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20-year prevalence of prostate cancer

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Abstract: One of the problems of public health in Mexico are the oncological diseases, being one of the main causes of death in the population, according to the Mexican Social Security Institute, prostate cancer has a high incidence in mortality from malignant tumors with a 16% in 2015 and the most recent data published by the National Institute of Cancerology indicate a mortality rate of 13 deaths per 100.000 men, following this trend and according to the Matemetico analysis of population growth for years 2020 are estimated A rate of 18.05 and for the years 2030 of 25.24 by which is presindible to implement program of diagnosis of timely treatment and thus be able to reverse the growth of mortality.
Key words: Prostate, prostate cancer, mathematical model.

Introduction

During the first autopsy conducted in 1761 by the anatomist Italian Giovanni Morgagni, laid the foundations for the scientific study of cancer, also known as "Oncology", to the nineteenth century when the microscope modern was invented, was born the "pathological study of modern cancer"(Gandur, 2012).

Orlich refers that Langstaff in 1817 describes the cancer as tumors fungantes by the appearance of macroscopic during autopsies, due to that the histological examination was not carried out in those times for 1853 the surgeon Adams made a report on the first case of prostate cancer diagnosed by histological examination where the principle The disease is recognized to examine parts with histology in the prostectomia practiced to the obstructive uropathy by growth prostate. However at that time did not differentiate between benign prostatic hyperplasia and Prostate Cancer as causes of an obstruction prostatic. The doctor Young in 1905 would develop the technique of radical prostatectomy perineal, in their first years only with palliation; after thanks to an earlier diagnosis and advances in the staging of the disease became the treatment of choice.
With the discovery of the X-rays by Roentgen and the description of the properties of the radium by Curie began in 1998 new treatments, one of them being the radiotherapy that due to its little reach to the prostate is used to eliminate the pain due to the presence of metastases.

Brachytherapy is given to know with Desnos to deploy radium directly within the prostate by perineal in 1914 and for 1941 radiotherapy loses importance by the discovery of the ablation androgenic by its effectiveness in the treatment of cancer of the prostate (CAP).

In our days we know that the human body is made up of millions of living cells that develop, are metabolized, reproduced and die, normal cells divide rapidly facilitating their growth reaching adulthood, most are only split and replaced the worn, to cells that are dying or help to regenerate injuries; Cancer arises in any area of the body when cells grow in an uncontrolled manner instead of die and are abnormal cells causing alterations in DNA; when you alter the DNA and the cell is normal repaired the damage or dies, on the contrary, in the cancer the damaged DNA is not repaired, and does not die, these cells doubled although the body does not need resulting new cells with the same genetic damage(INFOCANCER, 2014).

The cancer in general is the disease with greater relevance to the global level, the World Health Organization estimated that in 2005 died of cancer 7.6 millions of individuals and that in the next ten years will die 84 million, estimating that the burden of cancer is at least a 47% in developed countries and 53% in developing countries, under this international context, different nations have developed or have implemented national plans or programs for the control of cáncer (OMS, 2010).

Research shows that the cancer in some cases is avoidable and in large part can be prevented; when the disease is in the body and are detected in its early stages, this may be treated and in many cases cured, finally in the advanced stage the treatment approach to slow the progression of the disease or reduce pain and to provide assistance to families to cope with the load. In accordance with the foregoing the 33.3 % of the cases of cancer can be prevented, the other 33.3 % can be detected early with an effective treatment and the remaining you must provide palliative care, it is therefore necessary to achieve an adequate balance between the actions performed on the promotion of health, prevention, early detection, diagnosis, treatment, rehabilitation and palliative care; using them effectively and equitably,

In order to improve the quality of life of patients and their families, reduce the burden of this disease, confront the upward trend of some risk factors and to improve the control of the same (OMS, 2010).

For the 2013 notes that in 2008, died 7.6 million people, approximately 13 per cent of the total number of deaths, and estimated that by 2030, will increase to 13.1 million, with regard to the American Region died 1.2 million people in 2008 of cancer; affecting men mainly in the prostate, lung, colonorrectal and stomach; and women in the breast, lung, colonorrectal and Cervical Cancers, (OPS, 2013).

The incidence varies by more than 25 times at the global level with a higher frequency in developed countries of Oceania, Europe and North America, mainly by the use of the Antigen Prostatic Specific that detects both tumors clinically important as of slow growth that could escape to diagnosis, on the contrary, the increased mortality occurs in black population in regions of the Caribbean, which is due to differences in the genetic susceptibility and a diagnosis more late,(Jemal, 2011).

The cancer of prostate has been instituted in the past two decades in one of the public health problems more remarkable for the male population in the world, to the point that in some countries, such as in the United States and currently in Mexico, is positioned as the cancer that more is diagnosed, generating a huge implication from the medical point of view, social, economic, health and cultural(OPS, 2013).

In the United States have conducted research into the genetic origins due to the microarray gene expression of high performance, the technologies of sequencing and cell lines to evaluate the molecular aspects of cancer of prostate. The studies identified two ways of regulating the replica and DNA repair, but to date they have found histological markers or molecular to predict the disease, with a probability that the cancer develops by multiple factors(Arap Marco Antonio).

The incidence varies by more than 25 times at the global level with a frequency majority in the developed countries of Oceania, Europe and North America, mainly by the use of prostate-specific antigen that detect tumors important as of slow growth that could arrive at a diagnosis; on the contrary, the increased mortality is located in the black population in regions of the Caribbean, what is due to differences in the genetic susceptibility and a diagnosis more late, (Jemal, 2011).

In Mexico, according to the International Union Against Cancer (UICC), oncological diseases are the third leading cause of death and estimated that every year are detected 128 thousand new cases according to the Secretary of Health (SSA), and the Subsecretariat of Prevention and Health Promotion (SPPS), In view of the importance of this disease, the International Union Against Cancer with the support of the WHO, commemorated every 4 February the World Day against the cancer with the aim of raising public awareness of this disease and the need for its detection and its impact on the entire Mexican population(Figueredo, 2006)..

Prostate cancer is recognized as the most frequent malignant tumor in men over the age of 50 and has increased its incidence during the last decades, being one of the neoplasms with greater impact in the modern society, with significant rates of prevalence and morbidity and mortality among the older men,(INEGI, 2006).
The prevalence is high and is the second cause of death, which leads to several years ago has tried to put in place an action program against cancer of the prostate, in compliance with national policies which have pointed out the importance of this issue, taking into account that in Mexico there are obstacles and problems related to the care of cáncer,(Hernandez, 2011).

Intended, inform and guide on the prevalence of the CAP and for the reduction of morbidity and mortality, in addition to allow for the detection as quickly as possible before symptoms appear, a review easy to perform is the digital rectal examination during the routine physical examination and prostate-specific antigen which would make it possible to detect the disease in early stages(Pow-Sang, 2009).

The promotion of health, is an action educator, which in addition to minimize the risks and prevent diseases, aims to reduce the differences in the current state of health of the people and to ensure equal opportunities for improving the health conditions of the Community, these actions are aimed at the prevention, environmental sanitation, personal hygiene, collectively and to the organization of health services, You cannot avoid differences between populations that have economic resources and those who do not possess or are insufficient, the triad disease, ignorance and poverty is difficult to break, and to achieve an improvement in the quality of life, these must be modified in jointly, (Urbina, 2010).

You cannot avoid differences between populations that have economic resources and those who do not possess or are insufficient, the triad disease, ignorance and poverty is difficult to break, and to achieve an improvement in the quality of life, these must be modified in jointlyGLOBOCAN (2008),It is estimated that 12.7 million patients were diagnosed with cancer and of them died 7.6 million, approximately 56 per cent of the patients diagnosed and 64% of those who died were in developing countries, the survival by cancer is lower, usually associated with a combination of factors such as diagnostics in advanced stages and a limited access in time for the medical care and the standard treatments, To this explosion of cases of cancer at the global level may be reduced with programs for health education, screening and treatment early, as well as public awareness campaigns to promote physical activity and a healthier diet, (Jemal, 2011).

At the National Institute of Cancerology in Mexico (INCan), a further review was carried out in the period from 1985 to 1994, when there were 28, 581 patients with histological confirmation of cancer, of which 8, 984 (31.4%) were men, of which 5.5% presented CaP, in the Division for five-year periods, between 1985 and 1989 reported 238 cases that are equivalent to 5.6%, while in the period 2000 to 2004 were 258 equivalentto 5.5% for a total of 496 cases(Mohar, 2007).

In Mexico, the National Registry of Cancer genitourinary (RNCaGU) of 2011 that included records of men with penile cancer, prostate, kidney, testicle and bladder divided in specific geographic regions, showed what is shown in the table 1, (Jiménez, 2011).

	IMSS	ISSSTE	SS	High Specialty	TOTAL
North-east and Gulf of Cortés	10	5	10	4	29
North and Northeast	15	6	11	5	37
West and Bajio	23	27	52	3	105
South East	17	6	31	12	66
Center	27	14	32	9	82
Total de Hospitales	92	58	139	33	319

Table 1. Cancer Statistics genitourinary tract in Mexico 2007 to 2009, IMSS Mexican Institute of Social Security, ISSSTE Institute of Security of Social Workers of the State , SS Secretary of Health(Jiménez, 2011).

Methodology

It is a quantitative study of transversal, documentary for the develop mathematician according to the characteristics of a given population that will make predictions of the disease.

Results

In the following table notes that most of the Member States show an increase in deaths of CaP from 2000 to 2010 per 100 thousand men.

In the states with the highest percentage to 2010 are Baja California Sur, Campeche, Colima, Chihuahua, Guanajuato, Jalisco, Michoacan, Queretaro, Quintana Roo, Sinaloa, Sonora, Tabasco and Veracruz.

Comparing the figures of the following States from 2000 to the year 2012, the results show the following: Baja California Sur (8.8-13.5), Campeche (7.3-13.2), Colima (10.5-10.5), Chihuahua (11-11.2), Guanajuato (7.6-11.6), Jalisco (9.8-12.5), Michoacán (9.1-12.8), Queretaro (6.4-10.4), Quintana Roo (7.6-10.8), Sinaloa (11.2-11.1), Sonora (8.8- 12.6), Tabasco (9.3-12.9) and Veracruz (5.9-9)

There are states of the Republic that are with a low percentage of incidence, however the increase of deaths from cancer of the prostate is notorious as in the case of Puebla in 2000 that registers a percentage of 6 and for the 2010 increase to 7.8, Tlaxcala 3.7 in 2000 and to the 2010 increase to 6.6, Yucatan, 5.9 to 9 respectively

Year	2000	2001	2002	2003	2004		2005	2006	2007	2008	2009	2010
Aguas Calientes	6.4	8.9	10.8	11	9.5		9.8	11.1	10.1	11.5	14.2	9.2
Baja California	8.5	6.5	8.1	8.3	8.4		8.7	7.3	8.1	9.6	7.9	8.7
Baja California sur	8.8	8.2	12.8	13.1	10.4		10.6	12.3	8.1	10.5	13.7	13.5
Campeche	7.2	5.9	11.9	12.2	9		9.3	7.8	7.9	7.8	8.6	13.2
Coahuila	8.7	7.9	8.1	8.3	8.2	8.4	10.2	8.4	8.7	8	8.5	
Colima	10.5	7.4	12.3	12.6	8.1	8.4	12	10.3	14.1	9.6	10.5	
Chiapas	7.2	8.6	8.2	8.4	10.3	10.6	8.9	11.7	11.1	10.7	11	
Chihuahua	11	9.9	9.7	10	9.1	9.3	10.1	9.5	9.3	10.1	11.2	
Distrito Federal	8.1	8	8.4	8.6	8.5	8.8	8.9	8.2	9.1	9.3	9	
Durango	6.9	10	7	7.2	8.6	8.8	10.7	8.6	8.8	11.1	9	
Guanajuato	7.6	8.2	9	9.3	9.1	9.3	8.7	9.4	10.4	10.7	11.6	

Guerrero	5.7	6.8	5.6	5.8	7.4	7.6	6.8	7	8.9	9	8.7
Hidalgo	6.5	7.5	6.7	6.9	6.9	7.1	8.6	8.2	9.8	8	10
Jalisco	9.8	8.9	10.5	10.7	10	10.3	11.4	11.9	11.5	12.1	12.5
México	5.8	6.6	6.5	6.7	7.4	7.6	7	6.4	7.4	7.5	7.7
Michoacán	9.1	9.7	9.8	10.1	9.1	9.3	9.2	9.7	11.6	11.7	12.8
Morelos	6.4	7	8.2	8.4	9.3	9.5	6.6	8.7	9.1	8.5	9.1
Nayarit	10.3	8.8	11.3	11.6	10.5	10.8	12.9	13.2	13.2	14.7	11.8
Nuevo León	8	8.7	6.2	6.4	7.9	8.1	8.4	9.1	9.9	9	8.9
Oaxaca	6.1	5.4	5.5	5.6	7.1	7.3	6.7	7.3	6.7	7.4	8.5
Puebla	6	5.8	6.3	6.4	7.8	8	6.9	6.8	7.7	7.3	7.8
Querétaro	6.4	7.9	9.1	9.4	7	7.2	10.1	7.5	8.4	8.9	10.4
Quintana Roo	7.6	5.9	4.1	4.7	8.3	8.5	5.7	9.8	4.9	5.9	10.8
San Luis Potosí	8.1	9.4	6.6	6.8	10.6	10.9	8.2	9.9	9.9	9.7	9.8
Sinaloa	11.2	8.4	10.1	10.3	11	11.3	9.6	10	11.7	10.6	11.1
Sonora	8.8	11.3	10	10.3	10.4	10.7	11.1	11.3	10.2	11.1	12.6
Tabasco	9.3	9.2	9.6	9.9	10.3	10.6	12.4	11.4	11.6	9.3	12.9
Tamaulipas	6.2	6.5	7.7	7.9	8	10.2	8.3	9.2	9.7	8.9	9.7
Tlaxcala	3.7	5.6	8.1	8.3	7.2	7.4	7.1	7.6	6.8	8.8	6.6
Veracruz	8.1	8.9	9	9.2	8.9	9.2	9.1	9.8	9.7	9.9	10.2
Yucatán	5.9	6.2	7.1	7.2	5.7	5.9	7.1	6.9	6.4	10.6	9

Prostate cancer mortality in Mexico ((Sánchez-Barriga, 2013)

The prostate cancer at the national level adjusted by age for 2015 is 10.4 cases per 100 thousand men and the states with the highest ASMR during 2012 were: Aguascalientes (15.8), Nayarit (14.2), Jalisco (13.7), Colima (13.5) and Sinaloa (13.4). The lower rates were for the states of Hidalgo (7.9), Yucatan (7.2) and Quintana Roo (6.7)(González RA.2015).

Within the northern region is counted with the statistics of CaP in Chihuahua which occupies the twelfth place obtaining 87.6% of every 100 thousand men in 2012 mentioned by Paloma Sanchez in 2017, while the IMSS of this same State reported 43 deaths in the first nine months of 2016 by CaP. Within the state of Coahuila during the 2014 INEGI announcement 15 thousand deaths in general, of which 2 thousand 12 were by cancerous tumors with the 13.2% of deaths in its whole and of these 118 deaths were due to prostate cancer.

For 2008 the INEGI communicated a death rate by CaP of 18% in Nuevo Leon, to the 2009 there was a decrease of 8%, having a minimum increase in 2010 to 9%, however the percentage increase significantly to 19% during 2011, the last record is 2012 with a rate of 18% of CaP. On the other hand Ismael Lares in 2010 informed that in the state of Durango was serve 120 men with CaP per year. With a rate of 8 per cent of patients with CaP and a 7 per cent of deaths, while San Luis Potosi occupies the first place in this region with a mortality rate in men over 40 years of 13 persons for every ten thousand people affirm Olga Omaña regions in 2016 during the period from 2010 to 2013.

The SSA in 2013 I mention that during 2013 in the state of Zacatecas CaP obtained 7.7%, taking hospital discharges of a 42.9% in men 65 to 74 years.

During the 2013 in Aguas Calientes were recorded 38 deaths by CaP, while in 2012 were recorded 77 deaths. (From Network 2013).

For 2016 we conducted a total of 6,182 detections of growth prostate, of which 2,265 were sent to confirmatory tests.

Another of the States with the highest incidence trademark of CaP in men older than 45 years, resulting in a death rate of 75%.

Rodrigo Peiro in 2010 affirms that during the 2008 the Secretary of Health I confirm 6 thousand 500 new cases of CaP of which 4 thousand 600 were deaths, 45 years to the 70 years was recorded 1 case per 180 men and younger than 45 years 1 of each 10 men.

Sonora in the year 2008 I AM the fourth place in deaths by CP registering 121 deaths, with an average age of 74.3 years. In the 2001 deaths were 133 with a rate of 5.7 in accordance with the INEGI in 2001. For the 2014 deaths rose to 545(INEGI 2015).

In the West for Nayarit malignant tumors are the second cause of death by CaP, in 2012 registration the INEGI 5 thousand 724 deaths by cancer in general of which the 58.8% of the deaths were males and 24.1% corresponded to CaP according to Notimex 2014.

Cases for the 2010 in the state of Jalisco are 658 cases with a rate of 18.91 and 22.40 %, per 100,000 inhabitants, registering 483 deaths with a rate of 6.83 and 1.24%.(ss/dgis/seed/sinais/2009)

For the 2014 Colima move the third site to skin cancer, to be submitted 52 cases. Next to the 2015 that maintained the figures of 50 cases.

The data of the National Institute of Statistics and Geography show that Michoacan is located on the third place state with CP with 27.4 cases per 100,000 inhabitants, in a publication of Rebeca Hernández during 2015. When in 2012 the CaP represent 21.4% of the cases, with 16.5% of deaths.

In the central region Guanajuato in a writing of J.J. Sanchez during the 2013 public that during 2008 the State ranked sixth in mortality by CaP. For the 2010 deaths obtained 11.6% per 100 thousand inhabitants

Hidalgo in the 2009 Courage a morbidity of CaP of 6.89%, for men under 45 years of age the morbidity was of 1.3%, in those older than 80 years rose by 18.7%, in men 70 to 74 years the 19.3% and finally from 65 to 69 years 18.5%, data reported by the SSA 2010.

In the State of Mexico as J.J. barrier in the 2008 informed us that the mortality by CP in 2005 was 4 thousand 800 and for the 2006 registered 4 thousand 693 cases, while Puebla obtained an incidence of CaP 12% per 100 thousand inhabitants in males 60 years for the 2014 increase by an average of 30 cases published by M Stream during 2014.

The last report of the INEGI courage in 2011 for the State of Queretaro, 8 thousand 88 deaths by cancer in general of which 86 deaths were due to COP. During the 2016 P. Rosales informed us that the Secretary of Health reported log 57 cases per 100 thousand inhabitants of CaP during 2016.

In Tlaxcala CaP registers a 12.2 % of cases per 100 thousand men.

The Gulf region comprises the states of Tamaulipas, Veracruz and Tabasco. C.

Gomez and Sandra Sosa published in the 2016 data on the CaP inTamaulipas

where the INEGI said that in 2014 there were 7 cases per 100 thousand

inhabitants and during 2015 were recorded 8 new cases.

For Veracruz, the most recent data reported Angels Gonzalez in 2012 that the State Center of Cancerology detected 450 cases of CaP. While for Tabasco the ISSSTE has registered 30 patients with CaP detecting 5 cases annually, diagnosed in a timely manner and in advanced stage data that were published in 2017 by Crystyan vinegar.

In Warrior Within the southern region die every day 17 men by CaP reports Sweet Soto in 2017, where the director of the ISSSTE the State asserts that the incidence is 22.2 for every ten thousand beneficiaries during 2014, increasing in 2016 to 23.4 per cent for every ten thousand.

The INEGI for the 2002 public that in the state of Oaxaca there are a total of 1,971 deaths by malignancy of which the 13.3 corresponded to chap.

Finally in the region of the Yucatan Peninsula is Campeche who according to INEGI THE CP currently occupies the first place with a mortality rate of 17.2%, during the periods from 2003 to 2012 deaths were presented in males 60 years to Mas, with a representation of 95%.

To Yucatan and Quintana Roo during the 2016 INEGI reported 13.3 cases of CP per 100 thousand men.

The hospital morbidity by age group was 1.3% in men younger than 45 years, to over 80 increases the rate up to 19.7%, followed by men between 70 and 74 years with 19.3% and finally from 65 to 69 years 18.5%.

Discussion

In this study we can detect different points of interest because the cap is on the increase over the years in Mexico.

One of the first to consider is the study of population with a last record in 2010 of 112, 336,538 between men and women of whom 57, 481,307 are men and women of all ages, having a higher probability of presenting prostate cancer 6, 150,499, due to the fact that they are in an age of 45 to 80 and more. Within this section it is important to consider that the man in Mexico had until 2010 a life expectancy of 71 years, while for 2016 stood at 73 years. Coupled with this in the last few years the population pyramid has changed, registering in 2015 a population of men under 15 years of age with 27 per cent of the total, 15 to 64 constitute 65 per cent

and from 65 years onwards the 7.7 %. Therefore, according to different demographic studies, the population pyramid has been modified, where the children's community decreases, adulthood increases, and there is a high risk of developing CaP.

Another important factor to look at is the level of education in our country but for these years Mexico has invested of GDP more than that stipulated by the OECD, there is still a long way to go, is located just above of Colombia and Brazil countries with an educational level lower whereas, although it has been invested, only 53 per cent of young people between the ages of 5 and 14 years are enrolled, 6% is in the higher middle level and 24 per cent for upper level obtaining title 1 of every 10 students. Mexican politics expects individuals aged 15 to 29 deal more in the working area that in the study and the 20 per cent of them did not get a job or are enrolled in an educational level.

States such as Oaxaca and Michoacán are among the lowest in low educational level, followed by Guerrero and finally Tamaulipas and Baja California. Analyzing a quick comparison of the figures of CaP in the aforementioned states we have to Michoacan has a mortality rate of 21.4 %, Guerrero with 22.2 and Oaxaca with 13.3% being those that have a higher percentage with respect to the other States. While we have other states that handle high figures as is the state of Jalisco with 22.40 % this status is not with a low educational level, is within the level of education in general.

At the educational level men and women should have specific information on the disease, however if in our country to be implemented an education rational, the man would not have why refuse to be carried out the studies, since the reason you would provide the best option to take appropriate solutions for the management of their health.

We will now discuss the social aspect psychological and economic of the man that does not allow the valuation relevant of prostate cancer.

At present the laws on gender equality have been placing increasing importance in the activities relating to the female gender, the woman has achieved inserted in higher education levels, however until our days remains the boy who has greater access to higher positions, but even with this facility, The school dropout rate by the man from the primary schools is increasing according to educational levels. Therefore the man tends to work at an earlier age diminishing their educational level not allowing it to be sufficiently sound to make decisions about your health care. In addition to working days the man does not have the time to go to be relevant studies, and on many occasions it has to resort to a failure affecting the economy of their home so that it is preferable to leave this time for the job. While most of the male labor have some government institution of health that provide the services will be affected economically in less proportion that those who are not with them during the process of CaP, Otherwise the man is not prepared to invest money for your health unless it is in an advanced stage of the disease that causes symptoms of importance.

There are many beliefs around the prostate cancer that keeps the man away from these studies. These include the loss of virility, fear to become a gay person, to deal with a diagnosis positive, the discomfort of the study, thought mexican superhero because man will never happen. The bad information on the consequences of prostate cancer with negative thoughts and fearful.

The probability that the prostate cancer increases with the passage of years is high by the factors mentioned above, for the year 2020 there would be a rate of 1805 and 2030 of 25.24, however it is not a question of do massive campaigns, the majority of men know how to carry out the study and what is its purpose, It is that with education, let us be rational beings and see why you should leave these taboos that in the long run the only thing that are going to cause is the increase in the mortality due to this silent disease that afflicts the men.

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