Food and Social Background of Nasopharyngeal Cancer Patients in Jakarta

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Abstrak

Berbagai faktor telah dibuktikan sebagai penyebab dan predisposisi timbulnya karsinoma nasofaring (KNF) seperti Virus Epstein-Barr (EB), makanan, jenis kelamin, genetika, sosial ekonomi, lingkungan dan lain-lain. Selama 10 bulan dari Januari sampai Oktober 1996 di Bagian THT FKUI/RSUPN Dr. Cipto Mangunkusumo Jakarta didapatkan 81 kasus baru karsinoma nasofaring dan dibandingkan dengan 81 kasus bukan karsinoma nasofaring yang datang berobat yang diambil secara acak dalam waktu yang sama. Penderita laki-laki lebih banyak dari wanita (64,20% : 35,80%) dengan umur rata-rata 45 tahun pada kelompok KNF dan 34,13 tahun pada kelompok non-KNF. Diselidiki pula pendidikan, penghasilan sebulan, berat badan, energi untuk ....k, sumber air minum, dan didapatkan bahwa kelompok KNF memang berasal dari golongan berpenghasilan kurang. Ditem... ...n pula b... ..a secara bermakna ikan asin yang dikonsumsi sehari-hari oleh kelompok KNF lebih banyak dibandingkan pada kelo... ...ok non K... ...f, juga kebiasaan merokok dan lingkungan yang polutif lebih banyak pada penderita KNF.

Abstract

Many factors have been proven as the etiological and predisposing facto... ...nasophary... ...cancer such as EB virus, diet, sex, genetics, social economy, environment and others. During 10 months ...m ...ary to O...tober 1996 in the Department of Otorhinolaryngology, Medical Faculty, University of Indonesia we found 81 new cases... ...asopharyngeal cancer and compared them with 81 cases of non-NPC patients in the same time. Male patients wer... ...e frequent t... female (64.20% : 35.80%); the average age was 45 years in NPC and 34.13 years in non NPC group. Educati... monthly income, body weight, energy for cooking and water sources were studied. We found that the NPC patients came from ...ower inc... e group. The prominent evidence was that the consumption of salted fish as a protein source was higher in the NPC...pared... the non NPC group (33.33% and 13.58%), and this difference was statistically significant. Poluted environ... ...as well a... ...g habit were also higher in the NPC compared to the non NPC group.

Keywords: salted fish, smoking habit.

It's nearly definitive that EB-vi...us (E... ...) is the etiology of nasopharyngeal can... (NPC). B... EBV is not running alone; there are ...me ex...rnal factors that play a role in the appearing ...f N...C. Th...se factors are genetics, age, sex ...iet, g...raph... social economy, culture and habi... ...ol... ...n, in... ...on and many others.

Environmental p... ...on is ...l thought by many, especially in lay man, ...major cause of many forms of cancer. However, i...ensive research in the last 3 decades has shown that this concept is incorrect. Lifestyle or lifestyle-related behavior can promote and cause the development of various cancer found in human. The etiological factors are often complex and need careful analysis and evaluation.

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In nasopharyngeal carcinoma, many authors had mentioned EB virus, genetics and diet to be the main etiological factors. The enviromental factors and/or diet factors can react with genetic material, such as DNA and should be the important one in causing NPC.[1]

Ho[2] first proposed that Chinese salted fish, a popular food in Southern China, especially favoured by the Cantonese, was a possible factor in the development of NPC. This theory was based on the fact that the highest incidence of NPC occurs in the fisher folk of Hong Kong, whose diet contains a high proportion of salted fish and a deficient intake of vitamin-rich fresh vegetables and fruits. In Indonesia, there was no study to proof that salted fish consumption, social economic condition, culture and habit, and polution play a role in the NPC, even though Indonesian people have intermediate to high susceptibility to NPC.

Therefore, during 10 months, from January to October 1996 in the Department of Otorhinolaryngology, Medical Faculty, University of Indonesia we studied 81 new cases of NPC and compared them to another 81 patients of non NPC. This study was focused on food and social background of the NPC and non NPC cases.

METHODS

This study was held in the Department of Otorhinolaryngology, Medical Faculty, University of Indonesia/Dr. Cipto Mangunkusumo Hospital, Jakarta, between January 1 to October 31, 1996. During that time were found 81 new cases of nasopharyngeal cancer, which consist of 52 males and 29 females. The diagnosis was based on the anamnesis, clinical examination, radiological examination - CT Scan, biopsy and histopathological finding of nasopharyngeal cancer. The control group of non NPC patients were also consist of 52 males and 29 females suffering from various diseases and normal one. The control group cases were taken randomized on the same day after each case of NPC was diagnosed. The criteria to be the control group were an adult patient and has the same sex with the NPC patient. The exclusion of NPC was confirmed by the anamnesis, clinical examination, conventional radiological examination, biopsy and histopathological examination if suspicious there was a tumor and demonstrable signs and symptoms of nasopharyngeal cancer. In this control group included any kinds of diseases of the ear, nose and throat and neoplasms of the ear, nose and throat except nasopharyngeal cancer. In both group food and social background were studied including age, sex, occupation, education, monthly income, body weight, main food, protein sources, other supplement food, smoking habit, energy for cooking, drinking water sources and housing.

RESULTS

Sex

Both groups of 81 cases each, consist of 52 males (64.20%) and 29 females (35.80%).

Age

In NPC patients the age was ranging from 20 to 64 years and the mean was 45 years; in the control group the age was ranging from 18 to 84 years and the mean was 34.13 years (Table 1).

Table 1. Age distribution of NPC and non-NPC patients (N = 81)

Age in year	NPC % (N)	Non-NPC % (N)
Less than 20	2.47 (2)	9.88 (8)
20 - 29	9.88 (8)	38.29 (31)
30 - 39	25.92 (21)	23.47 (19)
40 - 49	25.92 (21)	12.35 (10)
50 - 59	19.75 (16)	8.64 (7)
60 - 69	16.06 (13)	2.47 (2)
more than 70	-	4.94 (4)
Mean of age	45 years	34.13 years
SD	± 12.83	± 13.46

Staging and type of disease

In the NPC group, most of the cases were in advanced stage, stage I while stage II two cases or 2.47%, stage III 17.28% 14 cases and stage IV 65 cases or 80.25%. All of the cases were undifferentiated type of squamous cell carcinoma.

Various diseases were found in the control group such as:

Chronic supp. otitis media	: 17	(20.99%)
Chronic sinusitis	: 14	(17.28%)
Allergic rhinitis	: 11	(13.58%)
Chronic tonsilitis	: 5	(6.17%)
Laryngeal tumor	: 3	(3.70%)
No abnormality detected	: 9	(11.11%)
Chronic pharyngitis	: 6	(7.41%)
Ceruminal plug	: 5	(6.17%)
Tonsil tumor	: 1	(1.23%)
Tongue tumor	: 1	(1.23%)
Submandibular abscess	: 1	(1.23%)
Nasal polyps	: 1	(1.23%)
Laryngitis	: 1	(1.23%)
Hypophysis tumor	: 1	(1.23%)
Tubal oclussion	: 2	(2.47%)
Vasomotor rhinitis	: 2	(2.47%)
Septal deflection	: 1	(1.23%)
Total	: 81	

Education

In the NPC group iliteracy cases were 5 (6.17%), Primary School 29 (35.80%), Secondary High School 17 (20.99%), High School 21 (25.92%) and University graduates 9 (11.12%). In the control group, iliteracy were 2 (2.47%), Primary School 9 (11.11%), Secondary High School 13 (16.05%), High School 35 (43.21%) and University graduates 22 (17.16%) (Table 2).

Table 2. Education of the two groups N = 81

Education	NPC % (N)	Non - NPC % (N)
Iliteracy	6.17 (5)	2.47 (2)
Primary School	35.80 (29)	11.11 (9)
Secondary High School	20.99 (17)	16.05 (13)
High School	25.92 (21)	43.21 (35)
University	11.12 (9)	17.16 (22)

Monthly income

Most of the cases in NPC and control group had monthly income between USD 50 to 150; in the NPC group there were 42 cases (58.03%), and in the control group there were 31 cases (38.28%) (Table 3).

Table 3. Monthly income of the two groups N = 81

Income (USD)	NPC % (N)	Non-NPC % (N)
0	4.94 (4)	12.34 (10)
< 50	13.58 (11)	17.28 (14)
50 - 150	58.03 (47)	38.28 (31)
150 - 250	17.28 (14)	14.82 (12)
> 250	6.17 (5)	17.28 (14)
Mean of income	120.78	135.21
SD	± 68.79	± 80.32

Body weight

Most of the NPC group patients have body weight below normal (58.02%), while the percentage of normal and above normal body weight was 20.99% and 20.99% respectively. Normal body weight = 90% (H - 100) kg (H = height in centimeter).

In non-NPC group, cases having below normal, normal and above normal body weight were 50.62%, 33.33% and 16.05% respectively. There was no significant difference for body weight figures between both groups (P = 0.02?).

Food

Rice was the main staple in both groups as well as most of Indonesian people. All of the NPC group ate rice two or three times a day (100%) and only one (1.23%) in the non-NPC group ate sago as main food.

Additional food

Vegetables and fruits are eaten by 74.07% and 62.96% of the NPC group, and by 76.54% and 59.26% in the non NPC group respectively. However, only 27.16% drank milk every day in the non-NPC group compared

with 42.21% in the NPC group and this difference was statistically not significant (P = 0.1098).

Protein sources

There are 4 kinds of protein sources taken by most Indonesian in their meals. Meat (beef, mutton, pork and fresh fish), taofu or soya bean curd, soya bean cake and salted fish. The last three were eaten in daily meal of most low income people in Indonesia.

In the NPC group meat, taofu, soya bean cake, and salted fish was taken by 45.68%, 95.06%, 82.72% and 33.33% of patients respectively, at least twice a week in their menu. In the other group, meat, taofu, soya bean cake was taken by 67.90%, 24.07% and 71.60% of patients respectively, but salted fish was taken by only 13.58% of the cases (Table 4).

Table 4. Protein sources in each group of patients (N = 81)

Protein sources	NPC % (N)	Non-NPC % (N)
Meat	45.68 (37)	67.90 (55)
Taofu	95.06 (77)	74.07 (60)
Soya bean cake	82.72 (67)	71.60 (58)
Salted fish	33.33 (27)	13.58 (11)

The salted fish intake as a protein source was statistically significantly different between the two groups (P < 0.005).

Smoking habit

There were smokers in both groups; 49.38% in NPC group and only 32.10% in non-NPC group, but this difference was statistically not significant (OR = 2.06, P = 0.0251).

Sources of energy

Most of subjects used kerosene as the main source of energy for cooking (Table 5).

Table 5. Energy for cooking (N = 81)

Source of energy	NPC % (N)	Non-NPC % (N)
Wood	18.52 (15)	7.41 (6)
Kerosene	65.43 (53)	59.26 (48)
Gas (LPG)	13.58 (11)	25.93 (21)
Electricity	2.47 (2)	7.41 (6)

The difference in the usage of wood and kerosene between the NPC and non NPC group was statistically not significant; wood: P = 0.3075, kerosene: P = 0.1098.

Water sources

Ground water was the main water source in most subjects; 70.10% of the NPC, and 62.90% of the non-NPC group used ground water. Clean water facilities was used by 28.40% of the NPC and 37.04% of the non-NPC group. Water deposit collected from rain fall was used by one patient of the NPC group (1.24%).

The difference between ground water and clean water facilities used by the two groups was not statistically significant ($P = 0,1501$).

Housing

Most of the subjects lived with their family in a small house, usually out of the city (Table 6).

Table 6. Housing size of both group of patients

Size (m^2)	NPC (%)	Non - NPC (%)
< 20 m^2	3.70 (3)	8.64 (7)
20 - 29	6.17 (5)	13.58 (11)
30 - 39	9.88 (8)	6.17 (5)
40 - 49	8.64 (7)	7.41 (6)
50 - 59	8.64 (7)	8.64 (7)
60 - 69	2.47 (2)	3.70 (3)
70 - 79	16.05 (13)	17.28 (14)
80 - 89	4.94 (4)	2.(2)
90 - 99	4.94 (4)	3.(3)
> 100	34.57 (28)	
Mean of housing size	71.48 m^2	70 m^2
SD	± 27.7	± 76

The house's size of the two groups was not statistically significant ($P = 0.1109$).

Combined factor

The combination of all factor above showed that sex, age, body weight, fish consumption, smoking habit, sources of energy (wood and kerosene), water sources and housing in logistic regression test had an OR of 2.18.

DISCUSSION

Sex ratio between male and female in this study was 1.8 : 1. It's a bit different with the figure mentioned by Shanmugaratnam who studied the epidemiology of NPC (2-3 : 1).[3]

The highest incidence of NPC is in the 4th decade of life.[2,3] NPC occured most frequently around the fourth to fifth decade of life, and this is in agreement with this study. However, NPC patients were also found at extremes of age such as 7 to 80 years old.[4]

Almost all of the NPC cases came on the late stage, 97.53% came to the hospital in the stage III and IV. This is the typical figure of NPC patients in Jakarta, where we found the same figure in 1988-1992, i.e. stage I 0.90%, stage II 2.94%, stage III 18.78% and stage IV 77.38%, or 96.16% were at stage III and IV from the 442 patients.[5]

Roezin et al[6] in 1989 also had the same figure from 90 NPC patients, i.e. 3.75% stage I, 1.25% stage II, 13.33% stage III and 83% stage IV, or 95.56% were at stage III and IV.

Most of the cases in the NPC group were Primary School graduates, but in the non-NPC group most of them were High School graduates. There were more University graduates in the non-NPC than in the NPC group. As a whole, the non-NPC group was more educated than the NPC group. The monthly income revealed that the NPC patients came from the lower income people compared to the non-NPC patients.

Normal and below normal body weight in the two groups showed nearly the same figure; 79.01 in the NPC and 83.95% in non-NPC group.

Almost all of the subjects in the two groups ate rice every day as well as most of Indonesian people, only one in the non-NPC group ate sago as the main carbohydrate source. In some people in east part of Indonesia sago is the main carbohydrate source and some other people in that region took corn as the main food.

In Jakarta, the meat price is much higher (± 8 times) than taofu and soya bean cake, and the price of salted fish is about 80% of meat price. In this study the subjects comsumed salted fish only 50 to 75 grams in each meal because they ate much more rice than salted fish.

In the NPC group they ate meat less in frequency and quantity compared to the non-NPC group (45.68% and 67.90%); in general, this showed that the NPC group came from lower economic class compared to the non NPC group. However, they ate more salted fish than the non-NPC group (33.33% and 13.58%), and this difference is statistically significant supposing the role of salted fish in predisposing NPC in this study.

The consumption of salted fish in Indonesian was very much different than people in China or Hong Kong. In

China or Hongkong, they ate a lot of salted fish in each meal, every day for years since the weaning. A case control study in Hong Kong on cases under 35 years of age found a positive association of NPC with the consumption of salted fish at any time, but this association was particularly strong for the consumption during childhood. There was a relative increase in risk of nearly 40 fold for the consumption of salted fish once or more times a week at age of 10, in comparison to rare consumption.[7] Some experimental support for this association was provided by the study of Yu and Henderson in which rats fed salted fish developed tumors in the nasal cavity.[8]

Vegetables and fruits were consumed by both groups with about the same percentage. However, it was much different in drinking milk which percentage was higher in the NPC group because they believe that milk could increase their body resistance against cancer.

There was difference between smoking habit in the NPC group (49.38%) compared to the non NPC group (32.10%). Even it's not statistically significant, but the O.R. showed that the smokers have 2 times higher risk to have nasopharyngeal cancer than the non smokers.

Wood and kerosene were used more frequent as energy source in the NPC compared with the non-NPC group, though those figures are statistically not significant. Both energy sources give more polution and are usually used by lower income group. In the non-NPC group they used more gas and electricity as energy sources compared to the NPC group. As a whole the NPC group lived in more poluted environment than non-NPC group.

Ground water are used by most of Indonesian people as water source for drink and other necessity. But some people in big city used water from clean water facilities provided by the goverment.

Ground water were more used by the NPC (70.10%) compared to 62.90% in non-NPC group, but water supply by government were used more in non-NPC (37.04%) than in NPC group (28.40%). The clean water fascilities by goverment are not found in all parts of Jakarta, but the figures showed that the non NPC group was more wealthy than NPC group.

House size is one of the parameter of healthy life.The mean house size in NPC was 71.48 m^2 compared to 63.70 m^2 in non-NPC group. Eventhough it's not statistically significant, it showed that the NPC group had larger house than the non-NPC group.

The combined factors i.e. age, sex, body weight, smoking habit, salted fish consumption, souces of energy (wood and kerosene), water sources and housing showed that the NPC group had 2.18 times the risk to have nasopharyngeal carcinoma than non NPC group.

The other factor that was never proved before as an important risk factor of NPC in Indonesia was salted fish. However, this study revealed that salted fish played a role in increasing the risk of NPC.

CONCLUSION

Male is more frequent to have nasopharyngeal cancer than female and the age average of NPC patients was 45 years (between to 50 years). Most of the NPC patients came from low income status, live in more poluted environment caused by smoking habit and energy source daily used; as a whole the quality of life was less wealthy compared to the non-NPC patients.

Male in 4th decade of life who ate salted fish more than twice a week, had a smoking habit and with a low social economic condition had 2.18 times the possibility to have nasopharyngeal cancer than other people with better social economic and do not have salted fish in their meal.

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