICU (Intensive Care Unit).

Results

As shown in Table I, (next page) the Doppler findings were most abnormal in the group with concomitant PIH and IUGR (twenty cases). All the twenty (100%) cases had diastolic notch in uterine artery, umbilical artery S/D>3 and abnormal C/U (PI, MCA/PI, umbilical artery). Also the perinatal outcome was worse in this group with low Apgar score in fourteen (70%) neonates, LBW babies in sixteen (80%) cases and all the twelve (60%) neonates were admitted in nursery out of which there were two (10%) neonatal deaths.

In the PIH group, Doppler findings were abnormal in twenty two (50%) cases, with low Apgar score in four (9%) neonates, LBW babies in 18 (41%) cases and two (4%) neonates were admitted to nursery out of which there was one (9%) neonatal death.

In the IUGR group, Doppler findings were abnormal in twenty two (61 %) cases, with low Apgar score in four (22%) neonates, LBW babies in 22 (71%) cases and no neonates were admitted to nursery.

Comparing Doppler studies in both groups, Table 2 shows that the PI, RI and S/D of the umbilical artery were significantly higher in the study group, (Table 2 - next page), P <0.001, and the Doppler studies of MCA in high risk pregnancy group were significantly lower than the control group, and that the S/D ratio was significantly different between the two groups (p<0.001).

Mean birth weight in the study group (2400gm) was significantly lower than in the control group (2800gm). Apgar score at 1 minute and 5 minutes was significantly lower in the high risk group than the control group (Table 3 - next page). In the high risk group the majority of the patients (78%) had LSCS (Lower Segment Cesarean Section) while in the control group most of the patients had vaginal delivery. High risk cases

High risk category	Number of cases	Umbilical artery S/D>3	Uterine artery diastolic notch	Abnormal C/U (PI.MCA/ PI.Umb.Art.)	Low Apgar (<7)	LBW <2500gm	Nursery admission	Neonatal deaths
PIH	44	18	20	22	4	18	8	2
IUGR	36	26	22	22	8	22	14	0
PIH+IUGR	20	20(100%)	20(100%)	20(100%)	14(70%)	16(80%)	12(60%)	2(10%)
Total	100	64	62	62	26	56	36	4%

Table I: Perinatal outcomes correlated to abnormal Doppler in high risk group

	Mean ± SD								
	Uterine artery Doppler MCA/umbilical artery doppler			Umbilical artery Doppler			MCA/umbilical artery ratio		
	PI	RI	S/D	PI	RI	S/D	PI	RI	S/D
Study group	0.61 + 0.173	0.44 + 0.092	1.87 + 0.062	1.18 + 0.260	0.71 + 0.082	3.71 + 0.970	1.08 + 0.265	0.66 + 0.073	3.03 + 1.03
Control group	0.56 + 0.145	0.41 + 0.068	1.70 + 0.212	0.87 + 0.150	0.59 + 0.068	2.46 + 0.401	1.28 + 0.236	0.74 + 0.196	3.93 + 0.946
P Value	>.05	>.05	>.001	<.001	<0.001	<0.001	<.001	<.001	<.001

Table 2: Doppler studies in both groups

	Birth weight(gm)	Apgar score 1 min	Apgar score 5 min	Normal vaginal delivery	Preterm delivery	Lower uterine segment C/S*
Study group	2400 + 610	6.8 + 0.66	7.52 + 0.60	25	20	75
Control group	2800 + 400	7.32 + 0.58	7.90 + 0.35	75	10	25
P Value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Table 3: Perinatal outcomes and mode of delivery in both groups

	Mean ± SD		
	PI	RI	S/D
Study group	1.08 + 0.265	0.66 + 0.073	3.03 + 1.03
Control group	1.28 + 0.236	0.74 + 0.196	3.93 + 0.946
P value	< .001	< .001	< .001

Table 4: MCA Doppler studies in both groups

had a higher admission rate to nursery (36%) as compared to the control group (5%).

Discussion

In our study, the majority of patients in the study group had PIH (Pregnancy Induced Hypertension) and IUGR.

We found that Doppler studies including PI, RI and S/D value of the umbilical artery showed significantly higher values in the study group as compared to the control group ($p<0.001$) indicating increased peripheral resistance and consequently decreased diastolic flow leading to fetal compromise. The PI, RI and S/D ratios of MCA in the high risk pregnancy group were significantly lower than that in the control group, indicating increase in the diastolic flow and cerebral vasodilatation. This suggested the presence of brain sparing effect in the presence of fetal hypoxia due to placental insufficiency. These findings were suggested also by Karowicz-Blinska A et al in 2006 .(6)

In our study, among the uterine artery indices, the S/D ratio was significantly higher in the study group as compared to the control group (p value < 0.001).

In 2005, Sosnowski D et al concluded in their study that uterine artery Doppler velocimetry is useful in high risk pregnancy diagnosis. (7)

Moreover our findings were supported by Piazze J et al in 2005 , as they studied seventy-two pregnant women with fetuses showing growth restriction and delivered within 48 hours of their last Doppler velocimetry evaluation and found that Umbilical artery PI values and the UA PI/MCA ratio were higher in those who had a non-reassuring result.(8)

Also, most of the women in the control group had vaginal delivery while in the high risk group the majority of the women had LSCS, thus indicating increased operative intervention in the high risk group based on abnormal Doppler velocimetry. The mean birth weight and the Apgar score were lower in the study group as compared to the control group and the difference was highly significant. In the present study, there was higher admission rate to the nursery (36%) in the study group as compared to the control group (5%). Similar findings were found by a study done by SeyamYS in 2002, where it was found that the average birth weight and gestational age at delivery were significantly lower for fetuses with abnormal Doppler velocimetry than for those in the normal Doppler group. The umbilical and MCA artery indices were abnormal in the group whose babies were admitted in the nursery as compared to those whose babies were not admitted. This implied poor perinatal outcome in the presence of abnormal indices and hence in the presence of fetal anoxia. When the uterine artery indices were compared in the two groups, it was found that, although the PI, RI, S/D ratio in the high risk group were higher than that in the control group; the difference was not statistically significant.

The Doppler studies of MCA in the high risk pregnancy group were significantly lower than the control group.

Banos et al in 2010 studied PI of fetal MCA and umbilical artery in 90 pregnancies of 30-41 weeks gestation that had been diagnosed clinically as intrauterine growth retardation (IUGR) over a period of 1 year and found that the MCA/ Umbilical artery ratio is a better predictor of SGA fetuses and adverse perinatal outcome.(9)

In our study, there were more neonatal deaths in the study group than in the control group (4 Vs none) thus indicating poor perinatal outcome in the high risk group associated with abnormal Doppler findings.

Similar findings were noticed by Mikovic et al in 2003. In their study they found that in the high risk group with abnormal Doppler indices, the average birth weight was 1327+ 245gm, with neonatal mortality of 8.6%, while perinatal mortality was 14.3%.(10)

Conclusion

Doppler study is very useful in predicting high risk pregnancies with adverse perinatal outcome when the Doppler velocimetry is abnormal.

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