World Family Medicine Journal
incorporating the Middle East Journal of Family Medicine

ISSN 1839-0188

February 2017 - Volume 15, Issue 2

Influence of Elderly parent on family dynamics: results of a survey from Karachi, Pakistan

page 16

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

Editorial enquiries:
aabyad@cyberia.net.lb

This issue is rich with many papers from the Region dealing with topics of interest to the field. A paper from Saudi Arabia looked at the Pattern of current tobacco use among the Saudi adult population: using results of the national Survey of Risk Factors of Non-Communicable Diseases . A total 4751 Saudi aged 15-64 years were analysed. Most of current tobacco users are tobacco smokers (92%). The overall prevalence of current tobacco smokers is 12.9% (611) of the total participants, with significantly higher proportion of males' smokers than females (24.7% of males and 1.4% of females). Univariate analysis shows that smoking prevalence was higher among males, age group 25-34, northern and eastern regions, educated people, and among those in certain occupations. Using logistic model, significant predictors for current smoking were: Male, younger adults, being in the eastern or northern regions, and being unemployed.
The authors concluded that unlike adult females, tobacco smoking was prevalent among adult males in Kingdom of Saudi Arabia. Significant predictors for current smoking were: Male sex, younger adults, being in the eastern or northern regions, and being unemployed.

A second paper from Saudi Arabia looked at the Leadership in Family Medicine/ Primary Health Care. In Eastern province of Saudi Arabia, a step model leadership approach has been utilized to achieve targets set for training of postgraduates in Family Medicine training program-MOH. Step model leadership initiative is a transformational leadership that involves three steps. Step one essentially is based on a managerial role where tasks are assigned for the team and desired outcomes agreed at the start of the program. Step two is role model stage that ensures progression of the task. Step three is essentially an evaluator type of leadership role that tries to establish whether desired outcomes have been achieved or not. It utilizes advocacy as one of its main strategies.

It is important that one in a leadership position in this step model understands their role and contributes effectively in line with the expectations of the step model for leadership initiative. This Step Model for leadership has been successfully applied in the training of postgraduates in Family Medicine Program in Eastern province-MOH of Saudi Arabia. It is proposed that it should be applied throughout Saudi Arabia and in other countries of the region.

A cross-sectional study from Pakistan was carried out in a tertiary care hospital of Karachi, Pakistan through convenience sampling during August to October 2014. The aim of the study is to look at the Influence of Elderly parent on family dynamics: results of a survey from Karachi, Pakistan. The individuals who were > 35 years and had an elderly parent (> 65 years) were included. A pre-tested structured questionnaire was used for data collection. Analysis was done using SPSS 19.0. Logistic regression analysis was used to identify the reasons for appreciating elderly parent's influence in daily lives of study participants. A total of 200 study participants' information was included. About 35% of the participants were between 35 to 40 years of age and there was preponderance of females (68%) in the study. Majority (81%) of the participants responded that their parents have an influence on their family matters. Parents experience (OR: 2.5; 95% CI: 1.1-5.4), wisdom (OR: 2.1; 95% CI: 0.9-4.6) and respect (OR: 1.2; 95% CI: 0.6-2.5) are some of the factors because of which participant(s) get influenced by their elderly parents. The authors concluded that children respect their elders' decision(s) and appreciate their influence in family matters. The elders should let children take their own decisions and become autonomous. Children on the other hand should give respect to their elders and should involve them in family decisions.

A paper from Iraq attempts to assess the antibacterial activity of two antimicrobial agents indicated in the treatment of tonsillitis; azithromycin and amoxicillin-clavulanic acid. The authors followed a single blind comparative study was conducted on 43 patients with recurrent tonsillitis with mean age of 5.46±2.38 years who were scheduled for tonsillectomy in ENT department, Rizgary Hospital. The patients were allocated randomly into 2 groups. Group1 patients (n=20) were given azithromycin and group 2 patients (n=23) received amoxicillin-clavulanic acid at the recommended dose for each antibiotic. Bacterial isolation and identification were performed and minimum inhibitory concentrations (MIC) of isolated bacteria were determined. Blood and tonsillar tissue samples were taken from each patient before and 2 hours after drug administration. The plasma and tonsillar tissue concentration of each antibiotic were determined.

Staphylococcus aureus was the most predominant organism isolated from the patients. Azithromycin and amoxicillin-clavulanic acid attained mean plasma concentration of 0.27±0.04µg/ml and 5.49±0.33µg/ml respectively and the mean azithromycin concentration in tonsils tissues was 13.97± 2.75µg/g whereas no detectable concentrations of amoxicillin-clavulanic acid were determined in the tonsils tissue of the patients. The authors concluded that Azithromycin achieved higher tissue concentration than amoxicillin-clavulanic acid in tonsils tissues making this antibiotic a good choice for recurrent tonsillitis.

A paper from Lebanon reviews a case of short stature. Children with short stature are encountered often in family practice. By definition, one child in 33 has height measurements below the third percentile for age. While this is often defined as the lower limit of "normal," most of these children are, in fact, healthy and growing adequately. Many will attain normal stature as adults. The practitioner's task is to identify the few children who are short as a result of medical conditions that lead to failure of normal growth.

Pattern of current tobacco use among the Saudi adult population: results of the national Survey of Risk Factors of Non-Communicable Diseases

Abdelshakour M. Abdalla (1)
Lamiaa Z. Abuzaid (2)
Waleed S. Al-Hussain (3)
Nasser A. Al-Hamdan (1)
Abdalla A. Saeed (1)
Ahmed A. Bahnassy (1)

(1) King Saud Bin Abdulaziz University for Health Sciences, Department of Community Medicine, Faculty of Medicine, King Fahad Medical City, PO Box 59046, Riyadh 11525, Saudi Arabia
(2) Department of Public Health, Community & Occupational Medicine, and Environmental Heath, Faculty of Medicine, Suez Canal University, Ismailia, Egypt.
(3) Internship, King Fahad Medical City, PO Box 59046, Riyadh 11525, Saudi Arabia

Correspondence:
Dr. Abdelshakour M. Abdalla
King Saud Bin Abdulaziz University for Health Sciences,
Department of Community Medicine, Faculty of Medicine,
King Fahad Medical City, PO Box 59046, Riyadh 11525,
Saudi Arabia
Tel. 0501225427
Email: Abdallaali63@hotmail.com

Abstract

Objective: The aim of this study is to describe the tobacco use status and determine the prevalence and pattern of current tobacco smoking among adult Saudi population to provide baseline data that may assist national health policies to control tobacco use in Saudi Arabia

Methods: 4,751 Saudis aged 15-64 years were analyzed, for pattern of tobacco use, from a national cross-sectional survey of non-communicable disease (NCD) risk factors. Data were collected using the standardized stepwise approach for NCD risk factor surveillance, of the World Health Organization (WHO).

Results: According to this study, most current tobacco users are tobacco smokers (92%). The overall prevalence of current tobacco smokers is 12.9% (611) of the total participants, with significantly higher proportion of male smokers than females (24.7% of males and 1.4% of females). Most current smokers are daily smokers (86%), of these 72.5% use manufactured cigarettes, with significantly more proportion of males than of females. The prevalence of current use of smokeless tobacco among the participants was estimated at 1.1% and more common among males than females, 1.7% and 0.5% respectively. But there was no significant difference.

In all the smoking status categories, the proportion of male tobacco users is significantly higher than female tobacco users even among the former smokers

Univariate analysis shows that smoking prevalence was higher among males, age group 25-34, northern and eastern regions, educated people, and among those in certain occupations: unemployment and nongovernmental employee, and participants with income equal or more than 15000 Saudi Riyals per Month.

Using logistic model, significant predictors for current smoking were: Male, younger adults, being in the eastern or northern regions, and being unemployed.

Conclusion: Unlike adult females, tobacco smoking was prevalent among adult males in Kingdom of Saudi Arabia. Significant predictors for current smoking were: Male sex, younger adults, being in the eastern or northern regions, and being unemployed.

Further explanatory research, considering gender differences and other socio-demographic subcategories in tobacco use is recommended to develop an effective anti-smoking intervention program.

Key words: Tobacco use, Pattern, Adults, Saudi Arabia

Introduction

Tobacco use is a major cause of morbidity and mortality all over the world, with more burdens in the developing countries. There is evidence that tobacco use is a main risk factor of the non-communicable diseases, which are steadily increasing all over the world, and contributed to 36 million deaths in 2008 (1,2).

The 1.3 billion adult world smokers in 2003 are predicted to rise up to 1.7 billion between 2020 and 2025 if the high level of tobacco use remains constant (3,4). The mortality rate is expected to increase from 5.4 million to 8.3 million a year in 2030, and 80% of these deaths are expected to be in developing countries (5, 6).

Tobacco consumption reasons are different in different subgroups.

This is why the tobacco industry takes into consideration the specific differences in their target groups according to sex, age group, ethnicity, and class, in efforts to broaden tobacco sales and promote tobacco use. Also there is evidence that tobacco smoking affects different subgroups differently. Therefore various subgroups need specific tobacco control measures to be effective (4). This emphasizes the importance of properly and appropriately studying the patterns of tobacco use according to the various subgroups in Saudi Arabia and other communities. This will enable the authorities to plan and implement intervention strategies.

Several studies were conducted in the Kingdom of Saudi Arabia (KSA) among different sectors of the communities. Those include students, health professionals and others. The prevalence among adults ranged from 11.6 to 52.3 % (median 22.6 %) (7). The only national study among Saudi adults reported that 19.1% of them were current smokers (8).

The aim of this study is to describe the tobacco use status and determine the prevalence and pattern of current tobacco smoking among adult Saudi population to provide baseline data that may assist national health policies to control tobacco use in Saudi Arabia.

Subjects and Methods

This is a cross-sectional community based study covering the whole of the Kingdom of Saudi Arabia to estimate the prevalence of some of the risk factors of non communicable diseases, including tobacco smoking. The WHO STEPwise approach to Surveillance (STEPS) of NCD risk factors was the basis for conducting the survey and collecting data (9, 10).

Study population:
The study population was all Saudi population of all the 20 health regions of the country, of persons aged 15 - 64 years.

Sampling:
A multistage stratified cluster random sampling technique was used to recruit the study subjects. Stratification was based on age (five 10 year age groups) and gender (2 groups) in all the health regions of the country. Based upon proposed methodology of the WHO STEPwise approach a sample size of 196 was calculated for each of these ten strata. To adjust for regional variation, the sample size was inflated to 5,000. A list of all Primary Health Care Centers (PHCCs) in each region was prepared and 10% of these PHCCs were randomly chosen, and were allocated a regional sample proportionate to the size of their catchment population in sampled PHCCs. To identify the households a map of the health center coverage area was used to choose the houses. Each house was assigned a number and a simple random draw was made. Within identified households, a list of all individuals aged 15-64 years was made and the study subject was selected using Kish method.

Data collection:
Tool used:
Data was collected using the WHO STEPwise approach which includes a questionnaire, physical measurements plus biochemical measurements covering tobacco use and other risk factors for the chronic diseases. Data on tobacco use addressed in this communication included current tobacco use. The questionnaire used for data collection was translated into Arabic by a team of physicians, and was back translated to ensure the accuracy of translation. Arabic instrument was pretested on 51 eligible respondents for wording and understanding of the questions, and necessary adjustments were made in the instrument in light of the pretest. The questionnaire includes socio-demographic data, tobacco consumption and data on other diseases and risk factors. The identified subject was interviewed using a questionnaire after obtaining consent. This communication deals only with current tobacco use and includes socio-demographic data.

Data collectors:
Data was collected by 54 males and 54 female data collectors, who work in teams. Each field team was made up of four persons a male data collector, a female data collector, a driver and a female assistant. Data collection teams were supervised by a hierarchy of local supervisor, regional coordinators and national coordinator.

Training of data collectors:
All individuals involved in data collection attended a comprehensive training workshop that included interview techniques, data collection tools, practical applications and field guidelines.

The following definitions were used to describe smoking status:
Tobacco: means any product obtained from leaf of Nicotina Tobacum plant.
Never smoker: Participant who never experimented with tobacco smoking

Ever smoker: Participant who had ever smoked any of tobacco products in the past. Ever smokers are further classified as current smokers and ex smokers.
A current smoker: is someone who at the time of the survey smokes any tobacco product and ex-smoker is someone who doesn't smoke at time of the survey.

The group of current smokers can be further divided into two categories:
Daily smoker: someone who smokes a tobacco product at least once a day (regular smoker) and occasional smoker who smokes but not on a daily basis (irregularly smoker).

Data management and analysis:
Questionnaires collected from the field were reviewed by team leaders assigned to each team before submitting them to the headquarters for data entry. Double entry of the questionnaires was performed using EPI-INFO 2000 software and EpiData software developed by the Menzes centre for validation. After data entry, data cleaning was conducted. New variables were defined by adopting the standard Steps variables (STEPS Data Management Manual, Draft version v1.5, October 2003). Data analysis was conducted for 4,751 participants using SPSS software.

Statistical Analysis:
Descriptive statistics, Chi square test, t-test, Mann Whitney test and ANOVA or Kruskal Wallis were used as appropriate after checking for normality. Level of significance level was set to be < 0.05 throughout the study. The data were processed in SPSS version 17.

Ethical clearance and confidentiality:
The protocol and the instrument of the surveillance were approved by the Ministry of Health, Center of Biomedical Ethics and the concerned authorities in the Kingdom. Informed consent of all subjects was obtained. Confidentiality of data was assured and that data will be used only for the stated purpose of the survey. Further details of the method used and sampling procedures can be found in Saudi Arabia STEPwise document (9, 10).

Results

A total of 4,883 people participated in the study with 97.7% response rate. Final analysis included 4,751 participants after 132 records were excluded because of major deficiencies in the data. There were no significant differences in the socio-demographic characteristics of the excluded participants compared to the included participants.

About 49% of the participants were males. Approximately half of the participants were of age 25 to 44 years (48.2%) and more than half of the participants had attained primary level of education or less (52.2%). About a third of participants have less than 3000 Saudi Riyals as house hold monthly estimated earnings. The overall prevalence of current smoked tobacco was 12.9% with significant gender differences (24.7% males compared to 1.4% females; p < 0.001). There were also significant age, geographical and sociodemographic differences as shown in Table 1. Current smoking was significantly more in age group 25 - 34 years, among higher income earners, residents of the eastern and northern regions, among the unemployed and non-government employees, and among participants with vocational training. Current tobacco smokers are divided into further categories; regular smokers (daily smokers) and occasional smokers. Most current smokers in this study are daily smokers (86%), and only 14% are occasional smokers (Table 2). About three-quarters (72.5%) of daily smokers use manufactured cigarettes with significantly more proportion of males than females (73%, and 53% respectively).

In all the smoking status categories, the proportion of male tobacco users is significantly higher than female tobacco users (Table 2).

The prevalence of current use of smokeless tobacco among the participants was estimated at 1.1% and was more common among males than females, 1.7% and 0.5% respectively. But there was no significant difference. These results are shown in Table 2.

All significant risk factors in univariate analysis were included in a multiple logistic model for predictors of current smoking (Table 3). Significant predictors for current smoking were: Male sex (odds ratio (OR) = 21.037), Younger adults (OR= 1.189), being in the eastern or northern regions (OR= 1.461), and being unemployed (OR= 1.037).

Discussion

This study found that the overall prevalence of current tobacco smokers is 12.9% (24.7% males and 1.4% females) of the total participants. Most current smokers are daily smokers (86%). Smoked tobacco products were the most preferred types for 92% of adult smokers and the rest (8%) preferred smokeless tobacco products. For smoked products 72.5% of smokers prefer manufactured cigarettes.

The prevalence of the current smoking in this study was within the reported ranges in the previous studies in Saudi Arabia, from 11.6-52.3%, but less than the median (22.6%). While the prevalence among males was consistent with the median of the previous studies (26.5%), in females it was obviously less than the median of the previous studies (9%) (7). Studies in other countries such as Iran in agreement with our findings reported prevalence of current smoking as 12.5% (23.4% males and 1.4% females) (11). Lower prevalence was reported from Nigeria, Ghana and Ethiopia (8.0, 8.8%, and 8.3% respectively), while higher prevalence was reported from Libya (27.26%) and Kenya (22.9%,) (6,12,13).

For both types, smoked and smokeless tobacco products, male users were significantly more than females, in agreement with all previous studies in the Kingdom and almost all other communities. (7, 11-16). Underreported

Table 1: Frequency of current tobacco smoking according to participants socio-demographic characteristics

Variable	Total n (%)	Current smoker's n (%)	P-value
Sex			
Male	2335 (49.1%)	577 (24.7%)	< 0.001
Female	2416 (50.9%)	34 (1.4%)	
Total	**4751**	**611 (12.9%)**	
Highest level of education			
Illiterate	1255 (26.5%)	68 (5.4%)	
Primary school completed	1220 (25.7%)	179 (14.7%)	< 0.001
Intermediate school	753 (15.9%)	137 (18.2%)	
Secondary school completed	787 (16.6%)	119 (15.0%)	
College/University completed	607 (12.8%)	83 (13.7%)	
Vocational Training	120 (2.5%)	25 (20.8%)	
Total	**4742 (100%)**	**611 (12.9%)**	
Age Group			
15-24 yrs	1074 (22.6%)	148 (13.8%)	0.018
25-34 yrs	1128 (23.7%)	163 (14.5%)	
35-44 yrs	1165 (24.5%)	155 (13.3%)	
45-54 yrs	841 (17.7%)	95 (11.3%)	
55-64 yrs	543 (11.4%)	50 (9.2%)	
Total	**4751 (100%)**	**611 (12.9%)**	
Main Employment			
Government employee	1368 (28.8%)	294 (21.5%)	
Non-government employee	454 (9.6%)	123 (27.1%)	< 0.001
Self-employed	647 (13.6%)	67 (10.4%)	
Student	1759 (37.1%)	24 (1.4%)	
Retired	307 (6.5%)	44 (14.3%)	
Unemployed	210 (4.4%)	59 (28%)	
Total	**4745 (100%)**	**611 (12.9%)**	
Estimated household earning			
LT 3000	1492 (33.1%)	177 (11.9%)	
3000-<7000	1011 (22.4%)	126 (12.5%	0.019
7000-<10000	1329 (29.5%)	203 (15.3%)	
10000- <15000	443 (9.8%)	48 (10.8%)	
>=15000	229 (5.1%)	37 (16.2%)	
Total	**4504 (100%)**	**591 (13.1%)**	
Regions			
Central Region	1133 (23.8%)	129 (11.4%)	
Eastern Region	706 (14.9%)	110 (15.6%)	0.005
Northern Region	455 (9.6%)	70 (15.4%)	
Southern Region	1000 (21.0%)	105 (10.5%)	
Western Region	1457 (30.7)	197 (13.5%)	
Total	**4751 (100%)**	**611 (100%)**	

Note: There are very few missed data on three variables, income 5%, employment 0.12% and level of education 0.18%

Table 2: shows the smoking status according to the gender

Smoking status	Total	Men	Women	P- value
	No (%)	No (%)	No (%)	
Current daily smokers (Regular)	528 (11.1)	499 (21.4)	29 (1.2)	<0.001
Current occasional smokers	83 (1.7)	78 (3.3)	5 (0.2)	<0.001
Total Current tobacco smokers	611 (12.9)	577 (24.7)	34 (1.4)	<0.001
Current using Smokeless tobacco	53 (1.1)	40 (1.7)	13 (0.5)	0.365
Total Current tobacco users	664 (14.0)	617 (26.4)	47 (1.9)	<0.001
Former daily smokers	585 (12.7)	556 (25.2%)	29 (1.2%)	<0.001
Former used Smokeless tobacco	40 (0.9)	29 (1.3)	11 (0.5)	0.002

Table 3: Multiple logistic regression analysis for predictors of smoking

Variables entered: Age, gender, education, occupation, region, income

	B	S.E.	Wald	df	Sig.	OR*	95.0% C.I.#. for OR	
							Lower	Upper
Region (Eastern /North)	.379	.140	7.302	1	**0.007**	1.461	1.110	1.924
Gender/Male	3.046	.191	254.469	1	**<0.001**	21.039	14.470	30.590
Age (25 -34 Years)	.173	.037	22.137	1	**<0.001**	1.189	1.107	1.279
Occupation (Unemployed)	.036	.021	3.113	1	**0.048**	1.037	.996	1.080
Constant	-2.602-	.243	114.484	1	.000	.074		

OR* = Odds Ratio
C. I.#. = Confidence Interval

tobacco smoking could not be excluded in this study, especially among females, because tobacco consumption is a stigma for women in Saudi Arabia where smoking is socially unacceptable among females.

In addition to gender, age was also associated with smoking with younger adults having a significantly higher prevalence. This agrees with findings of other studies (12,15) but also disagrees with others (17).

Other factors associated with smoking in our study include employment and geographical location. Some studies support the current findings that the higher prevalence rate of tobacco smoking was among the unemployed (18) .The study done in sub-Sahara Africa among 14 nations, support the opposite position that the unemployed smoked less (12). Saudi Arabia is a rich country; even unemployed persons seem to have enough money to buy cigarettes, mostly from other family members, unlike those in sub-Sahara Africa.

Residents of the northern and eastern regions in our study showed a significantly higher smoking prevalence than the other regions. The Northern region is on the border with Jordan and Syria, while the eastern region is on the border with Bahrain, which has a higher adult smoking prevalence (19).

These differences in smoking prevalence according to sociodemographic characteristics may be due to varying sampling procedures, definition of smoking uses, bias in reporting, in addition to real cultural, traditional differences and population characteristics.

Limitations

Estimates for tobacco smoking were based on self-reports and not biochemical tests, so underreport of tobacco smoking was suspected in this study, especially among females.

Conclusion

Unlike adult females, tobacco smoking was highly prevalent among adult males and significant predictors for current smoking were, male sex, younger adults, being in the eastern or northern regions, and being unemployed. Smoking is the most common method of consuming tobacco and cigarette was the most common tobacco product smoked.

Further explanatory research, considering gender differences and finding why females significantly are smoking less was recommended, to control the male smoking epidemic.

This study increases our understanding about the prevalence and correlates of tobacco smoking among adults in Saudi Arabia. This may contribute to the development of an effective smoking cessation and prevention program.

References

1. World Health Organization. World Health Statistics 2011. Geneva: WHO; 2011
2. U.S. Department of Health and Human Services. The Health Consequences of Smoking: A Report of the Surgeon General. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2004 [accessed 2011 Mar 11]. http://www.thriveri.org/documents/4g_health_consequences_smoking.pdf
3. Guindon GE, Boisclair D. Past, current, and future trends in tobacco use. Washington DC: World Bank, 2003. Available at: http://www.1.worldbank.org/tobacco/publications.asp
4. WHO (2007). Gender and Tobacco Control: A Policy Brief, Geneva Available at: www.who.int/tobacco/resources/publications/general/policy_brief.pdf.
5. Mathers CD, Loncar D (2006). Projections of global mortality and burden of disease from 2002 to 2030. PLoS Med., 3: 442.
6. World Health Organization. World Health Statistics 2008. Geneva: WHO; 2008
7. Bassiony MM. Smoking in Saudi Arabia. Saudi Med J. 2009; 30 (7):876-881
8. Al-Nozha MM, Arafah MR, Al-Mazrou YY, Al-Maatouq MA, Khan NB, Khalil MZ, Al-Khadra AH, Al-Marzouki K, Abdullah MA, Al-Harthi SS, Al-Shahid MS, Nouh MS, Al-Mobeireek A. Coronary artery disease, in Saudi Arabia. Saudi Med J. 2004 Sep;25(9):1165-1171
9. Bonita R, de Courten M, Dwyer T, Jamorzik K, Winkelmann R, "Surveillance of risk factors for Non Communicable diseases," The WHO Stepwise approach: WHO, 2001.
10. http:/ /www.who.int / chp / steps / 2005 Saudi Arabia STEPS Report EN.pdf.
11. Alipasha Alipasha Meysamie, Reza Ghaletaki, Mehrdad Haghazali, Fereshteh Asgari, Armin Rashidi, Omid Khalilzadeh, Alireza Esteghamati, Mehrshad Abbasi. Pattern of tobacco use among the Iranian adult population: results of the national Survey of Risk Factors of Non-Communicable Diseases. Tob Control 2010;19:125-128 http://www.dph.gov.my/ncd/surveillance/index.php?
12. Pampel F. Tobacco use in sub-Saharan Africa: Estimates from the demographic health surveys. Soc. Sci. Med. 2008; 66: 1772-1783.
13. R.K.Pal and Ali Grera. Coronary Artery Disease in Africa: Community based study of Risk Factors. : BJMP 2010;3(2):326 (from the journal 6-10)
14. MOH. NCD Surveillance 2005/06: Report on NCD risk factor in Malaysia. Ministry of Health, Malaysia. Available from URL here. (accessed 13 February 2008)
15. Jarallah JS, al-Rubeaan KA, al-Nuaim AR, al-Ruhaily AA, Kalantan KA. Prevalence and determinants of smoking in three regions of Saudi Arabia.. Tob Control. 1999; 8(1):53-56.
16. Sarraf-Zadegan N, Boshtam m. Tobacco use among Iranian men, women, and adolescents. Eur J public Health 2004; 14:76-78)
17. Sibai AM and Hwalla N. WHO STEPS Chronic Disease Risk Factor Surveillance: Data Book for. Lebanon, 2009. American University of Beirut, 2010.
18. Hammarström A, Janlert U. Unemployment. An important predictor for future smoking: a 14-year follow-up study of school leavers. Scand J Public Health. 2003;31(3):229-32.
19. Maziak W, Nakkash R, Bahelah R, Husseini A, Fanous N, Eissenberg T. Tobacco in the Arab world: old and new epidemics amidst policy paralysis. Health Policy Plan. 2014 Sep;29(6):784-94.

Concentrations of Azithromycin and Amoxicillin-Clavulanic acid in patients undergoing tonsillectomy

Nidhal AK Mohammed Ali (1)
Rasha G. Thanoon (2)

(1) Ph.D. Assistant Professor, Department of Pharmacology, College of Medicine, Hawler Medical University.
(2) MSc. Registration Department of Kurdistan Medical Control Agency, Ministry of Health, Kurdistan Region, Iraq

Correspondence:
Nidhal AK Mohammed Ali
Department of Pharmacology
College of Medicine
Hawler Medical University
Tel: +9647504369240
Email: nidhal.mali@med.hmu.edu.iq

Abstract

Background: In treating microbial infections, it is important to choose an antibiotic with appropriate spectrum of activity and one that achieves adequate concentration for a sufficient period of time at the site of infection. This concept becomes necessary when antibiotics fail to cure infection, along with increasing emergence of antimicrobial resistance.

Aim: The aim of the study is to assess the antibacterial activity of two antimicrobial agents indicated in the treatment of tonsillitis; azithromycin and amoxicillin-clavulanic acid.

Methods: A single blind comparative study was conducted on 43 patients with recurrent tonsillitis with mean age of 5.46±2.38 years who were scheduled for tonsillectomy in ENT department, Rizgary Hospital. The patients were allocated randomly into 2 groups. Group 1 patients (n=20) were given azithromycin and group 2 patients (n=23) received amoxicillin-clavulanic acid at the recommended dose for each antibiotic. Bacterial isolation and identification were performed and minimum inhibitory concentrations (MIC) of isolated bacteria were determined. Blood and tonsillar tissue samples were taken from each patient before, and 2 hours after, drug administration. The plasma and tonsillar tissue concentration of each antibiotic were determined.

Results: Staphylococcus aureus was the most predominant organism isolated from the patients. Azithromycin and amoxicillin-clavulanic acid attained mean plasma concentration of 0.27±0.04µg/ml and 5.49±0.33µg/ml respectively and the mean azithromycin concentration in tonsils tissues was 13.97± 2.75µg/g whereas no detectable concentrations of amoxicillin-clavulanic acid were determined in the tonsils tissue of the patients.

Conclusion: Azithromycin achieved higher tissue concentration than amoxicillin-clavulanic acid in tonsils tissues making this antibiotic a good choice for recurrent tonsillitis.

Key words: azithromycin, amoxicillin-clavulanic acid, tonsillitis, pharyngitis, resistance.

Introduction

There are continuous reports relating to failure of antimicrobial therapy to emergence of bacterial resistance (1, 2). This resistance problem markedly encouraged reassessment of antibacterial effectiveness of microbial infections with resistant organisms (3, 4).

Although, Streptococci group A beta-hemolytic (GABHS) is the main cause of pharyngo-tonsillitis (5), other bacteria such as S. aureus, S. pneumoniae, H. influenzae are also isolated (6,7). . Penicillin V is considered the drug of choice for the treatment of GABHS pharyngitis however it is not effective when the infection is caused by beta-lactamase-producing bacteria (8). Amoxicillin is an amino-penicillin with extended spectrum of activity combined with clavulanic acid (Amoxiclav)® to broaden its activity against resistant organisms (8). The semi-synthetic macrolide, azithromycin is effective against a wide variety of bacteria including those causing pharyngo-tonsilitis and is usually reserved for patients who are allergic to Penicillins (8, 9).

Although these antibiotics possess broad spectrum activity that cover most pathogens causing pharyngitis, they are still unsuccessful in preventing recurrences of these infections and 7%-37% of children treated with an appropriate antibiotic are considered bacteriologic failures (9, 10). This problem could be related to either infection with resistant bacteria or failure of drugs to achieve adequate antimicrobial concentrations in the site of infection (2). Therefore, this study was designed to compare the effectiveness of two commercially available antimicrobial agents indicated in the treatment of tonsillitis; azithromycin and amoxicillin/clavulanate by estimating their concentrations in plasma and tonsils tissue of children undergoing tonsillectomy and relate these levels with the minimal inhibitory concentrations (MIC) of the bacteria isolated from the patient's tonsils.

Patients and Methods

The study design was a single blind comparative study that included forty three children aged between 2-14 years of both gender with recurrent tonsillitis who were scheduled for tonsillectomy with no history of allergy to beta-lactams or macrolides antibiotics. Patients with preexisting medical condition that might affect drug pharmacokinetics or requiring perioperative antibiotics (i.e., endocarditis), or with history of antibiotic use within 2 weeks prior to tonsillectomy or with history of significant hematological, renal and hepatic disease, were excluded from the study.

The study was conducted with the approval of the Ethical Committee of the College of Medicine, Hawler Medical University and informed consent was taken from parents of each patient after explaining the study protocol in keeping with the Ethical Committee policy.

The patients were allocated randomly into 2 groups. The children were given the drug suspension by a calibrated syringe so that the volume of suspension given is measured precisely. Group 1 patients (n=23) were given amoxicillin-clavulanic acid (Julmentin®; Julphar, UAE) and azithromycin (Zomzx®; Hikma, Jordan) was given to group 2 patients (n=20). The drugs were given orally a day before and approximately 2 hours before the scheduled time of surgery at the recommended dose of 10 mg/kg for azithromycin and 156mg/5ml (24.96 mg/kg/day) for amoxicillin-clavulanic acid. Before starting medications, sterile swabs were taken from the core of the tonsil of each patient for microbiological isolation of bacteria (11) and thereafter bacteria were identified to the species level by VITEK 2 colorimetric identification card (12). The minimum inhibitory concentration (MIC) of each isolate was determined by broth dilution method according to the National Committee for Clinical Laboratory Standards (13).

Samples from venous blood were taken from each patient before drug administration and at time of operation corresponding to 2 hours after drug administration. The blood samples were collected in heparinized tubes and plasma was obtained by centrifugation of blood samples for 10 minutes. Tonsils were taken at the time of operation at the surgical theatre at times relevant to timing of the blood samples, weighed, wiped gently with dry sterile gauze. Plasma and tonsils samples were immediately stored in deep freeze (-40^{o} C) until analyzed by the microbiological assay method using standard S. aureus ATCC (6538P) sensitive to azithromycin and amoxicillin-clavulanic acid according to (14, 15) respectively.

For the determination of drugs concentrations, drug-free plasma and tonsil samples were spiked with different concentrations of each drug separately. The standard concentrations were analyzed in triplicate along with the samples by the microbiological assay method mentioned above and a standard curve was generated relating the diameter of zone of inhibition (mm) with different concentrations of either drug. Calculations of azithromycin and amoxicillin-clavulanic acid concentrations in plasma and tonsils samples were determined according to (16). The limit of detection for azithromycin and amoxicillin - clavulanic acid in plasma and tonsils were 0.01 µ g/ml and (0.05 µg/g respectively.

SPSS version 19 was used to analyze the differences between different concentrations of the drugs in plasma and tonsils samples. A $P \leq 0.05$ was considered statistically significant difference.

Results

The mean age, weight and distribution of gender of patients enrolled in the study in both treatment groups are shown in Table 1.

Table 1: Demographic characteristics of patients

Patient Characteristic	Amoxicillin-clavulanic acid group (n= 23)	Azithromycin group (n= 20)	Total
Male	15	11	26/43
Female	8	9	17/43
Mean age ± S.D. (years)	5.25 ± 2.13	5.7 ± 2.68	5.46±2.38
Mean body weight ±S.D.(kg)	20.087 ± 4.65	20.8± 6.42	20.42±5.49

The mean age of children was 5.25±2.13 years and 5.7 ± 2.68 year for amoxicillin-clavulanic acid and azithromycin group respectively (Table 1). The children had a mean weight of 20.42 ±5.49 kg and the ratio of distribution of male: female was 1.53:1 (Table 1).

Different microorganisms were isolated from the tonsils taken from the patients and S. aureus was isolated from the majority of the patients (Table 2).

Table 2: Microorganisms isolated from the tonsils of patients in different treatment groups

Microorganism isolated	No. isolated		%
	Amoxicillin-Clavulanic acid group	Azithromycin Group	
Staphylococcus aureus	7	4	27.27
Streptococcus pyogenes	1	1	4.55
Streptococcus mitis	2	3	11.6
Staphylococcus epidermidis	2	3	11.6
Streptococcus sanginus	2	1	7
Streptococcus agalactiae	1	1	4.7
Streptococcus salivarius	2	1	7
Streptococcus intermedius	2	1	7
Staphylococcus lentus	1	1	4.7
Staphylococcus haemolyticus	1	1	4.7
Pseudomonas aurogenosa	1	1	4.7
Proteous mirabilis	1	1	4.7
Granulicatella elegans	1	1	4.7

S. pyogenes isolated from patients was resistant to both amoxicillin-clavulanic acid and azithromycin antimicrobial agents whereas *S. agalactiae* was sensitive to amoxicillin-clavulanic acid but resistant to azithromycin. Four *S. aureus* isolates were sensitive, 2 were intermediately sensitive and only one was resistant to amoxicillin-Clavulanic acid while all four isolates of S. aureus were resistant to azithromycin antimicrobial agent as shown in Table (3).

Table 3: Susceptibilities of different micro-organisms isolated from tonsils of the patients to amoxicillin-clavulanic acid and azithromycin

Microorganism	Amoxicillin- Clavulanic acid No. cases / MIC (µg/ml)			Azithromycin No. cases/ MIC (µg/ml)		
	Sensitive	Intermediate	Resistant	Sensitive	Intermediate	Resistant
S. pyogenes	-	-	1(0.5)	-	-	1 (16)
S. agalactiae	1 (0.125)	-	-	-	-	1 (4)
S. aureus	4 (2)	2 (4)	1 (8)	-	-	4 (4)

The mean concentrations of amoxicillin-clavulanic acid and azithromycin in plasma were 5.49± 0.33µg/ml and 0.27 ± 0.04µg/ml respectively. In the tonsils, the mean concentrations of azithromycin was 13.97 ± 2.75 µg/g whereas no detectable concentrations were determined for amoxicillin-clavulanic acid in tonsils according to the limit of detection of the assay (Table 4).

Table 4: The mean concentration of Amoxicillin-clavulanic group and Azithromycin in plasma and tonsils tissue

Amoxicillin-clavulanic group		Azithromycin group	
Plasma Concentration (µg/ml)	Tonsillar Concentration (µg/g)	Plasma Concentration (µg/ml)	Tonsillar Concentration (µg/g)
5.49 ± 0.33	0.0 ± 0.0	0.27 ± 0.04	13.97 ±2.75

Discussion

To obtain an effective clinical response to antimicrobial therapy, the drug should reach effective concentration at the site of infection greater than the MIC of the causative organisms (3, 4).

S. aureus was the most predominant organism (27.27%) isolated from the patients in the present study and has also been reported in other studies as the most predominant pathogen isolated from children with recurrent tonsillitis (6, 11). *S. pyogenes* was only isolated from 2 patients (4.55%) in the present study, which is also in accordance to other findings (11, 17). Another study stated that among a total of 294 children with acute tonsillitis, Group A streptococci was isolated only from three children (18).

The mean plasma amoxicillin concentration (5.49±0.33 µg/ml) estimated in the plasma of the patients, indicates that amoxicillin is well absorbed into systemic circulation. Indeed amoxicillin has high oral bioavailability (70-90%) with peak plasma levels occurring within 1 to 2 hours (19-21). This mean plasma levels (5.49 µ g/ml) is close to those determined (4.7 µ g/ml) in children (22) although higher peak concentration of 7.32 µg/ml and 10.8 µg/ml was detected 2 hours in adult volunteers given amoxicillin-clavulanic acid at a dose similar to those administered in the present study (20,21). The differences in the concentrations is most likely related to differences in the drug formulations, amount of dose given or to the analytical method of analysis. Based on recommendations of therapeutic effectiveness of beta-lactams in humans and experimental studies; the concentrations of antibiotic is required to be four to five times the MIC or higher when associated with improved outcome especially with resistant strains (23,24) thus, although levels of amoxicillin-clavulanic acid in plasma were higher than the MICs of the isolated species, this antibiotic did not attain effective concentrations in the site of infection (tonsils) to eradicate the resistant organisms (24). The *S. pyogenes* that was isolated from the patients was considered resistant according to the breakpoint therefore this antibacterial agent would not provide an effective treatment especially in recurrent cases with resistant organisms.

Furthermore, although plasma concentrations are generally a good indicator of drug effectiveness they are usually a poor indicator of intracellular concentrations, which is of major importance for intracellular pathogens including *S. aureus* as well as *S. pyogenes* that are also shown to be intracellular pathogen of tonsils (25, 26). One of the properties that characterize β-lactams including amoxicillin is that they are weak acids and quickly diffuse into cells and because the cell cytosol is more acidic than extracellular milieu they will be more in unionized form so they are prevented from accumulating in the cells and will readily be absorbed to systemic circulation (27, 28). Studies recommended administering amoxicillin-clavulanic acid at higher dose are based on their finding that one high dose of amoxicillin-clavulanic acid would inhibit the biofilm formed in the tonsillar tissue therefore exposing the bacteria to effective treatment since recurrent pharyno-tonsillitis and failure of treatment has been attributed to biofilm formation (29, 30).

Concerning azithromycin, the mean plasma concentrations of (0.27 ± 0.04 µg/ml) is close to those reported (0.24 µg/ml) in children receiving 30 mg azithromycin (31). However, lower concentrations in plasma (0.18 µ g/ml) were estimated by (32) and 0.13 µg/ml by (33). These differences are related to differences in dosing, different drug formulations and method of drug analysis. The mean azithromycin concentrations (13.96 ± 2.75 µg/g) in tonsillar tissues indicate this drug undergoes rapid uptake from systemic circulation into the infection site thus exposing the local compartment (tonsils) to azithromycin concentrations higher than plasma levels. High ratio of azithromycin concentration in tonsils to that in plasma was also reported and shown to be greater than plasma concentrations by many fold for all time intervals after administration (15, 33).

One of the remarkable features of azithromycin is its ability to accumulate in intracellular compartments, mainly in fibroblasts, phagocytic cells, and other white blood cells (34). This prominent character is explained by its dibasic molecular structure that allows azithromycin to be concentrated within the acidic lysosomes of white blood cells due to an ion-trapping mechanism from where it will be released very slowly from intracellular compartments (35). This characteristic is believed to account for the prolonged drug concentrations in tissues which are reported to persist long after the end of therapy and reflected by a long elimination half-life of up to 5 days (36).

In conclusion; although amoxicillin-clavulanic acid is clinically considered more effective against beta-lactamase producing organisms and is the most frequently prescribed antibiotic for such infection (9,37) azithromycin's good tissue penetration, once daily administration, besides its immunomodulatory effects provides further benefits along with its dual antibacterial mode of action (38, 39) and makes this antibiotic a good choice when the standard penicillin V therapy of tonsilo-pharyngitis fails. Furthermore, the consequences of the low amoxicillin-clavulanic acid levels in tonsils might lead to potentially negative effects on clinical response and emergence of resistances (40).

References

1- Huttner A, Harbarth S, Carlet J, Cosgrove S, Goossens H, Holmes A, et al. Antimicrobial resistance: a global view from the 2013 World Healthcare-Associated Infections Forum. Antimicrob Resist Infect Control. 2013; 2:31- 41.

2- Llor C, Bjerrum L. Antimicrobial resistance: risk associated with antibiotic overuse and initiatives to reduce the problem. Ther Adv Drug Saf. 2014; 5(6): 229- 41.

3- Thabit AK, Crandon JL, Nicolau DP. Antimicrobial resistance: impact on clinical and economic outcomes and the need for new antimicrobials. Expert Opin Pharmacother. 2015; 16(2):159-77.

4- Ventola CL. The antibiotic resistance crisis: part 1: causes and threats. P T. 2015; 40(4):277-83.

5- Michael R. Wessels, M.D. Streptococcal Pharyngitis. N Engl J Med, 2011; 364:648-55.

6- Zautner AE, Krause M, Stropahl G, Holtfreter S, Frickmann H, Maletzki C, et al. Intracellular Persisting Staphylococcus aureus is the Major Pathogen in Recurrent Tonsillitis. PLos One. 2010; 5(3): e9452.

7- Alasil S, Omar R, Ismail S, Yusof MY, Ameen M. Bacterial identification and antibiotic susceptibility patterns of Staphyloccocus aureus isolates from patients undergoing tonsillectomy in Malaysian University Hospital. Afr J Microb Res. 2011; 5(27): 4748-52.

8- Shulman ST, Bisno AL, Clegg HW, Gerber MA, Kaplan EL, Lee G, et al. Clinical practice guideline for the diagnosis and management of group A streptococcal pharyngitis: 2012 update by the Infectious Diseases Society of America. Clin Infect Dis. 2012; 55(10): 1279-82.

9- Regoli M, Chiappini E, Bonsignori F, Galli L, de Martino M. Update on the management of acute pharyngitis in children. Ital J Pediatr. 2011; 37:10-17.

10- Aalbers J, O'Brien KK, Chan WS, Falk GA, Teljeur C, Dimitrov BD, Fahey T. Predicting streptococcal pharyngitis in adults in primary care: a systematic review of the diagnostic accuracy of symptoms and signs and validation of the Centor score. BMC Med. 2011; 9:67-78.

11- Babaiwa UF, Onyeagwara NC Akerele JO. Bacterial tonsillar microbiota and antibiogram in recurrent tonsillitis. Biomedical Research. 2013; 24 (3): 298-302.

12- Wallet F, Loiez C, Renaux E, Lemaitre N, Courcol RJ. Performances of VITEK 2 colorimetric cards for identification of gram-positive and gram-negative bacteria. J Clin Microbiol. 2005; 43(9):4402-06.

13- Clinical and Laboratory Standards Institute. Performance Standards for Antimicrobial Susceptibility Testing; Twenty-First Informational Supplement. Wayne, PA. USA. 2012; 32 (3): M100-S22.

14- Davies BE, Boon R, Horton R, Reubi,FC, C E Descoeudres CE. Pharmacokinetics of amoxycillin and clavulanic acid in haemodialysis patients following intravenous administration of Augmentin. Br. J. clin. Pharmac. 1988; 26: 385-90.

15- Blandizzi C, Malizia T, Batoni, G, Ghelardi E, Baschiera F, Paolo Bruschini P, et al. Distribution of Azithromycin in Plasma and Tonsil Tissue after Repeated Oral Administration of 10 or 20 Milligrams per Kilogram in Pediatric Patients. Antimicrob Agents Chemother. 2002; 46(5): 1594-96.

16- Jusko, WJ. Guidelines for collection and analysis of pharmacokinetic data. In: Shargel L, Wu-Pong S, Yu A, editors. Applied Biopharmacetics and Pharmacokinetics, New York: McGraw-Hill; 2005: 8-27.

17- Devi U, Borah PK, Mahanta J. The prevalence and antimicrobial susceptibility patterns of beta-hemolytic streptococci colonizing the throats of schoolchildren in Assam, India. J Infect Dev Ctries 2011; 5(11):804-08.

18- Hsieh TH, Chen PY, Huang FL, Wang JD, Wang LC, Lin HK, et al. Are empiric antibiotics for acute exudative tonsillitis needed in children? J Microbiol Immunol Infect. 2011; 44: 328-32.

19- Navarro SA. New formulations of amoxicillin/clavulanic acid: a pharmacokinetic and pharmacodynamic review. Clin Pharmacokinet. 2005; 44(11):1097-115.

20- Mostafavi SA, Dormiani K, Khazaie Y. Pharmacokinetics of Amoxicillin/clavulanic acid after oral administration

of new suspensions formulation in human volunteers. International J Pharmacology. 2007; 3(3): 265-69.
21- Kaur, RAO R, Nanda S. Amoxicillin: A broad spectrum antibiotic. Int J Pharm Pharm Sci. 2011; 3 (3): 30-37.
22- Averono G, Vidali M, Olina M, Basile M, Bagnati M, Bellomo G, Aluffi P. Evaluation of amoxicillin plasma and tissue levels in pediatric patients undergoing tonsillectomy. Int J Pediatr Otorhinolaryngol. 2010; 74(9):995-98.
23- Andes D, Craig WA. In vivo activities of amoxicillin and amoxicillin-clavulanate against Streptococcus pneumoniae: application to breakpoint determinations. Antimicrob Agents Chemother. 1998; 42: 2375-79.
24- Haeseker M, Havenith T, Stolk L, Neef C, Bruggeman C, Verbon A. Is the standard dose of amoxicillin-clavulanic acid sufficient? BMC Pharmacol Toxicol. 2014; 15: 38-46.
25- Fraunholz M, Sinha B. Intracellular Staphylococcus aureus: live-in and let die. Front Cell Infect Microbiol. 2012; 2:43- 50.
26- Fischetti VA, Dale JB. One More Disguise in the Stealth Behavior of Streptococcus pyogenes. mBio. 2016; 7(3): e00661-16.
27- Jensen A, Fago-Olsen, H, Sørensen CH, Kilian M. Molecular Mapping to Species Level of the Tonsillar Crypt Microbiota Associated with Health and Recurrent Tonsillitis. Plos One. 2013; 8(2): e56418.
28- Yamanaka, N. Moving towards a New Era in the Research of Tonsils and Mucosal Barriers. Adv Otorhinolaryngol. 2011; 72: 6-19.
29- Roberts AL, Connolly KL, Kirse DJ, Evans AK, Poehling KA, Peters TR, et al. Detection of group A Streptococcus in tonsils from pediatric patients reveals high rate of asymptomatic streptococcal carriage. BMC Pediatrics. 2012; 12: 3-11.
30- Alasil SM, Omar R, Ismail S, Yusof MY, Dhabaan GN, Abdulla MA. Evidence of Bacterial Biofilms among Infected and Hypertrophied Tonsils in Correlation with the Microbiology, Histopathology, and Clinical Symptoms of Tonsillar Diseases. Int J Otolaryngol. 2013; 2013:408238.
31- Liu P, Fang, AF, LaBadie RR, Crownover PH, Arguedas AG. Comparison of Azithromycin Pharmacokinetics following Single Oral Doses of Extended-Release and Immediate-Release Formulations in Children with Acute Otitis Media. Antimicrobial agents and chemotherapy. 2011; 55(11): 5022-26.
32- Danesi R, Lupetti A, Barbara C, Ghelardi E, Chella A, Malizia T, et al. Comparative distribution of azithromycin in lung tissue of patients given oral daily doses of 500 and 1000 mg. J Antimicrob Chemother. 2003; 51(4): 939-45.
33- Baschiera F, Fornai M, Lazzeri, G, Blandizzi C, Bruschinin P, Tacca MD. Improved tonsillar disposition of azithromycin following a 3-day oral treatment with 20 mg kg-1 in paediatric patients. Pharmacol Res. 2002; 46(1): 95-100.
34- Amsden GW. Advanced-generation macrolides: tissue-directed antibiotics. Int J Antimicrob Agents. 2001; 18 (S1): S11-15.
35- Hand WL, Hand DL. Characteristics and mechanisms of azithromycin accumulation and efflux in human polymorphonuclear leukocytes. Int J Antimicrob Agents. 2001; 18(5):419-25.
36- Bosnar M, Kelneric Z, Munic V, Erakovic V, Parnham MJ. Cellular uptake and efflux of azithromycin, erythromycin, clarithromycin, telithromycin, and cethromycin. Antimicrob Agents Chemother. 2005; 49(6): 2372-77.
37- Mollahaliloglu S, Alkan A, Donertas B, Ozgulcu S, Akici A. Assessment of antibiotic prescribing at different hospitals and primary health care facilities. Saudi Pharm J. 2013; 21 (3): 281-91.
38- Jelic D, Antolovic R. From Erythromycin to Azithromycin and New Potential Ribosome-Binding Antimicrobials. Antibiotics. 2016; 5(3): E29.
39- Kanoh S. & Rubin BK. Mechanisms of Action and Clinical Application of Macrolides as Immunomodulatory Medications. Clin. Microbiol. Rev. 2010; 23, 590-615.
40- Taccone FS, Laterre PF, Dugernier T, Spapen H, Delattre I. Insufficient beta-lactam concentrations in the early phase of severe sepsis and septic shock. Crit Care. 2010; 14:R126.

Influence of Elderly parent on family dynamics: results of a survey from Karachi, Pakistan

Waris Qidwai (1)
Imdad Ali Khushk (2)
Sabrina Allauddin (3)
Kashmira Nanji (4)

(1) Dr Waris Qidwai
Professor and Chairman
Department of Family Medicine
The Aga Khan University
Karachi Pakistan

(2) Dr Imdad Ali Khushk
MBBS, MSPH, MBA
Pakistan Medical & Dental Council
Islamabad

(3) Sabrina Allauddin
Medical Student
Dow University of Health Sciences
Karachi Pakistan

(4) Kashmira Nanji
Epidemiologist
Aga Khan University, Karachi 74800, Pakistan

Correspondence:
Dr. Waris Qidwai
MBBS, MCPS (FM), FCPS (FM), FRCGP (INT), FCGP(SL), MFPH(UK)
The Tajuddin Chatoor
Professor and Chairman
Department of Family Medicine
Service Line Chief, Family Health
Aga Khan University, Karachi
Stadium Road, PO Box: 3500
Karachi-74800, Pakistan
Tel: 92-21-3486-4842 (Office) 92-3332317836 (Cell)
Fax: 92-21-3493-4294
Email: waris.qidwai@aku.edu

Abstract

Background: The current and projected increase of the elderly population has raised concerns about the financial, social, and emotional support for the elderly. The objective of this study was to explore the level(s) to which elderly individuals had an influence in important family matters and daily life activities.

Methods: A cross-sectional study was carried out in a tertiary care hospital of Karachi, Pakistan through convenience sampling during August to October 2014. The individuals who were > 35 years and had an elderly parent (> 65 years) were included. A pretested structured questionnaire was used for data collection. Analysis was done using SPSS 19.0. Logistic regression analysis was used to identify the reasons for appreciating elderly parent's influence in daily lives of study participants.

Results: A total of 200 study participants' information was included. About 35% of the participants were between 35 to 40 years of age and there was preponderance of females (68%) in the study. The majority (81%) of the participants responded that their parents have an influence on their family matters. Parents' experience (OR: 2.5; 95% CI: 1.1-5.4), wisdom (OR: 2.1; 95% CI: 0.9-4.6) and respect (OR: 1.2; 95% CI: 0.6-2.5) are some of the factors in which participant(s) are influenced by their elderly parents.

Conclusion: The study reveals that children respect their elders' decision(s) and appreciate their influence in family matters. The elders should let children take their own decisions and become autonomous. Children on the other hand should give respect to their elders and should involve them in family decisions.

Key words: elderly; geriatrics; family decisions; family matters; family system; family dynamics; social support

Introduction

Family is a fundamental unit of any society. In recent times, this unit has adjusted itself to new challenges by changing its functions to cope with new realities. The emergence of the modern generation in a quickly changing world is an illustrative example of it (1). Besides, the advances in the field of medicine over the past 50 years have led to an increase in the average lifespan of the population and in the developing world; ageing issues have only recently begun to emerge as a cause of concern(2). World Health Organization reports that approximately six percent of the population was aged over 60 years in 1998, however, it will be almost doubled by 2025(3). This is because of the rise in the life expectancy; which has increased in the last three decades.(4).

As population ages there are many potential problems that can affect the mental status and overall health of the elderly(5). Although, health problems are considered to be the fundamental part of the aging process, the elderly face major challenges in social as well as economic aspects(5,6). The increase in world elderly population has raised concerns about the financial, social, and emotional support for the elderly(7). Since change occurs in the elderly's socio-economic status, the power to make decision(s) transfers from the parents to the younger generation(8,9). Due to this, the social position of elderly within the family is compromised(8). It is important to discuss the role of elderly population in this modified family system. Moreover, the level to which they would be involved in family matters in the future is also questionable.

Sociologists have been debating the role of elderly in the present society, wherein the family structure has changed from extended/joint to nuclear family system.(10) This change has led to a gap between the young generation and their grandparents; who had earlier played a distinctive role in traditional education of the children and decisions in family matters(11). Therefore, it is important to identify the factors and their extent for such changes.

Family systems in Asia vary considerably. However, this new framework is now applicable to both developed and developing countries(12). The objective of this study was to examine the extent to which seniors can influence the decisions made in the family. It is one of the indicators of assessing the social status of elderly. However, it is a very important aspect to discuss for the future role of elderly in families.

Methods

Study Setting and Participants:
A cross-sectional survey was conducted from August to October 2014 in a tertiary care hospital of Karachi, which is the largest, most populous and cosmopolitan city of Pakistan. Those individuals aged above 35 years and who had an elderly parent (> 65 years) were recruited for study through convenience sampling.

Consent
Written informed consent was taken from the study participants after the study protocol had been explained to them. Assurance with regards to confidentiality was provided to the participants. The study was reviewed and

permitted by the departmental research committee of the Aga Khan University.

Questionnaire and Data Collection:
The interviews were questionnaire based. The initial questionnaire was developed in English which was later translated into Urdu, the national language, for clear understanding of the participants. The questionnaire was pre-tested on 10 individuals and it was revised based on the findings of the pre-test. The data collectors were trained before data collection to eliminate interviewer bias. The questionnaire comprised 2 sections beginning with the demographic details of the study participants. The second section of the questionnaire was about the extent of family matters influenced by elders; if it has a positive or a negative impact on the lives of the study participants. The extent of the influence of elderly was categorized into three levels i.e. low, medium and high.

Statistical Analysis:
Data was double entered and analyzed through SPSS 19.0. Proportions were calculated and chi-square test was used for assessing the different levels of influence. Logistic regression analysis was used to identify the reasons due to which the study participants were influenced by elderly parents. All the analysis was two-tailed and a p-value of 0.05 was considered statistically significant. Results are reported in the form of proportions, odds ratio and their corresponding 95% confidence intervals.

Results

A total of 200 study participants' information was included in the final analysis. The baseline characteristics of the study participants are presented in **Table 1**. Over one-third of the participants (35%) were between 35 to 40 years of age and 45.5% were more than 45 years of age. There was a preponderance of females in the study sample (68%). About 70% of the participants had more than 12 years of education and three-quarters of the participants (75%) were employed. Approximately 77% of the participants had their parents living with them and 46% of the participants lived with both the parents. The majority (81%) of the participants responded that their parents have an influence on their family matters.

Table 2 (page 20) presents the level of parents' influence on different aspects of daily living. The participants responded that they felt the highest level of influence from parents in day to day activities of daily living (77.3%, P=0.001), followed by influence in household matters (76.1%, P=0.001). Likewise, regarding influence on religious beliefs and practices, 53.4% of the participants responded that their parents have high influence in religious issues. The lowest degree of influence by parents was felt on health related matters (31.5%).

The majority of the participants (87.7%) responded that the influence of elderly parents is favorable to them (**Table 3,** page 21). Moreover, 68.5% of the spouses considered the influence of elderly parents as positive. Approximately 81.5% of the parents are happy with the influence they have on their families while 80% of the participants mentioned that the reason for accepting parents influence on their lives is parents' experience. In addition, 50.6% of the participants accepted parents' influence because of the respect they have for their parents.

The majority of the participants (84.6%) responded that they take parents' advice on family matters and 70% of their decisions are in accordance with the modern times. The participants also mentioned that they along with their spouses cannot take better decisions without input from the elderly parents. **Figure 1** (page 22) depicts the reasons for accepting elderly parents influence in daily lives. The study participants responded that parents' experience (OR: 2.5; 95% CI: 1.1-5.4), parents' wisdom (OR: 2.1; 95% CI: 0.9-4.6), parents' respect (OR: 1.2; 95% CI: 0.6-2.5) and at times parents' financial position (OR: 1.9; 95% CI: 0.4-8.9) are some of the factors by which they are influenced by their elderly parents.

Discussion

The joint family is an ancient institution of the sub-continent. Several generations living together is the ideal living arrangement where elders are being taken care of and their opinion is sought for every decision in family related matters, but it has undergone some changes in the late twentieth century.

The prominent feature of the joint family system was that the elderly person in the family was recognized by their leader who has been considered as someone having a firm grip keeping the entire family together with a strong foundation of morals and values. In addition to holding a sole authoritative place in the decision regarding major and minor family matters, their advice and guidance was also considered irreplaceable. The continuous and growing impact of urbanization, secularization, and Westernization, has however, made a significant impact on the family systems, both in terms of structure as well as decision-making. The societies and families in Pakistan have been distinguished for their cultural values and lifestyles since centuries(10). In the current study, 46% of the participants had both of their parents living with them.

This study assessed the level of the impact elders have on family. It has been documented that in a joint family, the family has been more dependent on the decision-making powers of the elderly members of the family as compared to the ones who are living separate from their parents and almost all the areas of their lives have been contributed to by them(4,5). Though in an opinion of a minor group, the contribution given by the elderly members of the family is appreciated, the younger group of the family ends up in difference of opinions and perceptions(13,14).

People's perception of the aging process varies from culture to culture, for instance, aging can be regarded as an unwanted phenomenon in one culture; and in another it can be a mark for wisdom, survival, and eminence (15,16).

Table 1: Baseline characteristics of study participants (n=200)

Variable	N	%
Age		
35 to 40 years	70	35
41 to 45 years	39	19.5
More than 45 years	91	45.5
Marital Status		
Single	32	16
Married	168	84
Gender		
Male	64	32
Female	136	68
Level of Education		
Less than 12 years of education	59	29.5
More than 12 years of education	141	70.5
Employment Status		
Employed	150	75
Unemployed	50	25
Parents living with you		
Yes	154	77
No	46	23
If YES then specify		
None	46	23
Either mother / father	62	31
Both	92	46
Parents influence on family matters		
Yes	162	81
No	38	19

In this study, upon enquiring about reasons for favoring the influence of elders in family matters, a vast majority of the subjects pointed out that the elders have more experience in dealing with daily life issues (OR: 2.5; 95% CI: 1.1-5.4), and better ways of solving problems (OR: 2.1; 95% CI: 0.9-4.6).

The study participants also responded that respect of the elderly is another factor for accepting the parents' influence. A considerable proportion of the families considered that the elderly affected their lives in a good way and they have a better approach to the issues regarding family matters.

In Asian families, elderly are considered to be a source of inspiration and are looked upon as a primary source of guidance(17,18). After retirement, there is a drastic change in the lifestyle of an elderly characterized by sudden loss of income, which leads to an abrupt transition from head of the family to an inactive member in decision-making, and consequently leads to low self-image and depression (17,19,20). On the contrary, in this study, the majority of the participants responded that not only they but their spouse also respects the decision of the elderly family member. However, we could not cross-validate the findings with the elderly family member(s).

Table 2: Level of parents' influence on different aspects of daily activities

Variable	Total (n=162)	Low influence N (%)	Medium influence N (%)	High influence N (%)
Influence on finance (P= 0.56)	90 (56)	10 (47.6)	28 (52.8)	52 (59.1)
Influence on personal matters (P= <0.001)	93 (57.4)	9 (42.9)	26 (49.1)	61 (69.3)
Influence on social life (P= 0.016)	96 (59.3)	9 (42.9)	26 (49.1)	61 (69.3)
Influence on religious beliefs and practices (P= 0.039)	72 (44.4)	8 (38.1)	17 (32.1)	74 (53.4)
Influence on decision regarding children and their lives (P= 0.495)	81 (50)	8 (38.1)	28 (52.8)	45 (51.1)
Influence on house matters (P= 0.001)	110(67.9)	7 (33.3)	36 (67.9)	67 (76.1)
Influence on food cooked and eaten at home (P= 0.002)	83 (51.2)	6(28.6)	21 (39.6)	56 (63.6)
Influence on family health matters (P= 0.624)	51 (31.5)	7 (33.3)	14 (26.4)	30 (34.1)
Parents influence your day to day activities (P= 0.001)	105(64.8)	9 (42.9)	28 (52.8)	68 (77.3)

In this study, 76.1% of the participants responded that they feel high severe influence of their parents in the actions of daily living. This can be disturbing on part of the children as in today's world male and females both are working to make their ends meet and they need to make certain decisions that they are capable of doing because of the changes in life style and other norms of the society(7,21,22). A relatively smaller group of the participants pointed out that their lives have been less influenced by the elders and they are of the opinion that family matters are handled in a better way by their own decision-making powers for their family(21, 23). Therefore, the elderly parents should allow a certain degree of freedom to their children to take decisions at least regarding activities of daily living (1,8,24).

This study had certain limitations. Firstly, the data was collected from a tertiary care hospital and so the results might not apply to the general population. Moreover, in the study, we inquired about parents influence from their children but we did not include parents' perspective. Therefore, future studies on this issue are warranted to include perspective of participants from different parts of Pakistan and also the population living in rural areas, so as to further understand and obtain views of both i.e. children and their parents.

Conclusion

The study reveals that children respect their elders' decisions and appreciate their influence in family matters. In addition, they look up to their elders because of their experience and better approach in solving problems. However, it is essential to achieve a balance for harmony in families, both from elderly parents and their children. Both the groups should realize their boundaries and limitations. The elders should give space and freedom to their children so that they can be autonomous and are prepared for the future. Children on the other hand should give proper care, respect to their elders and should involve them in family decisions so that they do not feel worthless.

References

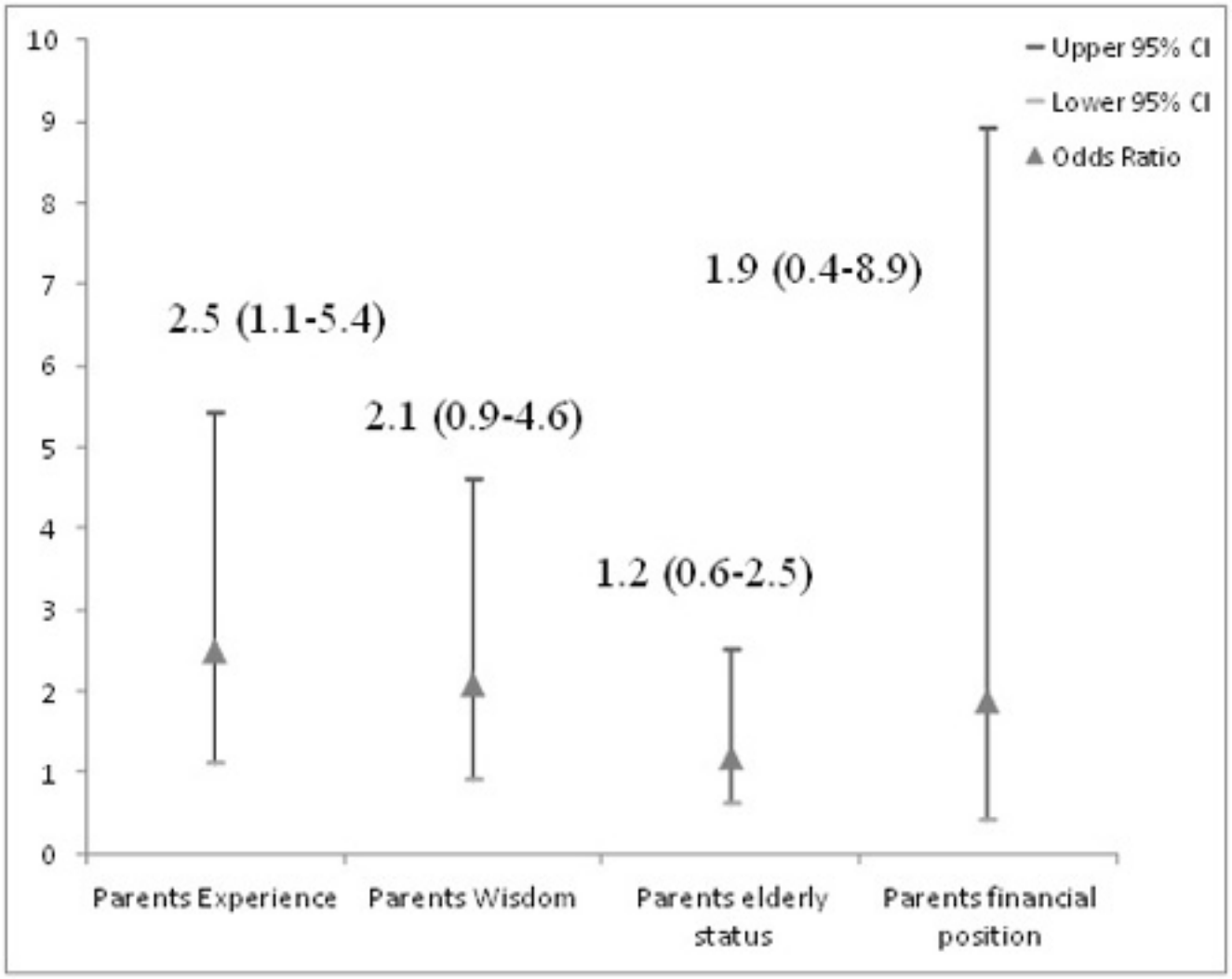
1. Li H, Ji Y, Chen T. The roles of different sources of social support on emotional well-being among Chinese elderly. PloS one. 2014;9(3):e90051.
2. Bowling A, Browne PD. Social networks, health, and emotional well-being among the oldest old in London. Journal of gerontology. 1991;46(1):S20-S32.
3. Cantor MH. Family and community: Changing roles in an aging society. The gerontologist. 1991;31(3):337-46.

Table 3: Parental influence and factors considered favorably by study participants (n=200)

Variable	Total (n=162)	Low influence N (%)	Medium influence N (%)	Severe influence N (%)
Influence considered favorable by you	142 (87.7)	17 (81)	46 (86.8)	79 (89.8)
Influence considered favorable by your spouse	111(68.5)	16 (76.2)	42 (79.2)	53 (60.2)
Influence considered favorable by your children	66 (40.7)	7 (33.3)	29(54.7)	30(34.1)
Parents happy with influence they have	132 (81.5)	14 (66.7)	41(77.4)	77 (87.5)
Parents experience makes you appreciate their decisions	129 (79.6)	15 (71.4)	40 (75.5)	74 (84.1)
Parents wisdom makes you appreciate their decisions	70 (43.2)	6 (28.6)	25 (47.2)	39 (44.3)
Parents elderly status makes you appreciate their decisions	82 (50.6)	13 (61.9)	27 (50.9)	42 (47.7)
Parents financial position makes you appreciate their decisions	16 (9.9)	2 (9.5)	8 (15.1)	6 (6.8)
Asking your parents advice for family matters	137 (84.6)	15 (71.4)	46 (86.8)	76 (86.4)
Is their input in accordance with modern times	113 (69.8)	15 (71.4)	34 (64.2)	64 (72.7)
You and your spouse can better decisions without their input	64 (39.5)	14 (66.7)	21 (39.6)	29 (33.3)
The influence affecting your quality of life	31 (19.1)	17 (81)	38 (71.7)	76 (86.4)

4. Prince MJ, Harwood RH, Blizard R, Thomas A, Mann AH. Social support deficits, loneliness and life events as risk factors for depression in old age. The Gospel Oak Project VI. Psychological medicine. 1997;27(02):323-32.
5. Siu O-L, Phillips DR. A study of family support, friendship, and psychological well-being among older women in Hong Kong. The International Journal of Aging and Human Development. 2002;55(4):299-319.
6. Thompson MG, Heller K. Facets of support related to well-being: quantitative social isolation and perceived family support in a sample of elderly women. Psychology and aging. 1990;5(4):535.
7. Kendig HL, Coles R, Pittelkow Y, Wilson S. Confidants and family structure in old age. Journal of gerontology. 1988;43(2):S31-S40.
8. Pinquart M, Sörensen S. Influences of socioeconomic status, social network, and competence on subjective well-being in later life: a meta-analysis. Psychology and aging. 2000;15(2):187.
9. Zarit SH, Reever KE, Bach-Peterson J. Relatives of the impaired elderly: correlates of feelings of burden. The gerontologist. 1980;20(6):649-55.
10. Taqui AM, Itrat A, Qidwai W, Qadri Z. Depression in the elderly: Does family system play a role? A cross-sectional study. BMC psychiatry. 2007;7(1):57.
11. Rubenstein RL. The role of grandparents in the psychological development of children: a cross-cultural study 2015. Doctoral Dissertation.
12. Lu L. Social Support, Reciprocity, and Well-Being. The Journal of social psychology. 1997;137(5):618-28.
13. Mullins LC, Mushel M. The Existence and Emotional Closeness of Relationships with Children, Friends, and Spouses The Effect on Loneliness among Older Persons. Research on Aging. 1992;14(4):448-70.
14. Antonucci TC, Birditt KS, Sherman CW, Trinh S. Stability and change in the intergenerational family: A convoy approach. Ageing and Society. 2011;31(07):1084-106.
15. Yi Z, Wang Z. Dynamics of family and elderly living arrangements in China: New lessons learned from the 2000 census. China Review. 2003:95-119.
16. Wellman B, Wortley S. Brothers' keepers: Situating kinship relations in broader networks of social support. Sociological perspectives. 1989;32(3):273-306.
17. Chou K-L, Chi I. Reciprocal relationship between social support and depressive symptoms among Chinese elderly. Aging & Mental Health. 2003;7(3):224-31.
18. Adams RG, Blieszner R. Aging well with friends and family. American Behavioural Scientist. 1995;39:209-24.
19. Shanas E. The family as a social support system in old age. The gerontologist. 1979;19(2):169-74.
20. Agneessens F, Waege H, Lievens J. Diversity in social support by role relations: A typology. Social networks. 2006;28(4):427-41.

Figure 1: Reasons for appreciating elderly parents' influence in daily lives



21. Ducharme F, Couture M, Lamontagne J. Decision-making process of family caregivers regarding placement of a cognitively impaired elderly relative. Home health care services quarterly. 2012;31(3):197-218.
22. Colombo F, Aroldi P, Carlo S. "Stay Tuned": The Role of ICTs in Elderly Life. Health Technology And Informatics 203. 2014:145.
23. Mullins LC, Johnson DP, Andersson L. Loneliness of the elderly: The impact of family and friends. Journal of Social Behavior & Personality. 1987.
24. Litwin H. Social network type and morale in old age. The gerontologist. 2001;41(4):516-24.

Leadership in Postgraduate Family Medicine Training Programs: A "Steps-Model" Implementation in Eastern Province-MOH Saudi Arabia

Abdullah Dukhail AL-Khathami

Correspondence:
Dr. Abdullah Dukhail AL-Khathami,
MBBS, ABFM, FFCM, MSc Med Edu (Cardiff-UK), DTQM, Diploma/MSc PMHC (Nova-Lisbon)
Consultant Family and Community Medicine-Medical Education
Director, Postgradute Family Medicine Program in Eastern Province-MOH
Chairman, Primary Mental Health Care Programs-MOH
CBAHI - Primary Care Surveyor
Vice-Chair, WONCA- Working Party on Mental Health-EMRO
Email: mabna@yahoo.com

Abstract

Leadership in Family Medicine/ Primary Health Care, including training of postgraduates in this discipline, is essential to favorably impact training, as well as patient related health care outcomes.

In the Eastern province of Saudi Arabia, a step model leadership approach has been utilized to achieve targets set for training of postgraduates in Family Medicine training program, in same time it also has been utilized in the primary mental health program in Eastern Province-MOH.

Step model leadership initiative is a transformational leadership that involves three steps. Step one essentially is based on a managerial role where tasks are assigned for the team and desired outcomes agreed at the start of the program. Step two is role model stage that ensures progression of the task. Step three is essentially an evaluator type of leadership role that tries to establish and mentain the continiuouty of achieving the desired outcomes, it utilizes advocacy as one of its main strategies.

It is important that one in a leadership position in this step model understands their role and contributes effectively in line with the expectations of the step model for leadership initiative.

This Step Model for leadership has been successfully applied in the training of postgraduates in Family Medicine Program in Eastern province, MOH of Saudi Arabia. It is proposed that it should be applied throughout Saudi Arabia and in other countries of the region.

Key words: **Leadership, Step model, Family Medicine Program, Post graduate training, Saudi Arabia**

Introduction

In one's role as Director of the postgraduates in Family Medicine training program,MOH, effective leadership is important to influence the performance and postgraduate training related and patient care outcomes(1). A new initiative called "Step model" leadership could be considered as a kind of transformational leadership for implantation in Family Medicine programs/Primary Health Care. Transformational leadership was introduced by James McGregor Burns, in 1978. He defined transformational leadership as a process where "leaders and their followers raise one another to higher levels of morality and motivation."(2)

Transformational leadership style demonstrates as a positive contributor to safety environment(3), and is effective in improving care staff's perception of management support(4). Also, it contributes positively to job satisfaction in healthcare institutions, and in enhancing the empowerment influences among work staff(5). Transformational style generates greater commitment from followers than other leadership styles(1).

Step-model is based on the the leader goal, the nature of the task, and the age of the institution. It has been applied in the Primary Mental Health Program since 2003, and in the Saudi Postgraduate Family Medicine Program in the Eastern Province, MOH since 2010. It has proved to be very effective in building a competent motivated team.

Step-model is based on transformation effectively through 3 levels: manager, leader, and internal evaluator. The person in charge should recognize these levels when he/she transfers from one step into another according to determined factors. These factors are:

(1) The task nature and complexity
(2) Age of the task, is it new, in progression, or already established?
(3) The maturity level of the team members.
(4) Ability of the person to modify his performance according to each level.
(5) Assigned person's competencies in leadership, motivation, and building a work-team.

For any new work or assigned task, the person who is assigned as responsible for a team to accomplish a task, should consider these three steps. This person should be able to play these roles correctly and transfer from one step to the next in the correct time according to the maturity of the team and the achievement level.

Step ONE "Manager":
When task is starting.
Manager's goal is "Coaching" to establish an effective and efficient process for the work.

The manager is concerned with setting the rules in order to accomplish a task. So, in this role, the rules must be clear for every team member. The manager is responsible for directing and coaching his/her team within clear and defined rules.

Manager's tasks:
1. Establish the framework of the work and its outcomes
2. Responsible for selection of the team members who could work in a familiar and safe environment.
3. Choice with the team an efficient process to achieve the proposed outcomes
4. Create the ground rules for the work in the view of the organization system
5. Assess team members' performance
6. Be sure the work is in the planned process
7. Work is on progression
8. Motivate the team members
9. Select a appropriate task-leader and members for a defined task
10. Work in solving the obstacles facing the team work
11. Create proposed work leaders

Manager should assured that, everyone in his/her team fully understand what they're responsible for, and know how one will measure success. Next, help the team to achieve the goal and stay motivated. This type of management links short-term achievement to the organization's longer-term goals(6). In this step clear communication and regular feedback are essential for the successful passing of this step.

Step TWO "Leader":
When task is in progression.
Leader's goal "Model" is guiding work-team for achieving the proposed outcomes.

The leader leads the team by redirecting them toward the goal. The leader delegates the task to the team members. However, he/she follows the task progression as well as facilitates the teamwork in order to achieve the set goals.

Leader's tasks:
1. Guide the team for acheiving the task goals
2. Be a lived model for the team members
3. Support the team members to achieve their tasks
4. Work with team to modify the process, as needed, according to the work needs
5. Share with his/her team the performance assessment
6. Motivate his/her team members
7. Create and maintain a safe work environment

As cited in Bernard M. Bass's book, 1985, this type of leader who is a model of integrity and fairness; sets clear goals; has high expectations; encourages others; provides support and recognition; stirs the emotions of people; gets people to look beyond their self-interest; inspires them to achieve their goals(7).

This step may be the longest period till it is sure that the proposed leaders become competent enough to carry the responsibilities as effective leaders.

Step THREE "Internal Evaluator":
- When task is almost or fully achieving the proposed outcome.

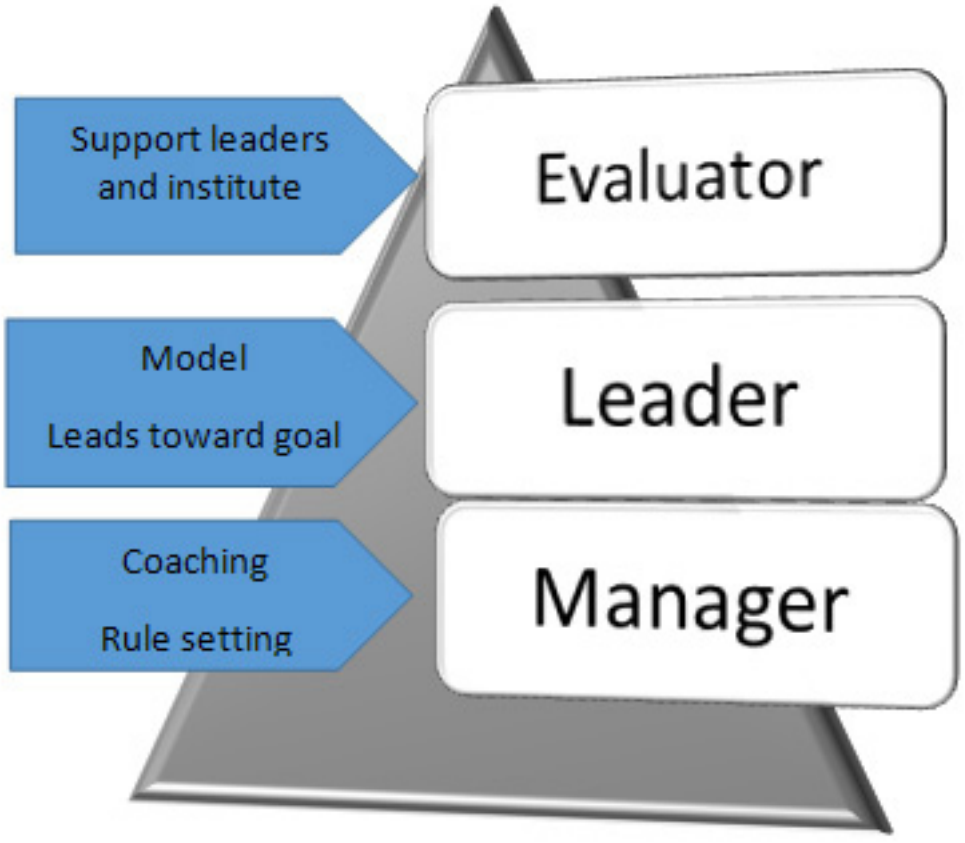
Evaluator's goal "Advocator" is to maintain work in effective progression.

The internal evaluator supports team leaders as well as the team members to accomplish the task. Internal evaluator plays also the role of the counsellor for the team.

Internal Evaluator's tasks:
1. Evaluate the leader's performance
2. Be sure the work outcomes are desirable
3. Work as an advocator and counsellor for the team members
4. Work as mentor and adviser for the team leaders and members.
5. Supervise the whole work and maintain it in the desired process.
6. Interfere and correct any mistake that can deviate the work.
7. Protect the work from outside distraction

The following Table shows Step-model and the factors that influence transformation from one step to another

Leadership style	Institution level	Task nature	Team maturity
Manager	Small immature	Simple/ complex	Unskilled
Leader	Small mature	Simple/ complex	Skilled
Evaluator	Large mature	complex	Skilled



Designed by Dr. Nada Bounian

Acknowledgement
I am thanking Allah for all support, guidance, and help for achieving a safe environment and succeed through my career as a director of a postgraduate family medicine (FM) program and a primary mental health care (PMHC) program in Eastern Province-MOH, Saudi Arabia.

My respect and thanks go to my colleagues in both programs, PMHC and postgraduate FM for their collabprations, contributations, and all affection and care which they have provided me during my work.

Deep thanks to my colleague and advisor Professor Waris Qidwai for his advice and review.

References

1. Spano-Szekely L, Quinn Griffin MT, Clavelle J, Fitzpatrick JJ. Emotional Intelligence and Transformational Leadership in Nurse Managers. J Nurs Adm. 2016 Feb;46(2):101-8.
2. Burns, J.M. (1978) 'Leadership,' New York: Harper and Row.
3. Merrill KC. Leadership style and patient safety: implications for nurse managers. J Nurs Adm. 2015 Jun;45(6):319-24.
4. Jeon YH, Simpson JM, Li Z, Cunich MM, Thomas TH, Chenoweth L, Kendig HL. Cluster Randomized Controlled Trial of An Aged Care Specific Leadership and Management Program to Improve Work Environment, Staff Turnover, and Care Quality. J Am Med Dir Assoc. 2015 Jul 1;16(7):629.e19-28.
5. Choi SL, Goh CF, Adam MB, Tan OK. Transformational leadership, empowerment, and job satisfaction: the mediating role of employee empowerment. Hum Resour Health. 2016 Dec 1;14(1):73.
6. Manktelow, J.N., Brodbeck, F., and Anand, N. (2005) 'How to Lead: Discover the Leader Within You,' Swindon: Mind Tools.
7. Bass, B.M. 'Leadership and Performance Beyond Expectations,' 1985. New York: Free Press.

Evaluation of the Child with Short Stature

Abdulrazak Abyad

Correspondence:
A. Abyad, MD, MPH, MBA, DBA, AGSF, AFCHSE
CEO, Abyad Medical Center
Chairman, Middle-East Academy for Medicine
Email: aabyad@cyberia.net.lb

Introduction

Children with short stature are encountered often in family practice. By definition, one child in 33 has height measurements below the third percentile for age. While this is often defined as the lower limit of "normal," most of these children are, in fact, healthy and growing adequately. Many will attain normal stature as adults. The practitioner's task is to identify the few children who are short as a result of medical conditions that lead to failure of normal growth.

Birth weight and length do not reliably predict ultimate height and weight. Tanner and co-workers (1) have reported a correlation co-efficient of only 0.25 between birth length and ultimate height. However, the correlation between height and two years of age and ultimate height is nearly 0.8.

Growth retardation may exist if

(1) Height is less than two standard deviations from the mean for age.
(2) Growth velocity is less than two standard deviations from the mean growth velocity for age or,
(3) A pubertal growth spurt fails to occur within two standard deviations of the usual time (2).

Causes of short stature

The causes of short stature are listed in (Table 1). An understanding of the typical pattern of growth seen in each of these conditions is helpful in evaluating the short child. Determining the level of epiphyseal maturation is also useful. The radiologic standards published by Gruelich and Pyle are used most widely and are based on the growth centres and epiphyses of the left wrist and hand (3).

Bone age is usually equal to chronological age in familial and primordial short stature, but is delayed in other causes of short stature. Its major value is prognostic, as children with delayed bone age have a better chance to attain normal adult height than do short children whose bone age is not delayed.

Table 1: Causes of short stature

Familial short stature
Constitutional growth delay
Chronic systemic disease
CNS abnormalities
Congenital heart disease
Respiratory disease (asthma, cystic fibrosis)
Gastrointestinal disease (inflammatory bowel disorder, celiac diseases)
Renal disease (renal tubular acidosis, chronic renal failure)
Immune deficiency
Chronic anemia
Primordial growth delay
Chromosomal abnormalities
Down syndrome
Turner syndrome
Skeletal dysplasias
Osteochondrodystrophies
Pseudohypoparathyroidism
Environmental causes
Malnutrition
Psychosocial deprivation
Endocrine disease
Hypothyroidism
Growth hormone deficiency
Cushing syndrome

Bone Age and Height Age

Bone age and height age are helpful in estimating a child's growth potential. The younger the bone age (the state of skeletal maturation), the greater the remaining growth potential. Bone age is determined by a radiologist, using standard tables. Height age is obtained on a growth chart by drawing a horizontal line from the patient's height to the 50th percentile line for height and then dropping a vertical line to the baseline to measure the age (4).

Although a child may have a delayed height age (HA) with respect to chronologic age (CA), if the bone age (BA) is proportionately delayed (CA > HA = BA), the ultimate height may be equal to that of the child whose chronologic age is equal to his height age and bone age (CA = HA = BA). Comparison of chronologic age, bone age and height age may be used to classify causes of short stature (5).

Height Prediction

Height prediction can be used to confirm suspicion of abnormal growth. To predict a target adult height, an adjusted midparental height is obtained by averaging the parents' heights after first adding 13 cm to the mother's height if the child is a boy or subtracting 13 cm from the father's height if the child is a girl. Projection of the child's anticipated growth along his or her growth percentile should yield an adult height that is within + 8.5 cm of the adjusted midparental height. If the projection of the child's growth is more than 8.5 cm below the adjusted midparental height, the growth of the child cannot be assumed to be secondary to parental short stature (6,7).

Evaluation of Growth Retardation

History and Physical Examination

If growth retardation is suspected, particular attention must be given to certain key aspects of the history and physical examination. The categories outlined in Tables 2 and 3 (pages 29 and 30) are touched on in the well-child examination. However, in the evaluation of growth retardation, each area must be more extensively considered. For example, a family tree can be used to plot family heights, ages of menarche and ages of pubertal growth spurts in search of familial short stature and constitutional delay of growth and maturation. Upper-to-lower segment ratios, usually not calculated in general physical examinations, should be included in all evaluations of growth in order to detect abnormalities of bone development (3).

Laboratory Evaluation

If growth retardation is suspected, the following routine screening tests should be performed: Complete blood count (anaemia); erythrocyte sedimentation rate (inflammatory bowel disease, which may be relatively asymptomatic except for growth retardation); urinalysis, blood urea nitrogen, serum creatinine and serum bicarbonate (renal disease); thyroid function tests (hypothyroidism) and hand films for bone age (helpful in determining whether growth is consistent with chronologic age and in excluding skeletal dysplasias) (9). If a child with growth failure is more than two years old, the plasma somatomedin-C (SM-C) level can be determined to screen for growth hormone deficiency. An SM-C level of less than 0.25 u per mL suggests a growth hormone deficiency. A value greater than 0.5 u per mL indicates that a growth hormone deficiency is unlikely. However, the SM-C level is not useful during the first two years of life because of the overlap of levels between normal and growth hormone-deficient patients (10).

If the SM-C level is abnormal or if there is strong suspicion of a hormonal deficiency (hypoglycemia in a short child), growth hormone stimulation tests should be done. Since baseline growth hormone levels are low, stimulation tests are required to separate subjects with hormonal deficiency from those with normal secretion (11).

Metabolic screening tests should be performed as needed to identify mucopolysaccharidosis, aminoacidopathies and galactosemia. Any girl with delayed bone age and unexplained shortness should have a karyotype done to rule out Turner's syndrome or one of its variants.

Differential Diagnosis

A useful way of approaching growth disturbances is by comparing chronologic age, bone age and height age (Table 5). A bone age that differs from height age by six months or less is not significant. However, a bone age that differs from height age by one year or more is significant (12).

Treatment

Treatment of short stature depends on the underlying cause. Children with chronic systemic disease will show improved growth if their medical status can be significantly improved. Growth failure because of dietary or environmental factors can also be reversed with appropriate intervention. Children with hypothyroidism usually show a rapid return to normal stature once hormone replacement is begun. For children with growth hormone deficiency, however, the results of treatment are seldom as dramatic, with most individuals remaining subnormal in height as adults.

There is no specific treatment for the other causes of short stature. Nevertheless, parents may enquire about the benefit of growth hormone treatment. When the child has constitutional delay, parents can be reassured that the adult height will be normal without intervention. Unfortunately, the same cannot be said for those with familial or primordial short stature. There is no evidence to show that the use of growth hormone results in any significant increase in final height for these children.

Growth hormone does seem to offer possible benefit to children with Turner syndrome. Although the results of long-term studies are not yet available, most girls with this condition who have been given growth hormone have shown an increase in linear growth that is expected to

Table 2: Important Historical Features in the evaluation of the Child With Growth Retardation

Historical Features	Diagnostic Implications
MATERNAL HISTORY Length of gestation, previous fetal abortions, complications of TORCH infection, pregnancy, smoking, alcohol and drug use	Fetal alcohol syndrome, hydantoin syndrome, intrauterine growth retardation secondary to placental insufficiency
ANTHROPOMETRIC VALUES Birth weight, birth length, dysmorphology	Intrauterine growth retardation, Turner's syndrome, Down's syndrome, other short stature syndromes
NEONATAL AND DEVELOPMENTAL HISTORY Neonatal hypoglycemia, hypothyroidism developmental milestones	Hypopituitarism,
NUTRITIONAL HISTORY Inadequate caloric intake	Failure to thrive
PSYCHOSOCIAL HISTORY Child neglect or psychological child abuse	Environmental
FAMILY HISTORY Genetic syndromes. Skeletal dysplasias (e.g. achondroplasia), inborn errors of metabolism (e.g. mucopolysaccharidosis, gangliosidosis type I, mucolipidosis II) Family height, ages of menarche,constitutional delay of maturation, ages of pubertal growth spurts	Familial short stature
REVIEW OF SYSTEMS Specific chronic organic diseases	Cardiac, pulmonary, hepatic, disorders
MEDICATION HISTORY Corticosteroids, stimulants	Drug-induced growth retardation

Referral to a pediatric endocrinologist seems appropriate when Turner syndrome is diagnosed.

In the second half of this paper I will present a charming child with short stature. The workup of this patient demonstrates the step that should be followed in investigation of short stature.

History and Physical Examination

Haifa was seen initially in Tripoli and was referred later to AUB where I saw the patient in the Family Medicine Practice Center. The investigations were done in Tripoli, AUB and Royal Hospital for sick children in London.

She was born in Tripoli in a maternity hospital, birth weight 3 kg, birth length 49 cm, following a spontaneous vertex delivery. Mother had been well during the pregnancy with no smoking nor alcohol intake. Mother is aged 36 with a height of 163.0 cm which is 50th centile. She reached menarche at age 13 years. Father, aged 37 years, is an agricultural land owner in good health. He is 183 cm tall, which would put him between the 9th and 97th centiles. There are four siblings, a boy aged 16 years who is 183 cm tall, a girl of nearly 13 years who has been menstruating for some six months, she is 167 cm tall, a girl of 10 years, said to be 154 cm, and a boy of 10 months, said to weigh 12 kg and be around 74 cm tall some two months ago. There is no history of stillbirth, neonatal death nor death in infancy.

In the past, Haifa has been in good health. She was breast fed for six months and solids introduced by seven to eight months of age. However, mother says that her appetite has always been bad and that she often has to force food into her. Bowels are open regularly once a day, said to have been of rather small volume but more normal of the last year and normal in colour. There have been no serious illnesses. Mother had no height records but thought that she had gained 5 cm over the last year and 8 cm the year before. She thinks her weight has been static over the last two years.

Table 3: Important Physical Findings in the Evaluation of the Child with Growth Retardation

Physical Findings	Diagnostic Implications
Upper-to-lower segment ratio	Disorders affecting bone growth (skeletal dysplasias) or resulting in infantile proportions, (hypothyroidism, hypopituitarism)
Head circumference	Evidence of poor cerebral growth, (malnutrition)
Goitre, prolonged jaundice, large posterior fontanelle, umbilical hernia	Hypothyroidism
Micropenis, visual disturbances	Hypopituitarism
Heart murmur, increased blood pressure, pallor, wasting	Evidence of chronic organic disease
Stigmata of short stature syndromes	
Cubitus valgus, webbed neck, low posterior hairline, edema of hands and feet	Turner's syndrome
Flat facies, inner epicanthal folds, upward lateral slant of palpebral fissures, short metacarpals and phalanges, simian crease	Down's syndrome

Table 4: Laboratory Evaluation

Initial Evaluation	Complete blood count Serum chemistry Urine analysis Wrist X-ray for bone age
Further Tests as Necessary	Chromosome analysis Lateral skull X-ray Thyroxin and thyroid Stimulating hormone Growth hormone level stimulation tests

On examination, Haifa was a delightful girl who looked well. She looked somewhat dysmorphic with coarse features, hypertelorism, rather square face with snub nose and coarse hair. Limbs superficially looked short with particularly short fingers and square hands with broad great toes. No abnormalities were found in the central nervous system with normal fundi, no cataracts, no squint. The cardiovascular system: There was a systolic murmur heard over the precordium at the left sternal edge and at the back with no thrill. There was no femororadial delay. There were no abnormalities in the respiratory system nor the abdomen. In particular, there was no hepatosplenomegaly. Genitalia were those of the normal female and there was no kyphoscoliosis. Triceps skinfold thickness was 6.2 mm (3rd centile), subscapular skinfolds 4.2 mm (3rd to 10th centile). Height 95.9 cm, which is well below the 3rd centile, sitting height 56.8 cm, and subischial leg length 39.1 cm, indicating that her back and limbs are proportionately small (-3.5 and -4 standard deviations, respectively).

Investigations

Haemoglobin, full blood count, showed no abnormality, with ESR of 10 mm/hr. Serum iron level was 12 mol/l (nl) with normal transferrin (2.6 g/l) and ferritin level (52 ug/l). Both vitamin B12 and folate level were within normal 824 ng/l and 10.6 ug/l, respectively with red cell folate of 371 ug/l (normal). Her electrolytes profile was normal including: Calcium 2.42 mmol/l, phosphate 1.38 mmol/l, creatinine 5.3 mmol/l. The plasma amino acid screen and organic acid urinary screen were normal as well. Qualitative urinalysis revealed trace of protein and ketones but no other abnormality. Mucopolysaccharidosis screen

Table 5: Differential Diagnosis of Growth Disorders by Comparing Chronologic Age, Bone Age, and Height Age

CA > BA = HA Hypopituitarism

Constitutional delay of growth and maturation
Nongrowth-hormone-deficient, growth-hormone-responsive growth failure (biologically inactive growth hormone, or growth hormone and/or somatomedin-C resistance)
Cushing's disease
Chronic malnutrition
Psychosocial deprivation
Chronic organic disease
Glucocorticoid excess

CA > HA > BA

Growth hormone deficiency (hypopituitarism)
Hypothyroidism

CA > BA > HA

Constitutional delay of growth and maturation with familial short stature
Intrauterine growth retardation
Turner's syndrome
Down's syndrome

CA = BA > HA

Familial short stature
Intrauterine growth retardation

KEY: CA = chronologic age; BA = bone age; HA = height age

revealed mucoolysaccharides of 19 mg/mmol creatinine (age related reference range 6-13 mg/mmol creatinine)

The pattern obtained from one dimensional electrophoresis does not support the diagnosis of mucopolysaccharidosis types I, II, or III. Her thyroxin was 165 nmol/l (normal) and prolactin 307 m u/l (normal).

Time	LH	FSH	TSH
Min	U/l	U/l	mU/l
0	<0.9	1.9	4.0
20	4.0	12.0	9.5
60	3.9	15.2	7.0

These are normal results though there is a somewhat exaggerated response of FSH of doubtful clinical significance.

Insulin hypoglycemia test: Plasma glucose fell from 4.7 mmol/l to a minimum of 1.8 mmol/l. Cortisol response baseline 409 nmol/l, maximum 814 nmol/l (normal response). Growth hormone rose to maximum of 16.5 mU/l (very slightly suboptimal response, but unlikely to be of clinical significance).

Jejunal biopsy: Two attempts failed, but stool culture negative. In addition, urine for reducing substances was negative.

Skeletal survey: There is abnormality of the hands and feet. This consists in the hands of short metacarpals, phalanges and a small carpal area. Similar changes are present in the feet. Long bones show only minor abnormality with slight loss of tubulation of the proximal humeri and tibiae. Remaining skeleton including the skull and spine, normal. Appearances are not of a mucopolysaccharidosis, but suggest a possible acrodysplasia.

Conclusion

It seemed very likely, on the first meeting with Haifa, that she had a syndrome diagnosis and I felt it quite possible that she would turn out to have either a mucopolysaccharidosis or a form of skeletal dysplasia. The investigations, however, have excluded a mucopolysaccharidosis and the measurements indicate that her short stature is proportional, with back and long bones equally short. The skeletal survey findings are not pathognomic of any particular syndrome and I would have expected the radiological changes to be more specific by her age in conditions such as acromesomelic dysplasia syndrome or brachydactyly syndrome type-E, although the latter does remain a possibility (14, 15).

The importance of making a specific syndrome diagnosis would be to provide genetic counselling and, of course, to be more specific about the prognosis. Most important, however, is the question as to whether any treatment is likely to influence Haifa's final height and, despite the marginally suboptimal growth hormone response to insulin hypoglycemia, there is nothing clinically about Haifa to suggest that she might respond to exogenous growth hormone treatment. There is nothing from our other investigations to suggest any other form of treatment that is likely to prove beneficial.

In summary, therefore, I think that Haifa is small because of a dysmorphic syndrome which we have been unable to positively identify. I think that it is very unlikely that any therapeutic intervention will improve her final height prognosis.

Final Comment

Growth is a manifestation of health in the young. As such, it is a parameter of the well-being of a child. A wide variety of disorders can affect the rate and the quality of growth. Thus, the ability to evaluate growth is a basic diagnostic skill that all physicians who provide care for children should possess. By focusing on key aspects of the history and physical examination, by performing the appropriate screening tests, by comparing chronologic age, bone age and height age, and by reviewing prior anthropometric measurements, the family physician can confidently evaluate the child with growth retardation.

References

1. Tanner JM, Healy MJ, Lockhard RD, MacKenzie JD, Whitehouse RH. Alberdeen growth study I. The prediction of adult body measurement from measurements taken each year from birth to five years. Arch Dis Child 1956;31:372-81.
2. Frasier SD. Growth disorders in children. Pediatr Clin North Am 1979;26:1-14.
3. Greulich WW, Pyle SI. Radiographic atlas of skeletal development of the hand and wrist, 2nd ed. Stanford CA: Stanford University Press, 1959.
4. Lindgren G. Growth of schoolchildren with early, average and lage ages of peak height velocity. Ann Hum Biol, 1978;5:253-67.
5. Moore DC. Proportionate delayed growth. In: Kelly VC, ed. Practice of pediatrics, Vol 7, chap 62. Philadelphia: Harper & Row, 1986:1-12.
6. Himes JH, Roche AF, Thissen D, Moore WM. Parent-specific adjustments for evaluation of recumbent length and stature of children. Pediatrics 1985;75:304-13.
7. Roche AF, Wainer H, Thissen D. The RWT method for the prediction of adult stature. Pediatrics 1975;56:1026-33.
8. Linder B, Cassorla F. Short stature: Etiology, diagnosis, and treatment. JAMA 1988;260:3171-5.
9. Mahoney CP. Evaluating the child with short stature. Pediatar Clin North Am 1987;34:825-49.
10. Kaplowitz PB, D'Ercole AJ, VAn Wyk JJ, Underwood LE. Plasma somatomedin-C during the first year of life. J Pediatr 1982;100:932-4.
11. Moore DC, Rubalcaba RH, Smith EK, Kelley VC. Plasma somatomedin-C as a screening test for growth hormone deficiency in children and adolescent. Horm Res 1982;16:49-55.
12. Lipsky MS, Horner JM. The child with short stature. Am Fam Physician 1988;37:230-41.
13. Lippe B, Frasier SD. How should we test for growth hormone deficiency, and whom should we treat? [Editorial] J Pediatr 1989;115:585-7.
14. Vincent M, Riccardi; MD, Lewis R. Holmes, MD. Brachydactyly, Type E: Hereditary shortening of digits, metacarpals, metatarsals, and long bones. J of Pediatrics 1974;84:251-4.