ORIGINAL ARTICLE

BONE DISEASES: PREVALENCE AND ASSOCIATED FACTORS IN THE POPULATION OF DISTRICT MULTAN, PAKISTAN

Muhammad Amjad, Muhammad Amin, Muhammad Amanullah

Department of Statistics, Bahauddin Zakariya University, Multan - Pakistan

ABSTRACT

Objective: To determine the risk factors for the type of bone disease (back bone, other bone, jointly bones) in the population of District Multan, Pakistan.

Material & Methods: A cross-sectional study was conducted in Nishtar hospital Multan at bone disease ward to explore the major factors for the type of bone diseases in Multan, Pakistan. We surveyed 400 patients diagnosed for bone diseases from December 2014 to May 2015. The chi-square test was used to find the associated factors for type of bone diseases. The data was analysis by using SPSS-19 software.

Results: In our data 164 males and 236 females suffering in bone diseases.8% back bone, 31.3% other bones and 6% jointly bones patients having no education. 54.3% married persons, 61% urban area people, 50.8% low income people, 75.3% family history patients, 37.8% B+ blood group, 67.8% smokers, 79.8% not take exercise patients, 48% have low level of protein, 68% have normal range of globulin, 70% have low level of calcium, 79.8% patients not use fish and 52.8% have normal weight patients suffering in bone diseases. On the basis of p-value, we have found that gender (P=0.004), smoking (P=0.012), uses of fish (P=0.026), weight (P=0.007), height (P=0.017), a/g ratio (P=0.000) and calcium (P=0.024) are statistically significant factors for bone diseases. While age (P=0.169), marital status (P=0.957), districts (P=0.508), area (P=0.126), income (P=0.416), education level (P=0.475), family history (P=0.851), uses of fruits (P=0.273), uses of milk (P=0.293), bitter fruits (P=0.873), blood group (P=0.176), exercise (P=0.544), protein (P=0.641), globulin (P=0.407), serum album (P=0.994), phosphors (P=0.547), uses of eggs (P=0.309), accident (P=0.496) and BMI (P=0.424) are the insignificant factors.

Conclusions: Gender, smoking, uses of fish, weight, height, A/G ratio and calcium are the significant factors of type of bone diseases.

Key Words: Bone diseases, Associated Factors, Chi-square test.

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INTRODUCTION

Bone diseases effects both males and females, it is supplementary in women. The woman rate is every 1 in 4 women are effected by bone disease. In further estimate "1 in 3" in women and '1 in 5' in men with osteoporosis will suffer the consequent breakage in their life. According to United States that osteoporosis affects 10 million people, and it's expected to responsible between "1.5 to 2 million" breakages in every year[1].

Dr. Muhammad Amin (Corresponding Author)
PhD. Scholar
Department of Statistics, BahauddinZakariya University, Multan, Pakistan
Cell: +92-301-7441402
Email: ma_amin15@yahoo.com
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Osteoporosis is a major and growing public health problem in Pakistan. Globally 200 million women suffer from osteoporosis. Across the globe, an osteoporotic fracture is estimated to occur every 3 seconds. Osteoporosis endorses a wide gamut of risk factors including gender, race, family history of menopause, age, early menopause, diet low in calcium and Vitamin D, smoking, lifestyle, excessive alcohol and caffeine consumption, low Body mass index[2]. The 14 million American women are effect by low bone density at the hip (Nutrition Examination Survey and national health). In India the almost "26 million" patients in 2003 are suffering from osteoporosis problem and it is increased to 36 million in 2013[3]. Osteoporosis and its significance of breakage represent a worldwide public healthiness problem, because breakage is related with the increased mortality, connected morbidity, and reduced superiority of life.

In lately stated, a high occurrence of osteoporosis in Vietnam[4]. The national health and nutrition examination survey (2005-2008) in America found that 50% of the women over the age of 50 suffering from the 'low BMD". Low mineral density is also a health issue in "Saudi Arabia" and commonness in lumbar and femur osteopenia from 7% to 43.4% and osteoporosis from 2.5 to 46.7 %[5]. According to national health survey, 14 million women are affected by low bone density at the hip in America. The chances of osteoporosis will increase as age increase both men and women[3]. According to international osteoporosis foundation, the 200 million women effects by osteoporosis in worldwide an age increasing, women have lower bone density and lose bone mass then men[6]. To compare people suffering of osteoporosis in Pakistan is at 5th position in the world. Osteoporosis in aged females is a substantial public health issue in the Pakistan. The previous study in the Pakistan has demonstrated that 75.3% of post-menopausal women are predisposed to osteoporosis with 55% within the age of 45-55 years. According to a survey in Pakistan 72% of the people clue an Inactive lifestyle and vitamin D shortage among the Pakistani women has been stated to be very high, i-e. 83%. Furthermore, the Pakistani diet has been creating to be lacking in calcium. Smoking prevalence has been stated to be "22% to 40%" in most current population based studies[2]. A US study about women over age 25 show the Asian women that is lived in Australia has lower calcium intake and very poor about knowledge of osteoporosis. The osteoporosis lies both in male and female but its rate is high in women[7]. The occurrence of osteoporosis in Pakistan is high, with 97% of women age group "75-84 years" and 55% of women age group "45-54 years" affect to osteoporosis[8].

As the life style, environment and diets are different in different countries. The literature cited above indicated that different researcher consider limited factors for bone diseases. No study yet consider in Pakistan, these factors with some more factors. So here we consider this research to explore the factors of bone diseases in Pakistan.

MATERIAL AND METHODS

A cross sectional study of 400 patients was conducted at bone diseases ward, Nishtar College and Hospital, Multan, Pakistan. Face to face interviews were conducted from the patients admitted in the wards and visiting the outdoor for seeking the treatments. This study was surveyed during the period December 2014 to May 2015 comprising of any age and locality seeking treatment from the bone diseases ward to collect the required information.

Here in our study variable of interest is the type of bone diseases (back bone, other bones, jointly bones). We collect the information of these type of bone diseases and have the test report of calcium, phosphors, globulin, serum album, A/G ratio and protein. The other factors which are study for type of bone diseases are include gender, age, marital status, districts, area, income, Education, family history, fruits, uses of milk in week, bitter fruits, smoking, weight, height, Exercise, uses of eggs, accident, BMI, and blood group of the patients.

RESULTS

The association results between bone diseases with the gender show that the total numbers of patients in Back bone, other bones and jointly bones are 68(17%), 280(70%) and 52(13%) respectively. This indicates that there are more female patients in all type of bone diseases than the males. Chi-square test indicate gender is significant factor for type of bone diseases as $P=0.004$ the association between bone diseases categories and age categories indicate that there are 11(2.8%), 36(9%) and 8(2%) patients of age less than 15 year from the back bone, other bones and jointly bones respectively. Between age 15 to 30 years, there were 24(6%), 129(32.3%) and 16(4%) respectively. There were 33(8.3%) back bone, 115(28.7%) others bones and 28(7%) jointly bones suffering in age greater than 30 year. This show that the majority of back bone and jointly bone patients in age greater than 30 and other bones majority in age 15 to 30 year. While for statistical test, we have found that age has no significant effect on types of bone diseases as $P=0.169$. The type of bone diseases according to marital status shows that (9.5%), (37.8%) and (7%) patients of back bones, other bones and jointly bones respectively in married persons and (7.5%) back bone, (32.3%) other bones and (6%) jointly bones patients respectively unmarried. The statistical value show that there are no significant association between bone diseases and marital status i.e. $P=0.95$. Locality, where the people are living may be causing the bone diseases. We evaluated the results of bone diseases type with locality. Majority of patients (61%) from urban locality. Reasons for this may be small, ugly house and the trend of urbanization towards the cities.

There are (8.8%), (43.3%) and (9%) patients from urban localities respectively for back bone, other bones and jointly bones while (8.3%), (26.8%) and (4%) patients are form rural localities for back bone, other bones and jointly bones. Chi-square tests indicate the no significant effect on type of bone diseases of this factor as $P=0.126$. The association between bone diseases and income level indicate that there are (7.5%), (36.5%) and (6.8%) patients from back bone, other bones and jointly bones respectively with income less than 10000 rupees. The majority of the patients (36.5%) have income less than Rs. 10,000 p/m. There are only (2.3%) other bones and (1%) back bone and jointly bones patients of total who belonging to a family with fairly high income (> 15000). Income level also has no significant effect on type of bone diseases as shown in Table 1 ($P=0.416$). The effect of education level on

the types of bones diseases is also studied. Results shown that the patients who are illiterate, back bone, other bones and jointly bones are 32(8%), 125(31.3%) and 24(6%) respectively. The number of patients who have got their education in college and university are (1%) back bone, (4.3%) other bones and (1%) jointly bones. This indicates that the numbers of patients, who are illiterate, are high in all types of bones diseases. The chi square test indicates the insignificant effect of education on type of bone diseases as p-value for this factor is 0.475. Associative results between bones diseases category with the family history of the patients show that there are (13.3%) patients of back bone have no family history and (3.8%) patients have family history and (9.8%) patients of jointly bones have no family history and (3.3%) have family history.

The numbers of patients have other bones (52.3%) no family history. Statistically, family history no significant effect on type of bone diseases as P=0.851. The associative figures of smoking and types of bone diseases given the result there are (10.5%), (45.5%) and (8.5%) patients suffering in back bone, other bones and jointly bones are smoker. The p-value indicate that there are significant association between bone diseases and smoker as P= 0.012. The cross tabulation of bone diseases and uses of milk for each patients show that there are (11.3%) of other bones diseases patients do not use milk and (7%), (30.3%) and (5.5%) of back bones, other bones and jointly bones respectively use only one kg milk drink in the week and (1.3%), (2.5%) and (1.5%) use greater than 2 kg milk use in the week. P-value from the chi-square test indicate the insignificant effect of uses of milk on bone diseases as P=0.293. The type of bone diseases according to uses of fruits shows that (5.8%), (27.8%) and (3.8%) patients of back bones, other bones and jointly bones respectively not uses the fruits and (11.3%) back bone, (42.3%) other bones and (9.3%) jointly bones patients respectively uses the fruits. The statistical value show that there are no significant association between bone diseases and uses of fruits i.e. P=0.273. In the association between bones diseases and weight of the patients shown that there are total of (73.3%) patients have weight over 45 kg and (2%) patients less than 15 kg weight.

The percentage of back bone, other bones and jointly bones are (10.5%), (52.5%) and (10.3%) respectively in the patients whose weight is over 45 kg the chi-square value shown that the significant effect of weight on bone diseases as P=0.007 the type of bone diseases according to height represent that there are (10.3%) back bone, (51.5%) other bones and (9.8%) having height over 60 inches and the majority of the patients have height over 60 inches. There are (5.5%) back bone, (14.3) other bones and (2.5%) jointly bones patients have height between 45≤height<60. The statistical value indicate that there are significant association between bone diseases and height of the patients as P=0.017. The type of bone diseases according to exercise shows that (13%), (55.8%) and (11%) patients of back bones, other bones and jointly bones respectively not take exercise and (4%) back bone, (14.3%) other bones and (2%) jointly bones patients respectively take exercise. The statistical value show that there are no significant association between bone diseases and exercise i.e.P=0.544. The cross tabulation of protein and type of bone diseases represent that there are (7.5%) back bone, (36.3%) other bones and (4.3%) jointly bones patients have low level of protein i.e. <6 g/dl. There are (8.5%), (31.3%) and (7.5%) of back bone, other bones and jointly bones respectively have normal range of protein 6≤protain<8.3 g/dl. The p-value represent that there are no association between bone diseases and protein as P=0.64. In the association between bones diseases and globulin level show that there are (3.5%) back bone, (14.8%) other bones and (2.5%) jointly bones patients have low level of globulin i-e <2.6 g/dl. There are (12.5%), (47.3%) and (8.3%) of back bone, other bones and jointly bones respectively have normal range of globulin as 2.6≤globulin<4.6. the cross tabulation also show there are (1%) back bone, (8%) other bones and (2.3%) jointly bones have high level of globulin as ≥4.6. the statistical value indicate that there are no significant association between bone diseases and globulin as P=0.407. The cross tabulation of A/G ratio and type of bone diseases represent that there are (15.3%) back bone, (67.8%) other bones and (12.3%) jointly bones patients have low level of A/G ratio i-e <1.7:1 g/dl. There is (.3%), (1.8%) and (0.8%) of back bone, other bones and jointly bones respectively have normal range of A/G ratio 1.7:1≤A/G ratio<2.0:1 g/dl. This shown that the majority of the patients have low level of A/G ratio. The p-value represent that there are significant association between bone diseases and A/G ratio as P=0.000. The statistical tabulation of calcium and type of bone diseases represent that there are (10.8%) back bone, (50.5%) other bones and (8.8%) jointly bones patients have low level of calcium i-e <8.5 g/dl. There is (5%), (18.5%) and (4.3%) of back bone, other bones and jointly bones respectively have normal range of calcium i-e 8.5≤calcium<10.2 g/dl. This shown that the majority of the patients have low level of calcium. The p-value represent that there are significant association between bone diseases and calcium as P=0.024. In the association between bones diseases and phosphors level show that there are (3.0%) back bone, (7.5%) other bones and (1.5%) jointly bones patients have low level of phosphors i-e <2.4 g/dl. There are (7%), (31.8%) and (6.5%) of back bone, other bones and jointly bones respectively have normal range of phosphors as 2.4≤phosphors<4.1. The cross tabulation also show there are (7%) back bone, (30.8%) other bones and (5.0%) jointly bones have high level of globulin as ≥4.1. the statistical value indicate that there are no significant association between bone diseases and phosphors as P=0.547. The association between bone diseases and body mass index (BMI) show that there are (26.5%) patients' shows underweight, (52.8%)

Table 1: Bone diseases factors

Factors	Levels	Type of bone diseases				
		Back bone N(%)	Other Bones N(%)	Jointly bones N(%)	Chi-square	P-value
Gender	Over all	68(17)	280(70)	52(13)	11.005	0.004
	Male	33(8.3)	100(25)	23(5.8)		
	Female	35(8.8)	180(45)	29(7.3)		
	Over all	68(17)	280(70)	52(13)		
Age	age<15	11(2.8)	36(9)	8(2)	9.085	0.169
	15≤age<30	24(6)	129(32.3)	16(4)		
	age≥30	33(8.3)	115(28.7)	28(7)		
	Over all	68(17)	280(70)	52(13)		
Marital Status	Single	30(7.5)	129(32.3)	24(6)	0.88	0.95
	Married	38(9.5)	151(37.8)	28(7)		
	Over all	68(17)	280(70)	52(13)		
Districts	Multan	46(11.5)	208(52)	41(10.3)	5.286	0.508
	D.G khan	13(3.3)	32(8)	4(1)		
	others	9(2.3)	40(10)	7(1.8)		
	Over all	68(17)	280(70)	52(13)		
Area	Urban	35(8.8)	173(43.3)	36(9)	4.149	0.126
	Ruler	33(8.3)	107(26.8)	16(4)		
	Over all	68(17)	280(70)	52(13)		
Income	Income≥15000	4(1)	9(2.3)	4(1)	3.925	0.416
	15000<Income≤10000	34(8.5)	125(31.3)	21(5.3)		
	Income<10000	30(7.5)	146(36.5)	27(6.8)		
	Over all	68(17)	280(70)	52(13)		
Education	Illiterate	32(8)	125(31.3)	24(6)	5.073	0.475
	Middle	14(3.5)	63(15.8)	17(4.3)		
	Matric	18(4.5)	75(18.8)	7(1.8)		
	college and above	4(1)	17(4.3)	4(1)		
	Over all	68(17)	280(70)	52(13)		
Family histor	No	53(13.3)	209(52.3)	39(9.8)	0.322	0.851
	Yes	15(3.8)	71(17.8)	13(3.3)		
	Over all	68(17)	280(70)	52(13)		
Fruits	No	23(5.8)	111(27.8)	15(3.8)	0.02599	0.273
	Yes	45(11.3)	169(42.3)	37(9.3)		
	Over all	68(17)	280(70)	52(13)		
Uses of Milk	No use	13(3.3)	45(11.3)	10(2.5)	7.995	0.293
	1	28(7)	121(30.3)	22(5.5)		
	2	22(5.5)	104(26)	14(3.5)		
	greater than 2	5(1.3)	10(2.5)	6(1.5)		
	Over all	68(17)	280(70)	52(13)		

Bitter fruits	No	42(10.5)	182(45.5)	34(8.5)	7.995	0.293
	Yes	26(6.5)	98(24.5)	18(4.5)		
	Over all	68(17)	280(70)	52(13)		
Blood group	A+	8(2)	18(4.5)	5(1.3)	0.271	0.873
	A-	3(0.8)	8(2)	3(0.8)		
	B+	26(6.5)	110(27.5)	15(3.8)		
	B-	4(1)	12(3)	5(1.3)		
	O+	14(3.5)	51(12.8)	15(3.8)		
	O-	7(1.8)	18(4.5)	2(0.5)		
	AB+	5(1.3)	45(11.3)	4(1)		
	AB-	1(0.3)	18(4.5)	3(0.8)		
	Over all	68(17)	280(70)	52(13)		
Smoking	Yes	45(11.3)	186(46.5)	40(10)	18.7	0.176
	No	23(5.8)	94(23.5)	12(3)		
	Over all	68(17)	280(70)	52(13)		
Weight	Weight<15	4(1)	3(0.8)	1(0.3)	2.303	0.012
	15≤weight<30	2(0.5)	25(6.3)	3(0.8)		
	30≤weight<45	20(5)	42(10.5)	7(1.8)		
	weight≥ 45	42(10.5)	210(52.5)	41(10.3)		
	Over all	68(17)	280(70)	52(13)		
Height	Height<35	4(1)	2(0.5)	1(0.3)	17.836	0.007
	35≤height<45	1(0.3)	15(3.8)	2(0.5)		
	45≤height<60	22(5.5)	57(14.3)	10(2.5)		
	height≥ 60	41(10.3)	206(51.5)	39(9.8)		
	Over all	68(17)	280(70)	52(13)		
Exercise	No	52(13)	223(55.8)	44(11)	0.15	0.017
	Yes	16(4)	57(14.3)	8(2)		
	Over all	68(17)	280(70)	52(13)		
Protein	protein< 6.0	30(7.5)	145(36.3)	17(4.3)	1.217	0.544
	6.0≤protain<8.3(normal)	34(8.5)	125(31.3)	30(7.5)		
	protein≥ 8.3	4(1)	10(2.5)	5(1.3)		
	Over all	68(17)	280(70)	52(13)		
Globulin	globulin<2.6	14(3.5)	59(14.8)	10(2.5)	8.894	0.64
	2.6≤globulin<4.6	50(12.5)	189(47.3)	33(8.3)		
	globulin≥ 4.6	4(1)	32(8)	9(2.3)		
	Over all	68(17)	280(70)	52(13)		
Serum album	serum album< 3.5	54(13.5)	230(57.5)	41(10.3)	3.99	0.407
	3.5≤serum album<4.5	12(3)	45(11.3)	10(2.5)		
	serum album≥4.5	2(0.5)	5(1.3)	1(0.3)		
	Over all	68(17)	280(70)	52(13)		
a/g ratio	a/g ratio< 1.7:1	61(15.3)	271(67.8)	46(11.5)	0.76	0.99
	1.7:1≤a/g ratio<2.0:1	1(0.3)	7(1.8)	3(0.8)		
	a/g ratio≥2.0:1	6(1.5)	2(0.5)	3(0.8)		
	Over all	68(17)	280(70)	52(13)		

Calcium	calcium< 8.5	43(10.8)	202(50.5)	32(8)	21.67	0.00
	8.5 ≤ lcalcium<10.2	20(5)	74(18.5)	17(4.2)		
	calcium≥ 10.2	5(1.3)	4(1)	3(0.8)		
	Over all	68(17)	280(70)	52(13)		
Phosphors	phosphors< 2.4	12(3)	30(7.5)	6(1.5)	11.263	0.024
	2.4 ≤ phosphors<4.1	28(7)	127(31.8)	26(6.5)		
	phosphors≥ 4.1	28(7)	123(30.8)	20(5)		
	Over all	68(17)	280(70)	52(13)		
Uses of fish in month	No	45(11.3)	229(57.3)	45(11.3)	3.065	0.547
	Yes	21(5.3)	43(10.8)	5(1.3)		
	2 or more	2(0.5)	8(2.1)	12(3)		
	Over all	68(17)	280(70)	52(13)		
Uses of eggs	No	23(5.8)	76(19)	16(4)	14.36	0.026
	01-Jan	44(11)	186(46.5)	35(8.8)		
	over 3	1(0.3)	18(4.5)	1(0.3)		
	Over all	68(17)	280(70)	52(13)		
Accident	No	36(9)	129(32.3)	27(6.8)	4.79	0.309
	Yes	32(8)	151(37.8)	25(6.3)		
	Over all	68(17)	280(70)	52(13)		
BMI	BMI< 19	13(3.3)	77(19.3)	16(4)	1.403	0.496
	19≤BMI<24	44(11)	140(35)	27(6.8)		
	25≤BMI<29	8(2)	42(10.5)	7(1.8)		
	BMI≥ 29	3(0.8)	21(5.3)	2(0.5)		

patients having the normal weight, (14.3%) patients over weighed and (6.5%) patients are Obese. The percentage of back bock, bones, jointly bones are high in normal weighted patients. There is (3.3%) back bone, (19.3%) other bones and (4.0%) jointly bones patients are underweight. We also found that BMI is insignificant factor for the type of bone diseases as P=0.424. The type of bone diseases according to accident shows that (9%), (32.3%) and (6.8%) patients of back bones, other bones and jointly bones respectively not accident and (8%) back bone, (37.8%) other bones and (6.3%) jointly bones patients respectively are accidental. The statistical value show that there are no significant association between bone diseases and accident i-e P=0.496. The association between bone diseases and uses of fish show that (11.3%), (57.3%) and (11.3%) patients of back bone, other bones and jointly bones respectively not uses the fish in the month. There is (5.3%) back bone, (10.8%) other bones and (11.3%) jointly bone patient uses one time fish in the month. The majority of the patients not use the fish. The statistical value indicate that there are significant association between bone diseases and uses of fish as P= 0.026.

DISCUSSION

The bone diseases may cause as a morbidity and mortality[12]. Bone diseases in all over the world may or may not be different due to life styles, eating pattern and environments. This research is used to investigate the type of bone diseases factors in Multan, Pakistan. First time we include various factors for the bone problems and test their significance. From our findings, it is observed that most patients are facing other bone issues. Of these, some (17%) are facing backbone problems and some (13%) are facing joint pain issues. Resultantly, it is observed that bone diseases like backbone and joint bones problemswhich more in females than the males as similar to that study which was conducted by Li et al[12]. We observed that bone problems are increases with increase in age especially joint pain issues are arises after 30 years.

Woolf and Pfleger[13] reported that joint issues arise after age of 60 years and 18% women and 9.6% men, who are suffering joint diseases. We consider some gradients which are very useful for the development of vitamin D. Vitamin has the significant effect on bone problems[14]. The literature also indicated that low vitamin D can create serious bone issues[15-17]. These gradients include the use of milk, use of fish and use of some bitter fruits. From our findings, it is found that use of fish has significant role in bone diseases. While the use of milk, use bitter fruits are contributing an insignificant role in bone diseases. Considering the effect of weight on bone diseases, we observed that weight and height are the significant factors for the prevalence of bone diseases. Jouanny et al[10] have shown that BMI contributing a significant role in the child's bones. As we consider all age's patients and our results has shown that BMI has no role for the prevalence of bone diseases. The role of education to know the knowledge about bone diseases is also considered. From our results, we have found that most people are illiterate who are suffering from the bone diseases. From Table 1, we have found that bone diseases are more in married as compared to unmarried patients. When we study the bone diseases by area of patients, we observed that more bone disease diseases patients belong to the urban areas. On studying the effect smoking on bone diseases, we have found that smokers were suffering more in bone diseases than non-smokers. Moreover, when we relate the bone diseases with blood groups to search out the which blood group patients are more affected by the bone diseases, we have found that bone diseases are more common in those patients whose blood group is B^+. On studying the association between family history and type of bone diseases, it is observed that there is no significant association between family history of bone diseases and types of bone diseases. On studying the role of exercise in bone diseases, it is observed that more patients are those who are not exercising regularly. On studying the effect of calcium on bone diseases, we have found that that bone diseases was commonly present in those patients who have low level of calcium as similar to the study conducted by de Groot[9]. Our study shows that calcium has significant role for the bone diseases. While phosphorus has insignificant role for the prevalence bone problems these are similar as given by de Groot[9]. Heaney and Layman[18] studied the effect of protein on bone health. Feskanich et al[19] and Barzel and Massey[20] reported that high protein of western diet is the risk factor of bone fracture. So the literature indicated the significant association between protein and the bone diseases. While our study shows the insignificant role of protein in bone diseases. Moreover, our results show that calcium has significant role for the prevalence of bone diseases as similar to that study conducted by Heaney and Layman[18]. Globulin, serum albumin, phosphorus and use of eggs are found to be insignificant for the prevalence of bone diseases. Low income and poor living conditions were also the factors which contributed in making the inhabitants to be patients of bone diseases. From the chi-square analysis, we have found that gender, smoking, uses of fish, weight, height, a/g ratio and calcium are the significant factors forthe type of bone diseases.

CONCLUSION

From the results and discussions, we have found that gender, smoking, uses of fish, weight, height, a/g ratio and calcium are the significant factors which are associated with the type of bone diseases. Awareness program must be launched to make people aware of bone diseases and its symptoms. Improve the living conditions and hospital facilities to overcome this burning issue.

RECOMMENDATIONS

Awareness program must be launched to make people aware about bone diseases and its symptoms. Improve the living conditions and hospital facilities to overcome this burning issue.

REFERENCES

1. Muir JM, Ye C, Bhandari M, Adachi JD, Thabane L. The effect of regular physical activity on bone mineral density in post-menopausal women aged 75 and over: a retrospective analysis from the Canadian multicenter osteoporosis study. BMC Musculoskeletal Disorders 2013; 14:253-62.
2. Danish SH, Ahmad F, Hassan F, Khan SA, Hashmi AA, Ali S. et al. Osteoporosis and its associated factors revisited: Case control study. Pakistan Journal of Medicine and Dentistry 2014;3:13-20.
3. Indumati V, Patil VS, Jailkhani R. Hospital based preliminary study on osteoporosis in postmenopausal women. Indian Journal of Clinical Biochemistry 2007; 22: 96-100.
4. Nguyen HTT, Schoulyz BV, Nguyen TV, Dzung DN, Duc PTM, Thuy VT, et al. Vitamin D deficiency in northern Vietnam: Prevalence, risk factors and associations with bone mineral density. Bone 2012; 51: 1029-34.
5. AlQuaiz A, Kazi A, Tayel S, Shaikh SA, Sharif A, Othman S, et al. Prevalence and factors associated with low bone mineral density in Saudi women: a community based survey. BMC Musculoskeletal Disorders 2014; 15: 2-10.
6. Oommen A, Alzahrani IH, Shoro AS, Alruwaili J, Aboalseel B. Relationship between body mass index and bone mineral density in Saudi womrn above 40 year with vitamin D deficiency. Science Journal of Public Health 2014; 2: 601-04.

7. Riaz M, Abid N, Patel MJ, Tariq M, Khan MS. Knowledge about osteoporosis among healthy women attending a tertiary care hospital. Journal of the Pakistan Medical Association, 2008; 58: 190-94.
8. Lowe NM, Ellahi B, Bano Q, Bangash SA, Mitra SR, Zaman, M. Dietary calcium intake, vitamin D status, and bone health in postmenopausal women in rural Pakistan. Journal of Health Population Nutr. 2011;29: 465-70.
9. de Groot MJ, Hoeksma M, Rijn MV, Slart RHJA, Spronsen FJV. Relationships between lumbar bone mineral density and biochemical parameters in phenylketonuria patients. Molecular Genetics and Metabolism 2012; 105: 566-70.
10. Jouanny P, Guillemin F, Kutz C, Jeandel C, Pourel J. Environmental and genetic factors affecting bone mass. Arthritis & Rheumatism 1995; 38: 61-67.
11. Bixin S, Dobson R. Risk factors, epidemiology and treatment strategiesfor metabolic bone disease in patients with neurological disease. Current Osteoporosis Report 2016; 14:199-210.
12. Li H, Li X, Ramanathan M, Zhang, A. Identifying informative risk factors and predicting bone disease progression via deep belief networks. Methods. 2014; 69: 257-65.
13. Woolf AD, Pfleger B. Burden of major musculoskeletal conditions. Bulletin of the World Health Organization 2003; 81: 646-56.
14. Christodoulou S, Goula T, Ververidis A, Drosos G. Vitamin D and bone diseases. BioMedical Research International 2013; 1-6.
15. Nieves J, Cosman F, Herbert J, Shen V, Lindsay R. High prevalence of vitamin D deficiency and reduced bone mass in multiple sclerosis. Neurology 1994; 44:1687-92.
16. Cosman F, Nieves J, Komar BS, et al. Fracture history and bone loss in patients with MS. Neurology 1998; 51:1161-65.
17. Terzi T, Terzi M, Tander B, Cantürk F, Onar M. Changes in bone mineral density and bone metabolism markers in premenopausal women with multiple sclerosis and the relationship to clinical variables. Journal of Clinical Neurosciences 2010; 17:1260-64.
18. Heaney RP, Layman DK.Amount and type of protein influences bone health. American Journal of Clinical Nutrition 2008; 87: 1567-70.
19. Feskanich D, Willett W, Stampfer M, Colditz G. Protein consumption and bone fractures in women. American Journal of Epidemiology 1996;143:472-79.
20. Barzel U, Massey L. Excess dietary protein can adversely affect bone. Journal of Nutrition 1998;128:1051-53.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Amjad M: Data collection & statistical analysis.

Amin M: Main idea, interpretation of data analysis.

Amanullah M: Proof reading.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.