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*RESEARCH ARTICLE*

# EPIDEMIOLOGICAL PROFILE OF THE CATARACT IN SENEGAL

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## *Abstract*

The crystalline, natural lens of the eye, is normally transparent. But, most often with age, it opacifies involving a decrease of visual acuteness. It's the cataract. It is the first cause of blindness in developing countries; about 40% of the 37 million blind people in the world are affected by. It is therefore a major problem of public health in these countries, particularly since the treatment is known and its application is only limited by the cost. The favorisant factors are undernutrition, dehydration, exhibition to the sun. Then it occurs to relatively young subject. In Senegal The cataract epidemiology revealed a sex ratio of 1.23; men are more affected. Some ethnic groups are more affected than others, as well as certain age, locality and occupation.



## Introduction:-

Two hundred and eighty five (285) millions of people with visual deficiency are registered in the world: 39 million of them are blind and 246 million have a visual acuteness drop. It is noted that about 40% of the 39 million blind people in the world are due to cataract and about 33% of visual deficiencies are caused by a non-operated cataracts (WHO, 2015). Like many countries in Africa, Senegal has established a politicies of preventive information which is not enough sufficient compared to the expansion of cataract. This explains the high rate of cases in the country. This work of thesis intends to establish the epidemiological profile of the cataract in Senegal. Cataract is found in all social fringes and at all ages, its ubiquity justifies the importance who is carried to him in this study. We propose to establish a concise notebook of its expansion in its diversity and form. Indeed, we will focus the study on age; Gender, ethnicity parameters, and associations between these variables.

**Methodology:-**

**Patients:-**

Patients are of any sexes, any ages and from different localities of Senegal. They are also of different socio professional category without any possible exclusion related to the kind of activity or ethnic group.

**Survey and questionnaire form:-**

The studied parameters were the subject of a questionnaire within a context of surgical intervention operation at the Ouakam Military Hospital (HMO) in 2015. All patient data were collected in a database prepared for this purpose. These data allowed us to make an epidemiological study in the strict sense of cataract in Senegal.

**Statistical studies:-**

The realization of this study required the use of statistical tools such as Access 2003, Excel 2003 and Epi info 7 with a confidence interval of 95%. These three softwares allowed the processing and analysis of the collected data.

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Indeed, the calculation of the sex ratio, the percentage and frequency calculations allowed us to obtain exploitable results and which are confirmed by p values calculated thanks to software STATVIEW version 5.0.

## Results:-

### Sex ratio:-

The study involved 234 cases of cataracts. On the 234 cases of our survey, 55.12% are male and 44.88% are female (Table 1). This means a sex ratio (M / F) of 1.23.

**Table 1**:- cataract and sex

| Sex | Number of case | Percentage(%) P. values(t) |
|---|---|---|
| Female | 105 | 44.88 |
| Male | 129 | 55.12 |
| Total | 234 | 100 0.0325 |

**Variation with age**:-

The Senile cataract is more prevalent than juvenile. It is more important from the age of 40 (28.63%) and over 60 (67.52%). Juvenile cataract appears earlier in women (1.90%) than in men (1.55%). In women, the sharing out seems constant up to 40 years (1.90%) and increases gradually beyond. however It should be noted that under 20 years we have no patients; The preponderance of juvenile cataract in women is only perceptible from 20 to 25 years then the trend is reversed.

In fact, from 25 to 60 years, cataract is more important in men and the distribution in men of 60 years old is 34.1% against 21.9% in women of the same age. At
retirement (> 60 years), women (74.28%) are more attained than men (62.01%).

**Table 2**:- Repartition according to the age

| AGE / SEX | 0-25 | 25-40 | 40-60 | >60 | Total |
|---|---|---|---|---|---|
| F | 2 | 2 | 23 | 78 | 105 |
| M | 2 | 3 | 44 | 80 | 129 |
| Total | 4 | 5 | 67 | 158 | 234 |
| %F | 1.9 | 1.9 | 21.9 | 74.28 | 100 |
| %M | 1.55 | 2.32 | 34.1 | 62.01 | 100 |
| %G | 1.7 | 2.13 | 28.63 | 67.52 | 100 |

(P = 0.03)

However, the following graph gives a more detailed picture of this difference in disease variations between men and women at different ages.

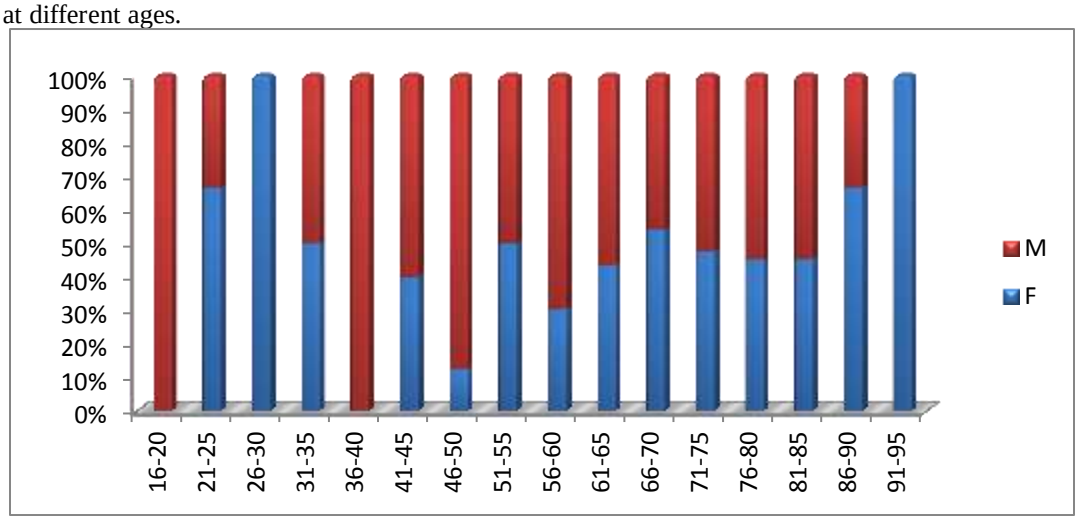



**Figure 1**:- Evolution of cataract according to age and sex

Moreover, if we focus on retired patients (over 60 years old) we notice that cataract is more important during the first year of retirement (Table 2). From 65 to about 90 years, there is a net constant of the number of cataracts.

**Ethnic group and geographical origin:-**

**Cataract and Ethnicity:-**

The ethnic groups most attained by cataract are degressively Wolofs, Peulhs, Sereres, Toucouleurs, Diolas and Lebous with respectively percentages of 34. 19; 16.24; 14.53; 10.68; 7.69; and 7.26. The other minority ethnic groups in Senegal have percentages of less than 2%. A sharing out between gender and ethnicity reveals that there are as many women as men in the Peulhs. Apart the sereres where the rate of affected woman is more important, all the other ethnic groups have more affected men than women. However, if we regroup the ethnic groups according to a division of the country related to their importance of concentration we can have three zones which are the south, the center and the north. The north gives 27.78% of cataract (the Nars, Peulh and toucouleurs), the south 15.81% (Bainounk, Bambara, Diakhanke, Diola, Malinké, Mandingue, Manjack, Mankagne, Soninké and Socé) and the center 56.41% (Lebou, Serere, Cape Verde, Wolof).

**Table 3**:- Frequency case according to ethnic groups

| Ethnics group | Number | Percentage |
|---|---|---|
| BAINOUNK | 1 | 0.43% |
| BAMBARA | 2 | 0.85% |
| CAPVERDIAN | 1 | 0.43% |
| DIAKHANKE | 1 | 0.43% |
| DIOLA | 18 | 7.69% |
| LEBOU | 17 | 7.26% |
| MALINKE | 1 | 0.43% |
| MANDINGUE | 3 | 1.28% |
| MANJACK | 3 | 1.28% |
| MANKAGNE | 2 | 0.85% |
| NAR | 2 | 0.85% |
| PEULH | 38 | 16.24% |
| SERERE | 34 | 14.53% |
| SOCE | 2 | 0.85% |
| SONINKE | 4 | 1.71% |
| TOUCOULEUR | 25 | 10.68% |
| WOLOF | 80 | 34.19% |
| TOTAL | 234 | 100.00% |

(p(t)=0.015 p (chi2) < 0.0001)

**Table 4**:- Frequency according to ethnics groups and female sex

| Ethnics group | Number | Percentage |
|---|---|---|
| BAMBARA | 2 | 1.90% |
| CAPVERDIAN | 1 | 0.95% |
| DIOLA | 7 | 6.67% |
| LEBOU | 7 | 6.67% |
| MALINKE | 1 | 0.95% |
| MANJACK | 2 | 1.90% |
| MANKAGNE | 1 | 0.95% |
| NAR | 1 | 0.95% |
| PEULH | 19 | 18.10% |
| SERERE | 18 | 17.14% |
| SONINKE | 2 | 1.90% |
| TOUCOULEUR | 6 | 5.71% |
| WOLOF | 38 | 36.19% |
| Total | 105 | 100.00% |

(p=0.020)

**Table 5:-** Frequency according to ethnics group and male sex

| Ethnics group | Number | Percentage |
|---|---|---|
| BAINOUNK | 1 | 0.78% |
| DIAKHANKE | 1 | 0.78% |
| DIOLA | 11 | 8.53% |
| LEBOU | 10 | 7.75% |
| MANDINGUE | 3 | 2.33% |
| MANJACK | 1 | 0.78% |
| MANKAGNE | 1 | 0.78% |
| NAR | 1 | 0.78% |
| PEULH | 19 | 14.73% |
| SERERE | 16 | 12.40% |
| SOCE | 2 | 1.55% |
| SONINKE | 2 | 1.55% |
| TOUCOULEUR | 19 | 14.73% |
| WOLOF | 42 | 32.56% |
| Total | 129 | 100.00% |

($p<0.0001$)

**Cataract and locality:-**

The study shows that 75% of cataracts detected are from Dakar. The second biggest concentration is in Thiès which is the second more important city of the country (4.71%). Casamance is in the third position with 3% cataracts. Fouta and Kaolack have the same rate (2.56%) as well as St-louis and Fatick (1.70%). The alone region of Diourbel registers for 2.14% of cases of cataracts. The other regions have rates which are less than one (<1).

**Table 6:-** Frequency of cases by location

| Localities | Number | Percentage |
|---|---|---|
| BAKEL | 1 | 0.43 |
| CASAMANCE | 7 | 3 |
| DAKAR | 177 | 75.64 |
| DIOURBEL | 5 | 2.14 |
| FATICK | 4 | 1.70 |
| FOUTA | 6 | 2.56 |
| GUINEE | 3 | 1.28 |
| KAFFRINE | 1 | 0.43 |
| KAOLACK | 6 | 2.56 |
| KOLDA | 2 | 0.86 |
| LINGUERE | 1 | 0.43 |
| LOUGA | 2 | 0.86 |
| MATAM | 1 | 0.43 |
| PODOR | 2 | 0.86 |
| ST LOUIS | 4 | 1.70 |
| TAMBACOUNDA | 1 | 0.43 |
| THIES | 11 | 4.71 |
| Total | **234** | **100.00%** |

($p<0.0001$)

**Association between cataract and socio-professional category:-**

The tables below shows that 34.19% of patients with cataract are housekeepers, 15.38% are workers and 13.25% are traders. Finally, 4.70% of the cataracts are drivers or farmers.

**Table 7:-** Frequency case according to profession

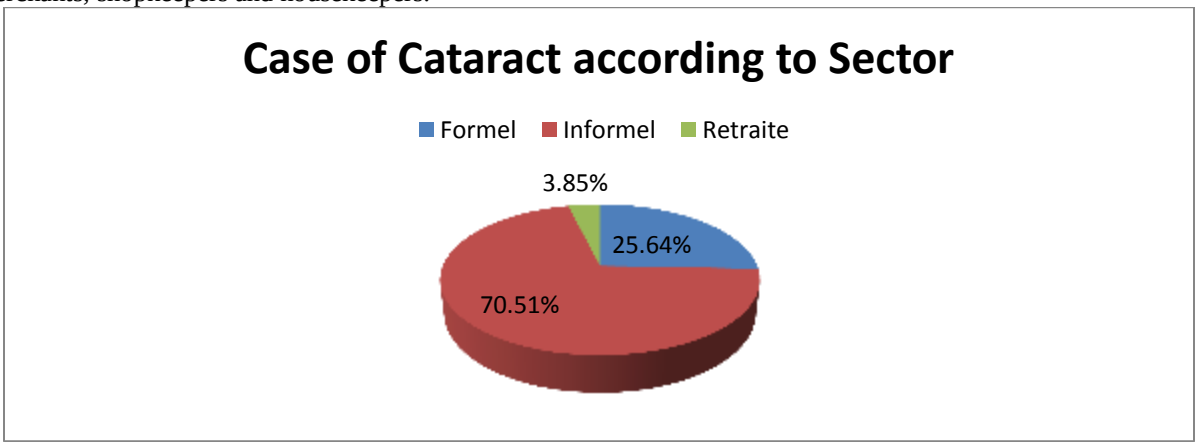
| Profession | Number | Percentage |
|---|---|---|
| ASSISTANT | 1 | 0.43% |

| | | |
|---|---|---|
| BANKER | 3 | 1.28% |
| BUTCHER | 1 | 0.43% |
| BAKER | 1 | 0.43% |
| DRIVER | 11 | 4.70% |
| HAIRDRESSER | 1 | 0.43% |
| TRADER | 31 | 13.25% |
| ACCOUNT | 4 | 1.71% |
| PUPIL | 3 | 1.28% |
| BREEDER | 1 | 0.43% |
| TEACHER | 5 | 2.14% |
| CONTRACTOR | 1 | 0.43% |
| FACTOR | 2 | 0.85% |
| CIVIL SERVANT | 3 | 1.28% |
| HORTICULTURIST | 2 | 0.85% |
| HOTELKEEPER | 2 | 0.85% |
| PRINTER | 2 | 0.85% |
| ENGINEER | 1 | 0.43% |
| JOURNALIST | 1 | 0.43% |
| WAREHOUSEMAN | 1 | 0.43% |
| DOCTOR | 4 | 1.71% |
| HOUSEKEEPER | 80 | 34.19% |
| CARPENTER | 1 | 0.43% |
| MILITARY | 8 | 3.42% |
| WORKER | 36 | 15.38% |
| FARMER | 11 | 4.70% |
| FISHERMAN | 3 | 1.28% |
| TUTOR | 1 | 0.43% |
| RESTAURANT OWNER | 1 | 0.43% |
| RETIRED-PERSON | 9 | 3.85% |
| SPORTSMAN | 1 | 0.43% |
| SECURITY GUARD | 2 | 0.85% |
| Total | 234 | 100.00% |

(p=0.007)

Figure 2 shows the division by sector. Indeed the alone informal presents more cases of cataract than the formal and retired together.

Tertiary workers (doctors, accountants, bankers, teachers, etc.) have the lowest rates of affected compared to merchants, shopkeepers and housekeepers.




(p<0.0001) Formal-Informal-Retired

**Figure 2:-** Case of cataract according to Sector

## Discussion:-

Nowadays Cataract is the leading cause of blindness in the world (Zhang et al., 2011). Senegal is particularly affected by this disease (Sarr, 2008). To this effect, we propose to establish an epidemiological profile that is fairly representative of the different socio-ethnic strata. In Senegal men would suffer more from cataract than women (R =1.23; p=0.0325). This predominance of male sex in cataract can be due to the fact that men by their work are more exposed to sunlight and chemicals (Saadat and jahroumi, 2006). It should be noted that tobacco addiction (Balasubramanian, 2000) and alcohol (Hammond, 2001) that cause cataract are much more the attribute of men than women in Senegal (Ndiaye, 2016). Juvenile cataract is higher in males under 20 years old, in women between 20 and 25 years old and still more in males between 25 and 40 years old; the different pubertal evolution between genders can be a cause (p=0.03). Sex does not seem to have a heavy impact on juvenile cataract. However, its recrudescence in comparison with the previous generations could be due to the excessive use of the game consoles (Allary, 2003) .This use is the main cause of the majority of myopia detected these last years and myopia is known to be one of the cause of cataracts (Flament, 2002). From 40 years old the cataract is senile, the ratio M / F is very perceptible at this age because the number of men in activity remains more important (WHO, 2016). However, this trend changes from the age of 60 and this is probably due to the fact that the life expectancy of women is higher and that menopause affects the crystalline.

At age 60, predominance is more prevalent in the first years of retirement, which suggests that senile cataract declines with the age and the professional activity is a lagging factor to the development of crystalline opacities. Indeed, 33.33% of the retired cases declare themselves enough early (61 years). Relatively short life expectancy could be a bias in this fact (WHO, 2016). The ocular tiredness due to the accumulation of years of work (career) may also explain this appearance of cataract in the first years of retirement ( Saadat and Jahroumi, 2006). Besides, we can say that cataracts present disparities according to sex and age and if we associate the two parameters, this difference is none the less perceptible. Senegal has a population (over 40 years old) very affected by diseases such as diabetes and hypertension, which have a well-known influence on crystalline (Frezal & Mugnier, 2009). Finally, it can be said that the high rate of senile cataract is on all fours with that of diabetics and hypertensive patients (Chapuis-Lucciani, 2008; Abbas et al., 2014). The percentage representation of cataract more perceptible in certain ethnic groups could be related to their strong concentration in Dakar metropolis of its state. This theory could not be sustained insofar as apart the Lebous all the other ethnic groups in Dakar would have landed there as a result of the rural exodus. The ethnic bringing closer (same origin) between the Peulhs and Toucouleurs on the one hand, and between Sereres, Diolas and Lebous on the other hand could also justify their not too different percentage of cases. We can therefore say that cataract affects more wolofs and sereres than other ethnic groups (p=0.015). The ratio M / F is clearly perceptible in all ethnic groups except in the serer. Ethnic groups in Senegal have certain diversity. This is perceptible in the case of cataract. This could allow us to highlight a certain structuring ethnic groups in relation to their sensitivity to cataract (p=0.02).

However, the geographic ethno-localization, which concentrates certain ethnicities in certain localities more than others, shows that the cataract rate is higher in the center of the country. The luminous intensity produced by Cosmic rays are more violent in the center. This high luminosity could justify the fact that the cataract rate is higher there. Economic macrocephaly may be the main reason for the highest concentration of noted cases in Dakar. We can also argue that the proximity of patients living in Dakar where most operations are done may be the reason for this, which may explain the low rates for Kolda (0.86%) and Tambacounda (0.43%). This hypothesis is not valid in Casamance (3.00%) and in Fouta (2.56%). Therefore we can correlate part of the strong rate cataract in Dakar with the proximity but another part could be due to the high luminous exposure due to its geographical position (center of the country) and the strong chemical pollution (p<0.0001). Socio-professional categories give different rates of cataract attack. There is every reason to believe that workers in the informal sector, who certainly do not have enough information about the disease, do not adopt the appropriate prevention policy. Lack of information and follow-up may be the main cause of this high incidence in the informal sector. This is confirmed with tertiary workers such as bankers and others who have medical care and are able to do regular checkups.

It should also be noted that office work exposes more to ametropia than to a possible cataract (Allary, 2003). This distribution points out the fact that the informal sector is more affected by cataract (Mc carty and Taylor, 2002).

## Conclusion:-

Cataract is a very spread blindness disease in Senegal. It has a male predominance and its appearance has been underlined as more frequent in the elderly (over 40 years old). It is a more frequent disease in the wolofs, Peulhs, Sereres, Diolas, Toucouleurs and Lebous (p=0.015). It is more important in the center of the country than in the South and the North, and it affects a greater proportion of informal sector workers.

Cataract in Senegal is a pathology that finds its aetiology deeply rooted in the Senegalese way of life (smoking, alcoholism, menopause ... etc) and in their environment (solar radiation, ultraviolet rays, exposure to artificial lights, pollution ... etc). It should also be noted that cataract is readily associated with diseases such as diabetes and hypertension (Abbas et al., 2014). It can be concluded that a balanced diet would avoid cataract. In sum, it would be essential to develop quite enlarged sensitization and information policies on the issue of eye diseases, in this circumstances cataract.

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