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Determinants and Prevalence of Stunting Among Rural Kavreli Pre-school Children ..... page 25

From the Editor

Chief Editor:
A. Abyad
MD, MPH, AGSF, AFCHSE
Email: aabyad@cyberia.net.lb
Ethics Editor and Publisher
Lesley Pocock
medi+WORLD International
AUSTRALIA
Email:
lesleypocock@mediworld.com.au

This is the third issue this year. This issue span papers from Qatar, Turkey, UAE, Nepal, Kuwait and Jordan

A paper from Qatar evaluates the prevalence of Enuresis and its recovery rate among children in the Western Area of Doha, and evaluated the different associations between Nocturnal Enuresis (NE) and medical and psychological conditions, and assessed the impact of the condition in children and families. The results indicated a 36.3% prevalence of Enuresis in children. Significant associations of medical and psychological problems such as snoring, brachial asthma and stressful events were found. Recovery rates of 26, 24, and 19% were observed after 3 times follow-up at 6, 12, and 18 months respectively. This study confirms the prevalence of Nocturnal Enuresis among children frequenting the primary health care centers of the Western area of Doha, and the Medical and Psychological associations are similar to those of similar studies from various countries of the Arab countries area. Health education will encourage the parents to be aware, deal with this problem and find appropriate medical advice.

A paper from Jordan evaluates the incidence of ischiofemoral impingement (IFI) syndrome among patients who presented for pelvic MRI as a case of pelvic pain at KHMC. A total of 125 pelvic MRI done between august 2015 and august 2016, for patients presented as cases of LBP or pelvic pain at KHMC were reviewed. Seven patients of the 125 had the full blown picture of IFI syndrome accounting for around 5 % of patients. Two of them had long standing unexplained pelvic pain. Five of them had the changes after history of pelvic surgery or trauma. The authors conclude that Ischiofemoral impingement syndrome should be considered in differential diagnosis of patients with history of pelvic surgery or trauma LBP , hip pain or unexplained pelvic pain especially in patients with history of pelvic surgery or trauma

A paper from Turkey looked at the aging syndrome. The authors stressed that Aging syndrome or accelerated endothelial damage syndrome or metabolic syndrome is a chronic inflammatory process on vascular endothelium both at arterial and venous systems of the body. It terminates with an accelerated endothelial damage, an accelerated atherosclerosis, end-organ insufficiencies, early aging, and death. Male sex, sedentary life style, animal-rich diet, overweight, obesity, smoking, alcohol, white coat hypertension, hypertension, impaired fasting glucose, impaired glucose tolerance, diabetes mellitus, hypertriglyceridemia, dyslipidemia, chronic infections, chronic inflammations, chronic depression, cancers, overuse of the body, and sickle cell diseases may be the major parameters of the metabolic syndrome. Cirrhosis, chronic obstructive pulmonary disease, chronic renal disease, myocardial infarction, stroke, early aging, and death may be the main terminal end-points of the syndrome. As a conclusion, calendar ages should not be accepted as the real physiologic ages of patients with the above parameters and terminal end-points of the metabolic syndrome. On the other hand, long term underweight in the absence of any pathology such as anorexia nervosa, sudden weight loss, malignancies, chronic infections, chronic inflammations, or chronic depression may even decelerate the aging by decreasing insulin resistance, mean arterial blood pressure, and vascular endothelial damage and it may be a good property for a long lifespan.

A cross-sectional study was conducted in an ambulatory healthcare clinic, self-reported questionnaire was used to assess foot care behaviors, prevalence of diabetic foot risk factors and safety of footwear among diabetic patients. Inlow's 60-second Diabetic Foot Screen was used to examine foot, ADA risk classification was used for risk assessment. The total patients were 74, majority of respondents was local UAE patients 46(71.88%) with diabetes duration of 8.8 years, mean age was 59.1±10.11 years, male to female ratio was nearly similar, mean A1c level was 7.45 ±1.81with only 21 out of 50(42%) patients had their HbA1c controlled (<7), 80.28% of patients completed at least elementary school. Frequency patients received foot care education and foot examination were 60 (81.08%) and 55 (74.32 %) respectively, 42 (55.56%) walked barefoot indoors, 43(56.97%)wore shoes without socks, 35(47.95%) tested the water temperature with hand / elbow before taking a bath or a shower, 50 (68.49%) self-treated corns or calluses with a blade, 67 (90.54%) wore sandals, almost all 73(98.93) relied on feeling the fit of the shoes when buying a new pair, overall shoes assessment was improper shoes in 64 (86.49 %) , there were callus formation in 30(42.26%) ,foot deformity in11(15.28%) ,loss of sensation by monofilament in 0 to 9 sites out of 10 in foot 26 (40.55%) ,absent of dorsalis pedes pulse in 10 (13.89%) and 40 % were classified at risk category 1 to develop foot ulcer. Foot care practices are still substandard among diabetic patients, there was a gap between what patient receive in foot education by health care provider and what patients did in real practice, potential harmful foot care behaviors were high and protective foot care practice were low, finally there were one or more risk factor of diabetic foot ulcer in majority of patients.

A prospective, open label, double arm, observational, longitudinal registry study was carried in Kuwait looking at hyperglycemia in pregnancy in Arab Population. A total of 480 subjects comprising two equal groups (Group A with a known history of type 2 diabetes mellitus and Group B with GDM) were recruited, their obstetric history captured and followed up on a regular basis till delivery. Mode of delivery and neonatal status especially APGAR status at birth, 5 minutes and 10 minutes were closely monitored and captured using an eCRF by the study physicians. Statistical analysis revealed a significant difference in the obstetric history-parity (p=0.000), previous abortion history (p=0.007), previous caesarean sections (p= 0.000) and type of delivery (vaginal, caesarean, vacuum (p value= 0.000, 0.000 and 0.006 respectively) while there were no statistically significant variations amongst the neonatal statuses except for higher birth weight (p=0.02) and neonatal complications (p=0.033). The authors concluded that Hyperglycemia with pregnancy is a steadily increasing problem that can seriously affect both mother and baby as shown in the present study , however, the present study did not show any significant differences in the weeks of delivery (preterm vs term).

A community based cross-sectional survey was conducted in Nepal to find the prevalence of stunting including severe stunting and its determinants in pre-school children aged 3-4 years in Kharelthowk VDC, Nepal. A total 464 pre-school children of rural Kharelthowk VDC (Kavre district), both males and females of age between 3-4 years were enrolled in the study. A structured questionnaire was used to obtain information on socioeconomic characteristics and life style factors of children. The prevalence of stunting in pre-school children was 46.9%. The prevalence of stunting was significantly higher among male children (51%) than female children (42.7%). The study revealed that stunting was significantly associated with inadequate nutrition intake, infections, poor child care and socio-economic status of the family. The authors concluded that the magnitude of stunting is very high as compared to developed countries. Thus, proper attention should be given for the intervention on causes of stunting among pre-school children in order to avoid further risks in future.

Hyperglycemia In Pregnancy in Arab Population, Kuwait Oil Company Hospital, Kuwait

Hany M. Aiash (1)
Sameh F. Ahmed (2)
Amro Abo Elezz (3)

(1) Hani M. Aiash, MD, Family Medicine Department, Faculty of Medicine, Suez Canal University, Egypt
(2) Sameh F. Ahmed, MD, Family Medicine Department, Faculty of Medicine, Suez Canal University, Egypt
(3) Amro Abo Elezz, MD, Gynaecology & Obstetrics Department, Faculty of Medicine, Azhar University, Egypt

Correspondence:
Sameh F. Ahmed, MD,
Family Medicine Department, Faculty of Medicine, Suez Canal University,
Ismailia, 41111
Egypt
Phone: 00201118718112; 00966581803197(KSA)
Email: samehfawzi3691@gmail.com

Abstract

Background: The hyperglycemic population in pregnancy consists of two main cohorts- subjects with onset or first recognition during pregnancy (Gestational diabetes mellitus -GDM) and subjects with preexisting history of diabetes mellitus. The prevalence of GDM has been steadily increasing with the rise of obesity and unhealthy life style reaching up to 14 % annually in many countries including the United States. Hyperglycemia from any cause can seriously affect both mother and baby and increases the risk of complications during pregnancy, labor and after delivery.

Aim: We aimed to study any baseline obstetric history differences as well as labor outcomes and neonatal characteristics between the two groups, Group A- impaired glucose tolerance and recent diagnosis of pregnancy induced diabetes mellitus (n=240), and, Group B- known history of Type 2 Diabetes mellitus and already on medication (n=240).

Methods: This is a prospective, open label, double arm, observational, longitudinal registry study. The registry was launched with immediate effect in December 2012 and recruitment of subjects continued until January 2014. After fulfilling the inclusion criteria, a total of 480 subjects comprising two equal groups (Group A with a known history of type 2 diabetes mellitus and Group B with GDM) were recruited; their obstetric history captured and they were followed up on a regular basis till delivery. Mode of delivery and neonatal status especially APGAR status at birth, 5 minutes and 10 minutes were closely monitored and captured using an eCRF by the study physicians.

Results: Statistical analysis revealed a significant difference in the obstetric history-parity (p=0.000), previous abortion history (p=0.007), previous caesarean sections (p= 0.000) and type of delivery (vaginal, caesarean, vacuum (p value= 0.000, 0.000 and 0.006 respectively) while there were no statistically significant variations amongst the neonatal statuses except for higher birth weight (p=0.02) and neonatal complications (p=0.033).

Conclusion: Hyperglycemia with pregnancy is a steadily increasing problem that can seriously affect both mother and baby as shown in the present study, however, the present study did not show any significant differences in the weeks of delivery (preterm vs term). Also, the present study revealed more congenital heart problems, especially septal defects, among offspring of mothers with overt type 2 DM due to the chronicity of hyperglycemia compared with offspring of mothers with gestational diabetes.

Key words: Gestational Diabetes Mellitus, Impaired Glucose Tolerance, Type 2 Diabetes Mellitus, APGAR

Background

Kuwait has acquired a notorious place in the world ranking of metabolic disorders in the last decade, especially Diabetes Mellitus, mainly owing to the extreme climate (which makes outdoor activities less feasible) and unhealthy dietary habits. The hyperglycemic population in pregnancy consists of two main cohorts- subjects with onset or first recognition during pregnancy (Gestational diabetes mellitus -GDM) and subjects with preexisting history of diabetes mellitus.(1) Innumerous trials around the globe have dealt with the concept of impaired glucose tolerance and its effect on pregnancy and adverse outcomes. The prevalence of GDM has been steadily increasing with the rise of obesity and unhealthy life style, reaching up to 14 % annually in the United States, says Center for Disease Control (CDC).(2)

Pregnant women with gestational diabetes and impaired glucose tolerance are at high risk for pregnancy and delivery complications including infant macrosomia, neonatal hypoglycemia and caesarean delivery. (3,4) Hence, the impending necessity for a registry which compares the two hyperglycemic manifestations as GDM and known T2DM, so as to determine the effect of chronicity of hyperglycemia in pregnancy and neonatal statuses piqued our efforts. An intensive lifestyle intervention could significantly reduce incidence of diabetes. Weight loss and 150 min of physical activity per week similar in intensity to brisk walking are the most effective lifestyle intervention.(5)

Methods

This prospective, open label, double arm, observational, longitudinal registry sought the approval of its sole site (KOC hospital, Kuwait) ethics committee and gained the approval by November 2012. The registry was launched with immediate effect in December 2012 and recruitment of subjects (who complied with proper informed consent procedure) continued until January 2014. The inclusion criteria were broad, comprising 3 main points:

(a) Willingness to perform GTT (Glucose tolerance test) during 24-28 gestational weeks and follow study procedure,
(b) Women with risk factors for hyperglycemia and
(c) Signed informed consent. Exclusion criteria included any subject < 18 years of age, any underlying history of co-morbidities such as hypertension, coronary artery disease, chronic kidney disease and/ or inability to provide informed consent.

All subjects in the first trimester presenting to KOC hospital Obstetrics department were screened for a known history of T2DM and/or minimal two consecutive incidences of elevated Blood Glucose levels sufficient to meet the WHO - GDM definition.(5,6) All subjects with confirmed fasting glucose levels of $\geq$ 7.0 mmol/L or random glucose levels of $\geq$ 11.1 mmol/L in the first trimester were classified as overt / T2DM and grouped together (Group B) while those who presented with impaired glucose tolerance confirmed by a positive Oral Glucose Tolerance Test (OGTT) between 24- 28 gestational weeks were classified as GDM (Group A).(3)

Both groups had their OGTT performed and analyzed at KOC hospital laboratory. The OGTT consisted of 75 g 2-hours glucose test and was carried out after overnight fasting (10-16 hours) and at least 3 days of unrestricted diet and normal physical activity. A total of 480 subjects (Group A, n=240 and Group B, n=240) were recruited, their obstetric history captured and followed up on a regular basis till delivery. Mode of delivery and neonatal status especially APGAR status at birth, 5 minutes and 10 minutes, were closely monitored and captured using an eCRF by the study physicians.

Results

Statistical analysis:
Data were analyzed using SPSS version 12.0. A confidence interval of 5% and p- value of 0.05 were set. MANOVA and ANOVA were performed. To find significant correlations, Chi-square tests were adopted for continuous variables while Mann Whitney's U test was used for categorical variables.

Table 1 (next page) shows a significant statistical difference between Group A and B regarding obstetric history. In case of parity, Group A was comprised of comparatively higher percentages of nulliparous and primiparous subjects while multiparity was on the higher side in Group B (p= 0.000). Likewise, Group B subjects had significantly higher number of abortions (especially multiple abortions) than Group A (p= 0.007) as well as multiple caesarean sections (p=0.000). 53.3 % (n=128) in Group B were on Insulin supplementation while the rest were on oral hypoglycemic agents. All subjects in Group A were on oral hypoglycemic agents. OGTT was positive for all subjects in Group A while negative for those in Group B (probably owing to their medications).

Table 2 shows the neonatal statuses in both groups. There was statistically higher complications in Group B (p=0.033) and slightly higher birth weight (p=0.02) as compared to Group A, however there were no statistically significant differences in the APGAR scales.

Figure 1 depicts the variations in the modes of delivery for both groups. While group A had significantly higher percentage of vaginal deliveries and vacuum deliveries, group B could afford more caesarean sections (p=0.000, 0.006 and 0.000 respectively). However there were no significant differences in the weeks of delivery (preterm vs term) amongst both groups.

Table 1: Obstetric history and baseline characteristics of the two study groups

Sl no:	Criteria	Sub-classification (if any)	Group A-IGTT positive (n= 240)	Group B – IGTT negative (n= 240)	p-value
1	Live birth (mean ± S.D)		3± 2	4 ± 3	0.000**
	Live birth	Nullipara	34 (14.2%)	16 (6.7%)	
		Primipara	44 (18.3%)	32 (13.3%)	
		Multipara	162 (67.5%)	192 (80.0%)	
2	No: of abortions	None	128 (53.3%)	120 (50.0%)	0.007**
		1	74 (30.8%)	64(26.7%)	
		2-5	38 (15.8%)	56 (23.3%)	
3	No: of previous CS	None	178 (74.2%)	120 (50.0%)	0.000**
		1	32 (13.3%)	32 (13.3%)	
		≥2	30 (12.5%)	88 (36.67%)	
4	Known H/o T2DM		0 (0%)	240 (100%)	0.000**
	On Insulin treatment		0 (0%)	128 (53.3%)	0.000**
Current BSL status	IGTT	Positive	240 (100%)	0 (0%)	
		Negative	0 (0%)	240 (100%)	

IGTT = impaired glucose tolerance test, T2DM= type 2 diabetes mellitus

Figure 1: Types of delivery (percentages) in both groups

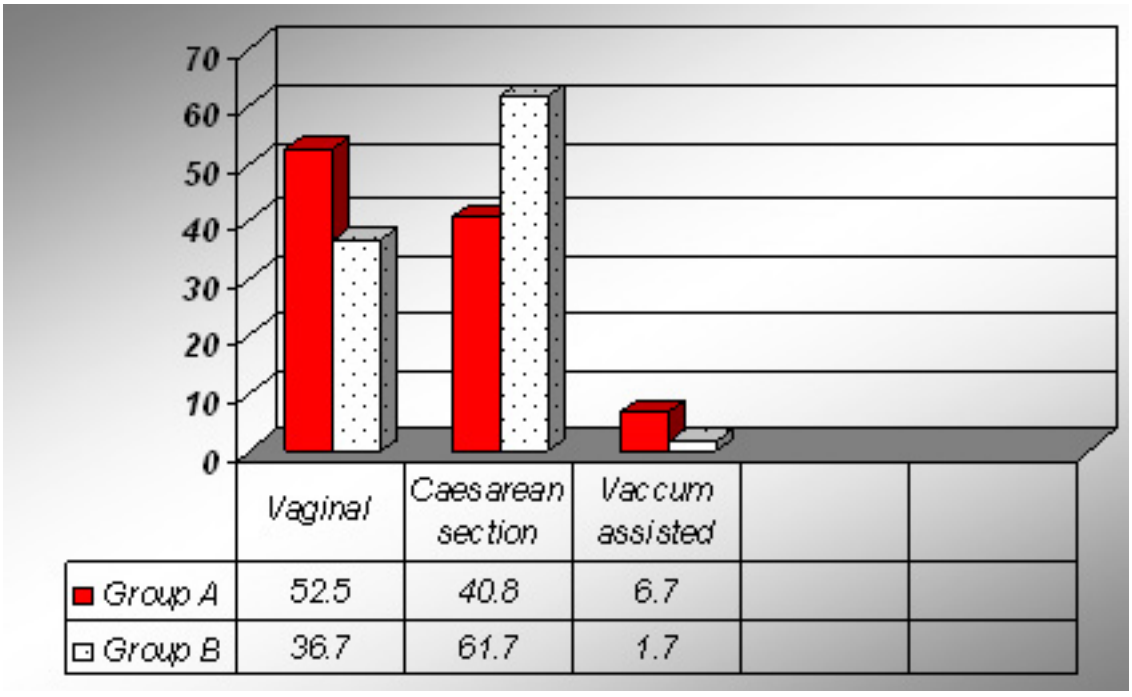

Table 2: Neonatal status

Sl no.	Criteria	Sub-classification (if any)	Group A-IGTT positive (n= 240)	Group B – IGTT negative (n= 240)	P-value
1	Birth weight				
	Average		3.22 ± 0.60	3.37 ±0.72	0.02*
	Classification of birth weight	Low	20 (8.3%)	20 (8.3%)	0.346
		Normal	208 (86.7%)	200 (83.3%)	
		High	12 (5.0%)	20 (8.3%)	
2	Abnormal birth weight		32 (13.3%)	40 (16.7%)	0.307
	APGAR				
a)	APGAR score on birth	Mean	7.72 ± 1.48	7.62 ±1.83	0.511
		Normal	220 (91.7%)	212(88.3%)	0.304
		Low	12 (5.0%)	16 (6.7%)	
		Critical	4 (1.7%)	8 (3.3%)	
		Nil	4 (1.7%)	4 (1.7%)	
b)	APGAR after 5 minutes	Mean	8.75 ± 1.30	8.50 ±1.74	0.075
		Normal	234 (97.5%)	224(93.3%)	0.150
		Low	2 (0.8%)	8 (3.3%)	
		Critical	0 (0%)	4 (1.7%)	
		Nil	4 (1.7%)	4 (1.7%)	
c)	APGAR after 10 minutes	Mean	9.57 ± 1.37	9.30 ± 1.78	0.066
		Normal	234 (97.5%)	232 (96.7%)	0.522
		Low	2 (0.8%)	0	
		Critical	0	4 (1.7%)	
		Nil	4 (1.7%)	4 (1.7%)	
3	NEONATAL COMPLICATIONS				
a	Complications present		48 (20.0%)	68 (28.3%)	0.033*
b	Type of complications				
c	Expired	Total	4 (1.7%)	4 (1.7%)	
		Still born	2 (0.8%)	0	
		Macerated	2 (0.8%)	0	
d	Cord vessel abnormalities		4 (1.7%)	0	
e	Septal defects	Total	2 (0.8%)	8 (3.3%)	
		ASD	2 (0.8%)	4(1.7%)	
		VSD	0	4 (1.7%)	
		ASD and VSD	0	4 (1.7%)	
f	Patent ductus arteriosus		2 (0.8%)	4 (1.7%)	
	Patent foramen ovale(PFO)		2 (0.8%)	4 (1.7%)	
g	Potter's syndrome		0	4 (1.7%)	
h	Polycythemia vera		2 (0.8%)	0	
i	Respiratory disorders	RDS	2 (0.8%)	4 (1.7%)	
		TTN	8 (3.3%)	8 (3.3%)	
		Cyanosis	8 (3.3%)	0	
		Ventilated	6 (2.5%)	12 (5.0%)	
		Incubated	0	0	
j	Shoulder dystocia		2 (0.8%)	0	
k	Caput medusa		0	4 (1.7%)	

ASD= atrial septal defect,
VSD= ventricular septal defect,
RDS= respiratory distress syndrome,
TTN= transient tachycardia in new born

Discussion

The aim of our registry was to identify any key differences between T2DM and GDM cases, and the related delivery complications and neonatal statuses. As opposed to the meta- analysis reports of 14 studies done by Hai-Qing Wang, Han-Lin Lai, Yi Li et al in 2015(8), our study did not show any significant risk effect for impaired Glucose tolerance as a predictor for Large for Gestational Age (LGA). Fetal growth is mainly dependent on interactions of maternal and fetal endocrine statuses and genetic predispositions. Higher amount of maternal blood sugar levels in turn exposes the fetus to higher levels of glucose leading to fetal lipogenesis and excessive growth.(9) In our study, it was shown that the average birth weight was statistically higher in known diabetics than gestational diabetics.

Earlier studies have proved that achievement of glucose control in women with at least one OGTT value decreased adverse neonatal outcomes to near baseline level.(10,11,12) However our study has shown that chronicity of hyperglycemic status significantly increases adverse neonatal outcomes (p=0.033).

Recent studies have confirmed in mouse models that maternal type 2 diabetes mellitus causes heart defects in the developing embryo manifested with oxidative stress, endoplasmic reticulum stress, and excessive apoptosis in heart cells.(13) Our trial has shown that though congenital heart defects (especially septal defects) were common in both groups of offspring of females with either overt diabetes or gestational diabetes, but more frequent among the offspring of mothers with overt T2DM (8% vs 2%, in Group B and Group A respectively).

Even though the differences between APGAR scores at birth, 5 minutes and 10 minutes weren't statistically significant, it was noted that while those in Group A born with low scores recovered rapidly, the recovery was late in group B.

New meta-analysis done by Jared T. Rockner et al (14) from 25 studies has shown that women with 1 abnormal value on 3- h, 100 g OGTT have a significantly increased risk for poor outcomes comparable with women who have gestational diabetes mellitus. Even though our study hasn't included any similar subjects we have been able to conclude that though both groups require good management, more care needs to be given to those with previous history of T2DM even if their OGTT is negative. Along with medications, dietary control and exercise shall make for better management. (15)

Conclusion

Hyperglycemia with pregnancy is a steadily increasing problem that can seriously affect both mother and baby as shown in the present study, however, there were no significant differences in the weeks of delivery (preterm vs term) amongst this group of people. However our study has shown that chronicity of hyperglycemic status significantly increases adverse neonatal outcomes especially in regards to septal defects. The limitation of the study lies in the fact that this was a single centre trial with no randomization. Also, a thorough analysis of all baseline characteristics and clinical presentations, as well as adverse event log needs to be maintained.

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Ischiofemoral impingement syndrome, incidence and clinical importance

Jamil S. Shawaqfeh
Maysoon Banihani
Hend Harahsheh
Ashraf Tamimi
Abdulaziz Bawazir

Radiologists, Royal Medical Services
Jordan

Correspondence:
Jamil S. Shawaqfeh , MD
Royal Medical Services
Jordan
Email: jshawaqfeh@yahoo.com

Abstract

Objective: To evaluate the incidence of ischiofemoral impingement (IFI) syndrome among patients who presented for pelvic MRI as a case of pelvic pain at KHMC.

Methods: 125 pelvic MRI were done between August 2015 and August 2016 , for patients who presented as cases of LBP or pelvic pain at KHMC and were reviewed.

All studies were done on a Skyra 3 Tesla MRI machine with standard protocol of coronal STIR images , axial T1 and T2WI and PD fat sat sequences.

The studies were reviewed for quadratus femoris muscle edema or atrophy and measurements of both quadratus femoris and ischiofemoral spaces were done. Results were analyzed using simple statistical methods.

Results:
7 patients of the 125 had the full blown picture of IFI syndrome accounting for around 5 % of patients.

2 of them had long standing unexplained pelvic pain.

5 of them had the changes after history of pelvic surgery or trauma.

Conclusion: Ischiofemoral impingement syndrome should be considered in the differential diagnosis of patients with LBP, hip pain or unexplained pelvic pain especially in patients with history of pelvic surgery or trauma.

Key words: Ischiofemoral, impingement, pelvic

Introduction

Ischiofemoral impingement syndrome is a clinical entity, meaning that there is narrowing of the space between the ischial bone and the lesser trochanter of the femur impinging upon the quadratus femoris muscle.

MRI is a widely accepted and used method for evaluation of patients with low back pain and pelvic pain and it is usually ordered looking for common causes of these pains including disc diseases , joint problems , inflammatory arthritis or many conditions with the same clinical presentation.

Of these conditions radiologists noticed a clinical entity in which there is edema in quadratus femoris muscle . This muscle has a course between the lesser trochanter of the femur and the ischial spine.

They began to do measurements for this space and found it to be around 20 mm on average.

Another important space to measure is called the quadratus femoris space measured between the insertion of the iliopsoas muscle and the insertion of hamstring muscle.

When these spaces are narrow, impingement of the quadratus femoris muscle with edema and later on atrophy, is noticed.

This was described as ischiofemoral impingement syndrome.

This entity has more prevalance in patients who had previous pelvic surgery or trauma.

The purpose of this study was to evaluate the incidence of ischiofemoral impingement (IFI) syndrome among patients who presented for pelvic MRI as a case of pelvic pain at KHMC.

Methods and Materials

125 pelvic MRI were done between August 2015 and August 2016 , for patients who presented as cases of LBP or pelvic pain at KHMC and were reviewed.

All studies were done on Skyra 3 Tesla MRI machine with standard protocol of coronal STIR images , axial T1 and T2WI and PD fat sat sequences.

The studies were reviewed for quadratus femoris muscle edema or atrophy and measurements of both quadratus femoris and ischiofemoral spaces were done. Results were analyzed using simple statistical methods.

The measurements were done to evaluate both the ischiofemoral space which is the narrowest space between the cortex of ischial spine to the cortex of the lesser femoral trochanter, and the quadratus femoris space which is the narrowest space between the superolateral surface of hamstring muscle and the posteromedial surface of iliopsoas muscle.

The spaces were measured by three radiologists in three separate settings and the results were averaged.

Also, the changes in signal intensity of the quadratus muscle were evaluated for edema, muscle injury or atrophy.

Results

7 patients of the 125 had the full blown picture of IFI syndrome accounting for around 5 % of patients. 2 of them had long standing unexplained pelvic pain.

5 of them had the changes after history of pelvic surgery or trauma; three of these had previous MRI studies with nearly normal IFS and QFS and the narrowing occuring after the pelvic surgery.

The average measurement for the IFS was around 19 mm. The average measurement of the QFS was around 16 mm.

The changes involving the quadratus femoris muscle include edema, muscle tear and atrophic changes .

Discussion

The complex anatomy of the pelvis provides a potential space for impingement between the lesser trochanter of the femur and the ischium.

This space is subject affected by the anatomy of the pelvis and the natural support mechanisms so any disruption to the normal anatomy may affect this space such as in cases of bony pelvic surgeries or trauma.

The clinical presentation most of the time is hip pain with radiation to the lower limbs; the pain is more upon standing. The pain can be elicited by variable hip motions mostly if you combine extension, adduction and external rotation at the level of hip joint the patient will feel snapping pain with radiation to the lower limbs.

In this study the average in IFS was around 19 mm with no significant gender differences.

The average measurement of the QFS was around 16 mm.

Other similar studies show nearly similar findings indicating no definite racial differences.

In patients with no IFI the results were nearly the same in both sides.

Conclusion

Ischiofemoral impingement syndrome should be considered in the differential diagnosis of patients with LBP, hip pain or unexplained pelvic pain, especially in patients with a history of pelvic surgery or trauma.

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Assessment of behaviors, risk factors of Diabetic foot ulcer and footwear safety among diabetic patients in primary care setting, Abu Dhabi, UAE

Osama Moheb Ibrahim Mohamed (1)
Nwanneka E. O. Ofiaeli (2)
Adnan Syeed (3)
Amira Elhassan (4)
Mona Al Tunaiji (5)
Khuloud Al Hammadi (6)
Maryam Al Ali (7)

(1) MBBCh, MSc, MD FM, (MSc, UK), Consultant Family Medicine, Ambulatory Health Services, SEHA corporate, Abu Dhabi, UAE
(2) MBBS, MRCGP (UK), DFFP(UK), Consultant Family Medicine, Ambulatory Health Services, SEHA corporate, Abu Dhabi, UAE
(3) MBBS, MRCS, MRCGP(UK), Consultant Family Medicine, Ambulatory Health Services, SEHA corporate, Abu Dhabi, UAE
(4) Consultant Family Medicine, Ambulatory Health Services, SEHA corporate, Abu Dhabi, UAE
(5) Consultant Family Medicine, Ambulatory Health Services, SEHA corporate, Abu Dhabi, UAE
(6) Khuloud Al Hammady, Family Medicine residents, SKMC, SEHA corporate, Abu Dhabi, UAE
(7) Maryam Al Ali , Family medicine resident SKMC, SEHA corporate, Abu Dhabi, UAE

Correspondence:
Dr. Osama Moheb Ibrahim Mohamed
Consultant Family Medicine,
Ambulatory Health Services,
SEHA corporate,
Abu Dhabi,
UAE
Email: osamamohebibrahim@gmail.com

Abstract

Background: Diabetes mellitus accounts for 5.2 % of all deaths world-wide. UAE had a prevalence of 19.3% in 2015. It is estimated that by 2025 this will rise to more than 21.5%(1). In patients with Diabetes 60-70% will develop peripheral neuropathy, (2) and 25% will develop a foot ulcer(3). The yearly incidence of diabetic foot ulcers ranges from 2 to 32%. More than half of all foot ulcers (wounds) will become infected, requiring hospitalization and 20% of infections result in amputation.(5) History of diabetic foot ulcer results in a 40% greater 10-year mortality in diabetic patients(10). Diabetic foot ulcers can be prevented and researchers have established that up to 85% of amputations can be prevented(15).

Objective: The Aim of this study was to assess behaviors, prevalence of diabetic foot risk factors and safety of footwear among diabetic patients.

Methods: A cross-sectional study was conducted in an ambulatory healthcare clinic. Self-reported questionnaire was used to assess foot care behaviors,'. Inlow's 60-second Diabetic Foot Screen was used to examine foot. ADA risk classification was used for risk assessment. Furthermore descriptive statistics were employed to assess the predicators of practice of diabetic foot care.

Results: The total patients were 74; the majority of respondents were local UAE patients 46 (71.88%) with diabetes duration of 8.8 years. Mean age was 59.1±10.11 years; male to female ratio was nearly similar. Mean A1c level was 7.45 ±1.81 and only 21 out of 50 (42%) patients had their HbA1c controlled (<7). 80.28% of patients completed at least elementary school. The frequency patients received foot care education and foot examination were 60 (81.08%) and 55 (74.32 %) respectively; 42 (55.56%) walked barefoot indoors, 43 (56.97%) wore shoes without socks, 35(47.95%) tested the water temperature with hand / elbow before taking a bath or a shower, 50 (68.49%) self-treated corns or calluses with a blade, 67 (90.54%) wore sandals, almost all 73 (98.93) relied on feeling the fit of the shoes when buying a new pair; overall shoes assessment was improper shoes in 64 (86.49 %). There was callus formation in 30 (42.26%), foot deformity in 11 (15.28%), loss of sensation by monofilament in 0 to 9 sites, out of 10 in foot 26 (40.55%), absence of dorsalis pedes pulse in 10 (13.89%) and 40 % were classified at risk category 1 to develop foot ulcer.

Conclusion: Foot care practices are still substandard among diabetic patients. There was a gap between what patient receive in foot education by health care provider and what patients did in real practice. Potential harmful foot care behaviors were high and protective foot care practice was low. Finally there were one or more risk factors of diabetic foot ulcer in the majority of patients.

Key words: Diabetes, Diabetic foot, diabetic neuropathy, foot deformity, proper shoes for diabetics, Abu Dhabi

Introduction

Diabetes mellitus (DM) is a major emerging clinical and public health problem accounting currently for 5.2 % of all deaths world-wide. According to International Diabetes Federation (IDF), prevalence of DM in UAE was 19.3 % in 2015. According to WHO estimates (2007), 190 million people suffer from diabetes world-wide and about 330 million are expected to be diabetic by the year 2025. UAE had been estimated to be the 10th country in the prevalence of Diabetes with prevalence of 19.6. Recent changes in physical activity and dietary patterns have promoted the development of diabetes and if different preventive and control activities are not adopted, by the year 2025 more than 21.5% of the population above 20 years old) will have diabetes(1).

About 60-70% of those with diabetes will develop peripheral neuropathy, or lose sensation in their feet(2). Up to 25% of those with diabetes will develop a foot ulcer(3). The yearly incidence of diabetic foot ulcers ranges from 2% to 32%, depending on ADA risk classification(4). More than half of all foot ulcers (wounds) will become infected, requiring hospitalization and 20% of infections result in amputation(5). Diabetes contributes to approximately 80% of the 120,000 non-traumatic amputations performed yearly in the United States(6). "Every 20 seconds, somewhere in the world, a limb is lost as a consequence of diabetes"(7). After a major amputation, 50% of people will have their other limb amputated within 2 years(7).

The relative 5-year mortality rate after limb amputation is 68%. When compared with cancer, it is second only to lung cancer (86%) (Colorectal cancer 39%, Breast cancer 23%, Hodgkin's disease 18%, Prostate cancer 8%). People with a history of a diabetic foot ulcer have a 40% greater 10-year mortality than people with diabetes alone(8) Every 30 minutes a limb is lost due to a landmine. Every 30 seconds, a limb is lost due to diabetes(9). Having a wound immediately doubles one's chances of dying at 10 years

compared with someone without diabetes(9). Diabetic foot ulcers double mortality and heart attack risk while increasing risk for stroke by 40% (10); each $1 invested in care by a podiatrist for people with diabetes results in $27 to $51 of healthcare savings(11).

Diabetic foot ulcers as a result of neuropathy or ischemia are common. In developed countries, up to five per cent of people with diabetes have foot ulcers, and one in every six people with diabetes will have an ulcer during their lifetime. Foot problems are the most common cause of admission to hospital for people with diabetes. In developing countries, foot problems related to diabetes are thought to be even more common. Without action, global amputations rates will continue to rise(12).

In most cases, however, diabetic foot ulcers and amputations can be prevented. Researchers have established that between 49% and 85% of all amputations can be prevented. It is imperative, therefore, that healthcare professionals, policymakers and diabetes representative organizations undertake concerted action to ensure that diabetic foot care is structured as effectively as local resources will allow. This will facilitate improvements in foot care for people with diabetes throughout the world and bring about a reduction in diabetic-foot-related morbidity and mortality(13).

Rationale

Diabetic foot is one of the common disabling diabetes complications leading to amputation and fortunately 85% of amputation is preventable by a cost-effective foot care. Diabetic foot examination is one of the key performance indicators (KPI) by Health Authority / SEHA Corporation so more data is needed among the Emirati diabetics to be used as a database for formulation of an organized structured foot care intervention program; this study is aiming to provide a database for foot care intervention program.

Objectives

1- To assess the behaviors of patients with diabetes with respect to their foot care,
2- To assess the prevalence of diabetic foot risk among diabetic patients, and
3- To examine the safety of footwear for diabetic patients

Methods

A-Study Design:
A cross sectional study was conducted in a primary care clinic, Ambulatory Health Care.

B-Study Population:

1-Patient population: Patients who presented to Al Bateen Family Medicine Clinic with physician-diagnosed Diabetes based on the A1C above or equal 6.5% and who met the inclusion and exclusion criteria, were included in the study

2-Inclusion Criteria were: patients suffering from diabetes for at least 3 years, Adult (above 18) diabetic patients

3-Exclusion criteria were: Patient with current Diabetic foot ulcer, History of amputation, Charcot's foot, congenital foot deformities, Visual impairment, Physically independent. Informed consent was obtained and study proposal was approved by research committee, ambulatory health care.

4-Sample size: Based on patients' inclusion and exclusion criteria and 11% anticipated frequency of "proper foot care" at 95% confidence interval, sample size was estimated to be 74 diabetic patients(14)..

C- Statistical Analysis:

The data were entered into Excel spreadsheet and analyzed using SPSS(17) for Windows. Analysis used simple frequency distribution of key variables in the study. Comparison was made with selected base line demographic variable age gender, educational status and socioeconomic status. The level of significance was set at $p < 0.05$. Data was collected by the investigators for consistency. For ethical purposes foot care education was promoted among unaware diabetic patients who participated in the study.

D-Methods of Data Collection:

1- Demographic data (age, sex, education, employment status, duration of diabetes, A1c level, smoking status).

2- Evaluation of Foot Care behaviour: Patients were asked to fill Vileikyte and colleagues (15) questionnaires for assessment of foot-care behavior, (Figure 1). The content of the tool was based on international "diabetic foot care guidelines"(16-17). The seventeen-item questionnaire is split into two behavioral subscales: nine items pertaining to preventative behavior and eight items to potentially damaging behavior. Responses were rated on two different scales: a 6-point scale for "during the past week" questions (twice a day, daily, every other day, twice a week, once a week, or never) and on a four-point scale for "in general" questions (always, most of the time, occasionally, or never).

3- Foot Examination: Inlow's 60-second Diabetic Foot Screen was used to examine foot(18), (Figure 2)

4- Foot risk classification : ADA foot risk classification was used for risk assessment (Figure3)(19)

5- Foot-wear assessment checklist (Figure 4). A foot examination check list was also developed which scored on the presence or absence of proper footwear and included footwear recommendations prepared by the International Working Group on the Diabetic Foot; any abnormal character of the footwear in the checklist indicated improper footwear (20).

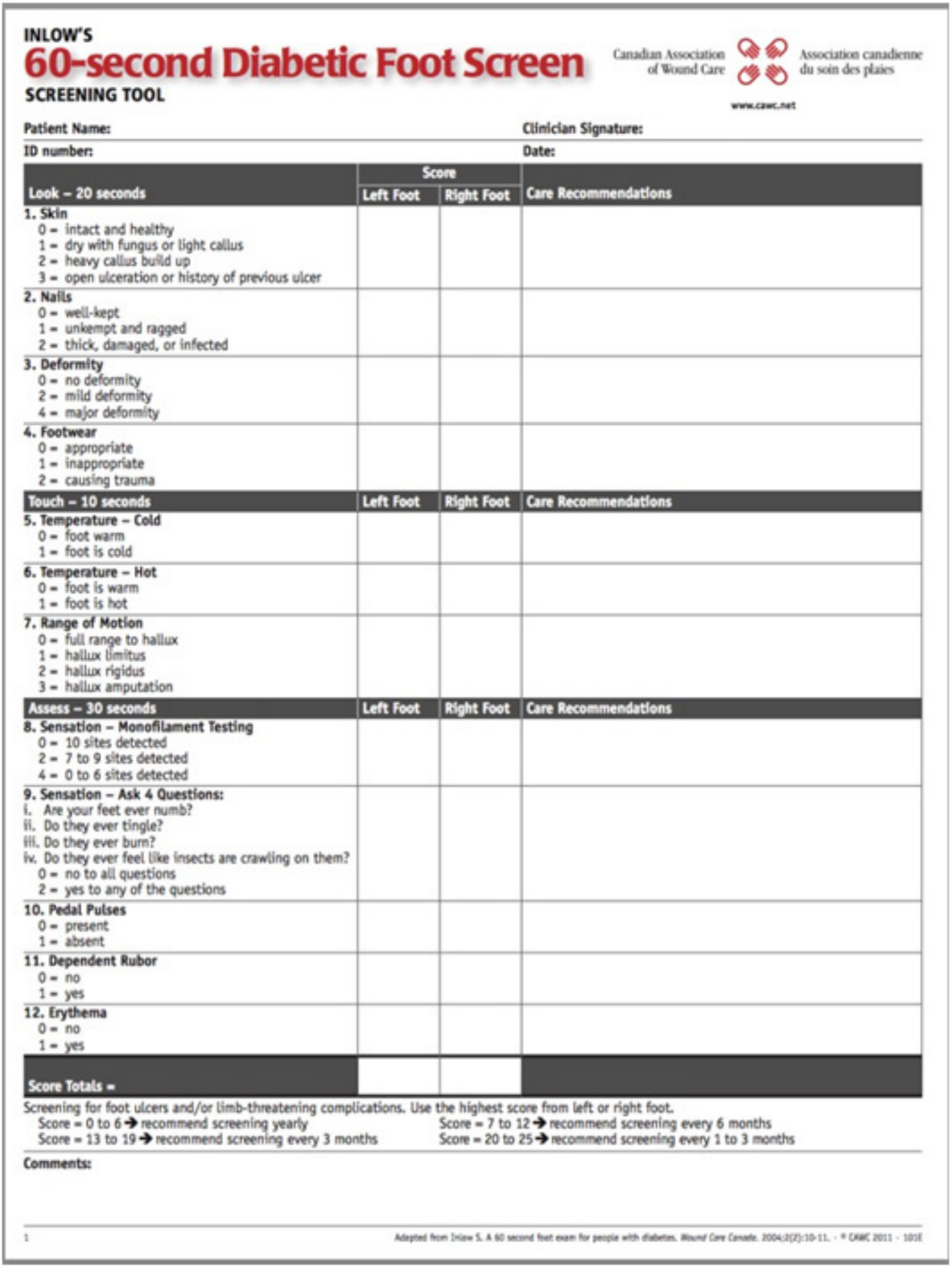
Figure 1: The behavior questions

Question	Behavior subscale
During the past week how often did you examine your feet?	Preventative
During the past week how often did you wash your feet?	Preventative
During the past week how often did you check the inside of your shoes?	Preventative
During the past week how often did you use moisturizing oils or creams for your feet?	Preventative
During the past week how often did you change your socks?	Preventative
During the past week, how often did you test the water temperature with your Hand / elbow before taking a bath or a shower?	Preventative
During the past week how often did you walk barefoot indoors?	Potentially damaging
During the past week how often did you walk barefoot outdoors?	Potentially damaging
During the past week how often did you wear shoes without the socks?	Potentially damaging
In general, how often do you use chemical agents or plasters to remove corns and calluses?	Potentially damaging
In general, how often do you yourself treat corns or calluses with a blade?	Potentially damaging
In general, how often do you cut your toenails straight across?	Preventative
In general, how often do you have your feet measured when buying a new pair of shoes?	Preventative
In general, how often do you wear trainers/sneakers or lace-up shoes?	Preventative
In general, how often do you rely on feeling the fit of the shoes when buying a new pair?	Potentially damaging
In general, how often do you wear sandals or slip-ons?	Potentially damaging
In general, when your feet feel cold at night, how often do you use hot water bottles/heating pads to warm them?	Potentially damaging

Figure 2: Risk classification based on the comprehensive foot examination

Risk category	Definition	Treatment recommendations	Suggested follow-up
0	No LOPS, no PAD, no deformity	• list-behavior=unordered prefix-word= mark-type=disc • Patient education including advice on appropriate footwear.	Annually (by generalist and/ or specialist)
1	LOPS ± deformity	• list-behavior=unordered prefix-word= mark-type=disc • Consider prescriptive or accommodative footwear. • Consider prophylactic surgery if deformity is not able to be safely accommodated in shoes. Continue patient education.	Every 3–6 months (by generalist or specialist
2	PAD ± LOPS	• list-behavior=unordered prefix-word= mark-type=disc • Consider prescriptive or accommodative footwear. • Consider vascular consultation for combined follow-up	Every 2–3 months (by specialist)
3	History of ulcer or amputation	• list-behavior=unordered prefix-word= mark-type=disc • Same as category 1 • Consider vascular consultation for combined follow-up if PAD present	Every 1–2 months (by specialist)

Figure 3



INLOW'S

60-second Diabetic Foot Screen

SCREENING TOOL

Canadian Association of Wound Care / Association canadienne du soin des plaies

www.cawc.net

Patient Name: **Clinician Signature:**

ID number: **Date:**

Look – 20 seconds	Score: Left Foot	Score: Right Foot	Care Recommendations
1. Skin 0 = intact and healthy 1 = dry with fungus or light callus 2 = heavy callus build up 3 = open ulceration or history of previous ulcer			
2. Nails 0 = well-kept 1 = unkempt and ragged 2 = thick, damaged, or infected			
3. Deformity 0 = no deformity 2 = mild deformity 4 = major deformity			
4. Footwear 0 = appropriate 1 = inappropriate 2 = causing trauma			
Touch – 10 seconds	**Left Foot**	**Right Foot**	**Care Recommendations**
5. Temperature – Cold 0 = foot warm 1 = foot is cold			
6. Temperature – Hot 0 = foot is warm 1 = foot is hot			
7. Range of Motion 0 = full range to hallux 1 = hallux limitus 2 = hallux rigidus 3 = hallux amputation			
Assess – 30 seconds	**Left Foot**	**Right Foot**	**Care Recommendations**
8. Sensation – Monofilament Testing 0 = 10 sites detected 2 = 7 to 9 sites detected 4 = 0 to 6 sites detected			
9. Sensation – Ask 4 Questions: i. Are your feet ever numb? ii. Do they ever tingle? iii. Do they ever burn? iv. Do they ever feel like insects are crawling on them? 0 = no to all questions 2 = yes to any of the questions			
10. Pedal Pulses 0 = present 1 = absent			
11. Dependent Rubor 0 = no 1 = yes			
12. Erythema 0 = no 1 = yes			
Score Totals =			

Screening for foot ulcers and/or limb-threatening complications. Use the highest score from left or right foot.

Score = 0 to 6 → recommend screening yearly

Score = 7 to 12 → recommend screening every 6 months

Score = 13 to 19 → recommend screening every 3 months

Score = 20 to 25 → recommend screening every 1 to 3 months

Comments:

1 Adapted from Inlow S. A 60 second foot exam for people with diabetes. *Wound Care Canada*. 2004;2(2):10-11. · © CAWC 2011 · 101E

Figure 4: Footwear Assessment Checklist

Type of heel used	Flat	High (improper)
Shoe type	Open (improper)	Covered
Forepart of shoe	Narrow (improper)	Wide
Shoe material	Hard (improper)	Soft
The back of the shoe, the 'heel counter' is firm enough to provide support for the foot	Yes	No (improper)
The inside of the shoes is 1–2 cm longer than the feet	Yes	No (improper)
The internal width is equal to the width of the foot at the site of the metatarsophalangeal joints, and the height is allowing enough room for the toes.	Yes	No (improper)
Shoes' sole	Thick rubber	Leather (improper)
Shoes have a lace-up or Velcro fastening	Yes	No (improper)
There are any rough seams inside shoes	Yes (improper)	No
Overall Shoes assessment result	**Proper shoes**	**Improper (any improper answer)**

Results

Characteristics of the participants are reported in Table 1. A higher percentage of the participants were local and were diagnosed with type 2 diabetes, and there were a high proportion of participants who did not complete secondary school.

Table 1: Characteristics of Study populations

Variable	Number of patients = 74
Nationality	
Local n (%)	46(71.88%)
Non local n (%)	18(28.12%)
Employment	
Yes, n (%)	21(29.58%)
No n (%)	50(70.42%)
Smoker n (%)	8(11.59%)
Non Smoker n (%)	61(88.41%)
Male sex (%)	32(43.24%)
Female sex (%)	42(56.76%)
Age (years) +SD	59.1 (±10.11)
Diabetes duration (years)+SD	8.86 (±6.95)
HbA1c level +SD	7.45 (±1.81)
HbA1c below 7	21/50 (42%)
HbA1cequal or above 7	29/50 (58%)
No school n (%)	14 (19.72%)
Elementary n (%)	21 (29.58%)
College n (%)	13(18.31%)
University n (%)	9 (12.68%)
Post graduate n (%)	13 (18.31%)
Literacy classes n (%)	1 (1.41%)

There were a significantly higher proportion of study population who received foot care health education and feet were examined by healthcare personnel as shown in Table 2.

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Table 2: Frequency patient received foot care education and foot examination

Variable \ Value	YES, N (%)	NO, N (%)	One-Sample Chi-square	P-VALUE
Feet examined by healthcare professional within last year	60 (81.08%)	14 (18.92%)	28.595	0.0001
Patients were aware of diabetes foot care and complications	55 (74.32 %)	19 (25.68%)	17.514	0.0001

Forty-two patients (55.56%) walked barefoot indoors, 43 (56.97%) wear shoes without socks, 35 (47.95%) did you test the water temperature with hand / elbow before taking a bath or a shower, 50 (68.49%) self-treated corns or calluses with a blade, 67 (90.54%) wear sandals as shown in Table 3.

Table 3: Frequency of patients' Diabetic foot preventative behaviors during the past week

Variable \ Value	Once or more daily N (%)	Daily N (%)	Every other day N (%)	Twice a week N (%)	Once a week N (%)	Never N (%)
How often did you examine your feet?	20 (27.40%)	25 (34.25%)	6 (8.22%)	7 (9.59%)	4 (5.48%)	11 (15.07%)
How often did you check the inside of your shoes?	4 (5.56%)	18 (25.00%)	9 (12.50%)	12 (16.67%)	13 (18.06%)	16 (22.22%)
How often did you wash your feet?	58 (78.38%)	12 (16.22%)	2 (2.70%)	1 (1.35%)	11 (15.07%)	1 (1.35%)
How often did you change your socks?	9 (12.33%)	25 (34.25%)	8 (10.96%)	8 (10.9%)	4 (5.48%)	25 (34.25%)
How often did you use moisturizing oils or creams for your feet?	8 (10.96%)	16 (21.92%)	6 (8.22%)	7 (9.59%)	4 (5.48%)	11 (15.07%)
How often did you test the water temperature with your hand / elbow before taking a bath or a shower?	11 (15.07%)	15 (20.55)	5 (6.85%)	5 (6.85%)	2 (2.74%)	35 (47.95%)

Only 41.89 of patients often wear trainers/sneakers or lace-up shoes, Table 4.

Table 4: Frequency of patients' Diabetic foot preventative behaviors during the past week

Variable \ Value	Always N (%)	Most of the time N (%)	Occasionally N (%)	Never N (%)
How often do you have your feet measured when buying a new pair of shoes?	11 (14.86%)	21 (28.38%)	23 (31.08 %)	19 (25.68%)
How often do you wear trainers/sneakers or lace-up shoes?	6 (8.11%)	12 (16.22 %)	25 (33.78 %)	31 (41.89%)
In general, how often do you cut your toenails straight across?	31 (42.47 %)	23 (31.51%)	11 (15.07%)	8 (10.96%)

Thirty two percent and 31% did not walk bare foot or wear shoes without socks respectively, Table 5.

Table 5: Frequency of patients' Diabetic Foot potentially damaging behaviors during the past week

Variable \ Value	Once or more a day N (%)	Daily N (%)	Every other day N (%)	Twice a week N (%)	Once a week	Never N (%)
How often did you walk barefoot indoors?	8 (11.11 %)	15 (20.83 %)	2 (2.78 %)	5 (6.94 %)	10 (13.89 %)	32 (44.44 %)
How often did you wear shoes without socks?	15 (20.83 %)	5 (6.94%)	8 (11.11%)	9 (12.50 %)	4 (5.56 %)	31 (43.06 %)

Table 6: Frequency of patients' Diabetic Foot potentially damaging behaviors during the past week

Variable \ Value	Always N (%)	Most of the time N (%)	Occasionally N (%)	Never N (%)
How often do you use chemical agents or plasters to remove corns and calluses?	4 (5.41 %)	1 (1.35 %)	6 (8.11%)	63 (85.14%)
How often do you wear sandals or slip-ons?	38 (51.35%)	25 (33.78 %)	7 (9.46 %)	7 (9.46%)
How often do you rely on feeling the fit of the shoes when buying a new pair?	28 (38.36%)	30 (41.10)	14 (19.18 %)	1 (1.37%)
In general, how often do you, yourself, treat corns or calluses with a blade?	4 (5.48 %)	3 (4.11 %)	16 (21.92%)	50 (68.49 %)

Table 7: Footwear Assessment among participants

Variable	Character	N (%)	P Value
Type of heel	Flat High	58(80.56%) 14(19.44%)	0.0001
Shoe type	Covered Open	22(29.73%) 52(70.27%)	0.0005
Forepart of shoe	Wide Narrow	50(67.57%) 24(32.43%)	0.0025
Shoe material	Soft Hard	65 (87.84%) 9 (12.16%)	0.0001
Heel counter' is firm enough to provide support	Yes No	59 (79.73%) 15 (20.27%)	0.0001
Inner shoe length 1–2 cm longer than the foot	Yes No	44 (60.27%) 29 (39.73 %)	0.0792
Internal width is equal to the width of the foot at the site of the metatarsophalangeal joints	Yes No	55 (74.32%) 19 (25.68 %)	0.0001
Height of shoes allows enough room for the toes	Yes No	60 (81.08 %) 14 (18.92 %)	0.0001
Shoes' sole	Leather Thick rubber	62 (83.78%) 12 (16.22 %)	0.0001
Lace-up or Velcro fastening present	Yes No	35 (47.30%) 39 (52.70%)	0.6419
Rough seams present inside shoes	Yes No	55 (74.32%) 19 (25.68 %)	0.0001
OVERALL ASSESSMENT	PROPER IMPROPER	10 (13.51%) 64 (86.49 %)	0.0001

There was callus formation in 30 (42.26%), foot deformity in11 (15.28%), loss of sensation by monofilament in 0 to 9 sites out of 10 in foot 26 (40.55%), absence of dorsalis pedes pulse in 10 (13.89%) and 40 % were classified at risk category 1 to develop foot ulcer. as shown in Table 8.

Table 8: 60-second Diabetic Foot Screen

Item	Count /Percent
1. Skin	
• Intact and healthy	40(56.34%)
• Dry with fungus or light callus	21(29.58%)
• Heavy callus builds up	9 (12.68%)
• Open ulceration or history of previous ulcer	1 (1.41%)
2. Nails	
• Well-kept	42(58.33%)
• Unkempt and ragged	23(31.94%)
• Thick, damaged, or infected	7 (9.72%)
3. Deformity	
• No deformity	61(84.72%)
• Mild deformity	9 (12.50%)
• Major deformity	2 (2.78%)
4. Footwear	
• Appropriate	6 (13.51%)
• Inappropriate	64 (86.49%)
5. Temperature – Cold	
• foot is warm	70 (97.22%)
• foot is cold	2 (2.78%)
6. Temperature – hot	
• foot is warm	71(98.61%)
• foot is hot	1(1.39%)
7. Range of Motion	
• full range of hallux	6(8.1%)
• hallux limitus	7(9.72%)
• hallux rigidus	0
• hallux amputation	0
8. Sensation – Monofilament Testing	
• 10 sites detected	44(59.45%)
• 7 to 9 sites detected	19(25.67%)
• 0 to 6 sites detected	11(14.86%)
9. Sensation – Ask 4 Questions:	
i. Are your feet ever numb?	
ii. Do they ever tingle?	
iii. Do they ever burn?	
iv. Do they ever feel like insects are crawling on them?	
• no to all questions	56(78.87%)
• yes, to any of the questions	15(21.13%)
10. Pedal Pulses	
• present	62(86.11%)
• absent	10(13.89%)
11. Dependent Rubor	
• no	68(95.77%)
• yes	3(4.23%)
12. Erythema	
• no	69(95.83%)
• yes	3(4.17%)

Twenty-one (33.79%) of study population were classified to have either risk categories 1, 2 or 3 to develop foot ulcer, Table 9.

Table 9: Risk classification based on foot examination

Risk category Definition	N (%)
0 - No LOPS, no PAD, no deformity	49 (66.21%)
1 - LOPS ± deformity	21 (33.79%)
2 - PAD ± LOPS	10 (13.89%) absent pedal pulse
3 - History of ulcer or amputation	1 (0.)1%)

LOPS; loss of peripheral sensation, PAD; peripheral arterial disease

Discussion

A total 74 patients were recruited; the majority of respondents were local UAE patients 46 (71.88%) with diabetes duration of 8.8 years; mean age was 59.1±10.11 years; male to female ratio was nearly similar; mean A1c level was 7.45 ±1.81 and 80.28 of patients completed at least elementary school. The frequency as to which patients received foot care education and foot examination were 60 (81.08%) and 55 (74.32 %) respectively. 42 (55.56%) walked barefoot indoors; 43(56.97%) wear shoes without socks, 35(47.95%) did test the water temperature with hand / elbow before taking a bath or a shower; 50 (68.49%) self-treated corns or calluses with a blade; 67 (90.54%) wear sandals; almost all 73 (98.93) relied on feeling the fit of the shoes when buying a new pair. Overall shoes assessment was improper shoes in 64 (86.49%); there were callus formation in 30 (42.26%), foot deformity in 11 (15.28%), loss of sensation by monofilament in 0 to 9 sites out of 10 in foot 30 (40.54%), absence of dorsalis pedes pulse in 10 (13.89%) and 40 % were classified at risk category 1 to develop foot ulcer.

Prevalence of patients who achieved controlled DM (<7) in this study was 42%. This result is consistent with a big survey conducted in 9952 subjects which demonstrated that almost half of the subjects did not meet the recommended target of glycemic control, and especially the rate of achieving the HbA1c target markedly decreased with longer durations despite increases in the use of any diabetes medication.(21)

In this study although patients who received foot care education and foot examination were 60 (81.08%) and 55 (74.32 %) respectively, surprisingly, foot care practices are still poor as shown in improper footwear 64 (86.49%). Education and foot examination were not usually associated with improvement of foot care behaviors. A similar result was found in a study conducted in the USA and recommended that understanding the risk factors, and having the ability to manage complications outside of the clinical encounter is an important part of a diabetes foot self-care management program(22).

In this study, there were 21.13% of patients who complained of feet pain and numbness which is not consistent with another study conducted in 160 patients with diabetes in a hospital setting which demonstrated 42% had numbness/ tingling and pain in their feet (23). This difference may be attributed to a population sample in hospital settings. In another community based study painful symptoms occurred in 26% of patients without neuropathy(24) which is similar to the current study.

In this study, we found that although approximately 80% of patients at Al Bateen Clinic engaged in some recommended foot care practices and education, fairly high proportions reported foot care or footwear practices that should be avoided; in particular, walking barefooted, wearing shoes without socks and wearing pointed (narrow) toe shoes that leads to development of predisposing conditions of diabetic foot like corn, calluses, foot injury, foot deformity, fungal infections, clawing, ingrowing nails, edema feet. Comparable data on footwear and foot care practices in Caribbean populations, from two studies, one from Trinidad25 and the other from Barbados26 have reported some data. In Trinidad 49% of patients attending primary care diabetes clinics reported walking barefooted inside the house and 23% walked barefooted outside the house. Comparable data with similar results in a study reported 44.4 % walking barefooted inside home (27, 28).

In this study, we found 33.79% of the study population were classified to have either risk categories 1, 2 or 3 to develop foot ulcer. Our data was similar to data demonstrated in a study conducted in UAE in 2007 which showed 39% (95% CI: 35.1-43.7%) had peripheral neuropathy and 12% (95% CI: 8.8-14.4%) had peripheral vascular disease(29).

The findings of this study are limited by the small sample size which limited our ability to demonstrate any associations between foot care practices or footwear and socio-demographic factors. Despite these limitations, these data highlight the need for further studies with larger, representative samples to better understand the problem at a national level. We also believe that publication of these findings will serve as a catalyst for further studies in the subject area, where clinicians and researchers can evaluate the extent to which appropriate practices are being

followed in their setting. Additionally, prospective studies that evaluate the impact of foot care and footwear practices on outcomes such as foot ulcers and amputations would further help to determine the potential for interventions to improve practice and reduce complications.

Foot care practices are still substandard; there was a gap between what patients receive in foot education by health care provider and what patients did in real practice., Potential harmful foot care behaviors were high and protective foot care practice was low. Finally there were one or more risk factors of diabetic foot ulcer in the majority of diabetic patients.

Overall, the study highlights the need for greater emphasis on foot care education and foot wear practices for patients with diabetes in Al Bateen Clinic and the need to identify barriers to foot care practice, both as it relates to the physician and to the patient. This would then lead to studies evaluating the efficacy of various intervention strategies to provide evidence-based guidelines for practice.

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The first draft of study protocol was written by the first author then authors from 1-5 reviewed and edited the final study protocol; all authors contributed in data collection. The first author conducted the statistical analysis, results and wrote the manuscript (including the discussion section) then all authors reviewed and edited the manuscript and made the decision to submit the manuscript for publication. The study was approved by the ethics and research committee in Ambulatory Healthcare Services/SEHA.

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Determinants and Prevalence of Stunting Among Rural Kavreli Pre-school Children

Kharel Sushil (1)
Mainalee Mandira (2)
Pandey Niraj (3)

(1) Lecturer, Department of Physiology,
Kathmandu Medical College and Teaching Hospital,
Kathmandu, Nepal
(2) Community Social Worker, Kavre
(3) Department of Anatomy, KMCTH

Correspondence:
Sushil Kharel
Lecturer, Department of Physiology,
Kathmandu Medical College and Teaching Hospital,
Kathmandu,
Nepal
Email: drsushilkharel@gmail.com

Abstract

Background: Stunting is a reduced growth rate in human development. It is "height for age" value to be less than two standard deviations of the WHO Child Growth Standards median. Different studies have shown that inadequate nutrient intake, infections, unsafe water and poor child care are among its main determinants. In rural Nepal, stunting in children is one of the most serious public health concerns.

Aims and Objective: The objective of this study was to find the prevalence of stunting including severe stunting and its determinants in pre-school children aged 3-4 years in Kharelthowk VDC, Nepal.

Materials and Methods: A community based cross-sectional survey was conducted from July 2016 to January 2017 with systematic random sampling technique. Total 464 pre-school children of rural Kharelthowk VDC(Kavre district), both males and females of age between 3-4 years were enrolled in the study. A structured questionnaire was used to obtain information on socioeconomic characteristics and life style factors of children. WHO Anthro Software V3.2.2 was used for analyzing anthropometric parameters of the children and Statistical package for Social Sciences (SPSS) Windows version 21 was used to analyze the data.

Result: The prevalence of stunting in pre-school children was 46.9%. The prevalence of stunting was significantly higher among male children (51%) than female children (42.7%). The study revealed that stunting was significantly associated with inadequate nutrition intake, infections, poor child care and socio-economic status of the family. Conclusion: The magnitude of stunting is very high compared to developed countries. Thus, proper attention should be given for the intervention on causes of stunting among pre-school children in order to avoid further risks in future.

Key words: Stunting; Pre-school children; Kavre

Introduction

Stunting in pre-school children is associated with adverse physiological consequences, including poor cognition and educational achievements, lost productivity and, when accompanied by huge weight gain later in childhood(1). In developing countries, it is estimated that 29% of children aged less than five years (under-five children) are stunted [<-2 standard deviation (SD) height-for-age] or malnourished. Although stunting has declined recently, prevalence is still extremely high, especially in South Central Asia, which alone accounts for about half of the global problem(2). Child malnutrition is affected by several determinants, such as intrauterine growth retardation, lack of exclusive breastfeeding, inappropriate complementary feeding, and continuous attacks of infectious illnesses, food unavailability, and micronutrient deficiencies(3). Although the pathogenesis of stunting is not yet well-understood, many studies have shown that inadequate nutrient intake, infections, unsafe water and poor child care, literacy rate of mothers, are among its main determinants(4). Other factors in developing countries include low socioeconomic status, residence and poor access to health care services(5, 6). There is a wide variation in rates of malnutrition throughout Nepal, both ecologically and regionally. Nepal Demographic and Health Survey indicates that more rural children are stunted (low height for age), 42% than urban children (27%). Regional variation in nutritional status of children is substantial. Stunting levels are very high in the mountains (53 %) (7).

The present analyses describe levels and trends of stunting in pre-school children based on the WHO standards. Moreover, while the earlier research covered only stunting in urban areas and reported the trends, the present study was focused on the rural scenario of childhood stunting.

Methods

A cross-sectional community-based study was conducted in pre-school children of Kharelthowk VDC. The study was carried out from July 2016 to January 2017. Five trained volunteers were actively involved in collecting the data of pre-school children. Informed written consent was taken from the parents/guardian and school authority and Helsinki guidelines were followed. A self-designed structured questionnaire regarding lifestyle factors of child, economic status of family, etc was given to them. Anthropometric assessment was done, their weight, height, head circumference, mid-upper arm circumference were measured three consecutive times. Later on, mean was taken as their actual weight and height, which helped in calculating the BMI (body mass index). Anthropometric measurement was done by LG digital weighing machine (with a difference of only 20 grams), by Stadiometer and non stretchable measuring tape. The condition of the weighing machine was checked then was kept on firm flooring (heavy clothing and shoes were removed). Children were told to stand with both feet in the center of the scale and weight was recorded. Height measurement was done by Stadiometer; children were asked to stand up straight with feet and heels together keeping the heels back against the upright section of the stadiometer (arms relaxed by sides). Children were asked to look straight ahead at the marker. Three standard indices of physical growth given by WHO-Height-for-age (Stunting), Weight-for-age (Underweight) and weight-for-height (Wasting) that described the nutritional status of children was considered in this study.

WHO Classification (8).

Stunting: Height for age < -2 Standard Deviations (SD) of the WHO growth standard Median

Underweight: Weight for age < -2 Standard Deviations (SD) of the WHO growth standard Median

Wasting: Weight for Height < -2 Standard Deviations (SD) of the WHO growth standard Median

Overweight: Weight for Height > + 2 Standard Deviations (SD) of the WHO growth standard Median

Inclusion criteria: The pre-school children aged between 3 to 4 years.

Exclusion criteria: The children who were not in good health and uncooperative. Analysis was done by universally accepted WHO Anthro Software Version 3.2.2 and SPSS Version 21. Z test was used to calculate the P value. P-value of < 0.05 was considered as statistically significant

Results

A total of 464 pre-school children aged between 3-4 years were enrolled in the study. Of these 464 participants 237(51.07%) were males and 227(49.93%) were females (Figure 1). Among the mothers of participants, 54.5% (254) were literate and 45.5% (210) were illiterate (Figure 2). Prevalence of overall stunting was 46.9% (218). Prevalence of severe stunting in males and females were 8.8% and 3.5% respectively. Males were more stunted as compared to females. The prevalence of stunting in male and female population compared to its own counterpart was 51% and 42.7% respectively (Table 1). The prevalence of underweight and wasting of the study population was 31.2% and 17.5% respectively whereas overweight was among 4.3 % of the study population (Figure 4).

Figure 1: Sex wise distribution of the pre-school children

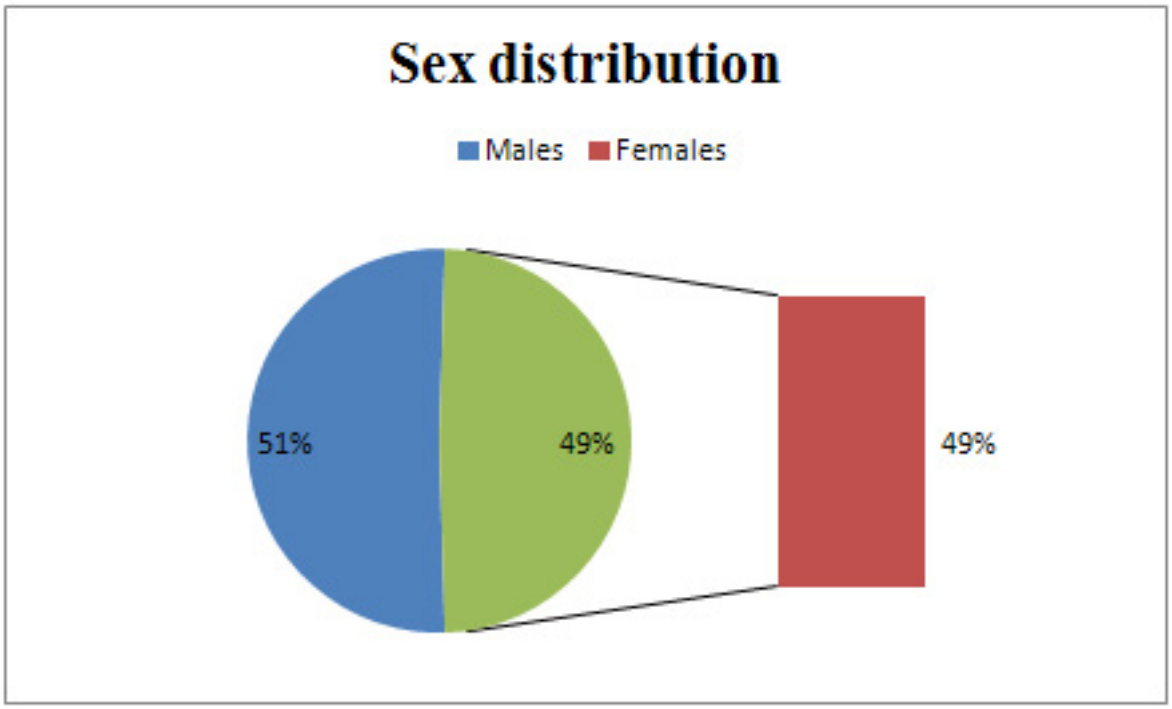

Figure 2: Literacy rate among mothers of pre-school children in the study population

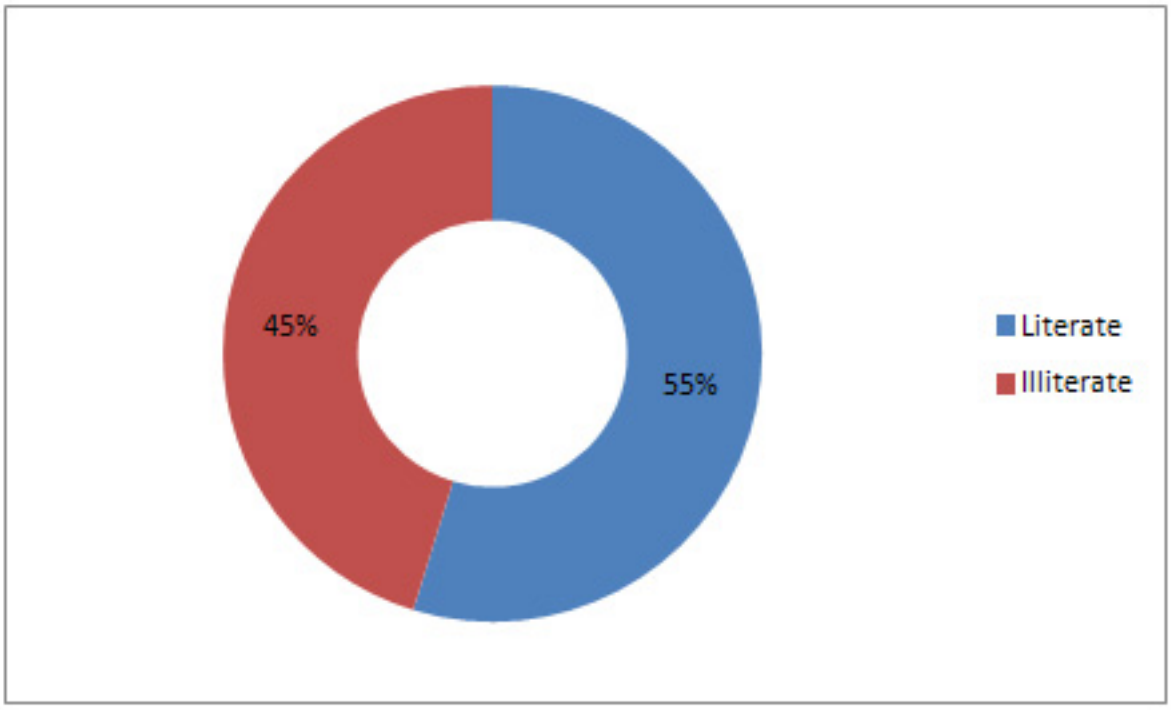

Table 1: Weight-for-height Stunting in the study population (95% CI)

Participants	Total No	No of severe stunting Children (< -3SD)	Percentage of severe stunting Children < -3 SD)	No of stunting Children (< -2SD)	Percentage of stunting Children (< -2 SD)	Mean Z Score	SD	P Value
Male	237	21	8.8	121	51.0	-1.43	0.97	0.076
Female	227	8	3.5	97	42.7	-1.10	0.84	0.135
Total	464	29	6.2	218	46.9	-1.26	0.92	0.103

Figure 3: Comparison of Stunting among male and female pre-school children in the study population

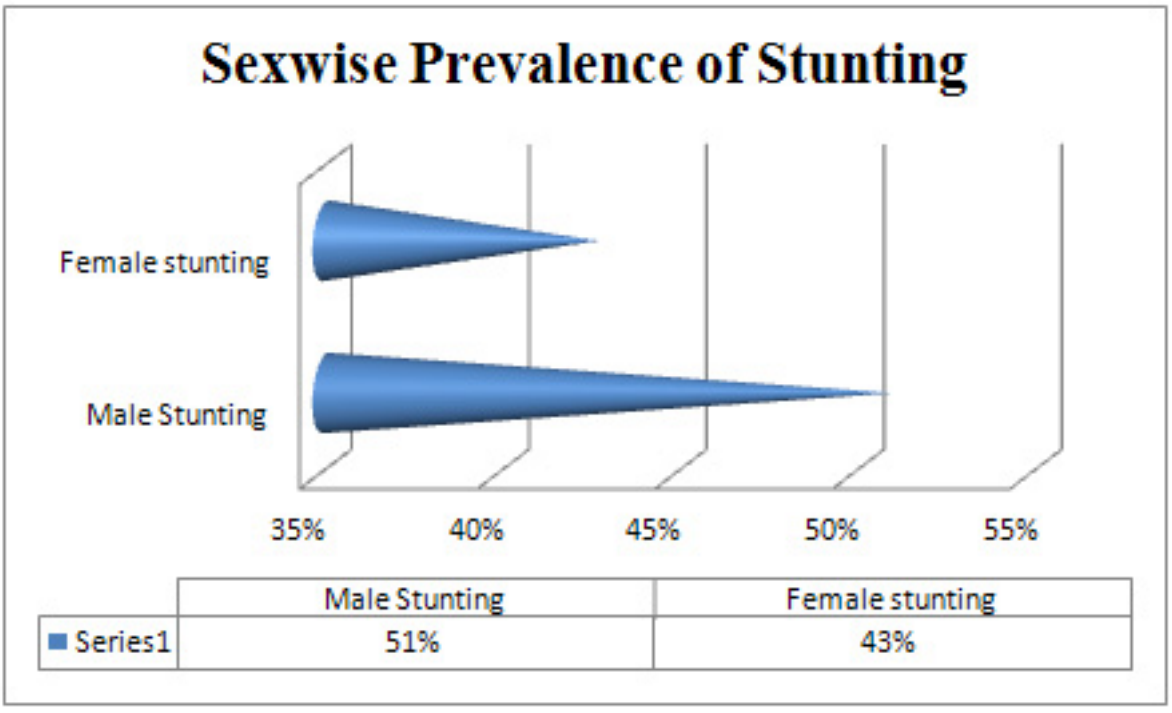

Figure 4: Prevalence of stunting, underweight, overweight and wasting among study children (3-4 Years of age)

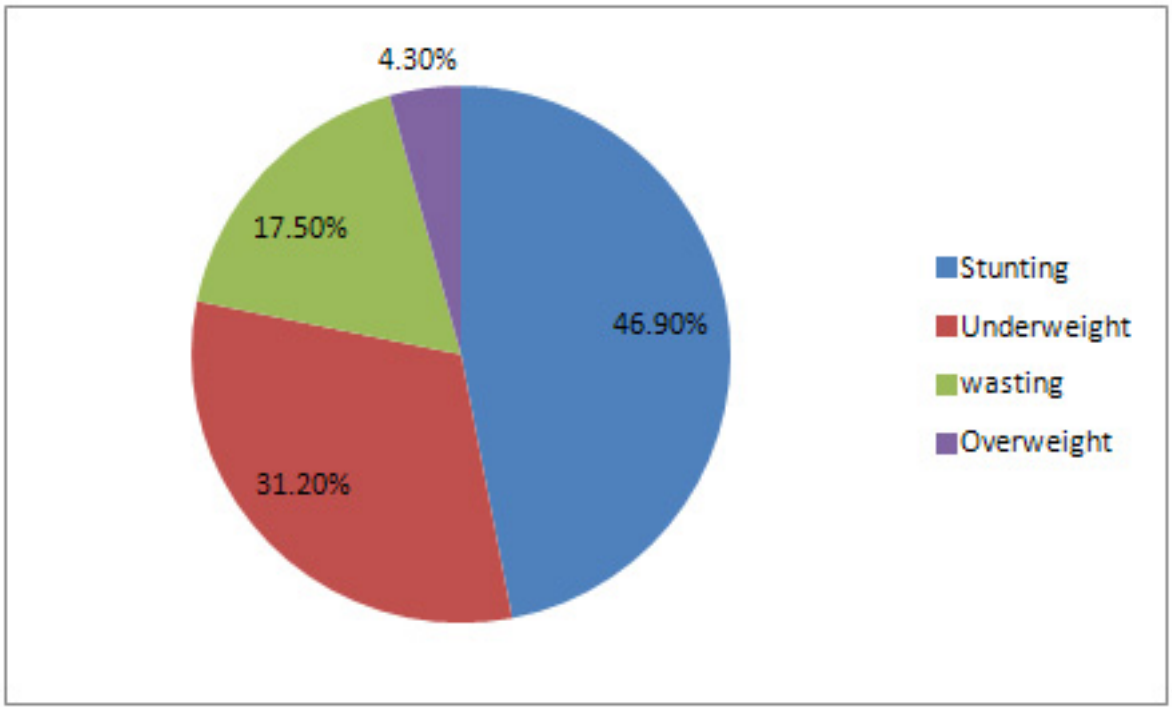

Table 2: Socio-demographic characteristics of study children

Variable	Number	Percentage (%)
Sex of the children		
Male	237	51.07
Female	227	48.93
Religion of the mothers		
Hindu	433	93.3
Buddhist	11	2.37
Christian	13	2.8
Others	07	1.53
Maternal education		
Literate	254	54.5
Illiterate	210	45.5
Annual Household Income		
Less than 1000$	334	71.98
1000$ to 2000$	105	22.62
More than 2000$	25	5.40

Table 3: Life style factors and health condition of the children

VARIABLES	No of participants	Percentage (%)
Feeding trends		
Usually takes normal meals	272	58.6
Difficulty in taking normal meals or eat less	151	32.5
Overeating tendency	41	8.9
Junk foods		
Likes very much	230	49.6
Not so much	234	50.4
Eating habit		
Watches TV/Tablets/Mobiles while eating	123	26.5
Doesn't watch anything while eating	341	73.5
Sleeping habit	265	57.11
Has normal sleep	199	14.22
Wakes up many times at night		
Involvement in physical activities		
Usually likes to play outdoors	348	75.00
Stays inside house watching TV/Playing indoor games	116	25.00
Health condition		
Usually becomes sick	233	50.2
Not so much	231	49.8
Exclusive Breastfeeding(EBF)		
Was exclusively breastfeed	329	71
Not exclusively breastfeed	135	29
Child birth weight(Health post/Hospital records)		
Had normal birth weight(≥ 2500 gm)	234	50.43
Below normal birth weight(< 2500 gm)	230	49.57

Discussion

In developing countries like Nepal, stunting in children has become a public health concern in recent times due to its bad impact on the health of the child in the future. People are still unaware of the situation and this may lead to epidemic causing increase risk of diabetes, hypertension and other diseases in future. In the present study the average age of the child was 3.5± 0.2 years. The youngest child was 36 months whereas the oldest among study population was 48 months. A study in Andhra Pradesh, India assessed 1013 tribal children and found that 48.27% were stunted (9). This study showed similar results to our study which showed 46.9% of children of age 3-4 years were stunted. Bisai et al. found the overall prevalence of stunting was 47.8 % in 3-6 years children(10). Another study from Rajasthan reported that 60 % were stunted among rural children less than 3 years (11). Rao et al. found that 51.6% were stunted among tribal pre-school children(12). In a study in Saudi Arabia it showed that a prevalence of stunting was 10.9% in under 5 children which is far lower as compared to us and our region(13). One noticeable aspect of our study is significantly higher prevalence of stunting among boys as compared with girls. Rao et al. in their study also had found a higher prevalence of stunting (54.4% vs. 48.8 %) among boys(12). But Stalin et al. in his study found that malnutrition was more prevalent among girls than boys in Tamilnadu, India (62.6% vs. 44%) (14).

The study clearly showed that the stunting was significantly associated with feeding habit, sleeping condition, health condition of child, child birth weight (Table 3) and lower socio-economic status of the family (Table 3).

Conclusion

The prevalence of stunting found in this study is very high as compared to developed countries. This is due to poor child nutrition, illness, low birth weight of child and poor economic conditions. Thus, proper attention should be given for the intervention on causes of stunting among pre-school children in order to avoid the diseases in future.

Limitations

The trend of studies in developing countries is only focused in urban areas. The problem of stunting in children is more in rural areas so this type of study should be concentrated more in rural areas.

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I express my deep sense of gratitude to my participants who were very little children without their cooperation this study might not have been successful. A special thanks to Mr. Sunil Kharel (Head of the Department of Economics, Uniglobe College) for his help and support in statistical analysis.

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Medical and Psychological Associations with Nocturnal Enuresis in Children in Qatar

Ahmed Mohamed Kahlout
Hayam Ali AlSada

PHCC, Doha
Qatar

Correspondence:
Dr. Ahmed Mohamed Kahlout
Doha
Qatar
Email: akahlout@phcc.gov.qa

Abstract

Nocturnal Enuresis is a common problem observed in Qatar. However, no Qatar-based study has examined enuresis in the primary health care setting, and thus this study will have particular relevance to this population. A prospective study was designed in primary health care centers in Qatar to collect information on Nocturnal Enuresis of children in Qatar.

Aim: The aim of this study is to determine the prevalence of Enuresis and its recovery rate among children in the Western Area of Doha, and evaluate the different associations between Nocturnal Enuresis (NE) and medical and psychological conditions, and to assess the impact of the condition in children and families.

Methods: Questionnaires about nocturnal enuresis were distributed to the parents of 399 children age 5 to 11 frequenting the Primary Health Care centers clinics in the Western Area of Doha. All cases received followed up evaluations at 6, 12, and 18 months.

Results: The results indicated a 36.3% prevalence of Enuresis in children. Significant associations of medical and psychological problems such as snoring, bronchial asthma and stressful events were found. Recovery rates of 26, 24, and 19% were observed after 3 times follow-up at 6, 12, and 18 months respectively.

Conclusions: This study confirms the prevalence of Nocturnal Enuresis among children frequenting the primary health care centers of the Western area of Doha, and the Medical and Psychological associations are similar to those of similar studies from various countries of the Arab countries area. Health education will encourage the parents to be aware, deal with this problem and find appropriate medical advice.

Key words: nocturnal enuresis,
Medical and psychological associations, Doha,
Qatar

Introduction

Enuresis is a condition characterized by involuntary discharge of urine overnight, as per the ICCS definition (1). Commonly seen in young children, enuresis is considered problematic when it occurs in children 5 or older. Enuresis may be primary or secondary, where a child with primary enuresis has never had a dry period for at least 6 months, whereas a child with secondary enuresis has experienced a dry spell of at least this duration (1, 2, 3).

Various management strategies are available for nocturnal enuresis: for example, counseling of parents, medical treatment, or psychotherapy.

Nocturnal Enuresis is a common problem observed in Qatar. However, no Qatar-based study has examined enuresis in the primary health care setting, and thus this study will have particular relevance to this population.

The aim of this study is to determine the prevalence of Enuresis and its recovery rate among children in the Western Area of Doha, and evaluate the different associations between Nocturnal Enuresis (NE) and medical and psychological conditions, and to assess the impact of the condition in children and families.

Materials and Methods

Participants were children age 5 to 11 recruited while visiting the Primary Health Care clinics; children with known neurological and genetic syndromes were excluded.

The study was conducted by requesting that parents complete a questionnaire on their child's history with urinary and other behaviors. The questionnaire was purpose-built for this research by the author and was subsequently validated by the Hamad Medical Corporation (HMC) Research Committee. This study was approved by HMC ethics committee.

The questionnaire consisted of three parts where the first part included socio-demographic characteristics and toilet training of the sample. The second part was designed to enquire about the presence of nocturnal enuresis and its relevant characteristics. Children without NE were asked about the age of dryness. The third part of the questionnaire asked all participants about psychological and medical conditions such as constipation, snoring, and the experience of stressful events. Sleep disturbances are defined by the ICD-10 such as nightmares, sleep terrors, sleep walking, and sleep talking.

Constipation was defined as delay or difficulty in defecation, present for two or more weeks and sufficient to cause distress to the patient. (4,5)

The questionnaire was not based on the Screening Instrument for Psychological Problems because ADD and ADHD subjects were not part of the study. The questionnaires were not validated as the Vancouver or Toronto voiding questionnaires.

Statistical Analysis: Qualitative and quantitative data values were expressed as frequency along with percentage and mean±SD. Descriptive statistics were used to summarize demographic and all other clinical characteristics of the participants. The prevalence of nocturnal enuresis was estimated and presented along with 95% CI. Associations between two or more qualitative variables were assessed using chi-square test, chi-square test with continuity correction factor or Fisher exact test as appropriate. Quantitative variables data between two independent groups (nocturnal enuresis and nocturnal continence) were analyzed using unpaired 't' test. The results were presented with the associated 95% confidence interval. Univariate and multivariate logistic regression analysis was carried out to assess the association of various potential factors and predictors such as age at diurnal dryness, age at nocturnal dryness, age when child started toilet training, gender, family size, family history enuresis, nocturnal dryness, suffer constipation, fecal incontinence, stressful events, snoring and other medical problems with outcome variable nocturnal enuresis. Logistic regression analysis results were presented in terms of odds ratio (OR) and associated 95% CI. A two-sided P value <0.05 was considered to be statistically significant. All Statistical analyses were done using statistical packages SPSS 22.0 (SPSS Inc. Chicago, IL).

Results

There were 399 participants in the study; 145 (36.3%) were nocturnal enuresis, 254 (73.7%) participants were nocturnal continence. Mean age at diurnal dryness in the nocturnal enuresis group was significantly higher 30.7±7.8 years, compared to nocturnal continence group 27.9±7.4 years (P<0.001). Similarly, the mean age at nocturnal dryness (40.6±14.8 vs 34.4±10.1; P=0.004), age when child started toilet training (25.8±6.9 vs 23.8±6.9; P=0.006) in the nocturnal enuresis group was significantly higher compared to nocturnal continence group respectively.

Surprisingly, we found that 36.3% of children suffered from enuresis, while the remaining subjects didn't suffer from enuresis. This was based on analyzing data collected from 399 patients at Al Rayyan and Abu Baker primary health care centers, of which 84 (59%) were male (Table 2). Of all participants, the age when the child started toilet training was 24.6 months on average; diurnal dryness was achieved at age 28.9 months (±7.6), and nocturnal dryness was achieved at 35.5 months (±11.4) (Table 1).

The prevalence of nocturnal enuresis and their association with demographic, physiological, and other medical and clinical characteristics are shown in Table 2. The overall prevalence of nocturnal enuresis was 36.3% (95% CI: 31.6 to 41.1). The prevalence of nocturnal enuresis in the positive family history of enuresis was significantly higher 97/172; 56.4% compared with 48/227; 21.1% (P<0.001) in the nocturnal continence group. Significantly higher

in the nocturnal continence group. Significantly higher nocturnal enuresis prevalence occurred among children who presented with non-nocturnal dryness (87.6% vs 16.1%; P<0.001) compared to nocturnal dryness. Similarly children experiencing stressful events had significantly higher nocturnal enuresis compared with children with stressful events (56.3% vs 17.9%; P<0.00). Also, children with other medical problems showed a similar trend with significantly higher occurrences of nocturnal enuresis, P<0.001. Gender, age at diurnal dryness, family history, did not have any significant association with nocturnal enuresis as presented in Table 2.

The results of logistic regression analysis testing for each predictive variable and factors and their association with nocturnal enuresis are presented in Table 2. The results were presented with odds ratio (OR) and associated 95% confidence interval (CIs). Logistic regression analysis revealed that increasing age at nocturnal dryness, age when child started toilet training, family history enuresis, nocturnal dryness, suffer constipation, fecal incontinence, stressful events, snoring and other medical problems were common risk factors and predictors significantly associated with an increased risk for nocturnal enuresis. Risk of nocturnal enuresis was 2.6 times likely to be higher among children having age at nocturnal dryness more than 40 months (unadjusted OR 2.6, 95% CI 1.37-4.94; P=0.003) compared to age group less or equal to forty months. Children who had positive family history of enuresis were nearly 4.8 times as likely to have more risk for nocturnal enuresis (unadjusted OR 4.82, 95% CI 3.11-7.48; P<0.001). Children who had nocturnal enuresis were nearly 1.7 times as likely to suffer from constipation (unadjusted OR 1.68, 95% CI 1.0-2.82; P=0.05), 3.1 times as likely to be positive for fecal incontinence (unadjusted OR 3.06, 95% CI 1.09-8.61; P=0.034), 5.9 times as likely to have stressful events (unadjusted OR 5.91, 95% CI 3.75-9.32; P<0.001), 4.2 times as likely to have sleep disturbance and 3.4 times more likely to have other medical problems, than those who had nocturnal continence. Children with enuresis were twice as likely to snore than children without enuresis (unadjusted OR 2.1, 95% CI 1.29-3.78; P=0.003).

Children with enuresis were almost 8 times more likely to have worms than children without enuresis (unadjusted OR 7.9, 95% CI 4.19-15.14; P<0.001).

Using multivariable logistic regression analysis controlling for all other potential predictors and factors such as age at diurnal dryness, age at nocturnal dryness, age when child started toilet training, gender, family size, family history enuresis, suffer constipation, fecal incontinence, stressful events, snoring and other medical problems we found that the factors with the strongest and significant association with nocturnal enuresis are children having positive family history of enuresis, nocturnal dryness, stressful events and sleeping disturbance or snoring. No significant interactions were found between different potential factors and predictors considered above and including an interaction terms in the model, had no effect on the adjusted odds ratio as shown in Table 3.

Most parents were assisting their children when they bed wet (64); 43 blamed the child and 6 spanked the child (Table 1). At the follow up evaluations at 6, 12, and 18 months where the number of children with enuresis reduced from 102 children to 97 and 75 respectively (Table 4).

Discussion and Conclusions

In our study, we found a high prevalence and an unexpectedly high percentage of nocturnal enuresis (36.3%) with equal distribution in both sexes. In similar studies carried out in Jordan and Yemen, the prevalence of Nocturnal Enuresis among 5 to 15 years old children was reported as 8.8% to 28.6% respectively (6, 7). The prevalence found in this study was higher than reported worldwide, at 8.3 - 12.3% (9). This difference could be explained due to the high number of 5 and 6-year old participants in our study which also explains the reduction in the numbers found also at the follow up evaluations at 6, 12, and 18 months where the number of children with enuresis reduced from 102 (25%) children to 97 (24%) and 75 (19%) respectively. At this age, the rate of resolution worldwide is usually reported at 15% per year (9).

Stressful events and sleep disturbances were significantly higher in the children with enuresis compared with those without enuresis - 74.5% vs. 33.1% , p < .0001, and 54.5 % vs22 % p <0001 respectively. Worldwide the overall rate of comorbidity in epidemiological and in clinical studies are approximately: 13.5%-40.1% of all wetting children have clinically relevant behavioral problems (9), emphasizing the importance of taking a thorough history of sleep disturbances such as nightmares, sleepwalking, sleep talking, and stressful events like mother deprivation, school failure, and siblings' rivalry. It is helpful to support the family and children in these cases with follow up even without excellent outcome of the treatment,; (10) when necessary, patients should be referred to the appropriate professionals for related conditions.

Medical problems (e.g., UTI, bronchial asthma) were found to be higher in the children with enuresis compared to the control group (unadjusted OR 3.37, 95% CI 2.18-5.21; P<0.001) while intestinal worms in children in enuresis were also found to be higher (unadjusted OR 7.9, 95% CI 4.19-15.14; P<0.001) These children may benefit from medical treatment. Of course, treatment of intestinal worms will reduce one of the child's sufferings but it is not known whether this contributes to the resolution of enuresis or not.

It was found that 34 children with enuresis also were snoring (unadjusted OR 2.1, 95% CI 1.29-3.78; P=0.003). On the other hand 31 children without enuresis were also snoring. We don't know whether future treatment of snoring will improve bedwetting as was found in another study where half of the children tonsillectomised had improvement of their enuresis (8).

During the 3 follow ups (6, 12, and 18 months), spontaneous recovery was observed. Recovery rates of 26, 24, and

Table 1: Baseline Demographic, Physiological and other Clinical Characteristics

Characteristics	Mean ± SD; N (%)
Age at diurnal dryness (months)	28.9 ± 7.6
Age at nocturnal dryness (months)	35.5 ± 11.4
Age when child started toilet training (months)	24.6 ± 7.0
Gender	
Male	233 (58.4%)
Female	166 (41.6%)
Nationality	
Qatari	293 (73.4%)
Non Qatari	106 (26.6%)
Family size	
≤ 4 person	152 (38.1%)
5-8 person	210 (52.6%)
≥ 9 person	37 (9.3%)
Family history of enuresis	
Yes	172 (43.1%)
No	227 (56.9%)
Nocturnal dryness	
Yes	254 (63.7%)
No	145 (36.3%)
Suffer from constipation	
Yes	71 (30.2%)
No	328 (69.8%)
Episode of fecal incontinence	
Yes	16 (4.0%)
No	383 (96%)
Child Stressful events	
Yes	192 (48.1%)
No	207 (51.9%)
Snoring	
Yes	65 (16.3%)
No	334 (83.7%)
Suffer from sleep disturbances (nightmares, sleeping walking, and sleep talking)	
Yes	135 (33.8%)
No	264 (66.2%)
Suffer from medical problems	
Yes	135 (33.6%)
No	265 (66.4%)
Worms	
Yes	60 (15%)
No	299 (85%)
Child presently wet the bed	
Yes	145 (36.3%)
No	254 (63.7%)
Frequency of bed wetting	
Nightly	35 (24.1%)
Weekly	57 (39.3%)
Monthly	53 (36.6%)

Table 2: Association of various predictors with nocturnal enuresis: Univariate Logistic regression analysis

Variable	Nocturnal Enuresis	Nocturnal Continence	Unadjusted OR	95% CI for OR	P-value
Age at diurnal dryness					
≤ 30 month†	93 (33.1%)	188 (66.9%)	1.0		
>30 month	48 (42.9%)	64 (57.1%)	1.52	0.97, 2.38	0.069
Age at nocturnal dryness					
≤ 40 month†	36 (15.5%)	197 (84.5%)	1.0		
>40 month	20 (32.3%)	42 (67.7%)	2.61	1.37, 4.94	0.003
Age when child started toilet training					
≤ 24 month†	96 (33.1%)	194 (66.9%)	1.0		
>24 month	49 (45.0%)	60 (55.0%)	1.65	1.05, 2.59	0.029
Gender					
Male†	84 (36.1%)	149 (63.9%)	1.0		
Female	61 (36.7%)	105 (63.3%)	1.03	0.68, 1.56	0.887
Family size					
≤ 4 people	65 (42.8%)	87 (57.2%)	1.77	0.81, 3.83	0.150
5-8 people	69 (32.9%)	141 (67.1%)	1.16	0.54, 2.48	0.708
≥ 9 people†	11 (29.7%)	26 (70.3%)	1.0		
Family history enuresis					
Yes	97 (56.4%)	75 (43.6 %)	4.82	3.11, 7.48	<0.001
No†	48 (21.1%)	179 (78.9%)	1.0		
Nocturnal dryness					
Yes†	0 (0%)	254 (100%)	NA	NA	<0.001
No	145 (100%)	0 (0%)			
Suffer constipation					
Yes	33 (46.5%)	38 (53.5%)	1.68	1.0, 2.82	0.05
No†	112 (34.1%)	216 (65.9%)	1.0		
Fecal Incontinence					
Yes	10 (62.5%)	6 (37.5%)	3.06	1.09, 8.61	0.034
No†	135 (35.2%)	248 (64.8%)	1.0		
Child Stressful events					
Yes	108 (56.3%)	84 (43.8%)	5.91	3.75, 9.32	<0.001
No†	37 (17.9%)	170 (82.1%)	1.0		
Suffer from sleep disturbances	79 (58.5%)	56 (41.5%)	4.23	2.72, 6.58	<0.001
Yes	66 (25.0%)	198 (75.0%)	1.0		
No†					
Snoring					
Yes	34 (52.3%)	31 (47.7%)	2.1	1.29, 3.78	0.003
No†	111 (33.2%)	223 (66.7%)	1.0		
Worms					
Yes	46(76.7%)	14 (23.3%)	7.9	4.19,	<0.001
No†	99 (29.2%)	240 (70.8 %)	1.0	15.14	
Medical Problems					
Yes	74 (55.2%)	60 (44.8%)	3.37	2.18, 5.21	<0.001
No†	71 (26.8%)	194 (73.2%)	1.0		

CI: Confidence interval; OR: odds ratio; †Subjects in this category served as the reference group.

Table 3. Association of various predictors with nocturnal enuresis: Multivariate Logistic regression analysis

Variable	Nocturnal Enuresis	Nocturnal Continence	Adjusted Odds ratio (OR)	95% CI for OR	P-value
Family history enuresis					
Yes	97 (56.4%)	75 (43.6 %)	2.16	1.1, 4.2	0.026
Not	48 (21.1%)	179 (78.9%)	1.0		
Child Stressful events					
Yes	108 (56.3%)	84 (43.8%)	2.7	1.3, 5.4	0.006
Not	37 (17.9%)	170 (82.1%)	1.0		
Suffer from sleep disturbances					
Yes	79 (58.5%)	56 (41.5%)	3.9	2.0, 7.8	<0.001
Not	66 (25.0%)	198 (75.0%)	1.0		

CI: Confidence interval; †Subjects in this category served as the reference group.
The sum may not equal to n=399 for some variables due to some missing data.

Table 4: Follow-up outcome measures

Variable	Frequency	Percentage
6 months follow up		
Without Enuresis	297	74.4
With Enuresis	102	25.6
12 months follow up		
Without Enuresis	302	75.7
With Enuresis	97	24.3
18 months follow up		
Without Enuresis	324	81.2
With Enuresis	75	18.8

19% were observed after 3 times follow-up at 6, 12, and 18 months respectively. Interestingly, there were several new cases of children without enuresis starting to bed wet (likely from secondary enuresis), which should prompt a clinician to investigate and treat possible causes.

We recommend that clinicians obtain a thorough family, genetic, trauma, stressful events, and toilet-training history; conduct a physical examination; and perform urine and stool analysis and cultures, urine 24-hour osmolarity, and blood sugar tests. Abdominal and pelvic ultrasounds would be useful for suspected congenital malformation. Nocturnal enuresis is a benign condition, and its complications can often be resolved with special care and treatment.

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Aging Syndrome

Mehmet Rami Helvaci (1)
Orhan Ayyildiz (1)
Orhan Ekrem Muftuoglu (1)
Mustafa Yaprak (2)
Abdulrazak Abyad (3)
Lesley Pocock (4)

(1) Professor of Internal Medicine, MD
(2) Assistant Professor of Internal Medicine, MD
(3) Middle-East Academy for Medicine of Aging, Chairman, MD, MPH, MBA, AGSF
(4) medi-WORLD International

Correspondence:
Mehmet Rami Helvaci
Professor of Internal Medicine, MD
ALANYA, Antalya,
Turkey
Phone: 00-90-506-4708759
Email: mramihelvaci@hotmail.com

Abstract

Aging syndrome or accelerated endothelial damage syndrome or metabolic syndrome is a chronic inflammatory process on vascular endothelium both at arterial and venous systems of the body. It terminates with an accelerated endothelial damage, an accelerated atherosclerosis, end-organ insufficiencies, early aging, and death. Male sex, sedentary life style, animal-rich diet, overweight, obesity, smoking, alcohol, white coat hypertension, hypertension, impaired fasting glucose, impaired glucose tolerance, diabetes mellitus, hypertriglyceridemia, dyslipidemia, chronic infections, chronic inflammations, chronic depression, cancers, overuse of the body, and sickle cell diseases may be the major parameters of the metabolic syndrome. Cirrhosis, chronic obstructive pulmonary disease, chronic renal disease, myocardial infarction, stroke, early aging, and death may be the main terminal end-points of the syndrome. As a conclusion, calendar ages should not be accepted as the real physiologic ages of patients with the above parameters and terminal end-points of the metabolic syndrome. On the other hand, long term underweight in the absence of any pathology such as anorexia nervosa, sudden weight loss, malignancies, chronic infections, chronic inflammations, or chronic depression may even decelerate the aging by decreasing insulin resistance, mean arterial blood pressure, and vascular endothelial damage and it may be a good property for a long lifespan.

Key words: Aging syndrome, accelerated endothelial damage syndrome, metabolic syndrome

Aging syndrome or accelerated endothelial damage syndrome or metabolic syndrome is a chronic inflammatory process on vascular endothelium both at arterial and venous systems of the body. It terminates with an accelerated endothelial damage, an accelerated atherosclerosis, end-organ insufficiencies, early aging, and death (1-2). All factors accelerating the normal aging process may mainly act on vascular endothelium and they should be accepted as components of the metabolic syndrome. If we can define parameters of the metabolic syndrome exactly, we can prevent the accelerated aging process. Sedentary life style, animal-rich diet, and excess weight may be the most common parameters of the syndrome. Overweight and obesity may cause a low grade inflammation on vascular endothelium that can be shown by slightly increased C-reactive protein levels in patients. Although main targets of the syndrome may be both the afferent and efferent vascular endothelial cells, afferent blood vessels including capillaries may be much more affected due to their much higher blood pressure. Mean arterial blood pressure may be one of the significant causes of endothelial damage and it may mostly be affected by excess weight induced changes of the body. Excess adipose tissue acts as an endocrine organ anywhere in the body and induces insulin resistance. Therefore limitation of excess weight as abdominal obesity may be meaningless in definition of the metabolic syndrome. Actually excess weight should be defined by means of body mass index. Although mean body weight is greater in males due to their tallness, body mass index is greater in females as a more valuable indicator of excess fat in the body. On the other hand, long term underweight in the absence of any pathology such as anorexia nervosa, sudden weight loss, chronic infections, chronic inflammations, malignancies, or chronic depression may decelerate aging by decreasing insulin resistance, mean arterial blood pressure, and vascular endothelial damage, and it may be a good property for a long lifespan.

Smoking and alcohol are the other frequent parameters of aging syndrome or accelerated endothelial damage syndrome or metabolic syndrome since they cause severe endothelial damage not only in the vasculature of respiratory and gastrointestinal tracts but all over the body (3-4). Smoking and alcohol have similar adverse effects on vascular endothelium with different severity in different organs (5-7). Smoking causes cirrhosis too and alcohol also causes chronic obstructive pulmonary disease. Both of them affect both arterial and venous endothelial cells of the body. Smoking causes a chronic inflammatory process in the respiratory tract, lungs, and vascular endothelium all over the body, terminating with an accelerated atherosclerosis, end-organ insufficiencies, early aging, and death. Therefore it must be included among the parameters of the metabolic syndrome. On the other hand, smoking-induced weight loss is probably related with the smoking-induced endothelial inflammation all over the body, since loss of appetite is one of the major symptoms of inflammations in the body. In another explanation, smoking-induced loss of appetite is an indicator of being ill instead of being healthy during smoking (8-10). Buerger's disease (thromboangiitis obliterans) alone is clear evidence to show the strong atherosclerotic effects of smoking since this disease has not been shown in the absence of smoking. Similarly, the alcoholic cirrhosis alone is clear evidence to show strong atherosclerotic effects of alcohol. Alcohol causes a chronic inflammatory process in the gastrointestinal tract, liver, and vascular endothelium all over the body terminating with early aging and death therefore it must also be included among parameters of the metabolic syndrome.

Male sex alone may also be a significant factor for the accelerated atherosclerotic process of the metabolic syndrome since females live longer all over the world (11). Fear to protect his family is a feature of male sex in human beings and in all animal kinds. The feature probably comes from testosterone. You cannot see some females fighting with each other for a male but you can easily see some males fighting for a female in human beings and in animal species. You can see soldiers or coalmine workers in males but not in females. Males use their physical force more in daily life. The dominant physical role of male sex is also seen during sexual activities. The overuse of body probably comes as an accelerated atherosclerosis and a shortened lifespan in males in front. The shortened survival of male sex has even been shown in the sickle cell patients although their significantly shorter mean life expectancy may be caused by the current health services (12). Smoking and alcohol consumption are also more common in males all over the world which may also indicate presence of some additional pressures in society on them. But the longer lifespan of females cannot be explained by the strong atherosclerotic effects of smoking and alcohol alone. Effects of testosterone may also be important in the shortened survival in males. So the dominant role of male sex, and smoking and alcohol put them into the accelerated atherosclerotic process whereas excess weight is the major problem in females concerning the accelerated aging process. In other words, overuse of the body in males and underuse of the body in females may accelerate the endothelial damage, atherosclerosis, early aging, and death. Avoidance of smoking, alcohol, and excess weight are essential in protection from metabolic syndrome. The term of regular exercise should be replaced with daily and essential activities in the protection of females since they actually need a lifestyle change instead of exercise. Avoidance of animal-rich diet, walking as much as possible in a day, avoidance of using elevators, eating fruit even with its peel to escape chronic constipation, drinking black tea, finding regular daily responsibilities, finding news targets to live, and forgetting to use taxis should be thelifestyle of people in risk of metabolic syndrome.

Chronic infections such as tuberculosis and bronchiectasis, chronic inflammations such as rheumatoid arthritis and sickle cell diseases, chronic depression, and cancers induce an accelerated endothelial damage, an accelerated atherosclerosis, early aging, and death therefore they should also be included among the parameters of the aging syndrome or accelerated endothelial damage syndrome or metabolic syndrome. If possible, they should be treated

effectively and indicators of the systemic inflammation including acute phase reactants should be normalized in serum since the systemic inflammatory processes damage vascular endothelial cells further.

An accelerated atherosclerotic process may be the major pathology in the metabolic syndrome and it may be the main cause of early aging and death (13). Atherosclerosis is more important than venosclerosis concerning the clinical manifestations due to the rich collaterals of venous systems in the body. Actually, vascular endothelial damage develops in all arterial and venous systems of the body. Of couse much higher blood pressure of the arterial systems is also important for the enhanced endothelial damage in the afferent vasculature. But hyperglycemia, sickle cell diseases, dyslipidemia, smoking, alcohol, and activated immune cells in chronic infections, inflammations, and cancers also damage venous endothelium in addition to the arterial one. Eventually, the syndrome terminates with end-organ insufficiencies such as cirrhosis, chronic obstructive pulmonary disease, chronic renal failure, myocardial infarction, and stroke, clinically (14). Hepatosteatosis, hepatomegaly, and left lobe hypertrophy are probably some of the significant indicators of the metabolic syndrome in the liver (15). Not only alcohol, but also smoking, overweight, obesity, hypertriglyceridemia, dyslipidemia, white coat hypertension, hypertension, and diabetes mellitus probably have cumulative effects in the development of them via an accelerated endothelial damage in the liver (16). Chronic renal disease may be one of the other indicators of the metabolic syndrome. Smoking, alcohol, animal-rich diet, excess weight, dyslipidemia, hypertension, and diabetes mellitus probably have cumulative effects in the development via accelerated endothelial damage in kidneys. These factors cause a chronic low grade inflammation on vascular endothelium terminating with an accelerated atherosclerosis. Stroke and myocardial infarction are found among the major terminal end-points of the metabolic syndrome since neurons and myocardial cells do not have the ability of regeneration. Actually these hypoxic events develop in all organs of the body but they are able to regenerate. Chronic obstructive pulmonary disease is also found among the terminal end-points of the metabolic syndrome. Not only smoking and air pollution, but also alcohol, excess weight, dyslipidemia, hypertension, and diabetes mellitus probably have cumulative effects in the development via accelerated endothelial damage in lungs.

Male sex, sedentary life style, animal-rich diet, overweight, obesity, smoking, alcohol, white coat hypertension, hypertension, impaired fasting glucose, impaired glucose tolerance, diabetes mellitus, hypertriglyceridemia, dyslipidemia, chronic infections, chronic inflammations, chronic depression, cancers, overuse of the body, and sickle cell diseases accelerate the normal aging process via an accelerated atherosclerotic process all over the body. Therefore the individuals with the above problems are actually elder than their calendar ages, physiologically. Pack-year of smoking should be added to calendar ages to calculate physiological ages of the patients. Drink-year of alcohol should be added to calendar ages of the patients to calculate their physiological ages in the syndrome. Already developed diabetes mellitus, hypertension, cirrhosis, chronic obstructive pulmonary disease, chronic renal disease, coronary heart disease, and other end-organ insufficiencies also increase the calendar ages in the syndrome.

Sickle cell diseases may be the prototypes for the terminal end-points of the syndrome (17-18). We can observe the terminal consequences of disseminated endothelial damage in early years of age in the sickle cell patients. Disseminated endothelial damage may probably be the main cause of accelerated aging in the sickle cell diseases. Although arterial involvement is prominent in the metabolic syndrome, venous involvement is also seen in the sickle cell diseases due to the hard red blood cells induced endothelial damage. Physiologic ages of patients with sickle cell diseases are much higher than their calendar ages due to the hard red blood cells induced endothelial damage all over the body. The hard red blood cells damage vascular endothelial cells especially at the capillary level since the capillary systems are the main distributors of the hard cells into the tissues (19). An accelerated metabolic syndrome-like picture is seen in the sickle cell patients in their much earlier years of age since the accelerated endothelial damage initiates just after birth in their bodies.

Metformin should be the first drug to treat the metabolic syndrome. The main action of metformin is the loss of appetite. Although metformin provides significant weight loss in most cases, approximately 30% of patients cannot continue to use it due to the loss of appetite since they like eating. Metformin should not be used in patients above the age of 70 years together with multiple diseases. It should be used in patients in those we can see the benefits of weight loss in the longterm. Up to now, we have not seen any significant side effects of metformin. Thus it is found among one of the most prescribed drugs in the world today. Since metformin decreases body weight by suppressing the appetite, it also decreases blood pressure and serum triglyceride levels. Actually, metformin should be the drug of treatment for white coat hypertension in cases of overweight or obesity. Hypertriglyceridemia and dyslipidemia should also be treated with metformin in patients with overweight or obesity. Low dose aspirin and metformin should be initiated in all patients with overweight and obesity above the age of 50 years to prevent development of irreversible end-points of metabolic syndrome such as diabetes mellitus, hypertension, stroke, and other end-organ insufficiencies.

Acarbose should be the second choice of drug for the treatment of metabolic syndrome in case of metformin intolerance or insufficiency. So acarbose can be used alone or together with metformin. Since acarbose and metformin have different actions in the body, their cumulative effects will be stronger if used together. Since acarbose decreases absorption of complex sugars in the small intestine, it will also be useful for the treatment of chronic constipation which is also frequent above the age

of 50 years due to the decreased daily activities. Acarbose is also effective on metabolic parameters including serum triglyceride levels and mean arterial blood pressure by decreasing body weight significantly. If a patient cannot tolerate acarbose, it is highly possible that the patient does not want to use any drug since the side effects of acarbose are very rare.

As a conclusion, male sex, sedentary life style, animal-rich diet, overweight, obesity, smoking, alcohol, white coat hypertension, hypertension, impaired fasting glucose, impaired glucose tolerance, diabetes mellitus, hypertriglyceridemia, dyslipidemia, chronic infections, chronic inflammations, chronic depression, cancers, overuse of the body, and sickle cell diseases may be the major components of the metabolic syndrome. Aging syndrome or accelerated endothelial damage syndrome may be other names of the syndrome. Cirrhosis, chronic obstructive pulmonary disease, chronic renal disease, myocardial infarction, stroke, early aging, and death may be the major terminal end-points of the syndrome. Finally, calendar ages should not be accepted as the real physiologic ages of patients with the above parameters and terminal end-points of the syndrome. On the other hand, long term underweight in the absence of any pathology such as anorexia nervosa, sudden weight loss, malignancy, chronic infections, chronic inflammations, or chronic depression may decelerate aging by decreasing insulin resistance, mean arterial blood pressure, and vascular endothelial damage and it may be a good property for a long lifespan.

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