Level of Awareness about Osteoporosis among Women 50 Years and Older in Puerto Rico

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Osteoporosis is an established and well-defined disease that affects millions of people around the world and is a major cause of morbidity. Not much is known about the level of awareness of the condition among the general population in Puerto Rico. The objectives of this study were: 1) to determine the level of awareness and knowledge about osteoporosis among women 50 years and older in Puerto Rico, and 2) to describe the differences in level of awareness and knowledge among women who have been diagnosed with osteoporosis and those who have not. Telephone interviews were conducted among a sample of women 50 years and older who were residents of Puerto Rico during the month on February, 2005. A four-page questionnaire was developed to address the study objectives. Of the total number of women contacted (342), 28 (8%) indicated they did not know anything about osteoporosis and could not answer the remainder of the questionnaire. In spite of widespread awareness about the condition, more than one in ten women responded they did not know what factors contribute to the development of osteoporosis and nearly one in five women did not know the complications associated with osteoporosis. Public education campaigns must address risk factors and the strategies to overcome those that are modifiable in order to prevent the development of osteoporosis and its complications. [*P R Health Sci J 2010;1:54-59*]

Key words: osteoporosis, awareness, Puerto Rico

Osteoporosis is an established and well-defined disease that affects more than 75 million people in Europe, Japan and the USA, and causes more than 2.3 million fractures annually in Europe and the USA alone (1). The lifetime risk for hip, vertebral and forearm (wrist) fractures has been estimated to be approximately 40%, similar to that for coronary heart disease. Osteoporosis does not only cause fractures, it can also cause people to become bedridden with secondary complications that may be life threatening. Since osteoporosis also causes back pain and loss of height, prevention of the disease and its associated fractures is essential for maintaining health, quality of life, and independence among the elderly (1).

In the past, osteoporosis was an under-recognized disease and considered an inevitable consequence of aging. However, perceptions have changed, as epidemiological studies have highlighted the high burden of the disease and its costs to society and health care systems. Improvements in diagnostic technology and assessment facilities make it possible to detect the disease before fractures occur (1).

There is a wide body of evidence regarding the risk factors associated with the development of osteoporosis (1). Some of these factors, such as age and race, may not be modified. Others, such as smoking, exercise, calcium intake and vitamin D consumption, are modifiable with changes in patient behavior. Therefore, it is of utmost importance to educate the public to increase awareness and knowledge about osteoporosis. This is likely to result in preventive behaviors that may postpone the complications associated with this condition.

Although much is known about osteoporosis in certain areas of the world, there is a lack of information from Latin America and Caribbean countries, particularly with regard to the level of awareness of the condition among the general population. In Puerto Rico, there are no known studies that have assessed the level of awareness and knowledge about osteoporosis. This information would be important from a public policy perspective in order to develop public education campaigns aimed at engaging the community to adopt preventive measures to avoid the risks and complications of the condition.

Therefore, the objectives of this study were: 1) to determine the level of awareness and knowledge about osteoporosis among women 50 years and older in Puerto Rico, and 2) to describe the differences in level of awareness and knowledge among women who have been diagnosed with osteoporosis and those who have not.

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Methods

This was a cross-sectional survey consisting of telephone interviews conducted among 314 women 50 years and older who were residents of Puerto Rico during the month on February, 2005. The interviews were conducted by an independent contractor to ensure anonymity and confidentiality. The sample size was selected using as a basis the latest Census of the Population. At the time, the projected number of women 50 years and older was 550,799. Telephone numbers were selected at random from telephone directories within each of the regions. Households were contacted and the interviewers requested to speak with a female resident 50 years or older. Once identified, those who consented to participate were asked if they knew what osteoporosis is. Those who responded no to this question were thanked and the interview was ended. A record was kept of those responding that they did not know what osteoporosis is. Consecutive calls were made until the target sample size of 314 women 50 years or older with self-reported knowledge about osteoporosis was reached.

A four-page questionnaire that addressed the study objectives was developed using as a basis previously published studies (available upon request). The questionnaire had three sections: knowledge about osteoporosis, risk factors for osteoporosis, and demographic information. Descriptive statistics were used to analyze the findings using the Statistical Package for the Social Sciences (SPSS; Version 12.0) for Windows. Frequency distributions were used to summarize the findings for the total sample. Subgroup analyses were done looking at level of awareness about osteoporosis, its risk factors and complications among those who self-reported a diagnosis of osteoporosis (versus those who did not) and level of education (high school or less versus more than high school).

Results

Characteristics of Respondents

Three hundred forty-two women 50 years or older were contacted. Of the total number of women contacted (342), 28 (8%) indicated they did not know anything about osteoporosis and could not answer the remainder of the questionnaire. Table 1 shows the characteristics of the respondents. The average age was 63 years, with a minimum of 50 and a maximum of 93 (standard deviation = 9.3 years). The age distribution was similar to the population estimates by the Bureau of the Census for Puerto Rico.

Table 1 also shows the characteristics of respondents according to risk factor for developing osteoporosis. The reported incidence of fractures after 45 years of age was low among respondents. Nearly 30% of participants reported having being diagnosed with or having being treated for rheumatoid arthritis, which is substantially higher to the prevalence that has been reported in the United States for people 60 years and older (2). One in four reported having taken hormone replacement therapy. Lifestyle practices varied considerably. While nearly 20% reported smoking or having smoked and nearly half reported drinking more than two cups of coffee daily, 40% indicated they exercised at least 30 minutes daily, and 4% reported drinking alcoholic beverages regularly. A considerable number of respondents indicated that they take calcium and vitamin D supplements (70% and 55%, respectively).

Table 1. Characteristics of respondents

Characteristic	Frequency	Percent
Age	314	100%
50-60 years	138	44%
61-70 years	110	35%
71-80 years	47	15%
81 years or older	19	6%
Income	314	100%
Under $10,000	126	40%
$10,000 - $19,999	91	29%
$20,000 - $29,999	38	12%
$30,000 or more	39	12%
No answer	20	7%
Education	314	100%
Less than high school	102	32%
High school diploma	122	39%
Some college or university	37	12%
University or college degree	45	14%
Post-graduate degree	8	3%
Region	314	100%
San Juan	100	32%
Rest of the island	214	68%
Osteoporosis risk factors		
Have received treatment for rheumatoid arthritis	85	27.1%
Have had a hip fracture after the age of 45 years	3	5.9%
Have had a rib fracture after the age of 45 years	5	9.8%
Have has a wrist fracture after the age of 45 years	17	33.3%
Have taken hormone replacement therapy	78	24.8%
Smoker (currently or in the past)	58	18.5%
Exercises at least 30 minutes daily	126	40.1%
Drinks alcoholic beverages regularly	13	4.1%
Drinks more than two cups of coffee daily	13	45.9%
Takes calcium supplements	144	70.4%
Takes vitamin D supplements	221	55.1%

One in four of those interviewed, reported having been told by a physician that they have osteoporosis. Sixty-four percent said they have a family member or a friend who has been diagnosed with osteoporosis. Nearly 50% (147) of all the women interviewed reported they had undergone a bone mineral density test. Of these, 46% (68 respondents) reported that the

Table 2. Beliefs about risk factors and complications of osteoporosis

	Percent who identified risk factor or complication		
Risk Factors or Complications	**Total sample (n = 314)**	**Sample with self-reported diagnosis of osteoporosis (n = 81)**	**Sample with no self-reported diagnosis of osteoporosis (n = 233)**
Risk Factors			
Calcium deficiency	83.4%	84.0%	83.3%
Lack of exercise	35.7%	45.7%	32.2%
Vitamin D deficiency	21.3%	29.6%	18.5%
Family history	21.0%	25.9%	19.3%
Poor eating habits	13.0%	13.6%	12.4%
Smoking	12.1%	12.3%	12.0%
Alcohol consumption	8.6%	7.4%	9.0%
Increasing age	8.0%	8.6%	7.7%
Certain medicines	7.0%	7.4%	6.9%
Lack of hormones	4.0%	4.9%	3.4%
Menopause	3.0%	1.2%	3.9%
Don't know	12.0%	6.2%	13.7%
Complications			
Bone fractures	67.2%	72.8%	65.2%
Pain	65.9%	71.6%	63.9%
Hinders movement/ walking	37.3%	42.0%	35.6%
Loss of height	20.1%	16.0%	21.5%
Physical disability	18.0%	16.0%	17.6%
Don't know	17.5%	7.4%	21.0%

results were outside the normal values. More women who have been told they have osteoporosis had a bone density test done when compared to those without a diagnosis. However, almost 30% of women who had reported to have been diagnosed with osteoporosis reported not having had a bone density test done. Almost two-thirds (64%) of those diagnosed with osteoporosis mentioned taking medications or nutritional supplements for the condition compared to 6% of those not diagnosed.

When compared based on self-reported diagnosis of osteoporosis, those with a diagnosis were more likely than those without the diagnosis to have rheumatoid arthritis (48% vs. 20%), smoke (or having smoked; 26% vs. 16%), consume more than two cups of coffee per day (54% vs. 43%), take calcium supplements (85% vs. 65%), take vitamin D supplements (65% vs. 52%), and receive medication treatment for osteoporosis (64% vs. 6%).

Women were also asked about what sources of information they use to obtain information about osteoporosis. The three principal sources of information reported by respondents were: television (75% of respondents), physician (72%) and newspapers (48%). Other sources of information included: books (21%), family members (20%), friends (16%), radio (13%), pharmacists (5%) and Internet (3%).

Level of Awareness about Osteoporosis

Participants were asked to mention the factors that contribute to the development of osteoporosis as well as what are the complications from having osteoporosis. Table 2 shows the beliefs about risk factors and complications that were spontaneously provided by the participants.

More than one in ten women responded they did not know what factors contribute to the development of osteoporosis. More than three quarters of the women interviewed could not identify risk factors such as vitamin D deficiency, family history of osteoporosis, poor eating habits, smoking, alcohol consumption, increasing age, some medications and menopause.

There appeared to be a relationship between education and awareness of risk factors. When compared to respondents with a lower educational level (high school or less), a greater proportion of respondents with higher educational level (college or post-graduate education) were able to identify risk factors such as lack of exercise (42% vs. 33%), vitamin D deficiency (30% vs. 18%), family history (28% vs. 18%), smoking (22% vs. 8%), alcohol consumption (16% vs. 6%), and certain medicines (11% vs. 5%).

Nearly one in five women did not know the complications associated with osteoporosis. One-third did not mention "bone fractures" as a complication. Two-thirds mentioned pain and 47% difficulty to move or walk as a complication even when these are not necessarily present in persons with osteoporosis. The effect of education level was less evident when mentioning complications for osteoporosis. Those with college or post-graduate education were more likely than those with high school education or less to identify disability as a possible consequence (27% vs. 13%) as well as fractures (73% vs. 65%) and loss of height (28% vs. 16%).

Generally, there were no differences in identifying contributing factors for the development of osteoporosis and its complications among participants that reported having a diagnosis and those who did not. Nevertheless, there were some statements where there were moderate differences between groups. Participants with a diagnosis were more likely to mention that lack of exercise and lack of vitamin D are contributing factors for the development of osteoporosis than those without a diagnosis (46% and 30% versus 32% and 19%, respectively). Also, those with a diagnosis were less likely to respond "do not know" when asked about the possible complications of osteoporosis than those who did not have a diagnosis (7% versus 21%, respectively).

Beliefs about Osteoporosis

Several statements were read to participants and they were asked if they were true or false or if they did not know the answer (Table 3). Almost all respondents recognized that people with osteoporosis have a higher risk of suffering bone fractures, while over 70% agreed that people older than 40 years lose bone mass, that people who exercise have a lower risk of developing osteoporosis, and that medications for osteoporosis are given for life.

Table 3. Beliefs about osteoporosis (n = 314)*

Belief	True	False	Don't Know
People with osteoporosis have higher risk of suffering bone fractures	98.7% [98.8%]	0.3% [1.2%]	1.0% [0.0%]
In some patients, osteoporosis can produce a lot of pain	93.0% [92.6%]	2.5% [4.9%]	4.5% [2.5%]
High calcium intake increases the risk of developing osteoporosis	17.8% [14.8%]	74.8% [77.8%]	7.3% [7.4%]
People with osteoporosis rarely suffer fatal complications	80.3% [84.0%]	15.6% [12.3%]	4.1% [3.7%]
People older than 40 lose bone mass	77.7% [75.3%]	9.9% [9.9%]	12.4% [14.8%]
Persons that exercise have a lower risk of developing osteoporosis	70.7% [76.5%]	15.9% [13.6%]	13.4% [9.9%]
Medications for osteoporosis are given for life	70.4% [75.3%]	12.7% [16.0%]	16.9% [8.6%]
Vitamin D consumption reduces the risk of developing osteoporosis	62.7% [72.8%]	11.8% [11.1%]	25.5% [16.0%]
The probability of developing osteoporosis increases if there is a family history of the condition	56.7% [56.8%]	29.0% [28.4%]	14.3% [14.8%]
Smoking decreases bone mass	55.4% [59.3%]	15.3% [12.3%]	29.3% [28.4%]
Menopause reduces bone loss	52.9% [49.4%]	35.4% [38.3%]	11.8% [12.3%]
Osteoporosis cannot be prevented	43.6% [42.0%]	49.7% [46.9%]	6.7% [11.1%]
Excess alcohol consumption increases bone mass	37.6% [40.7%]	31.8% [37.0%]	30.6% [22.2%]
There is no relationship between food habits and osteoporosis	34.7% [35.8%]	50.3% [46.9%]	15.0% [17.3%]
Osteoporosis is a condition that affects only women	20.4% [11.1%]	75.5% [80.2%]	4.1% [8.6%]

*Data presented in brackets represent the percentage of respondents with self-reported diagnosis of osteoporosis (n = 81)

Osteoporosis was identified with pain, as nine out of ten respondents agreed with the statement "In some patients, osteoporosis can produce a lot of pain." Twenty percent of respondents indicated that osteoporosis is a condition that affects only women. Half were of the opinion that there is no relationship between food habits and osteoporosis. Eight of ten participants responded that people with osteoporosis rarely suffer fatal complications. Lack of knowledge based on the statements where participants marked "Don't know" was more evident for the statements regarding excess alcohol consumption, smoking, and vitamin D consumption.

Beliefs about osteoporosis were similar across participants with different levels of education. Only the responses to the statement "People with osteoporosis may suffer fractures and other complications that may rarely be fatal (cause death)" were found to be different according to the participant's education level. More participants with college or post-graduate education responded "False" to this statement than those with high school or less than high school education (46% vs. 26%).

Those who reported a diagnosis of osteoporosis were more in agreement with the statement "Vitamin D consumption reduces the risk of developing osteoporosis" than those who did not have the diagnosis (73% vs. 59%, respectively). Conversely, those with the diagnosis were less in agreement with the statement "Osteoporosis is a condition that affects only women" than those without the diagnosis (11% vs. 24%, respectively).

Discussion

The prevalence of osteopenia and osteoporosis among Puerto Rican women 50-69 years old has been reported to be 42% and 12%, respectively, when measured at the lumbar spine and 56% and 8.7%, respectively, when measured at the femoral neck using DXA (3). This is consistent with values reported from Latin America, where the prevalence of vertebral osteopenia in women 50 years and older in Latin America was found to range from 45.5% to 49.7% and vertebral osteoporosis from 21.1% to 17.6%, while the prevalence of femoral neck osteopenia ranged from 46% to 57.2% and femoral neck osteoporosis ranged from 7.9% to 22% (4). In spite of a relatively high incidence of osteopenia and osteoporosis, literature on the level or awareness and knowledge about osteoporosis in Puerto Rico and the Caribbean is lacking. This information is important to develop educational strategies so that adequate preventive measures are taken on time to prevent complications, such as fractures.

In spite of being a well-documented condition, osteoporosis has been largely examined from a physiological model, the chief target for this examination being postmenopausal

women (5). In fact, women have been found to have greater awareness of osteoporosis than men (6). The emphasis on older postmenopausal women's risk of developing osteoporosis may result in younger postmenopausal women (ages 50-65) and men ≥ 50 years who are not frequently screened to have less knowledge about this condition and perceiving that they are at low risk for developing it (5).The results of this study show that the majority of women over 50 years old in Puerto Rico are aware about osteoporosis as a health condition. This is consistent with previous findings in Canada, (6) Poland, (7) Turkey, (8) Sweden, (9) the Czech Republic, (10) and Scotland (11).

However, women were less aware of osteoporosis risk factors and complications. Ungan found that, in spite of high awareness, a considerable number of Turkish women were unaware of risk factors and consequences of osteoporosis (8). Waller and colleagues documented a lack of awareness about the importance of food products and nutrients, such as calcium, vitamins and minerals (9). Lewin et al. reported a lack of awareness of the risks associated with smoking, family history, being underweight and inactivity (11). Ailinger and colleagues reported that people from a university community in the United States taking the Facts on Osteoporosis Quiz had inadequate knowledge about osteoporosis (12). Education seems to play a role in the level of awareness about risk factors and complications of osteoporosis. Generally, women who had a higher education level were more likely to identify risk factors and complications than women with a lower educational level. This is consistent with the results of other studies (12-13).

Health beliefs also play an important role on actual health behaviors. Perceived susceptibility, seriousness, barriers, and benefits about osteoporosis have been found to be related to osteoporosis behaviors (5). This study has shown that there continue to be misconceptions with regard to risk factors and complications of osteoporosis. Some believe that osteoporosis is a condition that affects only women, that is not preventable and that there is no relationship between food habits and osteoporosis. The results from this study were once again similar to the study conducted by Juby and Davis in Canada (6). Developing public education strategies could enhance knowledge that could lead to a change in beliefs and more preventive behaviors. Waller, et al. found that subjects who had previously participated in an educational intervention consisting of information about osteoporosis' risk factors and complications had higher scores in a knowledge test than those who were new to the program (9).

This study has several limitations. The data is based on a cross sectional sample of women 50 years or older who were contacted by telephone at random using telephone directories. Not all households have listed telephone numbers or have telephones. Furthermore, there was no a priori way of determining if there would be an individual that fulfilled the inclusion criteria. Therefore, the sample was not necessarily representative of all the women 50 years or older who live in Puerto Rico. Health information, such as diagnosis and use of medications and supplements, was based on self-report and could not be verified. Also, the interviews were conducted in 2005 and public awareness about osteoporosis may have changed since. Finally, the study was not powered to study differences among those with a diagnosis of osteoporosis and those without a diagnosis. Therefore, differences between groups should be interpreted with caution.

In conclusion, although the majority of women 50 years and older reported to have some awareness about osteoporosis, the level of knowledge was poor, particularly with regard to risk factors associated with the condition and its complications. Knowing the risks of osteoporosis and health beliefs of those at risk is in important health concern because these may play a major role in influencing an individual's osteoporosis preventing behaviors (5). Considering the high economic burden of osteoporotic fractures worldwide (1), in the United States, (1, 14) and in Latin America, (4) addressing knowledge gaps is of utmost importance from a societal perspective. Public education campaigns must address risk factors and the strategies to overcome those that are modifiable in order to prevent the development of osteoporosis and its complications. Based on the sources of information respondents reported to consult to learn about osteoporosis, television and printed media, such as newspapers and books, and health care professionals, particularly physicians, could be the channels of communication of information about this condition.

Resumen

Osteoporosis es una enfermedad establecida y bien definida que afecta a millones de personas alrededor del mundo y es una causa mayor de morbilidad. No se conoce mucho sobre el nivel de conocimiento de la condición en la población general de Puerto Rico. Los objetivos de este estudio eran: 1) determinar el nivel de conciencia y conocimiento acerca de la osteoporosis entre mujeres de 50 años o más residentes en Puerto Rico y 2) describir las diferencias en los niveles de conciencia y conocimiento entre las mujeres que reportan un diagnóstico de osteoporosis y las que no lo reportan. Entrevistas telefónicas fueron llevadas a cabo en una muestra de mujeres de 50 años o más que eran residentes de Puerto Rico durante el mes de febrero de 2005. Un cuestionario de cuatro páginas se desarrolló para atender los objetivos del estudio. Del total de mujeres contactadas (342), 28 (8%) indicó que no conocían nada sobre osteoporosis y no podían contestar las preguntas del cuestionario. A pesar del amplio número que reportó estar concientes de la condición, más de una en diez mujeres respondió que no conocían qué factores contribuyen al desarrollo de osteoporosis y una en cinco no conocía las complicaciones asociadas con la condición. Campañas educativas públicas deben atender factores de riesgo y las estrategias para superar aquellos que son modificables de manera tal que se pueda prevenir el desarrollo de la osteoporosis y sus complicaciones.

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