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Editorial

Dr Abdul Abyad
Chief Editor

This is the last issue this year and the editorial office and the publishing team wish to send all readers and authors season's greeting and happy New Year.

A paper from Saudi Arabia looked at the Elderly patient from a Primary Care Perspective. The percentage of older patients is growing globally. While many of these patients may have multiple comorbid illnesses, many age well and remain independent for long periods of time. Newer arrangements such as assisted living, day centers and home health care help the elderly preserve function and autonomy. Aging is therefore not a pathologic condition but represents an important part of the continuum of life. The aging process is characterized by specific physiology that is not synonymous with disease, or dependency. The perception of the older patient is affected by different societal attitudes towards ageing, the elderly's attitude towards his/her health, and the attitude and knowledge of health care providers. The primary care physician is well situated to provide care to the elderly. The authors briefly highlight several commonly recognized social and medical conditions encountered by elderly patients, and summarize related evidence based key points for primary care physicians.

A case control study from Egypt attempts to study the correlation between bone mineral density (BMD) and breast cancer risk among postmenopausal females. All subjects were interviewed using a structured questionnaire and Body mass index was calculated for each subject. BMD was measured using dual-energy X-ray absorptiometry (DEXA) in 2 sites: lumbar spine (L2-L4) and proximal femur (neck). Breast cancer cases were found to have statistically significant lower age of menarche and longer years of ovulation than controls. The prevalence of osteoporosis among the studied group was found to be 51%; 20% among breast cancer cases compared to 58.8% among controls. Higher BMD mainly at lumbar spine is associated with increased risk of breast cancer. Larger studies are needed to confirm such an association and to plan clinical practice accordingly.

A paper from Jordan looked at the Incidence of infection Following Total Hip Replacement surgery and it risk factors experienced at Queen Alia hospital . A total of 120 patients undergoing total hip arthroplasty were studied. Infection was recorded in 5 patients, staph aureus recorded in one case, staph epidermis in two cases, acinetobacter in one case and candidal infection in one case; diabetes mellitus was noted in three cases. The authors concluded that infection following total hip arthroplasty is a devastating complication and therefore all policy must be introduced to prevent it.

A paper from India attempts to study the differentials in the risks of mortality by occupation among pensioners after superannuation retirement in Nagaland; who retired during 1996-2011. The relative risk of mortality was higher up to six years immediately after retirement but lower in the remaining years for retirees belonging to occupational category-I compared to those in occupational category-II and III. The risk of mortality was higher up to three years immediately after retirement but lower in the remaining years for retirees of occupational category-II compared to those in occupational category-III. The authors concluded that differentials in the risks of mortality of the pensioners by occupation exists in the post retirement years.

A second paper from Eygpt looked at estrogen Receptor α- Gene polymorphism Distribution among Egyptian Postmenopausal Females and Bone Mineral Density Correlations. A total of 108 postmenopausal females were recruited for the study. BMD was measured by dual-energy X-ray absorptiometry (DEXA) and ERα PvuII and XbaI polymorphism was determined by PCR-restriction fragment length polymorphism (RFLP). PvuII genotype was distributed as; 12% PP, 40.7% Pp, 47.2% pp, while the frequency of XbaI genotype was: 5.6% XX, 30.6% Xx, 63.9% xx with no significant difference between osteoporotics and non-osteoporotics. The authors concluded that the pp and xx haplotypes are the most prevalent among the studied population. Future larger studies are needed to further examine the spectrum of variation across the ESR1 gene within and between Egyptian populations and to examine the association with BMD on a larger base.

A paper from Bangladesh discussed the issue of no alternative way without adopting permanent contraceptive methods to reach replacement level of fertility in Bangladesh. Using Bangladesh Demographic and Health Survey (BDHS) 2007 data the researcher has analyzed when Bangladesh will reach the replacement level of fertility (2.1 children per woman) depending on the modern contraceptive methods. It is shown from the study that the fertility rate has remained almost same in the national level of Bangladesh for a long time. But it is also found from the study that fertility rate has reached near to the replacement level in a few divisions of Bangladesh. The researcher has identified there is no alternative way without adopting the permanent contraceptive methods among the six administration divisions, particularly female sterilization, to reach the goal. The researcher would like to suggest that the value of the regional key measures of the contraceptive indices, responsible for achieving the replacement level of fertility rate must be found out and finally applied in other divisions of the country. By doing this, they can reach the goal to achieve the replacement level of fertility in Bangladesh.

Original Contribution/Clinical Investigation

Bone Mineral Density and Breast Cancer Risk among Postmenopausal Females

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ABSTRACT

Purpose: To study the correlation between Bone Mineral Density (BMD) and breast cancer risk among postmenopausal females.

Method: A case control study was carried out, where 20 breast cancer cases and 80 cancer free controls, matched for age and body weight (±3kg), were recruited for the study. All subjects were interviewed using a structured questionnaire and Body mass index was calculated for each subject. BMD was measured using dual-energy X-ray absorptiometry (DEXA) in 2 sites: lumbar spine (L2-L4) and proximal femur (neck).

Results: Breast cancer cases were found to have a statistically significant lower age of menarche and longer years of ovulation than controls. The prevalence of osteoporosis among the studied group was found to be 51%; 20% among breast cancer cases compared to 58.8% among controls.

Breast cancer cases were found to have a statistically significant higher BMD at both assessed sites. The association with spine BMD was independent of years of ovulation and age of menarche. Females having spine BMD >1.2gm/cm^2 were found to have a 4.47fold increased risk for breast cancer.

Conclusion: Higher BMD, mainly at lumbar spine, is associated with increased risk of breast cancer. Larger studies are needed to confirm such an association and to plan clinical practice accordingly.

Keywords: Bone mineral density, Breast cancer risk, Menopause, Ovulatory life

Introduction

Osteoporosis and breast cancer are common age-related disorders in postmenopausal women and are associated with high morbidity and mortality. They are usually viewed as separate diseases which coexist since their frequency increases with aging. However, several reports have suggested that a link might exist between bone mineral density on one hand and the risk of breast cancer on the other hand (1).

Different surrogate markers of lifetime exposure to estrogen such as late menarche, early menopause or a low BMI as well as never use of postmenopausal HRT are associated with an increased risk of osteoporotic fracture (2). Most of these markers are the opposite of those for the risk of breast cancer.

Several studies have reported that women with higher bone mineral density (BMD) have a greater risk of breast cancer compared to women with lower BMD (3-12). However, some studies did not show such an association (13, 14).

Despite these controversies, this relationship is consistent with the view that BMD and breast cancer are associated markers of cumulative exposure to estrogen (15). However, it could also be that women with higher BMD have a higher survival rate, and hence have a higher likelihood of developing breast cancer.

The present study was designed to examine the hypothesis that higher bone mineral density could be associated with increased risk of breast cancer in postmenopausal women.

Methodology

Over a period of one year, 20 breast cancer cases were recruited for the study. All of these women had had breast cancer between 1998 and the time of participating in the study. Cases were selected from the hospital database and were contacted and the study aim and procedures were explained to each of them.

None of the cases were taking tamoxifen; they had either never taken it before or stopped using it more than 5 years back.

For every case, four cancer free controls matched for age and body weight (±3kg) were randomly selected for the study. Controls were randomly selected from the database, from females who had screening bilateral mammography examination done once over the past 3 years and were found to be free.

Females having a positive family history for breast cancer were excluded from the control group.

Controls were free from diseases that can affect bone metabolism such as chronic renal disease, chronic liver disease, endocrinal diseases such as hyperthyroidism, Cushing disease, or past history of stroke. Also those taking drugs affecting BMD, such as corticosteroids, heparin, anti-convulsants and loop diuretics, were excluded.

Females who were taking hormone replacement therapy, Bisphosphonates, or on calcium supplement were excluded from the study.
Explanation of the study aim and procedures was given to all subjects with informed consent taken from each of them and those who refused to participate were excluded from the study.

After obtaining informed consent, subjects were interviewed using a structured questionnaire to collect data, including age, life-style and clinical data and clinical history, including concomitant diseases and medications used. Women were asked about their age at menarche, and age at and type of menopause (spontaneous or artificial).

Menopause was defined as the cessation of menses for at least 1 year. For women reporting natural menopause, age at menopause was defined as the self-reported age of last menstruation. For all women who reported menopause after gynecologic surgery, information on the exact date and type of operation was verified by using patient records.

Length of ovulatory life was calculated as the number of years between menarche and menopause.

Body mass index was calculated as weight divided by height squared (kg/m2).

Bone mineral density (BMD) was measured by dual-energy X-ray absorptiometry (DEXA); measurements were done in 2 sites: lumbar spine (L2-L4) in the anteroposterior position and proximal femur (neck) on the left side using LUNAR DPX-MD+ densitometer. Quality control procedures were followed in accordance with the manufacturer's recommendations.

According to the DEXA measurements, participants were classified into: Normal BMD: T-score + or -1 SD, Osteopenia: T-score - 1 to -2.5 SD, Osteoporosis: T-score -2.5 or less (16).

Data processing and statistical analysis:
Data collected was revised, coded, tabulated and introduced to PC for statistical analysis. All data manipulation and analysis was performed using the 17th version of SPSS (Statistical Package for Social Sciences). Qualitative data was presented in the form of frequency tables (number and percentage). Quantitative data was presented in form of mean ± standard deviation and range.

Pearson Chi-squared was used with correction to test the association between 2 qualitative variables. Independent sample-t test was also used to compare two groups with quantitative continuous variables. In addition, logistic regression analysis was done to determine the independent association of different factors.

P value was always set as significant at 0.05.

Results

The study included 100 females (20 cases and 80 controls). The average age of the studied group was 65.60±6.45 (55-82). Average age of menopause of the studied group was 48.82± 5.12 (30-58) with 8% (n=8) of them having artificial menopause.

By design, there was no significance difference between the two groups in terms of age and weight or body mass index (Table 1 - opposite page).

	Cases n=20	Controls n=80	Significance Association	
	Mean± SD	Mean± SD	t	p
Age	65.75±6.18	65.56±6.55	0.117	0.907
Age at menarche	12.45±0.51	12.90±0.72	**2.623**	**0.010**
Age at menopause	50.60±3.75	48.37±5.33	1.757	0.082
Years of ovulation*	38.15±3.73	35.47±5.48	**2.063**	**0.042**
Parity	3.25±1.74	3.78±1.39	1.436	0.154
Weight (kg)	71.50±24.69	75.42±17.37	0.824	0.412
Height (cm)	151.95±6.72	154.24±6.55	1.389	0.168
BMI (kg/m^2)	29.87±8.61	31.41±6.86	0.849	0.398
Lumbar spine BMD (gm/cm^2)	1.11±0.29	0.92±0.19	**3.423**	**0.001**
Femur neck BMD (gm/cm^2)	0.86±0.11	0.77±0.12	**2.376**	**0.019**

*Years of ovulation were calculated as the number of years between menarche and menopause. SD= Standard deviation, BMI= Body mass index, BMD= Bone mineral density

Table 1: Characteristics of the studied group

	Cases n=20		Controls n=80		Significance Association
Femur Neck	N	%	N	%	
Normal	13	65	20	25	X^2=12.196
Osteopenia	6	30	40	50	p=0.002
Osteoporosis	1	5	20	25	
Lumbar Spine	N	%	N	%	
Normal	13	65	15	18.8	X^2=17.677
Osteopenia	4	20	23	28.8	p=0.000
Osteoporosis	3	15	42	52.5	

Table 2: Comparison between cases and controls regarding the prevalence of osteoporosis

Breast cancer cases were found to have a statistically significant lower age of menarche than the controls. As for the age of menopause, there was no statistically significant difference between the two groups, yet cases of breast cancer tended to have higher menopause age (Table 1).

Consequently the length of ovulation (years between menarche and menopause) is longer in cases than controls (Table 1). Breast cancer risk is associated with lower menarche age and longer years of ovulation.

There was no statistical difference between the two groups regarding the parity, however the frequency of nulliparity was higher among cases (15%, n=3/20) than controls (3.8%, n=3/80).

All the assessed lifestyle parameters such as calcium intake, tobacco, alcohol intake and physical activity were similar between the two groups.

Breast cancer cases were found to have a statistically significant higher BMD at both sites (lumbar spine and femur neck) (Table 1).

The prevalence of osteoporosis among the studied group was found to be 51%; 20% (n=4/20) among breast cancer cases compared to 58.8% (n=47/80) among controls (X^2=9.614, p=0.002) (Table 2).

Using logistic regression, the association between breast cancer and spine BMD (p=0.033), but not femur neck BMD (p=0.253) was found to be statistically significant independent from years of ovulation and age of menarche.

The relative risk for breast cancer among females having spine BMD >1.2gm/cm^2 (30% among cases) were found to be 4.47 (95% CI; 1.305-15.310).

Discussion

Both osteoporosis and breast cancer are common diseases in elderly women. Several studies have shown a high BMD to be associated with an increased breast cancer risk (3-12).

BMD and breast cancer are associated markers of cumulative exposure to estrogen. High estrogen exposure, both endogenous and exogenous, is associated with a high BMD (17), and also with increased breast cancer incidence, because of the influence on mitotic activity of breast cancer cells (18, 19).

However, BMD is not merely a marker for estrogen exposure. Other metabolic pathways and many growth factors and interleukins may be involved in the association between BMD and breast cancer, either alone or through stimulation of the estrogen pathway. For instance, both insulin and insulin-like growth factor type 1 are thought to have anabolic effects on bone, and could also be related to the risk of breast cancer (20, 21). Also, interaction may exist between the insulin-like growth factor and estrogen metabolic pathways (22). Furthermore, abnormalities in the transforming growth factor ? pathway may be involved in oncogenesis, particularly of breast cancer (23), whereas they are also associated with an increased BMD (24).

A high bone density may therefore be a predictor of incident breast cancer. The current study was designed to assess the hypothesis of the association between higher bone mineral density and increased risk of breast cancer in postmenopausal women.

The current study showed breast cancer to be associated with lower menarche age, longer years of ovulation and more prevalence of nulliparity.

This is consistent with the hypothesis that prolonged exposure to endogenous estrogens influences breast cancer risk (25).

Breast cancer cases were found to have a statistically significant higher BMD at both measured sites (lumbar spine and femur neck) but with the association with only the lumbar spine being independent of age of menarche and years of ovulation.

Females having high lumbar spine BMD (>1.2gm/cm^2) were found to have more than fourfold increased risk for breast cancer.

Several other studies have investigated the association between BMD and incidence of breast cancer. Some of these studies (5, 9) found, the same as the current study, the association to be stronger for the spine than the hip BMD.

The Study of Osteoporotic Fractures demonstrated that women in the highest quartile of distal radius BMD or metacarpal cortical bone mass had a two- to three-fold higher incidence of breast cancer than women in the lowest BMD quartile (3).

Zhang et al, 1997, showed that women in the highest quartile of metacarpal bone mass were at higher risk for breast cancer than those in the lowest quartile in the Framingham Study (4).

The Dubbo Osteoporosis Epidemiology Study found a twofold higher incidence of breast cancer in women with increased spine BMD and a modest increase in women with increased hip BMD as compared with women with low BMD (5).

The Fracture Intervention Trial found that women in the highest quartile of hip BMD had a non-statistically significant 1.5-fold higher incidence of breast cancer than women in the lowest quartile (7).

Whereas, the Rotterdam study found that women in the highest tertile of spine BMD had a twofold higher incidence of breast cancer than women in the middle tertile, but found no association with hip BMD and incidence of breast cancer (9).

Additionally, some studies, report that women with a history of fracture have a lower risk of breast cancer (26-28).

However, not all studies showed the same association. Kerlikowske et al, (2005) did not find that BMD was associated with risk of breast cancer (13).

Kritz-Silverstein et al, (2006) found little difference in BMD between women with and without breast cancer, and suggested that BMD is not useful as a prescreening predicator of

mammography in older women and using it as such would result in cases of breast cancer being missed (14).

The relationship found in the current study, might support the use of BMD probe - especially for the lumbar spine site- for assessing breast cancer risk and to identify women who may benefit from breast cancer prevention measures.

Kerlikowske et al. (1999) concluded that mammography is not worthwhile for older women with low BMD and recommended measuring BMD at age 65 and stopping mammography in women who have low BMD as a cost-effective clinical practice (29). However, Twiss et al (2001), in an 18-month prospective study, reported that 80% of women with a history of breast cancer had low BMD (defined as a T-score below -1.00) at baseline (30). Given these results, before the discontinuation of mammography in women at age 65 with low BMD becomes accepted clinical practice, it is necessary to further examine on a larger scale such association between BMD and the risk of breast cancer. Carrying out larger studies can provide a reference range for the BMD that can be protective or reference for for association that necessitates further assessment.

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Original Contribution/Clinical Investigation

Incidence of infection following Total Hip Replacement surgery and its risk factors; experience at Queen Alia hospital, Jordan

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ABSTRACT

Objectives: to study the incidence of sepsis following total hip replacement surgery and its etiology

Patients and methods: 120 patients undergoing total hips arthroplasty between June 2010 to June 2011. This study was conducted at one center, Queen Alia hospital in Jordan. Patients were evaluated by one reconstructive orthopaedic team, and routine clinical assessment in addition to radiological and laboratory analysis were done. Risk factors were mainly diabetes mellitus, rheumatoid arthritis, renal failure, genitourinary infection, dental abscess, previous hip surgery were recorded.

Results: Infection was recorded in 5 patients, staph aureus recorded in one case, staph epidermis in two cases, acinetobacter in one case and candidal infection in one case; diabetes mellitus was noted in three cases.

Conclusion: Infection following total hip arthroplasty is a devastating complication; all policy must be implemented to prevent it.

Keywords: infection following total hip replacement

Introduction

Infection following hip arthroplasty is a devastating complication which causes big trouble for both patients and doctor. Our aim was to prevent infection and to anticipate and record any risk factors, that may increase the risk so our protocol was to institute preoperative measures which include diabetic control blood glucose should be less than 125 and post operative should be less than 200mg, nasal MRSA screening so preoperative nasal swabs should be mandatory and decolonized before surgery by using bacitracin or chlorohexidene, dental screening for any focus infection, urine analysis for all patients, smoking must be stopped before surgery, chlorohexidene washing at night of surgery and before the operation. Operation room measures that include hand washing for at least 3- 5 minutes by using either betadine or chlorohexidine, prophylactic antibiotics given with anaesthetic medication and can be repeated if operation time more than 3 hours, Our own regime is the use of cefazoline and to continue using that for 48 hours post surgery, skin scrubbed by 10% betadine or clorohexidine at the end washing the wound with pulsatile lavage, irrigated wound with local antibiotic, such as gentamicin, surgeon and scrubbed nurse hygiene and using double gloves with different colors, steridrape wrapped around the area and changing of gloves at the end of draping ,and when implanting prosthesis and at closure of wound. The surgical gown, wearing mask, operating room hygiene and minimizing traffic of personnel and expert team, reduction of

operating time, operating room temperature around 18 degrees C, use of routine closing suction drain, suturing the fascia by vicryl suture, skin close by stapler at the end the wound covered by airstrip.

Post operative measures are mainly continuing antibiotic for 48 hours and discontinue wound drainage after 48 hours; wound and personal hygiene and starting physiotherapy on second post operative day.

Patients and Methods

A prospective study that was conducted on 120 cases of total hip replacement that was performed at one center Queen Alia hospital which is considered one of the pioneering centers in Jordan during the period from June 2010 to June 2011, using a cementless type prosthesis from Smith and Nephew company in 80% of cases and 20% from Depuy and CoVision. There were 70 female patients 58% and 50 male patients (42%). All the cases were assessed in one clinic . Preoperative, operative and post operative measures were applied for all which is mentioned in the introduction. The surgical approach was using Watson Jones (anterolateral approach) in the lateral position. For all the patients admitted in orthopaedic unit , routine clinical and laboratory test were performed in the form of CBC, blood sugar, kidney function test and urine analysis in addition to radiological routine X- ray that includes pelvis, chest and other specific views if needed. Routine average admission was 5-7 days and then the patients were followed in the outpatient clinic. In our series we follow our patients for one year.

Results

From our observation we record 5 cases (4%) from 120 cases that ended with infection staph epidermis implicated in 2 cases (40%) as the most common organism, followed by staph aureus 20% and Acinetobacter infections which are mostly due to contamination in 20% ,and all cases were diagnosed on a clinical and laboratory basis, and because there is no test that gives you sensitivity of 100% and no test giving 100% specificity ,so we recommend a diagnosis that depends on both clinical impression and laboratory findings including white blood cells which are not usually useful in detecting infection. ESR is very useful for screening for infection and an elevated level more than 30 per hour gives a high hint about the presence of infection. Sensitivity of ESR ranged between 60-90 %. C- reactive protein and an elevated level more than 10 mg are considered abnormal.

Aspiration of hip is considered the most helpful investigation. It carries a sensitivity rate of 60 to 100% with false negative test 0-15% so the method in which to collect the sample and the method of management and reading are so important . All antibiotics must be stopped 2-3 weeks before aspiration. The sum of three samples and the diagnosis must be detected in all. If negative in one, repeated aspiration and culture is done. Gram stain is sensitive in only 0-20%. Tissue culture is very useful in diagnosis; at least three samples are required. Sensitivity can reach up to 95%.

So our protocol of management is summarized as following.

If infection diagnosis is made during the first 4 weeks of operation, then irrigation, debridement, pulsatile lavage, irrigating the field with diluted betadine for 3 minutes, change the polyethylene, close suction drain and close the wound and provide coverage with antibiotics for 2-3 weeks according to response .We were able to treat 2 of our cases in which staph epidermis and acinetobacter were detected.

If there is a delay in diagnosis more than 4 weeks, our policy is to do 2 stage exchange of prosthesis with cement impregnated with antibiotic in form of tobramycin 3.5g in addition to 1 gram of vancomycin for a period of 6 weeks, in addition to antibiotic coverage for 6 weeks. Then we stop antibiotics for 3 weeks then re check by clinical laboratory test and aspiration and if negative re implantation of the prosthesis. We managed 3 cases by this modality and we succeeded in 2 and failed in one case because of uncontrolled blood glucose and renal impairment and poor soft tissue so lastly ended with Girdlestones operation.

Among the biggest risk factors recorded were diabetes mellitus, rheumatoid arthritis and poor patient hygiene, poor immune status, smoking, poor surgical technique, personnel traffic, sterility, steroids taken and skin problems in addition to previous surgery and ageing.

Discussion

Our study on the incidence of infection following total hip replacement is slightly higher than the recorded rate. it reached 4% and because diagnosis of infection depends on both high index of suspicion in addition to laboratory results in the form of positive CRP result more than 10 mg ,and level of ESR more than 30, in addition to predicted value of aspiration and tissue culture which gives high index of infection which may reach 95%, hence there is a three stage classification as mentioned by Coventry.

Type -1 infection occurs in the immediate post operative period and usually within one month of surgery and usually the diagnosis is easy which consists of erythema ,wound drainage and fever.
Type- 2 is usually 6-24 months post surgery and the diagnosis depends on clinical symptoms in the form of decreased function and pain and the pain increased by activity and persisting during rest.
Type- 3 the haematogenous spread of infection after an initial procedure and this type is most common in immunocompromised patients and inflammatory arthropathy.

So we recommend a diagnosis that depends on both clinical impression and laboratory findings including white blood cells which is not usually useful in detecting infection. ESR is very useful screening for infection; an elevated level more than 30 per hour gives a high hint about the presence of infection. Sensitivity of ESR may reach 60%, so aspiration from hip and tissue culture is still the golden method to diagnose infection, so the most important thing is to apply the principle that includes pre operative measures such as:

Diabetic control of blood glucose should be less than 125 and post operatively should be less than 200mg; nasal MRSA

screening so that preoperative nasal swabs should be mandatory and decolonized before surgery by using bacitracin or chlorohexidene, dental screening for any focus infection; urine analysis for all patients; smoking must be stopped before surgery; chlorohexidene washing at night of surgery and before operation.

Operation room measures include hand washing for at least 3-5 minutes by using either betadine or chlorohexidine; prophylactic antibiotics given with anaesthetic drug.

Operative measures
Skin scrubbed by 10% betadine or clorohexidine, surgeon and scrubbed nurse hygiene and using double gloves with different colors, steridrape wrapped around the area and changing of gloves at the end of draping and on implanting prosthesis and at closure of wound, disposable surgical gown and drape, wearing mask, operating room hygiene and minimizing traffic of personnel, an expert team reduce operating time, operating room temperature around 18 degree c and at the end washing the wound with pulsatile lavage, and using local antibiotic, such as gentamicin.

Use of routine closing suction drain, suturing the fascia by vicryl suture skin close by stapler and at the end the wound covered by airstrip.

Post operative measures mainly are to continue antibiotics for 48 hours and discontinue drain after 48 hours, keep wound hygienic and to start physiotherapy on the second day.

Our protocol of treatment consists of antibiotic suppression, open surgical debridement, two stage re- implantation, resection arthroplasty, arthrodesis and amputation and this depends mainly on stage classification.

Conclusion
Despite all measures taken still there is a certain percent of infection even in the best centers. Our message is to follow a strict criteria that is applied to all patients, that includes proper selection of patients, routine clinical, laboratory tests that give a clue about any possibility of infection,in addition to very restricted operative measures, delicate handling of tissue, minimized operation time, routine use of prophylactic antibiotic ,stopping any bleeding vessels and routine use of drainage to minimize any possibility for Haematoma formation. The presence of any risk factors that can increase the risk of infection must be noted and all measures must be taken to avoid it. Our aim is to reach zero percent of infection so we follow the best regimen that is applied in the best modern center.

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Original Contribution/Clinical Investigation

Estrogen Receptor α - Gene polymorphism Distribution among Egyptian Postmenopausal Females and Bone Mineral Density Correlations

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ABSTRACT

Objective: It has been suggested that polymorphism of estrogen receptor a (ERa) can predict bone fracture risk, and bone mineral density (BMD). This study was designed to evaluate distribution of ERα genotypes in a population of Egyptian postmenopausal women and the correlation with BMD.

Method: 108 postmenopausal females were recruited for the study. BMD was measured by dual-energy X-ray absorptiometry (DEXA) and ERa *Pvu*II and *Xba*I polymorphism was determined by PCR-restriction fragment length polymorphism (RFLP). The absence of *Pvu*II and *Xba*I restriction sites were indicated by "P" and "X" and presence by "p" and "x", respectively.

Results: *Pvu*II genotype was distributed as; 12% PP, 40.7% Pp, 47.2% pp, while the frequency of *Xba*I genotype was: 5.6% XX, 30.6% Xx, 63.9% xx with no significant difference between osteoporotics and non-osteoporotics. No significant association was found between the ER polymorphism and either age, age of menopause, or BMD though PP and XX haplotypes had higher BMD.

Conclusion: The pp and xx haplotypes are the most prevalent among the studied population. Future larger studies are needed to further examine the spectrum of variation across the ESR1 gene within and between Egyptian populations and to examine the association with BMD on a larger base.

Key words: Estrogen receptor, ER polymorphism, Osteoporosis, Postmenopausal, PvuII genotype, XbaI genotype.

Introduction

Osteoporosis is a major public health problem, affecting hundreds of millions of people worldwide, predominantly postmenopausal women [1].

Osteoporosis has a strong genetic component, and twin and family studies have shown that the variation of skeletal traits such as bone mineral density and bone size depends on heritable factors to a large extent [2].

Estrogens (ES) are an important factor maintaining bone mass in women. There are many different mechanisms through which ES induce cellular changes. The most important ES action is binding to its receptor (ESR). ES diffuse into the cell and bind to ESR located in the nucleus. This complex binds to ES response element sequence directly or indirectly through protein-protein interactions with activator protein in the promoter region of estrogen-responsive genes [3].

ESR exists in two main forms, ESRα and ESRβ, encoded by two separate genes, ESR1 and ESR2 respectively. ESR1 is located on the short arm of chromosome 6 (6q25.1) encompassing 140 kb of DNA, includes 8 exons, and encodes a protein of 595 amino acids with a molecular weight of about 66kDa [4] .

Several sequence variation or single nucleotide polymorphism (SNPs) in ESR1 have been identified and found to be associated with either decreased or increased risk of various diseases [3]. The best characterized SNPs of ESR1 are the *Pvu*II and *Xba*I restriction site polymorphism. Possible functional mechanisms attributed to these polymorphisms include a change of ESRα gene expression by altering the binding of transcription factors and influence on alternative splicing of ESRα gene.

There is a lot of evidence that ERα gene polymorphism influences many physiological processes in humans, women in particular, as well it may be the etiopathological factor of various diseases.

Several studies have shown an association of those polymorphisms with bone mineral density (BMD) or fractures [4-7] .On the other hand, others did not find such an association [8,9].

The results of the meta-analysis based on 29 reports suggest no contribution of the ER-PvuII polymorphism to BMD at any skeletal site but some contribution of the ER-XbaI polymorphism to femoral neck and lumbar spine BMD [10].

The current study was designed to evaluate distribution of ESR1 *Pvu*II and *Xba*I genotypes in a population of Egyptian postmenopausal women and the association with BMD.

Materials and Methods

Study subjects

Over a period of one year, postmenopausal females' attendants of the Geriatrics and Gerontology department, Ain Shams University Hospitals, were assessed. Menopause was defined as the cessation of menses for at least 1 year. Females having diseases that can affect bone metabolism such as chronic renal disease, chronic liver disease, endocrinal diseases as hyperthyroidism, Cushing disease, or past history of stroke, were excluded. Also those taking drugs affecting BMD, such as corticosteroids, heparin, anti-convulsants and loop diuretics were excluded.

Females who were taking hormone replacement therapy, Bisphosphonates, or on calcium supplement were also excluded from the study.

Explanation of the study aim and procedures was given to all subjects with informed consent taken from each one of them and those who refused to participate were excluded from the study.

After applying the inclusion and exclusion criteria, the total number of participants was 108 subjects.

Subjects were interviewed using a structured questionnaire to collect data including age, age at menopause, life-style and clinical data and clinical history, including concomitant diseases and medications used.

Body mass index was calculated as weight divided by height squared (kg/m^2).

BMD was measured by dual-energy X-ray absorptiometry (DEXA); measurements were done in 2 sites: lumbar spine (L2-L4) in the anteroposterior position and proximal femur (neck) on left side using LUNAR DPX-MD+ densitometer.

According to the DEXA measurements, participants were classified into; osteoporotic (T-score -2.5 or less) and non-osteoporotic [11].

Genetic Study

5cc of EDTA blood was collected from each participant for genetic study. Genomic DNA was extracted from the peripheral leukocytes according to modified salting procedure [12] using QIAamp®DNA Mini Kit (QIAGEN, USA).

The investigated single-nucleotide polymorphisms were T → C and A → G transitions, located in the long arm of chromosome 6 (6q25,1). These two polymorphisms, defined by the restriction enzymes *Pvu*II (dbSNP [database of SNPs]: rs2234693) and *Xba*I (dbSNP: rs9340799) using restriction fragment length polymorphisms (RFLPs) method. For *Xba*I and *Pvu*II, "X" and "P" denote the absence of the respective restriction sites (G and C alleles, respectively). The presence of the restriction site for each endonuclease was conventionally indicated with a lower-case letter ("p" or "x," for *Pvu*II and *Xba*I endonucleases respectively). Forward and reverse primers (5'CTG CCA CCC TAT CTG TAT CTT TTC CTA TTC TCC 3' and 5' TCT TTC TCT GCC ACC CTG GCG TCG ATT ATC TGA 3') were used to amplify the PCR product which was digested with *Pvu*II. The digestion of the PCR product with *Pvu*II generated two fragments. Individuals homozygous for the PP genotype had a single uncut fragment, while those homozygous for the pp genotype had two fragments. The heterozygotes Pp had all three bands. The second polymorphic region under study is located in 6q25,1. Forward and reverse primers (5'CTG CCA CCC TAT CTG TAT CTT TTC CTA TTC TCC 3' and 5' TCT TTC TCT GCC ACC CTG

	Cases n=42	Controls n= 66	Significance Association	
	Mean± SD	Mean± SD	t	p
Age	62.93±7.34	62.59±7.54	0.234	0.816
Age at menopause	47.31±3.42	47.48±5.62	0.182	0.856
Weight	71.83±16.78	74.83±17.37	0.884	0.379
Height	154.26±5.72	152.21±6.47	0.158	0.096
BMI	30.07±6.46	32.13±6.47	0.768	0.110
Lumbar spine BMD	0.822±0.108	1.054±0.182	7.445	0.000
Femur neck BMD	0.732±0.110	0.875±0.118	6.274	0.000

Table 1: Clinical characteristics of studied subjects

GCG TCG ATT ATC TGA 3') were used to amplify the PCR product which was then digested with *Xba*I. *Xba*I cuts the x allele of the ER gene but not the X allele. Digestion of the PCR product with XbaI generated two fragments. Individuals homozygous for the XX genotype had a single uncut fragment, while those homozygous for the xx genotype had two fragments. The heterozygotes Xx had all three bands.

Statistical Analysis

Data collected was revised, coded, tabulated and introduced to PC for statistical analysis. All data manipulation and analysis were performed using the 17th version of SPSS (Statistical Package for Social Sciences). Qualitative data was presented in the form of frequency tables (number and percentage). Quantitative data was presented in the form of mean ± standard deviation.

Pearson chi-squared was used with correction to test association between 2 qualitative variables, while, independent sample-t test was used to compare two groups with quantitative continuous variables. One way Analysis of variance (ANOVA) was also used to test for comparison between multiple groups with Quantitative continuous variables. A p-value less than 0.05 was considered significant.

Results

The study included 108 postmenopausal females with a mean age of 62.72±7.43, and mean age of menopause 47.42±4.86. 38.9% (n=42) were osteoporotic while 61.1% (n=66) were not osteoporotic (Table 1) with no difference between them regarding the lifestyle parameters, such as calcium intake and physical activity.

Among the osteoporotic group, 85.7% (n=36/42) had osteoporosis of lumbar spine, and 57.1% (n=24/42) had femur neck osteoporosis.

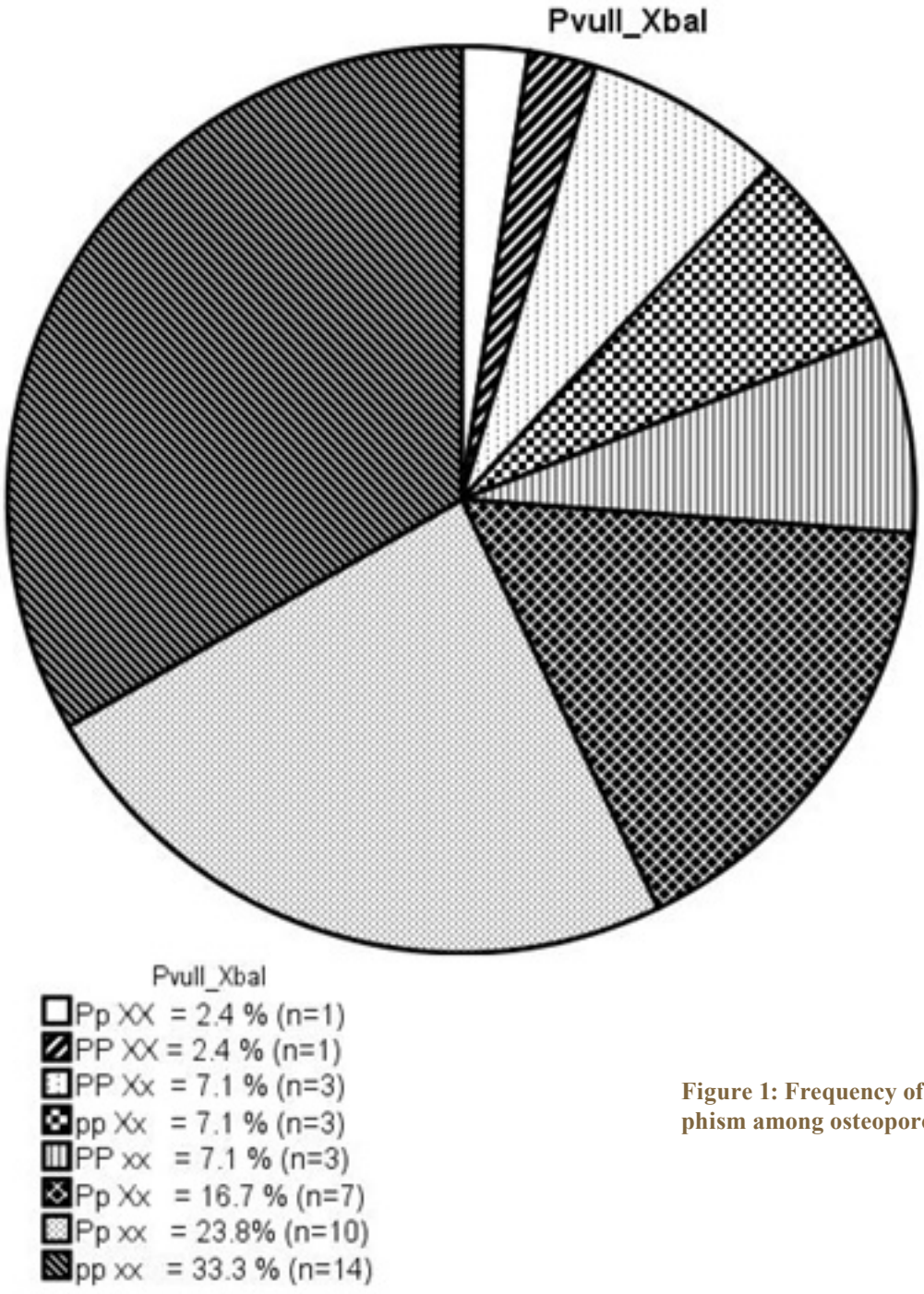

Figure 1: Frequency of PvuII - XbaI polymorphism among osteoporotic group

In our studied population, the distribution of the *Pvu*II and *Xba*I genotypes was found to be; PPXX 2.8% (n=3), PpXX 3.7% (n=4), PPxx 4.6% (n=5), PPXx 5.6% (n=6), ppXx 11.1%(n=12), PpXx 13.9% (n=15), Ppxx 22.2%(n=24), ppxx 36.1% (n=39), with no statistical difference between the studied groups (X2 =3.194, p=0.867) (Figure 1, 2).

*Pvu*II alleles frequency was; PP 12% (n= 13), Pp 40.7% (n=44), pp 47.2% (n=51), while that of *Xba*I genotype was: XX 5.6% (n=6), Xx 30.6% (n=33), xx 63.9% (n=69), with no statistical significance difference between the osteoporotic and non-osteoporotic groups (Table 2 - page 17).

Among those with lumbar spine osteoporosis the distribution was; PP 19.4% (n= 7), Pp 47.2% (n=17), pp 33.3% (n=12), XX 5.6% (n=2), Xx 30.6% (n=11), xx 63.9% (n=23), and for the femur neck osteoporosis the distribution was; PP 16.7% (n= 4), Pp 33.3% (n=8), pp 50% (n=12), XX 4.2% (n=1), Xx 20.8% (n=5), and xx 75% (n=18).

There was no significant correlation between the *Pvu*II and *Xba*I genotypes and either age, menopause age, weight, height, BMI and the BMD (Table 3 - page 18).

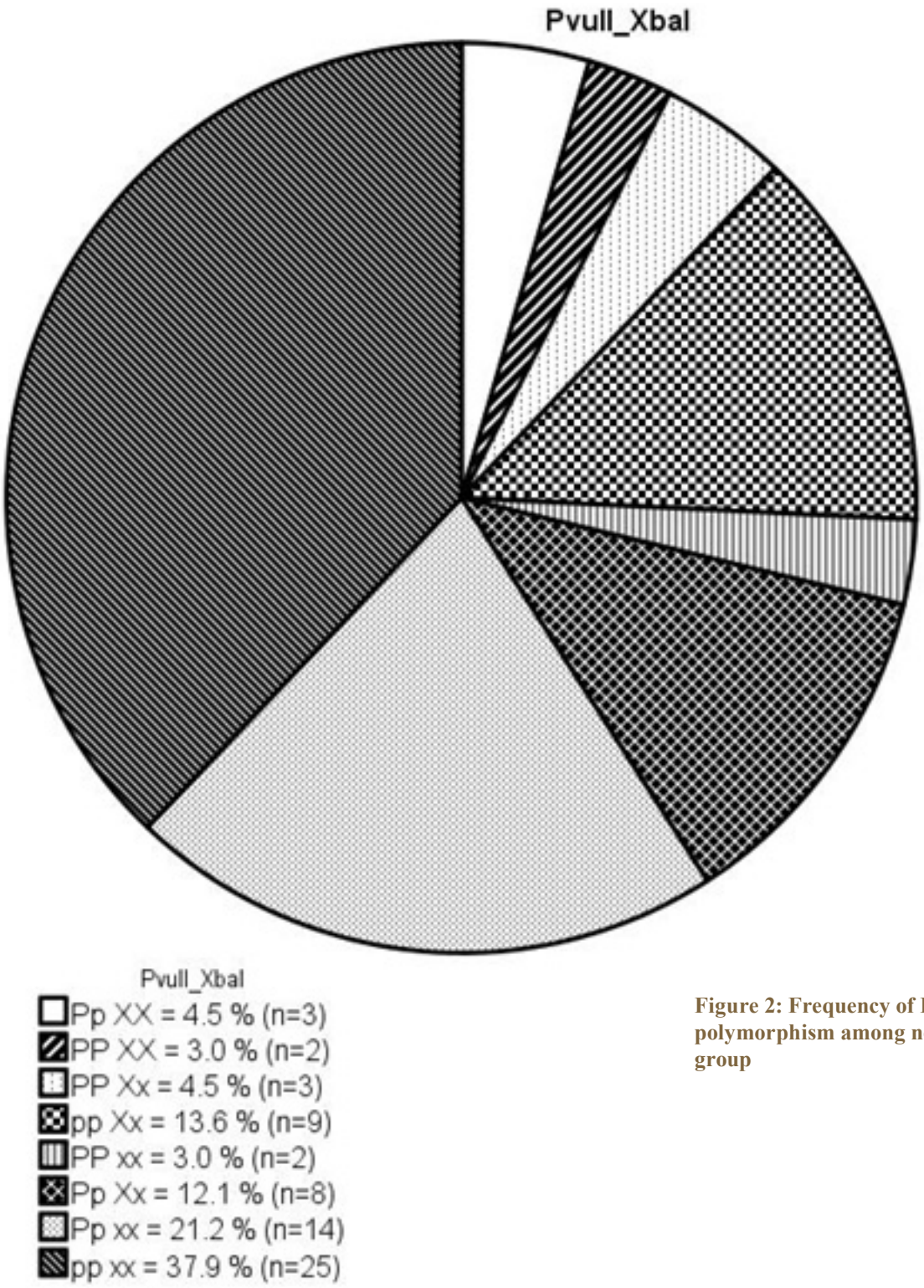

Figure 2: Frequency of PvuII - XbaI polymorphism among non-osteoporotic group

Discussion

BMD variability has a strong genetic determination with heritability within 50% - 90% [13, 14]. Association studies showed a number of candidate genes which may underlie BMD variation at different skeletal sites [15].

ER-α appears to be the major receptor mediating estrogen action in bone, and it has a prominent effect on regulation of bone turnover and maintenance of bone mass [4]. The ESR1 is therefore a candidate for genetic regulation of bone mass.

The distribution of *Pvu*II and *Xba*I polymorphisms, the SNPs of ESR1, was not found to be similar among different populations (Table 4) [3, 16-23]. The current study showed the Egyptian postmenopausal females to have a high frequency of px haplotype with low frequency for PX haplotype.

Asian populations showed an increased frequency of Px haplotype and a reduced frequency of PX haplotype with respect to Caucasian populations of European ancestry, while in an African population haplotype px was present at a lower frequency [20]. A differential degree of linkage disequilibrium among

	Cases n=42		Controls n= 66		Significance Association
	N	%	N	%	
PvuII					
PP	7	16.7	6	9.1	X^2 =1.962
Pp	18	42.9	26	39.4	P =0.375
pp	17	40.5	34	51.5	
XbaI					
XX	2	4.8	4	6.1	X^2 =0.085
Xx	13	31	20	30.3	P =0.959
xx	27	64.3	42	63.6	

Table 2: Frequency distribution of estrogen receptor ? PvuII and XbaI polymorphisms among the studied groups

different ethnic populations may partly explain discrepancies among ERα polymorphism studies [22]. Haplotype pX was not observed in the majority of studies, whereas haplotype Px was detected, in a low frequency. This frequency of haplotypes may be due to recombination or multiple mutations which have occurred between or at these two polymorphic sites.

Many investigators explored the association between ESR1 polymorphisms and bone phenotypes. Kobayashi et al, 1996 suggested that ER polymorphisms could be related to the acquisition of peak bone mass [16], whereas Han et al, 1997 hypothesized an influence on the rate of bone loss [8].

Kim et al. (2001) revealed the association of both *Pvu*II and *Xba*I polymorphisms with BMD [24], whereas, Nam et al (2005) observed the association of the *Pvu*II polymorphism of ER-α with BMD in population-based studies [25].

Binh et al, 2006 suggested that the *Pvu*II and *Xba*I genotypes and haplotypes of the ER-α gene, have associations with bone density, and are significant predictors of osteoporosis [6].

Genome-wide association (GWA) studies showed a very significant association between certain ESR1 polymorphisms and BMD [26, 27].

Ivanova et al, 2007 found *Xba*I and *Pvu*II polymorphisms to be associated with low BMD and suggested that they might therefore become useful genetic markers in osteoporosis risk assessment[28].

Velasco et al, 2010 also confirmed the association of ESR1 polymorphisms and hip fractures in women [29].

In contrast, other studies found no association between the PvuII polymorphism and bone mass [9, 10]. Han et al. (1997) failed to find any significant association between the ER-α genotypes and BMD in a hospital-based study [8].

These controversial results may be explained partly by population specificity and possible genetic effects masked by different gene-gene and gene-environment interactions.

		*Pvu*II				*Xba*I			
		PP (n=13)	Pp (n=44)	pp (n=51)	p	XX (n=6)	Xx (n=33)	xx (n=69)	p
Age		62.53±4.87	62.02±7.53	63.37±7.94	0.677	65.83±5.19	64.41±7.59	61.64±7.38	0.121
Meno age		47.77±4.78	46.84±5.81	47.82±3.95	0.599	48.00±4.82	48.73±3.40	46.74±5.36	0.149
Weight		79.27±15.95	73.02±16.68	72.78±17.84	0.456	73.00±17.99	73.33±16.34	73.88±17.67	0.984
Height		154.15±6.09	153.86±6.48	151.98±6.02	0.268	156.33±6.71	153.03±5.42	152.71±6.56	0.398
BMI		33.23±5.81	30.67±6.11	31.40±7.02	0.462	29.82±6.77	31.19±6.11	31.52±6.75	0.824
Spine BMD		1.043±0.23	0.961±0.23	0.946±0.15	0.273	1.059±0.21	0.999±0.21	0.939±0.18	0.156
Femur BMD		0.863±0.15	0.821±0.14	0.807±0.13	0.409	0.856±0.12	0.837±0.12	0.808±0.14	0.478

Table 3: Correlations between PvuII and XbaI polymorphism and the study variables

Several studies have shown that PP genotype has higher BMD than the Pp and pp genotypes [16, 30, 31].

Some studies reported that women with the XX genotype had higher BMD than those with the Xx and/or xx genotype [32, 33], while others found opposite results [24, 34].

Binh et al, 2006 found x allele of the ER-α gene to be significantly associated with reduced quantitative ultrasound parameters at the calcaneus [6].

Similarly, the P allele was also associated with a higher BMD in most of the reports [24, 25, 33], whereas only one reported an opposite association [35].

Haplotype px showed a significant association with decreased BMD at the lumbar spine in women, while haplotype PX was associated with increased lumbar spine BMD [20]. Albagha et al (2005) indicated that px haplotype was associated with reduced calcaneal broadband ultrasound attenuation values [36]. In contrast, two other studies found the *Pvu*II-*Xba*I haplotype Px to be associated with decreased BMD [18, 21], whereas others showed no association [19].

The current study found no significant association between *Pvu*II and *Xba*I polymorphism and BMD, but it has been noticed that the PP haplotype and XX haplotype had the highest mean BMD than the other haplotypes but with no statistical significance. In the case of the PP haplotype, subjects had the highest mean BMI which might explain this higher BMD. The Pp and Xx haplotypes were found to have intermediate BMD values.

Khosla et al, 2004 suggested that the pp or xx genotype may be relatively estrogen insensitive and subjects with the P or X allele may benefit more from the protective effects of estrogen on bone than subjects with the p or x allele [37].

One study has shown age of menarche to be associated with the *Xba*I and possibly the *Pvu*II polymorphism [38]. *Xba*I XX homozygotes or, in more general terms, subjects homozygous for the PX haplotype seem to have a modest delay in the age of menarche.

The biological pathway for *Xba*I and *Pvu*II that may affect the age of menarche is unknown. Restriction sites of both polymorphisms are located in the intron 1 of the ERα gene. Some introns contain regulatory sequences such as enhancers, which mean binding sites for elements that regulate the level of gene expression and thus also affect protein synthesis [4]. Regardless of the exact mechanism, if ERα gene polymorphisms can alter the estrogenic biological activity at the cellular level, this may influence the maturation of the hypothalamic-pituitary-gonadal axis, which determines the onset of menarche.

The PX haplotype may be important in regulating not only the onset, but also the end of estrogen exposure during the lifetime of an individual. Investigators have suggested that ERα gene polymorphisms, in particular *Pvu*II, may affect the age of menopause [39, 40].

Ethnic group	Place of study	No of subjects	PvuII and XbaI haplotypes			
			px	PX	Px	pX
Asians	Japan [16]	238	54.5	18.7	26.5	0.3
Asians	Japan [17]	2238	59.4	18.3	22.3	0
Asians	Korea [18]	598	57.7	18.5	22.3	2.3
Caucasians	Denmark [19]	454	53.0	33.7	13.3	0
Caucasians	Netherlands [20]	1100	53.0	36.1	10.9	0
Caucasians	United Kingdom[21]	206	56.1	33.5	9.2	1.2
Caucasians	Italy [22]	610	52.1	40.9	5.7	1.3
Caucasians	Canada[23]	662	54.9	35.6	9.5	0
Caucasians	Poland [3]	64	47.4	17.3	24.4	10.9
African Americans	United states[20]	19	36.8	50	13.6	0

Table 4: Distribution of PvuII and XbaI haplotypes in different populations (Cited in Jakimiuk et al, 2007[3])

Albagha et al, 2001, reported positive associations between Pvull and/ or Xball polymorphism and age at menopause [21]. The P allele showed a dose-effect relationship with a 0.5 year earlier onset of natural menopause per each copy of the P allele. On the other hand, two other studies, did not replicate this finding [41, 42].

Due to the age of the studied females in the current study, it was difficult to assess the association with age of menarche because many of them could not recall the date exactly, so age of menarche was not studied for fear of bias. As for the age of menopause, no significant association was found with the PvuII and XbaI polymorphism.

There is a hypothesis that ESR1 polymorphisms lead to a difference in bone growth, which might be explained by a genotype-dependent estrogen sensitivity locally at the site of bone growth. In support of this hypothesis, Schuit et al, 2004 found an association of ESR1 polymorphism with stature [43].

Studies indicated an association between ERα intron 1 RFLPs and height or body mass index [13, 43]. ERα is an isoform more highly expressed than ERβ in mature human adipocytes and the only one expressed in preadipocytes. In one study the association of the polymorphisms with not only a greater BMI, but also larger % fat mass, waist circumference and waist hip ratio in middle-aged women had been shown [44].

On the contrary, the current study did not find a significant association for the ER polymorphisms with weight, height or BMI.

Future studies will have to further examine the spectrum of variation across the ESR1 gene within and between Egyptian populations. The number of studied groups should be large enough in order to test gene-gene and gene-environment interactions that may potentially be involved at the interface of ESR1 variation and human diseases. The presence of an association with BMD needs to be assessed on a wider base.

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Review Article

The Elderly Patient: A Primary Care Perspective

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Introduction

The percentage of older patients is growing globally. While many of these patients may have multiple comorbid illnesses, many age well and remain independent for long periods of time. Newer arrangements such as assisted living, day centers and home health care help the elderly preserve function and autonomy. Aging, per se is therefore not a pathologic condition but represents an important part of the continuum of life. The aging process is characterized by specific physiology that is not synonymous with disease, or dependency. The perception of the older patient is affected by different societal attitudes towards ageing, the elderly's attitude towards his/her health, and the attitude and knowledge of health care providers. The primary care physician is well situated to provide care to the elderly. This paper will briefly highlight several commonly recognized social and medical conditions encountered by elderly patients, and summarize related evidence based key points for primary care physicians.

Patient Demographics

Elderly population above 65 years in USA increased from 4% in year 1980 to 14% in 2011. The average life expectancy at birth increased from 47 years in 1900 to 78 years in year 2008. In year 2030, USA elderly population is expected to reach 70 million (20% of USA total population)(1, 2). In Saudi Arabia the elderly population above 65 years of age accounted for 2.9% in 2010 and is expected to reach 6.6% in year 2030 and 13% by year 2050. (UN World population 2006, and Dr.Moh'd Al Gabbari (King Saud University Aug.14,2008)(3). Within the elderly there are a number of subcategories: the young-old (individuals' under 85 who have aged well and have little to no disease burden), the old-old ((individuals over 85 whose functional capacity is good and illness burden little) and the fragile or sick old (individuals over 65 who have significant illnesses and reduced functional capacity). The elderly account for 33% of all hospital admissions, 37% of medication prescriptions, 40% of healthcare resources, and most visits to primary care physicians and hospitals (4).

Physician Demographics

The ultimate goal of physicians treating elderly patients is to preserve function and improve quality of life. There are only 9000 geriatricians in the USA making the ratio of certified physicians to patients 1/3000. In the Arab world, the number of certified geriatricians is at best several hundred. In "Saudi Arabia the goal is for 3000 certified family physicians by year 2020 (Professor Adnan AL Bar, WONCA EMR Dubai, December 2012). Looking for a family physician for every 2000 individuals, the Arab world might be in need of 175,000 family physicians.(7) Presently in Saudi Arabia there are 9 family medicine residency programs graduating 25 family physicians yearly with a total of only 353 family physicians graduated by 2009-2010.(8,9) There are no geriatric programs currently available in the Middle East.

Age Related Considerations:

"Elderly are more susceptible to disease and slower to recover from injury or disease complications."(5) Homeostasis is replaced by homeostenosis, the restricted ability to recover normal physiologic function following an insult because organ reserve is diminished. Pharmacokinetics and pharmacodynamics are impaired due to the elevated levels of body fat and reduced renal function. Many patients suffer from multiple comorbidities at the same time: ischemic heart disease, arthritis, hypertension, diabetes mellitus type II, vision problems, hearing loss, osteoporosis, cognitive problems, constipation, depression, urinary incontinence and cancers. Multiple comorbidities lead to multiple medications with proportionate increases in side effects and drug-drug interactions. Patients

with multiple long term complications do have decreased life survival. Many elderly receive inappropriate screening tests and far less needed preventive measures such as immunization and counseling. (5,6).

Assessment and Goals of Care:

The assessment of older patients is a clinical challenge due to several factors. Elderly people usually suffer from several clinical conditions most prevalent of which are: arthritis, hypertension, obesity, diabetes mellitus, and osteoporosis, and urinary incontinence, visual and hearing problems. The multiple medications used by the elderly, impaired cognition, malnutrition, and poor social supports add to the diagnostic challenge. Acute illness in the elderly often presents with non-specific symptoms: Atrial fibrillation as the initial presentation of hyperthyroidism, elderly with decreased appetite or change in mental status might be found to suffer from constipation, urosepsis or pneumonia or myocardial infarction presenting as fatigue.

The goals of care need to be directed towards preservation of function and improving quality of life. Primary prevention aims to avoid development of disease through proper immunization and evidence based life style modifications producing relative risk decrease of all-cause mortality, e.g. smoking cessation (10). A CDC report pointed out "that 34% of American elderly between 65-74 years are inactive and up to almost half of adults aged 75 are in active". Regular exercise can reduce life-threatening falls by 58 %(USPSTF) as well as improve functional capacity in those with COPD, IHD or PVD. Secondary prevention might be delivered through screening for visual and hearing loss, cancer, osteoporosis, diabetes mellitus and hypertension. Tertiary prevention prevents further deterioration of already established morbidity conditions e.g. identification of cognitive or gait related problems.

Screening in Elderly:

Screening is usually affected by age; overall health; life expectancy; natural history of the disease; expense; and convenience of the screening test. The screening and treatment of diabetes and hypertension is based on the ADA and JNC recommendations (Table 1). The USPSTF recommends the screening and treatment of the elderly with hyperlipidemia whose Framingham score for CAD is >10% where benefits outweigh harm. The USPSTF and AAFP suggest stopping PAP smears at 65 years of age, mammography screening until 75 years and 80 years in elderly women with more than 4 years survival estimate. Screening colonoscopy for men should be stopped at 75 years and at 80 years for women with no significant co-morbidities. The complications of colonoscopy and sigmoidoscopy have been reported as 0.3% and 0.01% respectively among the elderly age group between 70-75 years of age. Prostatic specific antigen should stop at 75 years if conducted at all in otherwise healthy men. The USPSTF recommended against PSA screening due to the harm associated with testing and over diagnosis (11). The screening for osteoporosis starts at 65 years in women with no additional risk factors. "Women with normal or slightly normal bone mass (T-score -1.01 to 1.49) with no risk factors for accelerated bone loss may not require repeat testing before 17 years" (12). Screening for osteoporosis in men may start at 75 years of age, and in men with 10 years risk for fractures equal or more than white women 65 years or older with no additional risks (National osteoporosis foundation). The prevalence of abdominal aortic aneurysm in elderly 66-79 years might reach up to 10% with 80% mortality in men after dissection. The USPSTF recommends a onetime ultrasound for abdominal aortic aneurysm in men 65-75 who have smoked at any time in their life or with positive family history for abdominal aortic aneurysm (C recommendation). Finally, the decision to screen or stop screening needs to be taken after ample discussion with individual patients, using evidence based guidelines with due consideration to individual patient's preferences(13).

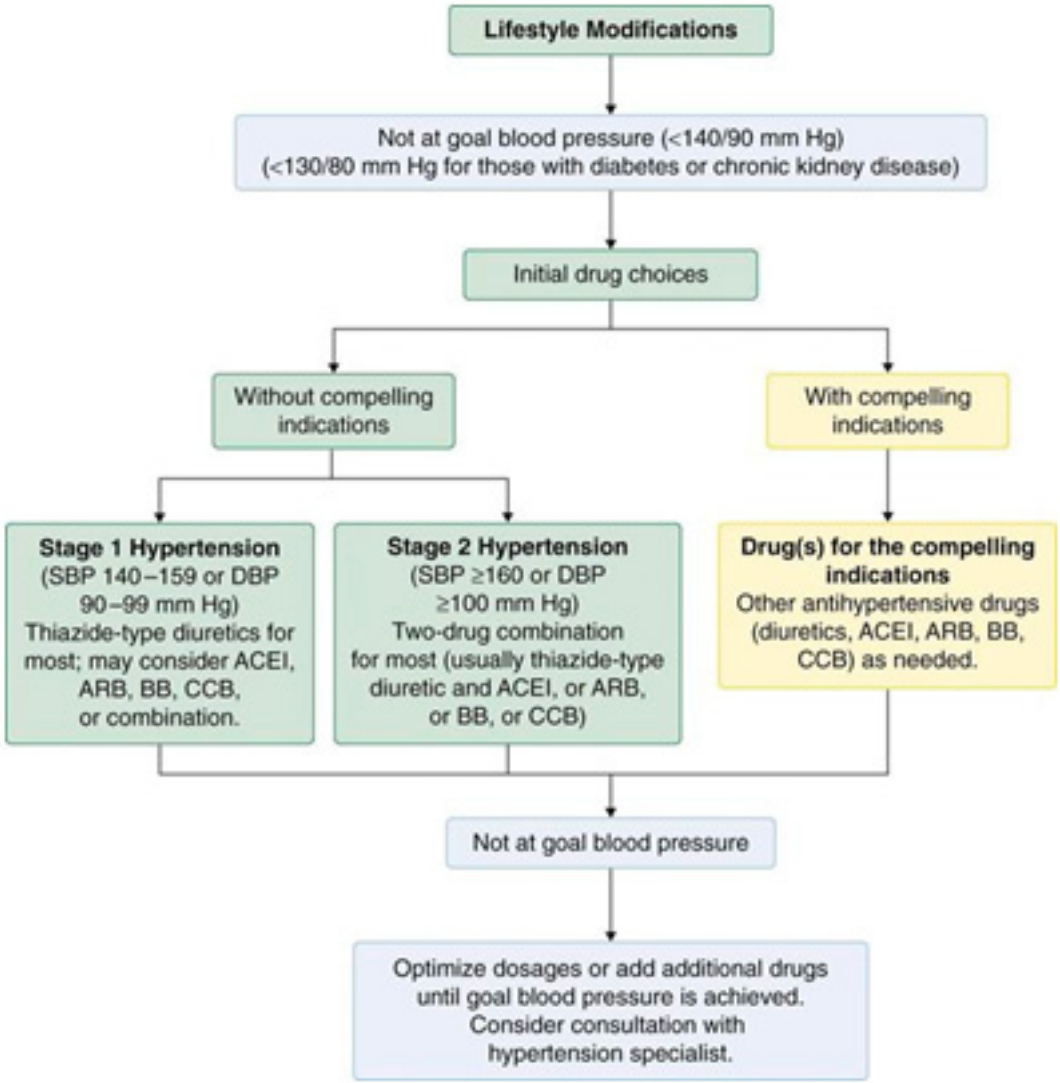
Some Common Clinical Findings

Falls and Compression Fractures:

Falls in the older population are multifactorial: visual, neurologic, podiatric and drug related. Thirty percent of patients 70 years or older fall more than two times yearly. Falls lead to hip and other fractures with subsequent complications. Osteoporosis is a risk factor for compression fractures; another source of significant limiting pain and disability. The diagnosis of compression fractures includes history, physical exam, plain

Criteria for testing for diabetes in asymptomatic adult individuals
1. Testing should be considered in all adults who are overweight (BMI ≥25 kg/m2*) and have additional risk factors: o physical inactivity o first-degree relative with diabetes o high-risk race/ethnicity (e.g., African American, Latino, Native American, Asian American, Pacific Islander) o women who delivered a baby weighing >9 lb or were diagnosed with GDM o hypertension (≥140/90 mmHg or on therapy for hypertension) o HDL cholesterol level <35 mg/dl (0.90 mmol/l) and/or a triglyceride level >250 mg/dl (2.82 mmol/l) o women with polycystic ovarian syndrome (PCOS) o A1C ≥5.7%, IGT, or IFG on previous testing o other clinical conditions associated with insulin resistance (e.g., severe obesity, acanthosis nigricans) o history of CVD
2. In the absence of the above criteria, testing for diabetes should begin at age 45 years.
3. If results are normal, testing should be repeated at least at 3-year intervals, with consideration of more frequent testing depending on initial results and risk status.
Taken from American Diabetes Association: Standard medical care in Diabetes-2011.Diabetes Care, 2011; 34(Suppl):S11-S61.

Table 1A



Taken from JNC7 on hypertension; 2003 Report.

Table 1B: Treatment algorithm for hypertension

X-ray and occasionally CT scans or MRI. Management of compression fractures includes limited bed rest, pain control, and gradual increase in physical activity as tolerated, and sometimes vertobroplasty. The "Get up and Go test" is a simple test to assess risk of falls in elderly patients; individual have to arise from a chair, walk 10 feet (3 meters), turn and sit. If the individual takes more than 13 seconds to complete this, or any postural instability or gait imbalance noticed, the patient will be considered to have an increased risk of fall. Prevention of falls entails identification of high risk patients, education, vitamin D, calcium supplementation and alendronate. Rehabilitation through stretching exercises proved to improve muscle mass, and balance has been shown to decrease falls (14).

Polypharmacy:

Western based studies have found that patients over 70 years of age usually take 4 prescription medications and 3 over the counter drugs. Moreover, adverse drug reactions increase from 2% in patients on 2 drugs to 13% in patients who take 6 drugs. Thirty percent of the elderly population is admitted due to adverse drug effects, and 50% of these side effects can be prevented through appropriate prescribing(15,16). The Beers criteria developed in 1991, updated in 1997, 2003 and recently in 2012, list a number of medications that have been recognized as inappropriate based on consensus guidelines and expert opinions. The list currently includes 53 medications classified under three categories: always preferable to be avoided, potentially inappropriate and those medications that should be used with caution. Some of the medications listed in Beers criteria are fluoxetine, non selective NSAIDS, and benzodiazepines due to risk of increased central nervous system stimulation, gastrointestinal bleeding and sedation respectively. Warfarin, ACE inhibitors, medications with anticholinergic effects first generation antihistamines, alpha blockers, muscle relaxants and other medications included in the list (17).

Hearing Loss:

Presbyacusis is the third most common diagnosis after hypertension and arthritis in USA. One study in Saudi Arabia reflected a prevalence of 30.6%. The Whispered voice test at 2 feet from the patient is a sensitive and specific test (18). Annual screening test by question is cost effective in robust elderly with no cognitive problems. Referral for audiogram and tympanogram and offering hearing aids helps to improve quality of life for patients affected.

Vision Loss:
Decreased visual acuity with age is considered a major health problem; a third of elderly above 65 years have some form of vision loss. One study in Saudi Arabia reflected a prevalence of 61.5% among the elderly. Age related macular degeneration, glaucoma, cataract and diabetic retinopathy are the most common causes of age related vision loss. Macular degeneration is considered a leading cause of painless central vision loss in the elderly above 60 years of age and reaches 46% in the elderly above 75 years. Other risk factors include: obesity, smoking, and family history. Age related macular degeneration can be treated either by laser, photodynamic treatment, and/or specific antigrowth blood vessel factor injections. Early diagnosis and referral through increased awareness, and screening will lead to earlier treatment and subsequent improvement in quality of life for those affected.

Cataract is another major cause of peripheral vision loss and is considered the most rewarding surgery in ophthalmology. Cataract can be due to old age, diabetes, or after glaucoma surgery, trauma or radiation. Glaucoma, on the other hand, damages the eye's optic nerve leading to vision loss or even blindness in those undiscovered early and left untreated. Forty percent of vision might be lost without being noticed by patients. Medical treatment with eye drops sometimes is not enough and surgical procedures namely trabeculosomy and trabeculectomy need to be resorted to towards improving vision and preventing further deterioration in vision. Finally diabetic retinopathy prevalence is affected by increased incidence of diabetes worldwide, longer duration of illness, compliance to treatment regimen and relatively poor blood sugar control. Diabetic retinopathy might present with floaters or blurred vision. There is no cure for diabetic retinopathy, however, photocoagulation and vitrectomy help remarkably in preventing vision loss and subsequently improve quality of life for affected patients (19).

Diabetes and HBA1C Considerations:
The diabetes prevalence in Saudi Arabia is 36.5% among the elderly more than 65 years of age (20). The patient and family centered approach is encouraged in treating old patients with diabetes mellitus. Treatment decisions need to take into consideration the general wellbeing of the patient, life expectancy, patient preferences, and values. Investment in life style modifications for the robust elderly including weight loss of 5-10% improved blood sugar control, and physical exercise of at least 150 mints/week lead to better general wellbeing. Metformin is the first to consider unless contraindicated (Males with creatinine <1.5mg/dl and females with creatinine <1.4mg/dl.), but the addition of another 1-2 oral or injectable medications towards better control may be required. Insulin should be considered in uncontrolled subjects when HBA1C level is greater or equal to 10-12%. A recent study indicated that HBA1C levels in "fragile or frail elderly" should be less ambitious than a younger healthier group of patients." HBA1C less than 7.5-8% may be acceptable in situations where lower targets remain unachievable with simple intervention (Silvio et al). "Higher HBA1C levels might even be passed in elderly patients with long term complications, with decreased self care, cognitive, psychological and poor social and economic support"(21).

Hypertension:
USA based studies reveal that 76% of hypertensive patients are aware of their hypertension, 65% are treated and only 37% are controlled. In the USA more than 50 million people are hypertensive but the national bench mark for controlled patients is only 30%. Current North America HT.2003-2004.

Hypertension prevalence in elderly USA patients above 65 years of age reaches 48.9%. It is the population with the lowest blood pressure control due to several factors. The JNC-7 raised a number of important inquiries: "When does hypertension cause harm in people above 65 years? What is the ideal blood pressure in elderly? What is the best treatment regimen? When do risks of lowering blood pressure outweigh potential benefit?" Blood pressure treatment in older patients results in significant decreases in all-cause mortality related to cardiovascular, stroke, and kidney diseases (22).

The JNC-8 (to be released later this year, (2012) and the online publication by the American College of Cardiologists offers the following reasonable considerations in the geriatric population: 1) Annual blood pressure screening, 2) consider measuring rennin and aldosterone to guide treatment. 3) prescribe diuretics either as first line or second line of treatment. Treatment with long half life diuretic like chlorthalidone is preferred (ALLHAT study). In elderly diabetic patients with hypertension ARBs are considered the first line where hypertension with left ventricular hypertrophy has been considered as an independent risk factor for coronary artery disease, stroke, peripheral artery disease and heart failure. A loop diuretic is recommended for patients with chronic renal failure, and those with diastolic heart failure. Elderly patients with diabetes, hypertension and nephropathy should be treated with ACEI or ARBs. If a combination of drugs is required, use of medications with synergistic effects is recommended. In hypertension patients with diabetes, a combination of ACEI and calcium channel blockers specifically amlodipine has 21% relative risk reduction and 2.2% absolute risk reduction in CV events compared with hydrochlothiazide and ACEI(ACCOMPLISH study). In the octogenarian population with hypertension, start with a single drug low dose thiazide diuretic, or calcium channel blocker towards achieving a systolic blood pressure of 140-145mmhg. Finally because there is a lack of information at which blood pressure levels adequate vital organ perfusion is impaired in 80+ year old patients, systolic blood pressures <130mmhg and diastolic blood pressures<65mmhg are preferably to be avoided(23).

Urinary Incontinence:
Urinary incontinence is considered a major source of emotional distress for male and female elderly patients. In the US the prevalence is 5-10% among ambulatory elderly, 30% in hospitalized patients, and 60% in nursing home residents. Stress incontinence is the most common cause in women less than 75 years, while urge incontinence is the most common cause in women over 75 years. Enlarged prostates in men, and diabetes mellitus and neurologic deficits are causes of overflow incontinence. A directed history, physical examination including rectal/pelvic exam, laboratory tests to detect infectious or metabolic diseases will crystallize the plan of management. Patients with prostatic nodules, pelvic relaxation and recurrent

urinary tract infections due to obstructive uropathy need to be referred for further treatment as indicated.

Treatment of urinary incontinence in elderly entails thinking of delirium as a possible cause, and infection, fecal impaction and diuretics as other possible causes of exacerbation. Estrogen replacement, biofeedback in patients with urge incontinence, and surgical relief of mechanical obstruction all lead to some degree of relief. Patients with neurogenic bladder might need to resort to intermittent long term indwelling catheterization (4).

Depression:
Up to twenty percent of the elderly population suffers from depression which is not a part the normal aging process. The rate of suicide among the elderly is 4 times higher than younger patients. The USPSTF recommends screening all older adults but the frequency of testing is not defined. When sought, depression in older adults can be easily diagnosed and treated as efficiently as in the younger population. One study revealed that 70% of patients committed suicide within one month of being seen by their health care practitioner due either to inadequate diagnosis of depression or reluctance to treat or refer the patient to the appropriate consultant (24).

Constipation:
Constipation is not a consequence of normal aging. Functional constipation might be related to decreased mobility, dehydration, diet, lack of physical activity, a variety of co-morbidities and medications. A complete history, physical examination, medications review including over the counter supplements, and focused initial laboratory tests to rule out metabolic disorders are appropriate. Constipation is a risk factor for delirium and depression. The treatment of constipation might include bowel training, a high fiber diet, warm water enemas and relative increase in physical activity. Finally further investigation might be needed in refractory cases.

Miscellaneous:
The elderly need to be encouraged in the independent activities of daily living (Table 2). Hobbies that stimulate mental, social, spiritual and physical dimensions maintain self-worth and self-realization. Granma Moses started her self-taught painting career of 30 years in her early 70s. Old people need to be encouraged to respect their own health, preserve good nutritional habits including vitamins and minerals. In KSA more than 60% of elderly live with their families, which provides a rich opportunity for social interaction. Yet, there is a documented growing number of neglected elderly in these settings as well as cases of 'granny bashing' (elder abuse).

Summary:
Ageing per se is not a pathologic condition. However, the diversity of associated clinical conditions encountered at old age, continues to challenge primary care physicians in providing continuous evidence supported management of their elderly patients. We reviewed briefly updated treatment options of most common clinical conditions encountered by old age (Diabetes, Hypertension, vision and hearing problems), as well as addressing the associated syndromes of old age namely: Polypharmacy, falls, depression, constipation, urinary incontinence, pain and cognitive impairment. Finally, we addressed few standards of care that might help our elderly patients to age gracefully and preserve a reasonably decent quality of life.

Activities of Daily living that should be assessed in Elderly Patients
Basic (self-care)
(Mnemonic "DEATH")
Dressing
Eating
Ambulating
Toileting
Hygiene
Instrumental, Independent (community interactions)
(Mnemonic "SHAFT")
Shopping
Housework
Accounting
Food preparation
Transportation

Taken from Fleming K. et al Practical functional assessment of elderly persons. A primary care approach. Mayo Clinic Proceedings 1995:70,890-910.
Table 2

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No Alternative Way without Adopting Permanent Contraceptive Methods to Reach Replacement Level of Fertility in Bangladesh

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ABSTRACT

Using the Bangladesh Demographic and Health Survey (BDHS) 2007 data, the researcher has analyzed when Bangladesh will reach the replacement level of fertility (2.1 children per woman) depending on modern contraceptive methods. It is shown from the study that the fertility rate has remained almost the same at the national level of Bangladesh for a long time. But it is also found from the study that fertility rate has reached near to the replacement level in a few divisions of Bangladesh. The researcher has identified there is no alternative way without adapting the permanent contraceptive methods among the six administration divisions, particularly female sterilization, to reach the goal. The researcher would like to suggest that the value of the regional key measures of the contraceptive indices, responsible for achieving the replacement level of fertility rate must be found out and finally applied in other divisions of the country. By doing this, we can reach to our goal to achieve the replacement level of fertility in Bangladesh.

Key Words: Contraception; Fertility Trends; Replacement Level of Fertility; Odds Ratio

Introduction

Bangladesh has been passing through a critical phase of fertility transition. The level of fertility started to decline since mid-seventies. The decline occurred at a rapid pace during the period 1975 to 1993-94. The total fertility rate was 6.3 in 1975 and decreased to 3.4 in 1993-94 (Mitra et al. 1994). However, since 1993-94, the level of total fertility appears to be unchanged at a level of 3.3, as observed from the BDHS 1996-97 and 1999-2000 results. The 2004 BDHS data indicated that after almost a decade-long stagnation, the TFR declined slightly from 3.3 to 3.0 between 1997-1999 and 2001-2004. However, during the period 1993-94 to 2004, the contraceptive prevalence rate has increased substantially from 44.6 per cent to 58.1 per cent. The unchanged level of fertility despite a rapid increase in the level of contraceptive prevalence during a decade, while the level of fertility still remains well above the level of replacement fertility, raised several questions for the policy makers.

The 2007 BDHS data, along with earlier rounds of the survey beginning in 1993, indicate that the decline in fertility has continued during the last three years, reaching 2.7 births per woman. Since 2001, a marked decline in fertility has been observed in Khulna, Chittagong, and Sylhet divisions.

The purpose of this study is to explore the possibility to achieve replacement level of fertility (2.1 children per women) in Bangladesh by using Bangladesh Demographic and Health Survey (BDHS) 2007, with special attention to the role that might be played by improvements of modern contraceptive methods (MCM).

Data and Methodology

The 2007 Bangladesh Demographic and Health Survey (BDHS) employed a nationally representative sample that covers the entire population residing in private dwelling units in Bangladesh. Bangladesh is divided into six administrative divisions: Barisal, Chittagong, Dhaka, Khulna, Rajshahi, and Sylthet. In turn, each division is divided into *zilas*, and each zila into *upazilas*. Rural areas in an upazila are divided into union *parishads* (UPs), and UPs are further divided into *mouzas*. Urban areas in an upazila are divided into wards, and wards are subdivided into *mahallas*. Of the 10,819 households selected for the survey, 10,461 were found to be occupied. Interviews were successfully completed in 10,400 households, or 99.4 percent of households. A total of 11,178 eligible women age 10-49 were identified in these households and 10,996 ever-married women were interviewed. In this research 4,667 currently married women were found out (BDHS, 2007) among 10,996 ever-married women.

Logistic regression analysis has been applied to identify the influential determinants which play the vital role of fertility reduction at the desired level among the selected modern contraceptive methods in the six administrative divisions of Bangladesh, in currently married women aged 10-49 on the basis of Barisal (639), Chittagong (712), Dhaka (1055), Khulna (806), Rajshahi (1096) and Sylhet (359) out of 4,667.

In order to create a dependent variable as well as fertility measurement variable, the researcher has calculated the median of the variable named total number of children ever born per currently married women and it is found to be 2 (i.e. two children ever born per woman). Then the variable has been coded as 0 (zero) for above median and 1 (one) for less or equal to median. To be literally meaningful the new variable is treated as index of fertility and its two levels are accordingly disfavourable fertility behaviour for above median and favourable fertility behaviour for less or equal to median. The dependent variable index of fertility is shown as a binary or dichotomous one. The expected replacement level fertility rate of Bangladeshi women is to be estimated by the created fertility index depending on the logistic regression analysis. When it takes the value 1, the probability will be P (say) if the respondent contains favourable fertility behaviour and 0 with probability (1-*P*) if he/she contains disfavourable fertility behaviour. The independent variables in the model belong to six modern contraceptive methods i.e. pill, IUD, injections, condom, male and female sterilization. The independent variables of the analysis are categorical as well as indicator variables so as to handle in logistic regression analysis the individual category of a variable is converted into the present and absence of a characteristic, usually denoted by 1 and 0, often called dummy variables.

Estimation of Logistic Regression

Logistic regression (Peduzzi 1996; Pampel et al. 2000) is a technique for analyzing problems in which there are one or more independent variables that determine an outcome. The outcome is measured with a dichotomous variable (in which there are only two possible outcomes). In logistic regression, the dependent variable is binary or dichotomous, i.e. it only

contains data coded as 1 (TRUE, success, pregnant, etc.) or 0 (FALSE, failure, non-pregnant, etc.).

The goal of logistic regression is to find the best fitting (yet biologically reasonable) model to describe the relationship between the dichotomous characteristic of interest (dependent variable = response or outcome variable) and a set of independent (predictor or explanatory) variables. Logistic regression generates the coefficients (and its standard errors and significance levels) of a formula to predict a *logit transformation* of the probability of presence of the characteristic of interest:

$$\text{logit}(p) = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + \ldots + b_k X_k$$

where p is the probability of presence of the characteristic of interest. The logit transformation is defined as the logged odds:

$$\text{odds} = \frac{p}{1-p} = \frac{\textit{probability of presence of characteristic}}{\textit{probability of absence of characteristic}}$$

and

$$\text{logit}(p) = \ln\left[\frac{p}{1-p}\right]$$

Rather than choosing parameters that minimize the sum of squared errors (like in ordinary regression), estimation in logistic regression chooses parameters that maximize the likelihood of observing the sample values.

Regression Coefficients

The regression coefficients are the coefficients b_0, b_1, b_2, ... b_k of the regression equation:

$$\text{logit}(p) = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + \ldots + b_k X_k$$

An independent variable with a regression coefficient not significantly different from 0 (P>0.05) can be removed from the regression model. If P<0.05 then the variable contributes significantly to the prediction of the outcome variable.

The logistic regression coefficients show the change (increase when bi>0, decrease when bi<0) in the predicted logged odds of having the characteristic of interest for a one-unit change in the independent variables. When the independent variables X_a and X_b are dichotomous variables (e.g. Smoking, Sex) then the influence of these variables on the dependent variable can simply be compared by comparing their regression coefficients b_a and b_b.

Odds Ratios

By taking the exponential of both sides of the regression equation as given above, the equation can be rewritten as:

$$\text{odds} = \frac{p}{1-p} = e^{b0} \times e^{b1X1} \times e^{b2X2} \times e^{b3X3} \times \ldots \times e^{bkXk}$$

It is clear that when a variable Xi increases by 1 unit, with all other factors remaining unchanged, then the odds will increase by a factor e^{bi}. This factor e^{bi} is the odds ratio (O.R.) for the independent variable X_i and it gives the relative amount by which the odds of the outcome increase (O.R. greater than 1) or decrease (O.R. less than 1) when the value of the independent variable is increased by 1 units. e.g. the variable SMOKING is coded as 0 (= no smoking) and 1 (= smoking), and the odds ratio for this variable is 3.2. This means that in the model the odds for a positive outcome in cases that do smoke are 3.2 times higher than in cases that do not smoke.

Trends of Fertility and Contraception in Bangladesh

Trends in fertility in Bangladesh since the early 1970s can be examined by observing a time series of estimates produced from demographic surveys fielded over the last three decades, beginning with the 1975 Bangladesh Fertility Survey (BFS). Data from the 2007 BDHS and previous surveys show that following a nearly decade-long plateau in fertility from 1993 to 2000, fertility in Bangladesh has resumed its decline. The estimates shown in Table: 1 describe the ongoing fertility transition in Bangladesh. Fertility has declined sharply, from 6.3 births per woman in 1971-75 to 2.7 births per woman in 2004-2006 (Table: 1 and Figure: 1). There was an initial rapid decline in fertility of nearly two children per women up to the early 1990s. Fertility then plateaued at around 3.3 births per woman for most of the 1990s. This was followed by another noteworthy decline in fertility during the current decade. The 2007 BDHS data, along with earlier rounds of the survey beginning in 1993, indicate that the decline in fertility has continued during the last three years, reaching 2.7 births per woman. Since 2001, a marked decline in fertility has been observed in Khulna, Chittagong, and Sylhet divisions. The decline in fertility in the last two decades occurred mostly among older women (Mitra et al. 1994; Mitra et al. 1997; NIPORT et al. 2001; NIPORT et al. 2005).

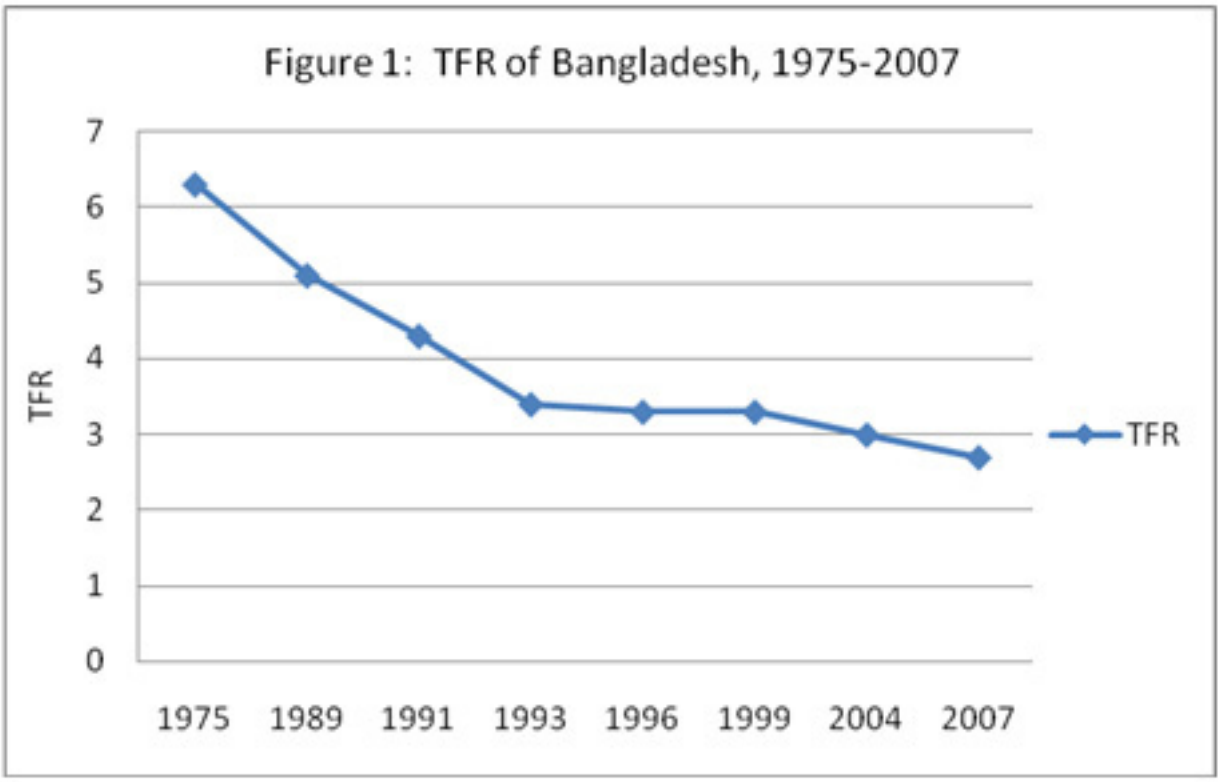
Age Group	Year							
	1975	1989	1991	1993-94	1996-97	1999-00	2004	2007
15-19	109	182	179	140	147	144	135	126
20-24	289	260	230	196	192	188	192	173
25-29	291	225	188	158	150	165	135	127
30-34	250	169	129	105	96	99	83	70
35-39	185	114	78	56	44	44	41	34
40-44	107	56	36	19	18	18	16	10
45-49	35	18	13	14	6	3	3	1
TFR	6.3	5.1	4.3	3.4	3.3	3.3	3.0	2.7

Source: (BFS 1975, 1989); (BCPS 1991); (BDHS 1993-94, 1996-97, 1999-2000, 2004 and 2007).

Table 1: Age-Specific Fertility Rates (per 1,000 women) and Total Fertility Rates (TFRs) among Women Age 15-49, Selected Sources, Bangladesh, 1975-2007

It is shown that the fertility rate has not been uniform in six administrative divisions of Bangladesh, in Tabl
e: 2. Fertility varies widely by administrative divisions of Bangladesh. The table represents that Khulna has already reached replacement level fertility, and Rajshahi is close to it in 2007. Sylhet has the highest TFR (3.7 births) followed by Chittagong (3.2 births). It is quite surprising that the level of fertility of Rajshahi, Dhaka and Barisal division is approaching the replacement level (TFR=2.1) that is to be declined 12.5%, 25% and 25% only. On the other hand Sylhet and Chittagong divisions have declined their fertility rate at 43% and 34% respectively to reach the replacement level of fertility. BDHS 2007 also represents that TFR of Sylhet division is 85% more than Khulna that is 2.0 to 3.7. Table: 2 depicts TFR is decreasing during the period 1996 to 2007 but very slowly in the different divisions of Bangladesh.

The contraceptive prevalence rate for currently married women in Bangladesh has increased from 8 percent in 1975 to 56 percent in 2007, a sevenfold increase over more than three decades (Table: 3 and Figure: 2). Overall, current contraceptive use



Division	TFR			
	2007	2004	1999-2000	1996-97
Barisal	2.8	2.9	3.26	3.31
Chittagong	3.2	3.7	3.96	4.06
Dhaka	2.8	2.9	3.21	3.18
Khulna	2.0	2.8	2.7	2.52
Rajshahi	2.4	2.6	3.02	2.78
Sylhet	3.7	4.2	4.08	4.2

Source: (BDHS 1996-97, 1999-2000, 2004 and 2007).

Table 2: Trends of TFR of Different Division, Bangladesh 1996-2007

has declined by two percentage points in the past three years, from 58 percent in 2004 to 56 percent in 2007, but use of modern methods has remained unchanged. Use of oral pills has continued to rise, but a two-decade trend of increasing injectable use was interrupted in 2007 (Table: 3 and Figure: 2). The observed decline in injectable use, from 10 percent in 2004 to 7 percent in 2007, could be the result of a significant shortage in injectable supplies during some periods of 2006-2007 that affected public-sector and NGO family planning service delivery. Between 2004 and 2007, use of traditional methods also declined from 11 percent to 8 percent.

The decade-long decline in the use of long-lasting contraceptive methods stabilized in 2007. As in 2004, only 7 percent of currently married women are using sterilization, IUD or Norplant in 2007, compared with 11 percent in 1993-1994. Consequently, the method mix has also changed in the past decade. In 1993-1994, long-lasting methods accounted for 26 percent of total contraceptive use, and now they account for only 13 percent.

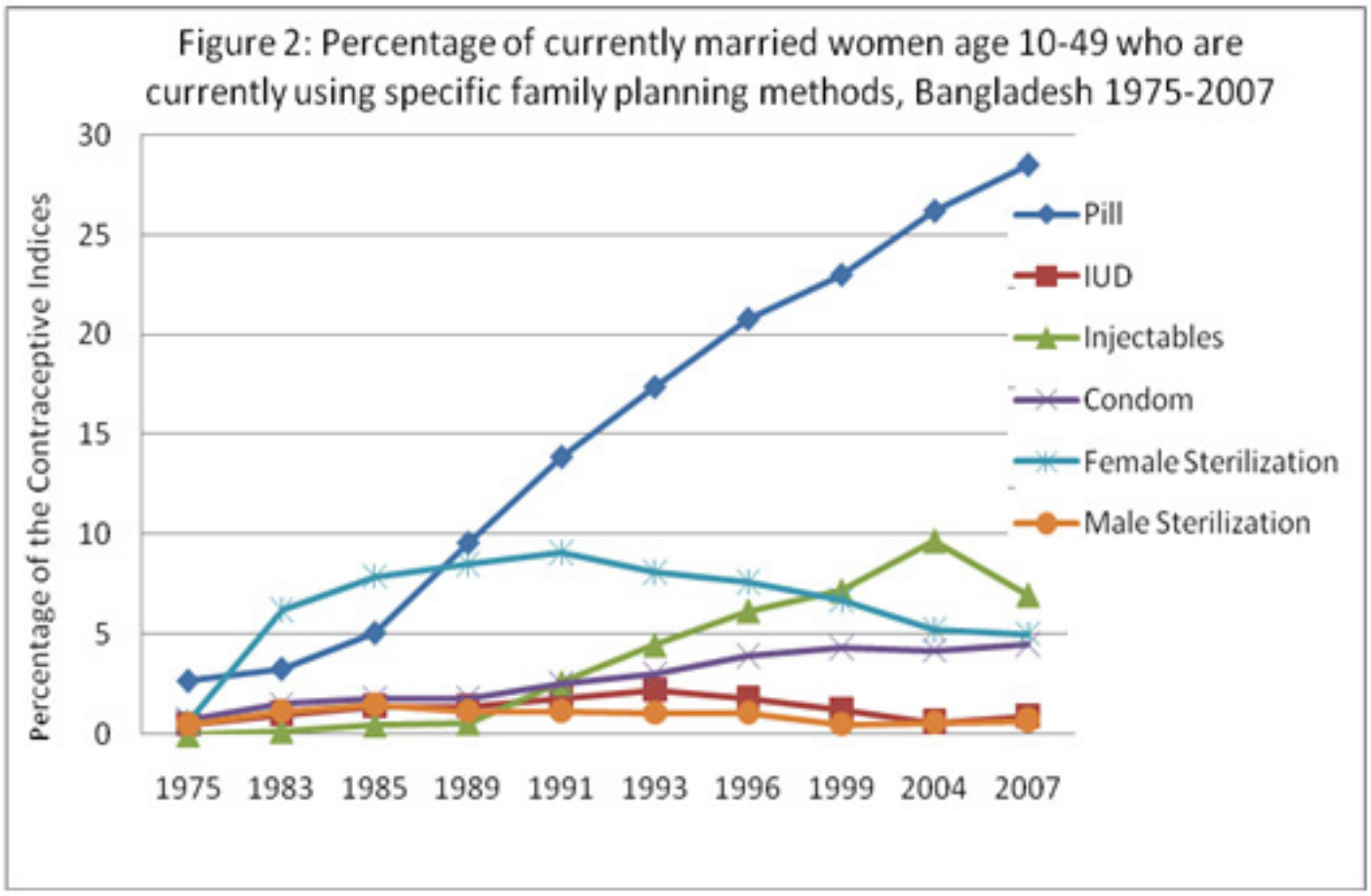
The level of fertility started to decline since mid-seventies. The decline occurred at a rapid pace during the period 1975 to 1993-94. Table: 4 indicates percentage using of pill, injectables and condom are generally increasing during the period of 1975-2007. On the other hand IUD, female and male sterilization increases up to 1993-94 then declines.

Table 5 (page 33) shows the percentage use of the contraceptive devices is always lowest at Sylhet division. The percentage use of pill is about 3 times at Rajshahi and 2.3 times at Khulna than Sylhet. The percentage use of IUD is the highest at Khulna. The percentage use of condom is about 2.5 times at Dhaka and 2 times at Khulna than Sylhet. Female and male sterilization as permanent birth control is highest in Rajshahi (6.6) and the second highest in Khulna.

Method	Year									
	1975	1983	1985	1989	1991	1993-94	1996-97	1999-00	2004	2007
Any Modern Method	5.0	13.8	18.4	23.2	31.2	36.2	41.5	43.4	47.3	47.5
Pill	2.7	3.3	5.1	9.6	13.9	17.4	20.8	23.0	26.2	28.5
IUD	0.5	1.0	1.4	1.4	1.8	2.2	1.8	1.2	0.6	0.9
Injectables	-	0.2	0.5	0.6	2.6	4.5	6.2	7.2	9.7	7.0
Norplant	-	-	-	-	-	-	0.1	0.5	0.8	0.7
Vaginal Methods	0.0	0.3	0.2	0.1	-	-	-	-	-	-
Condom	0.7	1.5	1.8	1.8	2.5	3.0	3.9	4.3	4.2	4.5
Male Sterilization	0.7	1.2	1.5	1.2	1.2	1.1	1.1	0.5	0.6	0.7
Female Sterilization	0.6	6.2	7.9	8.5	9.1	8.1	7.6	6.7	5.2	5.0
Any Traditional Method	2.7	5.4	6.9	7.6	8.7	8.4	7.7	10.3	10.8	8.3
Periodic Abstinence	0.9	2.4	3.8	4.0	4.7	4.8	5.0	5.4	6.5	4.9
Withdrawal	0.5	1.3	0.9	1.8	2.0	2.5	1.9	4.0	3.6	2.9
Other Traditional Methods	1.3	1.8	2.2	1.8	2.0	1.1	0.8	0.9	0.6	0.6
CPR	7.7	19.1	25.3	30.8	39.9	44.6	49.2	53.8	58.1	55.8

Source: (BFS 1975, 1989); (BCPS 1983, 1985 and 1991); (BDHS 1993-94, 1996-97, 1999-2000, 2004 and 2007).

Table 3: Percentage of Currently Married Women Age 10-49 Who are Currently Using Specific Family Planning Methods, Selected Sources, Bangladesh 1975-2007



Year	Pill	IUD	Injectables	Condom	Female Sterilization	Male Sterilization
1975	2.7	0.5	U	0.7	0.6	0.5
1983	3.3	1	0.2	1.5	6.2	1.2
1985	5.1	1.4	0.5	1.8	7.9	1.5
1989	9.6	1.4	0.6	1.8	8.5	1.2
1991	13.9	1.8	2.6	2.5	9.1	1.2
1993-94	17.4	2.2	4.5	3	8.1	1.1
1996-97	20.8	1.8	6.2	3.9	7.6	1.1
1999-00	23	1.2	7.2	4.3	6.7	0.5
2004	26.2	0.6	9.7	4.2	5.2	0.6
2007	28.5	0.9	7	4.5	5	0.7

Table 4: Percentage of currently married women age 10-49 who are currently using specific family planning methods, selected sources, Bangladesh 1975-2007.

2007						
Division	Pill	IUD	Injectables	Condom	Female Sterilization	Male Sterilization
Barisal	27.9	1.0	8.9	3.4	3.2	1.0
Chittagong	24.0	1.0	5.1	3.4	4.1	0.2
Dhaka	27.6	0.9	7.5	5.9	4.5	0.4
Khulna	30.7	1.1	8.1	4.8	6.2	0.9
Rajshahi	35.7	0.9	7.4	4.3	6.6	1.5
Sylhet	13.3	0.7	5.0	2.4	3.0	0.0

Table 5: Percent distribution of currently married women age 15-49 by contraceptive method currently used, Bangladesh 2007.

Methods	Divisions					
	Barisal	Chittagong	Dhaka	Khulna	Rajshahi	Sylhet
	Odds Ratios	Odds Ratios	Odds Ratios	Odds Ratios	Odds Ratios	Odds Ratios
Pill	11.896*	7.625*	4.999*	2.924*	4.648*	3.238*
IUD	7.200*	1.337	3.656*	3.074*	1.947***	0.786
Injections	6.452*	4.168*	3.285*	1.951**	2.878**	1.551
Condom	27.785*	11.733*	15.382*	4.024*	6.167*	6.417*
Male Sterilization	6.000*	1.100	1.343	1.576	1.618	-
Female Sterilization[r]	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**	**1.000**
TFR	2.8	3.2	2.8	2.0	2.4	3.7

r = Reference Category; '*' = Significant at 1% level; '**' = Significant at 5% level;
and '***' = Significant at 10% level

Table 6: Odds Ratios of the Logistic Regression Coefficients of the Modern Contraceptive Methods on the Six Administrative Divisions of Bangladesh 2007

Female sterilization has been taken as the reference category among six modern contraceptive methods for the six divisions of Bangladesh. The odds ratios of the divisions are given in Table: 6. The odds ratios of modern contraceptive methods (MCM) of Barisal division corresponding to pill, IUD, injections, condom and male sterilization representing favourable fertility behaviour are significantly 11.8, 7.2, 6.4, 27.7 and 6 times higher in the respondents respectively than the reference method female sterilization.

The odds ratios of MCM of Chittagong division corresponding to pill, injections and condom representing favourable fertility behaviour are significantly 7.6, 4.1 and 11.7 times higher respectively than the reference method. The odds ratios of IUD and male sterilization reveal there is no significant effect in the fertility due to its causes.

The odds ratios of MCM of Dhaka division corresponding to pill, IUD, injections and condom representing favourable fertility behaviour are significantly 4.9, 3.6, 3.2 and 15.3 times respectively higher than the reference method female sterilization. Similarly, it is 2.9, 3.0, 1.9 and 4.0 times higher in Khulna and 4.6, 1.9, 2.8 and 6.1 times higher in Rajshahi than the reference method.

In the Sylhet division, odds ratios of pill and condom of MCM representing favourable fertility behaviour are significantly 3.2 and 6.4 times higher than the reference method. It also shows from the analysis that IUD and injections in Sylhet division are not playing any significant role in fertility reduction at a desired level of Bangladesh. On the other hand male sterilization has no effect in Sylhet.

Conclusion

In Bangladesh, the onset of fertility decline was evident since the mid-seventies. The decline occurred at a rapid pace during the period 1975 to 1993-94. The total fertility rate was 6.3 in 1975 and decreased to 3.4 in 1993-94. However, since 1993-94, the level of total fertility appears to be unchanged at a level of 3.3, as observed from the BDHS 1996-97 and 1999-2000 results. Results show fertility rate is decreasing after 2000 but very slowly. However, during the period from 1993-94 to 2004, the contraceptive prevalence rate has increased substantially from 44.6 percent to 58.1 percent. The slow trends of fertility despite a rapid increase in the level of contraceptive prevalence during the past 10 years, while the level of fertility still remains well above the level of replacement fertility, raised questions about the policy measures in order to complete the demographic transition. The steep decline in fertility since 1975 has corresponded with the rise in CPR up to 1993-94 in Bangladesh. Using the relationship between TFR and CPR during this period to predict future fertility, researchers argued that a replacement level of fertility could be attained in Bangladesh by raising the CPR at a level of 70 percent. However, results of the last two BDHS in 1996-97 and 1999-2000 demonstrated that despite an increase in CPR over the period 1994-2000, the TFR has remained at the same level of 1993-94 (Mitra et al. 2001). This raises concern among researchers, policy makers and programme managers about the prospect of attaining the replacement level of fertility in Bangladesh in the near future.

Though, it is shown from the study that the fertility rate has remained almost the same in the national level of Bangladesh for a long time. But it is also found that fertility rate varies widely among the six divisions of Bangladesh. Khulna division has already reached and Rajshahi is near to replacement level of Bangladesh. The researchers have observed from the study that the percentage use rate of the modern contraceptive indices: pill, IUD, injections, condom, female sterilization and male sterilization are increasing from 1975 to 1993-94 then decreasing except pill, injections and condom. The researcher has also observed that in the same period fertility decline was rapid in Bangladesh. After then the country cannot achieve any remarkable success in fertility decrease. It is clear from the study that out of six modern contraceptive methods IUD, female sterilization and male sterilization are responsible for the situation.

The odds ratios of logistic regression in the divisions reflects favourable fertility behaviour appears to be high in the respondents due to pill, IUD, injections, condom and male sterilization compared to female sterilization. Observing the odds ratios of the analysis the researcher has suggested in the permanent contraceptive methods especially female sterilization must be increased in the six divisions of Bangladesh until the level of fertility reaches the replacement level.

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Occupational Differential Risks of Mortality among Pensioners in Nagaland, India

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ABSTRACT

Objectives: To study the differentials in the risks of mortality by occupation among pensioners, after superannuation retirement in Nagaland, who retired during 1996-2011.

Data and Methodology: The data are compiled from the Pension Payment Orders (PPOs) and are analysed using hazard model methodology based on Kaplan-Meier non-parametric estimation. The pensioners are classified into three occupational categories I, II and III which respectively represents the pensioners who retired from high, medium and low profile jobs.

Results: The relative risk of mortality was higher up to six years immediately after retirement but lower in the remaining years for retirees belonging to occupational category-I, compared to those in occupational category-II and III. And the risk of mortality was higher up to three years immediately after retirement but lower in the remaining years for retirees of occupational category-II compared to those in occupational category-III.

Conclusion: Differentials in the risks of mortality of the pensioners by occupation, exists in the post retirement years.

Key words: Superannuation, Pension Payment Orders (PPOs), Occupational Category, Hazard Model, Synthetic Life Table, Differentials Mortality Risks.

Introduction

Retirement is a social phenomenon which can be defined as withdrawal from the world of work. The term 'work' here refers to paid employment in the government organization and which has the character of an occupation. In our society, occupation or work is viewed not only as a source of income, but also as an indicator of personal and social identity. In an individual's life occupation is such an influencing socio-economic factor that his/her identity, life style, participation pattern, etc., all depend on his/her work. Thus, retirement from work after years of active service may be a traumatic experience to those who face compulsory withdrawal from the labour force, because it is the retirement that undercuts the role of occupation in defining an individual's position and identity in the family as well as in the society (1). It is also a fact that the old skilled people are being forced out of work under mandatory regulation of retirement irrespective of whether or not they are physically, mentally or economically ready for retirement from the paid labour force. In the government organisation, the working people have a fixed age of retirement called the superannuation age and usually nobody is allowed to stay in service beyond that age.

There has been much concern about compulsory retirement practice and its adverse effect on a person's life. The sudden and abrupt disengagement from active economic and social life due to retirement may result in numerous socio-psychological problems for retirees (2,3). These problems may affect their personal and social life as they shift to a non productive role with less income, possibly more social isolation, and perhaps with reduced status within the family. Such role loss and attendant feelings of worthlessness with ageing may have deleterious effects on the health of the retirees in terms of tension, stress and worry (1,4,5). Thus, the mortality of the elderly persons, especially of the pensioners, varies due to the socio-economic as well as occupational differentials (6,7,8,9).

The retired persons constitute a significant subgroup of the heterogeneous group of elderly population in India and their problems vary due to the differences in residential location, socio-economic and cultural differences. In the context of Nagaland, hardly any study has been carried out so far to examine the socio-economic, cultural and psychological effects on the mortality differentials of pensioners. Nagaland is basically a hilly tribal state. It is lagging behind socially, economically and educationally as compared to some other states of India. The problems of the retirees in Nagaland might not be similar to those faced by the retirees in some other states of the country. Thus the psychological stress and strain suffered by the pensioners in Nagaland may give rise to a different level of deleterious effect on their health and vigour and thereby a different scenario of risks of mortality by occupation.

With this backdrop, the objective of this article is to study the differentials in the risks of mortality by occupation among pensioners, after superannuation retirement in Nagaland, who retired during 1996-2011.

Data

(A) Source:

Data were collected from the non-conventional institutional data source which is the Pension Payment Orders (PPOs) available at the Government Pay and Accounts or Treasury Office situated at every district of a state in India (10). The PPOs provide information on name, age, occupation, date of retirement, date of death, amount of pension, etc., of the pensioners. Data were compiled from the PPOs available in the three Treasury Offices located at Kohima and Dimapur City, for the pensioners who retired from various state government jobs after attaining superannuation age during the period 1996-2011. Kohima and Dimapur are the two most advanced districts of Nagaland, one having its political capital and the other the commercial capital of the state and therefore government employees from across the state have a tendency to have their permanent residential settlement in either of the districts. Thus, the pensioners who draw their pension from the Treasury Offices of Kohima and Dimapur may be representative of the entire state. The descriptions of the variables used in the study are given in Table 1 (below).

(B) Occupational Categories (OCs):

Researchers have identified two major dimensions underlying occupational differences in mortality, namely 'exposure' and 'life-style'. 'Exposure' denotes the surrounding in which a person works in the service period and 'life-style' is defined as a by product of social status which includes health behaviour, access to health care facilities and attitudes towards health care (6,7,11). In some studies (8,9) the factors such as 'administrative powers to take decisions', 'the extent of public dealings' and 'nature of job' have been added to redefine the 'life-style'. By 'nature of job' it is meant whether or not the job requires direct hard physical labour to render service. We have classified the pensioners into three broad occupational categories (OCs) according to the degree of similarity of occupation expressed in terms of 'exposure' and 'life-style' which they enjoyed during their pre-retirement years. Accordingly, OC-I consists of those pensioners who retired from Nagaland state government jobs whose work involved the power of taking administrative decisions and also public dealing to a large

Variable	Description
Age	Age of pensioners (a) at the date of exit from the study due to death or other reason, (b) at the reference date of the study i.e. 31st March, 2011
Sex	Male and Female
Type of pension	Superannuation pension and Family pension granted after superannuation retirement.
Retirement Age	58 years at the time of superannuation retirement.
Date of Death	In the event of death of the pensioner after superannuation retirement

Table 1

extent, but no direct hard physical labour e.g., officers from various departments. OC-II includes those government jobs which involved neither the power of taking administrative decisions nor direct public dealing, but involved a lot of paper work to give the effect of administrative decisions e.g., Clerks, Sectional Assistants, etc. OC-III includes those government jobs which required direct hard physical labour to render service, but had no power of taking administrative decisions and public dealings e.g., drivers, peons, constables, etc. In other words, we can say that the three OCs I, II and III respectively represent the pensioners who were in high, medium and low profile jobs.

Methodology

In order to estimate the probability of death of pensioners in the years following retirement and to obtain mortality differentials by occupation in terms of relative risk, synthetic life tables have been constructed incorporating the censored information and then hazard rates of mortality are estimated by first estimating the survival function using Kaplan-Meier (12) nonparametric Estimate.

Construction of Life Tables by Incorporating Censored Information:

The following assumptions have been made in order to construct the synthetic life tables for pensioners who retired during the period 1996-2011.

(a) Assumptions:

i. The population is homogeneous; i.e., the risk of mortality for pensioners is constant for all individuals under study during the time interval (0,T).

ii. The failure and censoring mechanisms are independent, i.e., the mortality and survival experiences of the pensioners with differing entry dates are put together so as to yield a picture of mortality-survival experiences of a synthetic cohort with a common entry date.

The actuarial estimates of the life table functions are obtained for a series of time intervals each being of three years length which were obtained by dividing the entire period of observation under study (i.e., 15 years period starting from 1st April, 1996 to 31st March, 2011) into five equal intervals.

(b) Description of Life Table Columns:

The different columns of the synthetic life table are described below-

Column (1): Time intervals used for grouping the observations, all intervals being of length three years.

Column (2): n_j - Number of pensioners who are alive and are at the risk of death in the beginning of j[th] interval; j=1,2,3,4,5 and $n_{j+1} = n_j - d_j - c_j;\ j = 1,2,3,4,5$; where d_j and c_j are defined as follows:

Column (3): d_j - The number of deaths during the j[th] interval.

Column (4): c_j - The number of pensioners who were lost in follow up while they were under observation and supposed to be not experiencing the event of death till the end of the observational period (i.e. the reference date of the study, the 31st March, 2011). 'c_j' is also called the number of censored cases.

Column (5): -The average number of pensioners who are at risk of death during the j[th] interval of survival time and is given by $n_j' = n_j - a * c_j$; j=1,2,..,5

[Here, we do not make any assumption regarding the censoring process i.e. no assumptions are made as to whether censored survival time occurs uniformly or not throughout the jth interval. Instead we considered the actual value of the constant '*a*' (using observed number of deaths),

$$a = \frac{1}{k}\sum_{j=1}^{k} a_j$$

where '*a*' is defined by = average of 'k' average survival fractions=0.57]

Column (6): q_j - The estimated probability of death during the jth interval given that the pensioner was alive at the beginning of the interval and is obtained by

$$q_j = \frac{d_j}{n_j'}, j = 1,2,\ldots,5$$

Column (7): p_j - The estimated probability of survival of pensioner during the interval and is given by

$$p_j = 1 - q_j; j = 1,2,\ldots,5$$

Relative Risks of Mortality by Occupation:

The relative risk of mortality of the j^{th} occupational category with respect to the k^{th} occupational category is denoted by $R_{jk}(t)$ and is defined by:

$$R_{jk}(t) = \frac{Hazard\ rate\ h(t)\ for\ j-th\ category\ pensioners\ during\ the\ given\ period\ of\ survival\ time}{Hazard\ rate\ h(t)\ for\ k-th\ category\ pensioners\ during\ the\ same\ period\ of\ survival\ time}$$

If $R_{jk}(t) > 1$ then it implies that the risk of mortality among pensioners of the j^{th} occupational category is higher than that of the k^{th} occupational category of pensioners for the given interval of time. Here, $R_{jk}(t)$ is the reciprocal of $R_{kj}(t)$ i.e., $R_{jk}(t) \times R_{kj}(t) = 1\ for\ j \neq k;\ j,k = 1,2,3\ \forall t$.

Accordingly, the interpretations of $R_{jk}(t)$ can be made conversely to $R_{kj}(t)$.

Results and Interpretations

Period/ Time Interval	Number of Pensioners			
	Category-I	Category-II	Category-III	Total
(1996-1999)=[0 1)=1	37	64	79	180
(1999-2002)=[1 2)=2	64	91	155	310
(2002-2005)=[2 3)=3	84	122	231	437
(2005-2008)=[3 4)=4	212	206	295	713
(2008-2011)=[4 5)=5	344	296	333	973
Total	741	779	1093	2613

Table 2: Pensioners retired on attaining Superannuation during 1996-2011 by Occupational Categories

Survival Time Interval (j)	n_j	d_j	c_j	n_j'	q_j	p_j
[0 1)=1	741	3	19	730.17	0.00411	0.99589
[1 2)=2	719	12	44	693.92	0.01729	0.98271
[2 3)=3	663	8	68	624.24	0.01282	0.98718
[3 4)=4	587	22	196	475.28	0.04629	0.95371
[4 5)=5	369	25	343	173.49	0.14410	0.85590

Table 3: Synthetic Life Table for pensioners in Occupational Category (OC)-I

Survival Time Interval (t)	$S(j)$	$\varphi(t)$	$S(t)=\frac{S(j)+S(j+1)}{2}$	$h(t)=\frac{\phi(t)}{S(t)}$
[0 1)=1	1.00000	0.00411	0.99795	0.00412
[1 2)=2	0.99589	0.01722	0.98728	0.01744
[2 3)=3	0.97867	0.00856	0.97439	0.00878
[3 4)=4	0.97011	0.02862	0.95580	0.02994
[4 5)=5	0.94149	0.12521	0.87889	0.14246
[5 6)=6	0.81628			

$$S(j)=p_1\times p_2\times.....\times p_{j-1}\times p_j;\ j=1,2,...,5$$

$$\phi(t)=S_j-S_{j+1};\ j=1,2,...,5;\ S(t)=\frac{S(j)+S(j+1)}{2}\ \ and\ \ h(t)=\frac{\phi(t)}{S(t)}$$

Where

Table 4: Estimates of Survival Function $S(j)$, Prob. Density function $\phi(t)$ and Hazard function $h(t)$ of Pensioners in Occupational Category (OC)-I

Survival Time Interval (j)	n_j	d_j	c_j	n_j'	q_j	p_j
[0 1)=1	779	3	47	752.21	0.00399	0.99601
[1 2)=2	729	6	73	687.39	0.00873	0.99127
[2 3)=3	650	8	108	588.44	0.01360	0.98640
[3 4)=4	534	24	189	426.27	0.05630	0.94370
[4 5)=5	321	27	294	153.42	0.17599	0.82401

Table 5: Synthetic Life Table for Pensioners in the Occupational Category (OC)-II

Survival Time Interval (t)	$S(j)$	$\phi(t)$	$S(t)=\frac{S(j)+S(j+1)}{2}$	$h(t)=\frac{\phi(t)}{S(t)}$
[0 1)=1	1.00000	0.00399	0.99801	0.00400
[1 2)=2	0.99601	0.00869	0.99167	0.00876
[2 3)=3	0.98732	0.00953	0.98256	0.00970
[3 4)=4	0.97779	0.04692	0.95433	0.04917
[4 5)=5	0.93087	0.15325	0.85425	0.17940
[5 6)=6	0.77762			

Table 6: Estimates of Survival Function $S(j)$, Prob. Density function $\phi(t)$ and Hazard function $h(t)$ of Pensioners in Occupational Category (OC)-II

Survival Time Interval (j)	n_j	d_j	c_j	n_j'	q_j	p_j
[0 1)=1	1093	2	45	1067.35	0.00187	0.99813
[1 2)=2	1046	11	124	975.32	0.01128	0.98872
[2 3)=3	911	26	205	794.15	0.03274	0.96726
[3 4)=4	680	31	267	527.81	0.05873	0.94127
[4 5)=5	382	52	330	193.90	0.26818	0.73182

Table 7: Synthetic Life Table for Pensioners in the Occupational Category (OC)-III

Survival Time Interval (t)	$S(j)$	$\phi(t)$	$S(t)=\frac{S(j)+S(j+1)}{2}$	$h(t)=\frac{\phi(t)}{S(t)}$
[0 1)=1	1.00000	0.00187	0.99907	0.00187
[1 2)=2	0.99813	0.01126	0.99250	0.01135
[2 3)=3	0.98687	0.03052	0.97161	0.03141
[3 4)=4	0.95635	0.04590	0.93340	0.04918
[4 5)=5	0.91045	0.22161	0.79965	0.27713
[5 6)=6	0.68884			

Table 8: Estimates of Survival Function $S(j)$, Prob. Density function $\phi(t)$ and Hazard function $h(t)$ of Pensioners in Occupational Category (OC)-III

The results of synthetic life tables and the hazard rates for each category of pensioners are presented in the Tables 3 to 8 and the results of the relative risks of mortality by occupation is given in Table 9.

It is observed from the last column of Table 4, that the change in hazard rate between the 1st and 2nd period is positive (i.e., 0.01332); but the change is negative between the 2nd and 3rd period (i.e., -0.00866) and the changes between the consecutive next periods thereafter are positive. It implies that the first three years of retirement was more hazardous than the second three years of retirement for the pensioners belonging to OC-I. But, Table 6 and Table 8 show that for OC- II and III, the hazard rates are increasing with the increase in every survival time duration after retirement, but the increment is not uniform. The change in hazard rates between the 1st and 2nd periods is more than the change between the 2nd and 3rd periods. It indicates that the first three years of retirement was more hazardous than the second three years for pensioners in category-II. But, Table 8 depicts a different scenario. It shows that the higher risk of mortality starts only after six years of retirement for the pensioners belonging to OC-III. It is also important to note that in all the occupational categories, the hazard rates are higher in the last two periods indicating that the last 6 years of the considered 15 year period of life span after retirement are relatively more hazardous for all the pensioners. This may be due to the fact that the ageing process of the pensioners in the post retirement life span leads to more instantaneous mortality.

It is evident from column (2) and (3) of Table 9 that the risks of mortality of pensioners belonging to OC-I were relatively higher up to 6 years of retirement than the pensioners belonging to OC-II and III. However, the relative risks of mortality in the remaining years were found to be lower. On the other hand, column-(4) reveals that the risks of mortality of the pensioners belonging to OC-II were relatively higher than the pensioners belonging to OC-III in the first three year period after retirement and thereafter it is relatively lower. On the contrary, the relative risks of mortality of the pensioners belonging to OC-III are lower in the first six years immediately after retirement compared to pensioners in OC-I and higher thereafter, but it is lower only up to the first three years immediately after retirement and higher throughout the remaining years compared to the pensioners in OC-II.

Discussion and Conclusion

Retirement brings a major change in the 'life-style' of a pensioner. The pensioners enter into a new phase of life following retirement where they are to lead a life with reduced income, extra leisure time, without the workplace and the co-workers, etc. The post retirement periods act differently upon different occupational categories of pensioners. The pensioners who retired from high profile jobs (OC-I in our study) enjoyed much power, authority and sought compliance without questioning during their service time and soon after retirement the loss of power and authority, loss of workplace and co-workers, inability to properly plan for utilization of extra leisure time, the feeling of loss of status and role in the family and society along with ageing often results in emotional shock and psychological stress (3,13,14,15). Moreover, there are many people who attain a higher level in the job feel pseudo dignity and hence keep maintaining a distance from the society or have less social involvement and therefore find very little space for themselves in the society after retirement from government jobs. Because of these facts, this category of pensioners experiences greater stress in the initial years after retirement due to their inability to fully cope with the changed phase of life and as a result the initial years of retirement become more hazardous for them (8). The pensioners belonging to OC-II may not feel much change in their life-style after retirement and hence may not face the problems of adjustment to cope fully with the changed phase of life. Thus, they may have a lower risk of mortality compared to those belonging to OC-I in the initial years of retirement. This is supported by the findings of our empirical study. However, in the later years of retirement, the pensioners in OC-II experience higher risk of mortality compared to those pensioners in OC-I. This may happen perhaps due to the lower level of income, poorer diet, less medical attention and health care, etc.

On the other hand, workers with low level jobs requiring hard physical labour (OC-III in our study) often willingly accept retirement and when they stop working their health is likely to improve just after the retirement (16,17). Due to their ready acceptance of retirement they might experience little or no change in their 'life-style' during pre and post retirement periods and as such they are less likely to suffer from psychological stress and strain. This, in turn, results in low risk of mortality in the initial years of retirement for these pensioners compared to those in OC-I and II. But, in the later years of retirement and perhaps due to lower level of income, poorer diet, less medical attention and health care, etc., these pensioners experienced higher risk of mortality compared to those in OC-I and II.

A simple implication of the findings of the present study may be that there is a pressing need to formulate comprehensive retirement policies which include pre-retirement programmes for educating people, particularly those who reach senior positions in high profile government jobs around their retirement times, to prepare themselves for retirement so that they can minimise to a large extent the forthcoming adverse effects of various factors associated with retirement in the post retirement period and thereby reduce the risks of mortality among the pensioners during the initial years of retirement.

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