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*It was of great importance to publish a scientific journal by the ministry of public health & population. A Journal that is interested in researches & health medical studies that are carried out by Yemeni & other researchers in Yemen.*

**Goals / objectives (purpose):-**

1. Publishing health medical & researches, which are carried out by Yemeni researchers throughout free Journal, widely distributed among interest of health field personnel, in the institutes, facilities, Medical students, Medical schools teaching staffs, different Health institutes and other authorities.
2. Reublish of Yemeni health & medical research which have been published in the international, regional journals and periodicals that are expensive and limited distribution in Yemen.
3. Encouraging Yemeni researchers to publish their researches & studies that have faced difficulties and complicated conditions and delay.
4. Collecting & documentation Yemeni health & medical research that published to be available as references for interested researchers and students.

**Publication requirements:**

1. Researches must be directly related to health & medical problems in Republic of Yemen.
2. Research must fulfill all methodological & ethical condition / regulations of scientific researches.
3. Arabic abstract should include the research paper if the original language of research in English.
4. Must not be nose than five pages.
5. The journal is irresponsible in any way to the publishers.



# Research

**First cigarette smoking experience among  
secondary- school students in Aden,  
Republic of Yemen**

**Authors :-** A.A. Bawazeer, A.S. Hattab and E.Morales

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Page 440-449

**Abstract :-**

The objectives of this study were first to estimate the prevalence of cigarette smoking among secondary-school students and then to identify and analyse the demographic, social and cultural risk factors associated with the first cigarette smoking experience. A sample comprising 1000 students was selected randomly. Results showed that 19.6% of the total sample smoked; 15.5% among females and 21.9% among males. Family and/or friends appeared to influence the first cigarette experience and thus prevention strategies should involve not only the students themselves but the home, school and social environments also.

**Introduction:-**

The world consumption of cigarettes is estimated at around six hundred billion cigarettes per year. That total number of cigarettes is enough to send 3 million smokers to the grave annually; this includes both passive and active smokers. Smoking is becoming one of the important mortality risk factors, not only in industrialized countries but also in developing countries. Great efforts have been made to reduce the number of smokers in industrialized countries; for example the percentage of the population that smokes in England has been reduced to 9% and in United States to 25%. However, the number of smokers has been increasing in developing countries. The percentage of the population

who are smokers is about 22% in the Asiatic countries and 42% in the African communities [1].

Although the hazards of smoking are well known, the number of smokers among school students is still high. There are many factors influencing these students to start smoking; for example, socioeconomic status, parents, friends and siblings who smoke, and social environment [2]. Research in industrialized countries has repeatedly stressed the importance of preventing tobacco use among young people. In developing countries, however, smoking among children and adolescents has not received as much attention [3]. Nonetheless, it is well known that smoking among adolescents is a developmental phenomenon with several factors exerting an influence on cigarette use at different times [4]. Cigarette smoking is considered to be the single most preventable contributor to chronic diseases, but there is still controversy about the initiation and maintenance of smoking among adolescents [5].

Currently, there are more than 70 countries in the world which have official anti-smoking programmes and activities, including campaigns to protect individuals from tobacco smokers and promote a healthy environment. Work environments and other public places should be tobacco-smoke free in order to reduce the adverse effect on the people's health [6]. In response to international anti-smoking campaigns, the National Authority in the Republic of Yemen passed a resolution on community protection from smoking, which indicated in its general view the absolute prohibition of smoking in public places, including public transportation. However, it still has not been strictly implemented.

In the Republic of Yemen, the problem of smoking has not yet been investigated comprehensively, although some preliminary studies have been performed in some regions covering limited population groups. During 1991, a school-based study was carried out in Sirra District (Aden Governorate), which found that 7.1% of the total number of students of the secondary schools were smokers [7]. Another study on chewing khat and its associated habits showed that cigarette smoking was very common among khat-chewers. The study was carried out in 1992 among medical students of different grades in the Faculty of Medicine, Aden University and the results showed that 42% of khat-chewers were also smokers. Of these, 9.3% only smoked when they were chewing khat leaves [8].

Tobacco is cultivated in the country in limited areas; in Hadhramout (southern part) and in Tohamma (northern part). However, this tobacco is not used for the local manufacturing of cigarettes by the two cigarette companies; they only use imported tobacco. The local tobacco is usually used in different forms of consumption; for example, chewing it with the green leaves of pan (locally called tumbol), in the shisha pipe where the inhaling tube is commonly shared by a group of smokers and as snuff, although this last use is not widespread.

Our study aimed to investigate the smoking habits of secondary-school students, with particular reference to the first experience of cigarette smoking in order to provide some useful recommendations to reduce this habit among our youth. Our objectives were to:-

- estimate the prevalence of cigarette smoking among secondary-school students according to sex .
- describe the first experience of cigarette smoking among ever-smoker secondary-school students ( ever-smoker refers to those who smoke regularly and those who have only tried smoking ) .
- identify some demographic, psychosocial and familial factors associated with smoking among secondary-school students .

### **Subjects and methods :-**

This descriptive study was performed in April 1997 in Aden Governorate, Republic of Yemen. The study population was secondary-school students attending classes during the study period. A sample of 1000 students was randomly chosen applying a two-stage stratified cluster sampling, where each school was considered as a cluster. Stratification was by sex, school level and district in order to assure a representative sample according to the data available in the Office for Education in Aden.

At the first stage, and based on the number of students according to the register in the Office for Education in Aden, the proportion of the students by sex in the three directorates of Aden (Al-Meena, Seera, Al-Shab) was determined. The total sample size was fixed at 1000 students from the beginning and this total figure was distributed proportionally by sex, school level and directorate. To select the students, a second stage was used; that is the

selection of schools. Two schools in each directorate were selected by simple random sampling and the sample size for that district was proportionally divided between the total number of students in each school. The students were given a questionnaire and a 100% response rate was obtained using systematic sampling inside the school, i.e. if one student refused to participate, another was chosen.

The study was carried out with the full cooperation of the different levels of authority in the Local Office for Education and the school managers and written permission was sought from the Office.

An anonymous, closed, self-administered questionnaire was used for the data collection, which was completed by all those included in the sample. During data collection, teachers were requested to be out of the classroom thus giving more assurance of confidentiality.

Data were analysed using Microstat system. Chi-squared and hypothesis tests for difference of percentages were applied with a significance level of 5%, and 95% confidence intervals were calculated.

### **Results and discussion:-**

The sample studied comprised 64.5% males and 35.5% females. Among all students studied the smoking prevalence was 19.6%; 21.9% among males and 15.5% among females (Table 1). The difference was statistically significant ( $P < 0.05$ ). The 95% confidence intervals of the estimated smoking prevalence for secondary-school students in Aden Governorate are: all students 17.1-22.1; males 20.3-23.5; females 13.6-17.4.

Table 1. Prevalence of smoking among secondary-school students by sex , 1997 .

Smoking	Males		Females		Total	
	No.	%	No.	%	No.	%
Smokers	141	21.9	55	15.5	196	19.6
Never Smoked	504	78.1	300	84.5	804	80.4
Total <sup>a</sup>	645	64.5	355	35.5	1000	100

<sup>a</sup> Percentage calculated form the total of the row . the rest of the percentages calculated from the total of the column .

Jarallah and colleagues from Saudi Arabia reported a lower smoking prevalence rate among male junior secondary-school students (13.2%) [9]. Higher rates have been reported in the United States and New Zealand (52% and 65% respectively) [10,11]. These differences could be explained by the different social and cultural conditions prevailing in different communities.

Table 2. First cigarette smoking experience among ever-smoker secondary-school students by age group and sex, 1997.

Age group ( years )	Males		Females		Total	
	No.	%	No.	%	No.	%
< 10	22	15.6	9	16.4	31	15.8
10 – 14	32	22.7	22	40.0	54	27.5
15 – 19	82	58.2	23	41.8	105	53.6
Not specified	5	3.5	1	1.8	6	3.1
Total	141	100.0	55	100.0	196	100.0

The most common age for starting smoking was between 15 years and 19 years among all ever-smokers, followed by 10-14 years and under 10 years (Table 2). The pattern was similar for both sexes, although among females the proportion of those who started smoking between 10 years and 14 years was significantly higher than in males. It was found that 56.4% of female ever-smokers started at 14 years or less while 58.2% of male ever-smokers started at 15 years or more; thus females seem to start smoking at significantly younger ages than males ( $\chi^2 = 6.299$ ,  $P < 0.05$ ).

Generally the prevalence of ever-smoking increased with the age. Similar results have been reported from China where smoking prevalence

increased with age among boys and from Italy where smoking began among 11-13-year-old children and increased exponentially with age [12,13].

Table 3. Source of the first cigarette of ever-smoker secondary-school students by sex, 1997.

Source	Males		Females		Test of statistical significance (Z) <sup>a</sup>	Total	
	No.	%	No.	%		No.	%
Father	6	4.3	16	29.1	- 4.949*	22	11.2
Mother	-	-	7	12.7	-	7	3.6
Sibling	2	1.4	10	18.2	-4.398*	12	6.1
Relative/neighbor	36	24.8	14	25.4	-0.092	49	25.0
School friend	37	26.2	-	-	-	37	18.9
Friend outside school	32	22.7	2	3.6	3.166*	34	17.3
Teacher	5	3.6	-	-	-	5	2.6
Others	16	11.3	3	5.5	-	19	9.7
Not specified	8	5.7	3	5.5	-	11	5.6
Total	141	100.0	56	100.0	-	196	100.0

<sup>a</sup> Hypothesis testing of differences of percentages, two proportions from independent group

\* Statistically significant .

Considering all ever-smokers, the main sources of the first cigarette were relative/neighbour (25%), school friend (18.9%) and friend outside school (18.9%) (Table 3). Close relatives, i.e. father, mother or sibling, accounted for 20.9% if taken together. Teachers represented 2.6%. Similar findings have been reported from Indonesia and China [2,3]. By sex, the situation is completely different (Table 3). Among females, close relatives (father, mother, sibling) as

the source of the first cigarette constituted a significantly higher proportion than males. Among males, school friends and friends outside school as the sources of the first cigarette constituted a significantly higher proportion.

Table 4. Source of the first cigarette of ever-smoker secondary-school students by age group, 1997.

Source	Age group ( years )							
	< 10		10 – 14		15 – 19		Not specified	
	No.	%	No.	%	No.	%	No.	%
Father	10	32.3	7	12.9	5	4.8	-	-
Mother	-	-	3	5.5	4	3.8	-	-
Sibling	4	12.9	5	9.2	3	2.8	-	-
Relative/neighbor	17	54.8	15	27.7	11	10.5	6	100.0
School friend	-	-	11	20.4	26	24.8	-	-
Friend outside school	-	-	7	12.9	27	25.7	-	-
Teacher	-	-	-	-	5	4.8	-	-
Others	-	-	3	5.5	16	15.2	-	-
Not specified	-	-	3	5.5	8	7.6	-	-
Total	31	100.0	54	100.0	105	100.0	6	100.0

The first cigarette for those who started smoking before 10 years of age was predominantly given by a relative/neighbour, followed by close relatives (mainly the father) (Table 4). For those starting smoking between 10 years and 14 years the main sources were relative/neighbour, school friend and close relative (father, mother, sibling). For those who started smoking between 15 years and 19 years the main sources were friends outside school, school friends and others.

It is interesting to note that among those who started smoking at 14 years or younger the first cigarette was predominantly obtained at home, because the main sources were either close relative or relative/neighbour. Those who started smoking at 15 years or more acquired the habit outside the home, mainly at school or on the streets, i.e. school friends and friends outside school were the main sources. Teachers represented a very small proportion and were only mentioned as a source of the first cigarette by students between

15 years and 19 years. Similar findings were observed by Reimers and colleagues [4]. This indicates that strategies for smoking prevention should not be restricted to individual students but must also cover the student's home and school environment.

Table 5. Place of smoking the first cigarette of ever-smoker secondary-school students by sex, 1997.

Place	Males		Females		Test of statistical significance (Z)	Total	
	No.	%	No.	%		No.	%
Home	19	13.5	43	78.2	- 8.752 *	62	31.6
School	1	0.7	1	1.8	- 0.694	2	1.0
On the way to from School	35	24.8	1	1.8	3.737 *	36	18.4
House of friend/relative	18	12.8	4	7.3	1.095	22	11.2
Not specified	68	48.2	6	10.9	-	74	37.8
Total	141	100	55	100	-	196	100

\* Statistically significant

The first cigarette was usually smoked at home, followed by on the way to/from school and then at the house of a friend or relative (Table 5). By sex the situation was different. A significantly higher proportion of females reported the home as the place where they started smoking, while a significantly higher

proportion of males mentioned starting smoking on the way to/from school (Table 5).

Table 6. Place of smoking the first cigarette of ever-smoker secondary-school students by age group, 1997.

Place	Age group ( years )							
	< 10		10 – 14		15 – 19		Not specified	
	No.	%	No.	%	No.	%	No.	%
Home	15	48.4	22	40.7	23	21.9	2	33.3
School	1	3.2	-	-	1	0.9	-	-
On the way to /from school	2	6.5	13	24.1	19	18.1	2	33.3
House of friend/relative	9	29.0	3	5.6	9	8.6	1	16.7
Not specified	4	12.9	16	29.6	53	50.5	1	16.7
Total	31	100	54	100	105	100	6	100

Those who tried the first cigarette at under 10 years old did so in their homes followed by in the house of a friend or relative. Home and the way to/from school were the most common places for the first smoking experience in the age groups 10-14 years and 15-19 years (Table 6).

Table 7. Main reasons for starting smoking of ever-smoker secondary-school students by sex, 1997.

Main reason	Males		Females		Test of statistical significance (Z)	Total	
	No.	%	No.	%		No.	%
To see what it was like	75	53.2	46	83.6	- 3.940 *	121	61.7
To imitate behaviour of others	18	12.8	5	9.1	0.717	23	11.7
Encouraged by another	17	12.1	-	-	-	17	8.7
Smoking makes people elegant	12	8.5	3	5.5	0.723	15	7.7
Other	6	4.2	-	-	-	6	3.1
Not specified	13	9.2	1	1.8	-	14	7.1
Total	141	100	55	100	-	196	100

\* *Statistically significant.*

The reason for starting smoking was usually to see what it was like, i.e. curiosity, followed by to imitate others and then because of encouragement by others (Table 7). The idea that smoking makes people elegant was not a common reason given for starting smoking. By sex the pattern was similar (Table 7). However, the proportion of females who said they started smoking to see what it was like was significantly higher than the proportion of males who gave it that reason.

Table 8. Main reasons for starting smoking of ever-smoker secondary-school students by age group, 1997.

Main reason	Age group ( years )							
	< 10		10 – 14		15 – 19		Not specified	
	No	%	No.	%	No.	%	No	%
To see what it was like	14	45.2	34	63.0	71	67.7	2	33.3
To imitate behaviour of others	5	16.1	9	16.7	9	8.6	-	-
Encouraged by another	1	3.2	9	16.7	10	9.5	2	33.3
Smoking makes people elegant	2	6.5	4	7.4	8	7.6	1	16.7
Other	-	-	3	5.5	3	2.8	-	-
Not specified	9	29.0	-	-	4	3.8	1	16.7
Total	31	100	54	100	105	100	6	100

In all age groups the main reason expressed for starting cigarette smoking was to see what it was like (Table 8). The second reason for the age groups < 10 years and 10-14 years was to imitate the behaviour of others, while among the age group 15-19 years it was because of encouragement by others. The third reason given by those under 10 years was that they considered that

smoking made people look elegant. This was also the third reason for those aged 10-14 years. Among students who started smoking when they were 15-19 years old the third reason given was to imitate the behaviour of others.

Table 9. Person with whom the first cigarette was smoking of ever-smoker secondary-school students by sex, 1997.

Person with whom the first cigarette was smoked	Males		Females		Test of statistical significance (Z) <sup>a</sup>	Total	
	No.	%	No.	%		No.	%
Friend/school friend	64	45.4	7	12.8	4.275 *	71	36.6
Alone	36	24.8	21	38.2	- 1.860	56	28.6
Relative/neighbour	22	15.6	3	5.4	1.914	25	12.7
Family member	4	2.8	21	38.2	- 6.665 *	25	12.7
Other	16	11.4	-	-	-	16	8.2
Not specified	-	-	3	5.4	-	3	1.5
Total	141	100	55	100	-	196	100

<sup>a</sup> Hypothesis testing of difference of percentages, two proportions from independent group

\* Statistically significant.

The greatest percentage (36.3%) of ever-smoker secondary-school students had their first cigarette with friends/school friends, while 28.6% had their first cigarette alone (Table 9). Similar findings were reported by Conrad and colleagues, indicating that peer influences are strong predictors of smoking initiation [14]. However, there were statistically significant differences between males and females (Table 9). A significantly higher proportion of females were shown to have smoked the first cigarette with a family member, while a significantly higher proportion of males had their first cigarette with a

friend/school friend. The other practices had no statistically significant differences by sex.

Table 10. Person with whom the first cigarette was smoked of ever-smoker secondary-school students by age group, 1997.

Person with whom the first cigarette was smoked	Age group ( years )							
	< 10		10 – 14		15 – 19		Not specified	
	No.	%	No.	%	No.	%	No	%
Friend/school friend	3	9.7	18	33.3	50	47.7	2	33.3
Alone	14	45.2	17	31.5	24	22.8	-	-
Relative/neighbour	9	29.0	4	7.4	10	9.5	2	33.3
Family member	5	16.1	11	20.4	8	7.6	-	-
Other	-	-	4	7.4	11	10.5	1	16.7
Not specified	-	-	-	-	2	1.9	1	16.7
Total	31	100	54	100	105	100	6	100

For students who started smoking at under 10 years of age the highest proportion said that they had their first cigarette alone, followed by in the company of a relative/neighbour and then a family member (Table 10). Among the age group 10-14 years, the first smoking experience took place with friend/school friend (33.3%), alone (31.5%) and with a family member (20.4%).

### **Conclusions :-**

- The smoking prevalence among secondary-school students in Aden Governorate was higher among males than females.
- A significantly higher proportion of girls than boys started smoking at age 14 years or less.
- The main sources for the first cigarette were significantly different between boys and girls. For boys the sources were friends outside school and school friends, while for girls they were the close relatives, i.e. father, mother or sibling.
- The most common place for smoking the first cigarette for those aged 14 years or under was the home, while for males aged 15-19 years it was

outside the home. The place of smoking the first cigarette was significantly different between girls and boys; girls predominantly smoked their first cigarette at home, while boys had this experience on the way to/from school.

- The main reason for starting smoking was to see what it was like but a significantly higher proportion of girls than boys gave this as the reason. Among those aged 14 years or under the second reason expressed was to imitate the behaviour of others, while among the age group 15-19 years it was because of encouragement by others.
- The first cigarette was smoked in different company depending on the sex and the difference was significant. Girls reported the company of a family member and boys mentioned a friend/school friend. In those aged under 10 years, the first cigarette was generally smoked alone; among those aged 10 years or more it was smoked predominantly in the company a friend/school friend.
- Smoking prevention strategies should involve home, school and social environments as well as the students themselves.

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**Global Youth Tobacco Survey (GYTS)  
Republic of Yemen -2003**

**Prepared by :-** Dr. Ahmed Ali Bahaj\* ( Yemen GYTS – Coordinator ).

\* College of Medicine Hadhramout University for Science and Technology  
Hadhramout Governorate Republic of Yemen

**Executive Summary:-**

**Introduction:-** The global youth Tobacco Survey (GYTS) was developed by WHO/CDC to track tobacco use among youth in different countries. It is a school-based survey designed to use two- stage cluster sample to produce representative data on smoking among school-age students 13-15 years.

**Objectives:-** GYTS-Yemen 2003 report describes the knowledge, attitude and behavior of young people regarding tobacco use, their exposure to environmental tobacco smoke (ETS), pro-tobacco as well as anti- tobacco advertisement. It reveals also the extent to young people receive anti-tobacco knowledge in the schools.

**Methods: -** We conducted school- based, two-stage cluster survey in governmental and private schools in three governorates of Yemen (n = 12658, age 13-15 years), using a standardized questionnaire based on the Global Youth tobacco Survey .

**Results:-** 19.8% of boys and 10.6% of girls had ever smoked cigarette. ETS exposure is high, over 4 in 10 students live in home where others smoke in their presence, almost 5 in 10 expose to smoke in public places and over 4 in 10 have parents who smoke. Over 7 in 10 of students think smoke from others is harmful to them. Over 80% of current

smokers want to stop smoking and 70% of current smokers tried to stop smoking during the past year and failed. 30.8% think boys and 21.5% think girls who smoke have more friends and 24.9% think boys and 17.9% think girls who smoke look more attractive. In the past 30 days more than 80% saw pro- tobacco advertisements in billboards and 18.6% have an object with cigarette brand logo. Less than half of students (41%) had been taught in the class about the danger and effect of tobacco use and only 20% had discussed why people in their age smoke .

### **Conclusion:-**

The prevalence of tobacco use among students is quite high. Young students are daily exposed to ETS, tobacco advertisements and can access tobacco product easily. Immediate interventional prevention measures are needed to limit dangerous effects of tobacco on young population.

### **Introduction:-**

Tobacco among the main causes of heart and vascular diseases, it also causes cancer of the lung, larynx, mouth esophagus and bladder. It is responsible for intrauterine growth retardation, anomalies. Although tobacco use is one of chief preventable cause of death in the world, only modest success has been achieved in global tobacco control .

World Health Organization (WHO) reports indicate that tobacco consumption causes four million deaths a year, a figure expected to rise to about 10 million by the year 2030. 70% of the death occurs in the developing country and Yemen is not an exception .

Different studies indicate that smoking prevalence rate among adolescence is rising steadily and if this continues it will result in the death of 250 million of children and young peoples living today. Therefore, knowledge about tobacco use in school-aged children and adolescents is important given that they are a vulnerable cohort who are being targeted by tobacco company.

For that purpose, the international community spearheaded by Tobacco Free Initiative (TFI), WHO, United Nation Foundation for Intentional Partnership (UNFIP), United Nation Children Funds (UNICEF), Center for Disease Control and Prevention (CDC) and Office of on Smoking and Health (OSH) has developed international programs and initiatives to address and combat the devastating effect of tobacco on students aged 13-15 years.

In Yemen tobacco is cultivated and cigarette is manufactured and traded, but the exact figure is not known because of lack of human resources, lack of experience in tobacco control, lack of financial resources and lack of national studies. However, Yemen during the last month has signed the Framework Convention on Tobacco Control (FCTC). Also some tobacco- related studies are ongoing about the tobacco prevalence, tobacco consumption, Global Youth Tobacco Survey (GYTS) and Health Personnel Survey (HPS). Also some legislation became available as banning smoking in the closed public places, in health and education facilities and banning on media advertising.

### **The Global Youth Tobacco Survey (GYTS):-**

#### **Goals and Objectives:-**

The GYTS is school — based tobacco survey focuses on adolescence age 13-15 years (grades 7,8,9 of primary school). It assesses prevalence of smoking, student's attitude, knowledge and behavior related to tobacco use and exposure to environmental smoke (ETS), media and advertising, young people access to tobacco products, prevention education in the school curriculum and tobacco cessation. The information obtained from the survey may be used in decision - making and development of strategies to prevent and control tobacco use among young people.

### **Content of the GYTS:-**

The GYTS addresses the following issues:-

- Determine the level of tobacco use.
- Estimate the age of initiation of cigarette use.
- Estimating the level of susceptibility to become a cigarette smoker.
- Estimating the exposure to tobacco advertising
- Identifying key intervening variable, such as attitude, and beliefs on behavioral norms with regard to tobacco use among young people.
- Assessing the extent to which major preventing programs are reaching school-based population and establish the subjective opinion of those populations regarding such intervention

### **II- Method :-**

Total area of Yemen is 550000 sq. 1cm; it is divided into 20 governorates. The population is estimated to be 20 million in the year 2004. GYTS is conducted in three governorates, Sana'a, Aden and Hadhramout, representing the northern, southern and eastern sectors of the country respectively and all are representative for the whole Yemen.

#### ***II-I. Study design and Sample:-***

The 2003 Yemen GYTS is a school — based cross sectional survey which employed a two-stage cluster sample design to produce representative sample of students in grade 7-9 of primary schools. Data about schools (number of students by grades! class) were obtained from the Department of statistics — Ministry Of Education (MOE). All the data were set to CDC-USA to draw the study sample. At first stage, 25 of all schools from each of the three governorates containing the grades 7-9 were selected with probability .

Proportional to enrolment size, with a total of 75 schools as representative for the whole country. At the second stage, classes were randomly selected and all students in selected class were eligible to participate. The total number of students sampled were 15022, of them 12658 completed the questionnaire and were eligible for data analysis .

## ***II-2. The questionnaire:-***

The questionnaire consisted of a “ core” component and an “ optional” component. The core questions allow for regional as well as international comparison of the survey results while the optional questions dealing with specific issues correlated to individual country. All countries in EMRO who took part in the GYTS used all 56 questions of the core component of the questionnaire The optional component of the questionnaire included nine questions to know about other habits of tobacco use in Yemen specially shisha and tobacco chewing.

A weight has been associated with each questionnaire to reflect the likelihood of sampling each student and to reduce the bias by compensating for different pattern of non-resoponse. The weight used for estimation is given by:

$$W = WP W2 * F1 * F2 * F3 * F4 *$$

W1= the inverse of the probability of selecting school.

W2= the inverse of probability of selecting classroom within he school.

F1 = a school -level nonresponse adjustment factor calculated by school size category.

F2 = a class adjustment factor calculated by school.

F3 = a student —level nonresponse adjustment factor calculated by class.

F4= a post stratification adjustment factor calculated by gender and grade

The self-administered anonymous questionnaire was administered in the classroom. Student recorded their response on an answer sheet.

### ***II-3. Data collection:-***

Ministry Of Education (MOE) played a crucial role in performing Yemen — GYTS. The MOE provided a list of all primary schools registered in the country-involving grade 7,8,9 and issued all the necessary supporting letters to the selected schools for the survey. A team of three medical officers was trained by the national coordinator on how to conduct the survey; it is the same team who did the survey in the different areas with close supervision of the national coordinator.

300 booklets of the Arabic version of the questionnaire were prepared to be used in all schools and about 20000 answer sheets with all the necessary items including school and class — level forms, pencils, erasers, sharpeners... etc were prepared.

The team spent about 15 days in each governorate to conduct the survey during the period between October 2002 and January 2003 ( In between there was gap because of the vacation of the holy month of Ramadan and Eid — Alfater).

By completion of the survey all documents were couriered to CDC, Atlanta, USA for data analysis.

### **III –Analysis :-**

We used EpiInfo 2000, a software package, which accounted for the complex sampling design and weighing factor in the data set to calculate standard errors and prevalence estimate. Statistically differences included in this report were determined by comparing

the range of the 95% confidence interval (95%CI) for the estimate. If the ranges for the 95% CI did not overlap then the differences were statistically significant .

**VI- Results :-**

For the 2003 Yemen GYTS a total of 15022 students were sampled but 12658 questionnaires were completed in 75 schools, in the three governorates (Sana'a, Aden and Hadhramout), with overall response rate 84.2%.

	# Of schools		# Of students		Response Rate		
	Sample	Participated	Selected	Participated	School	Students	Overall
Sana'a	25	25	6795	5386	100%	79.25%	79.25%
Aden	25	25	5062	4266	100%	84.29%	84.29%
Hadhramout	25	25	3165	3006	100%	94.98%	94.98%
Total	75	75	15022	12658	100%	84.2%	84.2%

**I: Prevalence of Tobacco use :-**

Table 1: Percent of students who use tobacco, Yemen GYTS, 2003

Category	Ever Smoked Cigarettes, Even One or Two Puffs	Current Use			Never Smokers Susceptible to Initiating Smoking
		Any Tobacco Product	Cigarettes	Other Tobacco Products	
Total	16.7 (± 1.9)	19.5 (± 1.7)	6.1 (± 1.3)	15.9 (± 1.3)	35.1 (± 2.7)
Sex					
Boys	19.8 (± 1.8)	21.5 (± 1.6)	7.5 (± 3.3)	17.1 (± 1.1)	38.3 (± 2.4)
Girls	10.6 (± 2.4)	14.9 (± 2.2)	3.2 (± 1.2)	13.0 (± 2.1)	26.1 (± 3.6)
Aden	12.1 (± 3.1)	16.4 (± 2.7)	4.1 (± 3.1)	14.3 (± 2.1)	31.3 (± 3.6)
Hadhramout	12.6 (± 4.0)	18.5 (± 3.7)	5.7 (± 2.2)	14.9 (± 2.4)	29.4 (± 6.3)
Sana'a	18.7 (± 2.5)	21.0 (± 2.2)	6.6 (± 1.1)	17.3 (± 2.0)	39.6 (± 3.7)

From table 1, approximately one fifth (16.7%) of all students have ever smoked cigarette even one or two puffs. The prevalence among boys (19.8%) is significantly higher than that among girls (10.6%). Of students currently use tobacco, (19.5%) use any tobacco products, (6.1%) smoke cigarettes and (15.9%) use other tobacco product. The percentage of boys use any tobacco products is (21.5%) and that of girls is (14.9%) which is statistically significant. Boys currently use cigarettes (7.5%) are twice as girls (3.2%) while (17.1%) of boys and (13.0%) of girls currently use other tobacco products, both results are statistically significant.

More over there are many students (35.1%) are susceptible to initiate smoking next year, the prevalence is statistically higher in boys (38.3%) than that in girls (26.1%).

## II: Schools and tobacco :-

Table 2: School Curriculum, Yemen GYTS, 2003

Category	Percent taught of smoking	Percent discussed reasons why people their age smoke
Total	41.5 ( $\pm$ 3.4)	20.9 ( $\pm$ 2.2)
Sex		
Boys	42.7 ( $\pm$ 4.9)	21.3 ( $\pm$ 2.6)
Girls	35.5 ( $\pm$ 5.6)	20.8 ( $\pm$ 3.1)
Aden	51.1 ( $\pm$ 5.9)	20.5 ( $\pm$ 4.2)
Habhramout	29.4 ( $\pm$ 3.8)	24.3 ( $\pm$ 2.4)
Sana'a	38.6 ( $\pm$ 7.4)	18.9 ( $\pm$ 4.2)

Almost half of the students (41.5 %) had been taught the danger of smoking in the class during the past year. And only one about one fifth (20.9%) of them discussed reason why people in their age smoke. There was no significant different between girls and boys.

**III: Cessation :-**

Table 3: Cessation, Yemen GYTS, 2003

Category	Current Smokers	
	Percent desire to stop	Percent their to stop this year
Total	83.5 ( $\pm$ 5.2)	70.9 ( $\pm$ 7.2)
Sex		
Boys	86.6 ( $\pm$ 5.3)	72.6 ( $\pm$ 7.6)
Girls	71.3 ( $\pm$ 16.8)	62.8 ( $\pm$ 19.6)
Aden	91.8 ( $\pm$ 4.7)	77.0 ( $\pm$ 9.0)
Habhramout	83.4 ( $\pm$ 12.6)	66.8 ( $\pm$ 17.4)
Sana'a	79.7 ( $\pm$ 9.1)	65.9 ( $\pm$ 9.6)

Over 8 in 10 ( 83.5 % ) of students currently smoke desired to quit smoking and 7 of 10 ( 70.9 % ) tried to stop smoking during the past year but failed, there was no statistically significant difference by the gender .

**IV: Environmental tobacco use :-**

Table 4: Environmental tobacco Smoke, Yemen GYTS, 2003

Category	Exposed to smoke form others in their home		Exposed to smoke from others in public places		Percent think smoke should be banned from public places		Definitely think smoke from others is harmful to them	
	Never Smokers	Current Smokers	Never Smokers	Current Smokers	Never Smokers	Current Smokers	Never Smokers	Current Smokers
Total	37.3( $\pm$ 2.2)	69.6( $\pm$ 4.2)	42.6( $\pm$ 2.3)	72.8( $\pm$ 4.8)	77.0( $\pm$ 1.4)	67.3( $\pm$ 5.6)	73.4( $\pm$ 2.0)	58.5( $\pm$ 5.9)
Sex								
Boys	36.5( $\pm$ 3.0)	69.4( $\pm$ 4.9)	46.5( $\pm$ 2.5)	75.5( $\pm$ 5.6)	76.4( $\pm$ 1.4)	67.2( $\pm$ 5.9)	70.1( $\pm$ 5.9)	78.5( $\pm$ 6.9)
Girls	37.5( $\pm$ 2.6)	67.5( $\pm$ 13.5)	36.8( $\pm$ 2.7)	72.0( $\pm$ 10.5)	78.1( $\pm$ 1.8)	76.1( $\pm$ 10.2)	78.5( $\pm$ 2.3)	65.9( $\pm$ 12.3)
Aden	41.0( $\pm$ 3.3)	68.0( $\pm$ 8.0)	48.2( $\pm$ 2.7)	73.4( $\pm$ 9.9)	78.2( $\pm$ 2.5)	73.2( $\pm$ 10.2)	77.8( $\pm$ 3.1)	54.9( $\pm$ 12.6)
Habhramout	25.5( $\pm$ 3.7)	64.6( $\pm$ 10.0)	33.2( $\pm$ 5.2)	76.7( $\pm$ 10.5)	74.6( $\pm$ 2.7)	60.0( $\pm$ 12.3)	65.8( $\pm$ 4.3)	56.0( $\pm$ 9.5)
Sana'a	45.3( $\pm$ 3.9)	76.1( $\pm$ 3.1)	46.4( $\pm$ 3.8)	68.2( $\pm$ 6.9)	78.3( $\pm$ 1.8)	68.7( $\pm$ 5.6)	76.8( $\pm$ 2.6)	64.6( $\pm$ 7.1)

Almost 4 of 10 of never smoker and 7 of 10 of current smokers live in homes where others smoke in their presence and also exposed to smoke in public places. In both places the current smokers are exposed as twice as the exposure for never smokers. About 77% of never smokers and 67% of current smoker think that smoking should be banned in the public places. Approximately two third of never smokers (70.1%) and approximately half of current smoker (58.5 %) think smoke from others is harmful to them. However there was no significant difference between boys and girls.

**V: Knowledge and attitude :-**

Table 5: Knowledge and Attitudes. Yemen GYTS, 2003

Category	Thing boys who smoke have more friends		Thing Girls who smoke have more friends		Thing smoking makes boys look more attractive		Thing smoking makes girls look more attractive	
	Never Smokers	Current Smokers	Never Smokers	Current Smokers	Never Smokers	Current Smokers	Never Smokers	Current Smokers
Total	29.3 (±1.3)	37.3 (±6.0)	20.0 (±1.68)	25.4 (±2.8)	23.4 (±1.5)	34.3 (±5.1)	17.4 (±1.58)	29.6 (±5.7)
Sex								
Boys	30.3 (±1.6)	37.6 (±7.0)	22.2 (±3.7)	23.4 (±5.2)	25.3 (±2.1)	36.4 (±5.4)	20.7 (±3.1)	29.8 (±6.3)
Girls	28.2 (±1.6)	33.1 (±11.7)	16.3 (±1.5)	28.9 (±12.1)	20.8 (±2.2)	21.9 (±11.5)	12.6 (±1.8)	12.6 (±12.2)
Aden	23.5 (±2.3)	33.2 (±11.3)	17.1 (±2.0)	27.4 (±6.9)	20.4 (±2.7)	37.9 (±10.5)	16.3 (±2.6)	34.3 (±12.8)
Habhramout	33.5 (±2.6)	42.7 (±8.8)	21.8 (±3.2)	21.4 (±7.1)	26.6 (±2.5)	35.8 (±9.2)	19.0 (±3.4)	33.0 (±10.7)
Sana'a	31.0 (±1.7)	36.1 (±10.1)	21.1 (±2.6)	27.3 (±6.8)	23.3 (±2.4)	29.1 (±5.7)	16.9 (±1.9)	21.4 (±4.8)

Approximately one third (29.3%) of never smokers and more than one third (37%) of current smokers think that boys who smoke have more friends. There was no significant difference between boys and girls students. One fifth of students who never smoke (20.0%) and one fourth of current smokers (25.4%) think that girls who smoke have more friends. There is significant difference between boys and girls that never smoke while there is no significant difference by gender between currently smokers.

23.4% of students who never smoke and 34.3% of current smokers think smoking makes boys look more attractive, there is significant difference between never smokers and current smoked students who think smoking makes boys look more attractive

17.4% of students who never smoked and 29.5% of current smokers think that smoking makes girls look more attractive, there is significant difference between never smokers and current smokers.

#### **VI: Media and advertisin2 :-**

Table 6: Media and Advertising Yemen GYTS, 2003

Category	Percent Saw Anti Smoking Media Messages	Percent Saw Pro-Tobacco Messages in Newspapers and Magazines		Percent Who Had Object With a Cigarette Brand Logo On It		Percent Offered A Free Cigarette by a Tobacco Company Representative	
		Never smoke	Current smokers	Never smoke	Current smokers	Never smoke	Current smokers
Total	74.43 (±1.6)	73.4 (±1.7)	77.7 (±4.0)	18.8 (±1.3)	25.9 (±5.1)	17.6 (±1.4)	47.1 (±4.7)
Sex							
Boys	73.7 (±2.1)	72.2 (±2.3)	78.2 (±4.7)	16.5 (±1.7)	25.9 (±5.2)	18.9 (±1.9)	49.3 (±5.2)
Girls	75.6 (±1.7)	74.9 (±2.4)	78.1 (±12.3)	14.6 (±2.8)	22.0 (±9.4)	14.7 (±1.9)	32.7 (±11.1)
Aden	74.4 (±2.5)	76.2 (±3.1)	75.2 (±8.8)	15.8 (±2.1)	22.2 (±9.0)	15.8 (±1.9)	43.8 (±9.6)
Habhramout	71.1 (±3.6)	66.2 (±3.9)	72.7 (±6.9)	12.9 (±2.3)	21.0 (±9.5)	19.0 (±2.7)	49.4 (±8.1)
Sana'a	78.0 (±1.8)	77.8 (±1.9)	85.1 (±4.6)	18.6 (±2.1)	34.7 (±6.6)	17.9 (±2.5)	48.0 (±6.0)

Three- fourth of students (74.4 %) saw anti smoke media massages in the last 30 days. Over seven in ten of never smokers and of current smoker saw pro — tobacco massages in newspapers and magazine during the past 30 days. About two in ten (18.8 %) of never smoker and more than two in ten (25.9.0%) of current smokers had an object with cigarette brand logo in it. About two in ten (17.6%) of never smoker and five in ten of (47.1%) of current smoker were offered a free cigarette by tobacco company representative. There is statistically significant difference between current smoker and never smoker boys who either offered a free cigarette by tobacco representatives or had an object with cigarette brand logo in it, however there are no statistically significant difference between male and female students to media exposure.

### **VII: Access and availability :-**

Table7: Access and Availability. Yemen Hadhramout GYTS, 2003

Category	Percent Current Smokers who Usually Smoke at Home	Percent Current Smokers who Purchased Cigarettes in a Store	Percent Current Smokers who Bought Cigarettes in a Store who were Not Refused Because of Their Age
Total	24.9 ( $\pm 4.6$ )	43.6 ( $\pm 6.0$ )	62.8 ( $\pm 6.2$ )
Sex			
Boys	18.8 ( $\pm 4.4$ )	46.7 ( $\pm 6.3$ )	60.6 ( $\pm 7.2$ )
Girls	51.6 ( $\pm 14.8$ )	31.5 ( $\pm 11.6$ )	88.4 ( $\pm 12.2$ )
Aden	23.0 ( $\pm 6.5$ )	45.6 ( $\pm 9.6$ )	60.4 ( $\pm 12.7$ )
Habhramout	12.7 ( $\pm 5.9$ )	44.3 ( $\pm 12.7$ )	55.0 ( $\pm 9.9$ )
Sana'a	39.2 ( $\pm 10.9$ )	40.8 ( $\pm 7.7$ )	73.0 ( $\pm 8.4$ )

Almost one fourth of students (24.9%) who currently smoke cigarettes, smoke at home, three times as many girls (51.6%) compared to boys (18.8%). Approximately half of the students (43.6%) currently smoke purchase their

cigarettes from the stores. Six of ten (62.8%) of currently smokers that bought cigarette in the stores were not refused purchase because of their age.

**Discussion :-**

Global Youth Tobacco Survey (GYTS) —Yemen is the first nationwide survey done in Yemen to exhibit the magnitude of the problem of tobacco use among youth aged 13-15 years. The survey was done in three governorates in Yemen (Sana'a, Aden & Hadhramout), each represent different population composition

In our study, tobacco use is found to be quite high among school students consistent with studies from other countries. Near 17% of the students tried smoking cigarette even one or two puffs, 20% currently use any form of tobacco, 6% currently smoke cigarettes and 16% use other tobacco products mainly water pipe (shisha) and tobacco chewing. In all these groups of tobacco use, like many countries, boys are significantly higher than girls. Besides that this study showed that the likelihood of burden of tobacco use would increase among never smokers in the near future (35.1%). This figure is quietly high and need more efforts and cooperation between Ministry of Education and Ministry of Health, all governmental and non- governmental agencies to initiate interventional measures to protect susceptible students.

In this study it is found that half of the students in grade 7-9 were not taught about dangers and effects of tobacco health and four-fifth of them did not discuss the reasons that make the young people in their age to use tobacco, this indicates the major gap of health education in school curriculum about the problems like tobacco use.

The indication that over eight in ten of current smokers want to stop smoking and most of them actually tried and failed, dictate the need for active smoking cessation programs to help young smokers to quit smoking since many studies showed that those who start to smoke in younger age find it difficult to stop smoking.

Exposure of young to environmental tobacco smoke is quietly high in Yemen. Over four in ten students live in homes where others smoke in their presence; almost five in ten are exposed to smoke in public places and over four in ten have parents who smoke. In our study, like other studies from

different countries, currently smoking students are significantly higher than never smoking in exposure to some else smoke in their homes or public places. This consists with documented fact that an environmental smoking will encourage young people to smoke specially role models like parents, teachers and peers. Despite the presence of legislation in Yemen of banned smoking in public places, the law has not been successfully implemented and measures are needed to enforce the law and awareness campaigns are needed to educate current smoker parents, teachers and other roll models about the harm of smoking on themselves and others. The encouraging point in this issue that high percentage of never smokers (77%) and currently smokers (67%) students approve for banning smoking in public places.

Deficit of knowledge and bad attitude of the young students about smoking was reflected from the high percentage of the students who think that smoker students have more friends and look more attractive, however this attitude is higher among current smokers. Therefore, there is a need for intervention to correct these false and incorrect knowledge and attitudes towards smokers.

It is well known that tobacco advertising targeting and encouraging smoking among youngsters, in this study it is found that a large percentage of students either never smokers and smokers saw pro-tobacco massages in newspaper and magazines specially from some international TV channels and news papers since we have in Yemen a legislation banning advertising for tobacco in national media. In the same time almost the same percentage of students saw anti smoking media massages. About one —fourth current smokers had an object with cigarette brand logo on it and half of them offered a free cigarettes by a tobacco company representatives, these figures are higher than the never smokers students.

In this study, one in four (24.9%) of current smokers students smoke at home with or without parent's knowledge. The percentage of girls is significantly higher than boys , this reflect the absence of the most important factor of the family follow up and guidance in preventing them from smoking. Young people can access cigarette easily, and this could encourage them to smoke. More than six in ten of current smokers bought cigarette in stores who

were not refused because of age, this indicates the need for legislation in Yemen banned sale of cigarette to the young aged people.

### **Conclusion and Recommendation :-**

The GYTS Yemen 2003 has revealed a high prevalence rate of tobacco use in the country. This indicate the need to establish interventional strategies to overcome this threatening habit to our youth through decreasing the prevalence of smoking and help the smoker to stop smoking. Starting smoking in young age increase the risk of addiction to smoke and increase the risk of death from smoking - related causes. Despite of this established fact and high percentage of tobacco users students, unfortunately only few of them taught about the danger and effect of smoking and discussed why young people smoke in their schools. It is become very essential to establish effective mechanism for educational programs about dangers of tobacco in the school curriculum.

Other information provided by this study regarding knowledge attitude, environmental tobacco smoke, media and accessibility to tobacco could be used in prevention intervention programs focusing on the school and community:-

- Reducing exposure to environmental tobacco smoke in the home through increase awareness of parents about the harm of smoke on them and the surroundings and through banning of all form of tobacco use in schools and public places.
- Reduce youth access to tobacco product through issuing regulations to consider tobacco sale to less than 18 years of age is illegal. .
- Promote tobacco cessation through counseling programs.
  
- Reducing young people exposure to tobacco advertising through banning tobacco use advertisement in mass media and preventing tobacco companies from sponsoring sport events and distribution items carrying tobacco brand logos.
- Changing community norms regarding tobacco use tobacco use through creation of wide anti anti-smoking campaigns to increasing public

awareness about the harmful health consequences of tobacco use and addictive nature of tobacco.

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### **Field Researchers:**

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Mr.Mohammad Awadh Lardhi Preventive medicine Dept.MOH

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## Transhiatal versus transthoracic resection for oesophageal carcinoma in Yemen

**Author :-** Homesh N A, Alsabahi A A, Al-Agmar M H, Alwashaly A A, Valenzuela R E, Alhadid M A, Alkubati S M.\*

\* Department of Surgery Sana'a University and Al-Thawra Teaching Hospital , P O Box 1596 Sana'a – Yemen.

Correspondence to:-

Dr Nagi Homesh , Tel: (96) 7 7361 0118 / (96) 7 1 620 245 , Fax: (96) 7 1 671 446  
Email:nagihomesh@yahoo.com

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### **Abstract :-**

**Introduction :-** Cancer of the oesophagus is a major problem in Yemen, where most of the patients present with advanced disease.

Curative oesophageal resection for carcinoma may be carried out by either the transhiatal or transthoracic technique. The aims of this study were to compare the morbidity, mortality, short term outcome and long term survival of the two techniques in the treatment of oesophageal carcinoma.

**Methods:-** From March 1998 to July 2004, 118 patients with cancer of the oesophagus were studied. The tumours in 84 patients were resected by transhiatal oesophagectomy (43) and transthoracic oesophagectomy (41).

**Results:-** The two groups were comparable in terms of age, sex, location of the tumours, risk factors and stage of the disease. There was no significant difference in the mean intensive care unit stay, blood transfusion and mean hospital stay. Anastomotic leak was higher in the transhiatal oesophagectomy group than transthoracic group (21 percent versus 12 percent, p-value is equal to 0.001).

Recurrent laryngeal nerve lesion was present in 18.6 percent of the transhiatal group and absent in the transthoracic group. The overall hospital mortality was 8.3 percent with no significant difference between the two groups (transhiatal 9.3 percent versus transthoracic 7.3 percent, p-value is equal to 0.742).

**Conclusion:-** Transhiatal oesophagectomy was associated with a higher incidence of anastomotic complications and recurrent laryngeal nerve lesions, but there was no significant difference in the mortality between the two groups.

**Keywords:-** Oesophageal cancer, oesophagectomy, oesophagus, transhiatal resection, transthoracic resection.

### **Introduction :-**

Oesophageal cancer is the seventh most common malignancy worldwide(1). Annually, approximately 13.200 people in the U.S are diagnosed with oesophageal cancer and 12.500 die of this malignancy(2). Some of the highest rates occur in northern China and northern Iran, where the incidence exceeds 100 in 100.000 individuals(2).

In Yemen, cancer of the oesophagus is a major problem where it is quite common and most of the patients present with advanced disease(3). Surgical resection remains the primary treatment modality for oesophageal carcinoma as it provides sustained palliation of dysphagia and the best chance of cure(4).

Over the past 10 years, advances in surgical and anaesthetic techniques, together with improvement in perioperative management, have reduced the risks of oesophageal resection to an acceptable level(4).

Controversy exists as to the optimal surgical approach to patients with carcinoma of the oesophagus. For decades, the most popular approach has been the Ivor-Lewis (transthoracic) technique although today, the transhiatal one seems to be the approach of choice in order to avoid a painful incision and to decrease mortality, morbidity and duration of operation. So far, there has been no study to compare transhiatal and transthoracic oesophagectomy in the treatment of cancer of the oesophagus in Yemen. We undertook such a study to

compare the two methods, transhiatal oesophagectomy (THO) versus transthoracic oesophagectomy (TTO), in the treatment of cancer of the oesophagus. Our hypothesis was that in such dismal disease, there is no difference between these techniques.

### **Methods :-**

This is a prospective non-randomised study that included 118 patients who were admitted to the surgical department at Al-Thawra Teaching Hospital between March 1998 and July 2004. The study was authorised by the surgical department board of Sana'a Faculty of Medicine and Health Sciences.

A detailed history and comprehensive physical examination were the first step in every case. Age, sex, clinical manifestations and duration of symptoms prior to evaluation, and risk factors (gastro-oesophageal reflux disease, the use of tobacco, Kat and alcohol) were assessed.

Initial evaluation routinely included laboratory measurements (complete blood picture, serum albumin, glucose, creatinine, and liver function tests), electrocardiography (ECG) and chest radiograph. Barium swallow and meal, upper gastrointestinal endoscope and biopsy were also done. Abdominal and thoracic computed tomography (CT) were performed in some cases. Abdominal ultrasonography was also used as a screening tool to detect the presence of metastatic lesions to the liver of some patients.

Initial management included correction of anaemia, dehydration and hypoalbuminaemia. The correction was done by blood transfusion (if Hb was less than 10g/dL), by intravenous fluid (in case of dehydration) and by parenteral nutrition (if serum albumin was less than 30g/L). Two main techniques were performed for the selected 84 patients, namely:

THO with left cervical oesophageal anastomosis for 43 patients (51%) and TTO with intrathoracic anastomosis for 41 patients (49%). Other techniques were used for the non-selected 34 patients (Table I).

Selection of the surgical technique was determined by tumour location, patient condition and surgeon's preference. TTO was used with slightly greater

frequency for mid- and upper-thoracic tumours in order to ensure safe mediastinal dissection. THO has been used with increasing frequency in lesions arising in the lower one third of the oesophagus and gastro-oesophageal junction (GOJ), particularly if the patient has significant co-morbidity.

The stomach was used as plasty for replacement of all the resected 90 cases (43 THO, 41 TTO and 6 McKeown). The pyloric ring was dilated manually until the thumb could be inserted. The drainage tube and /or the chest tube were left in until a gastrografin swallow on the 5th-7th postoperative day was performed. Contraindications to resection (in 28 cases) included the demonstration of metastatic cervical lymphadenopathy, hepatic metastases, bulky coeliac lymphadenopathy that might preclude control of the left gastric artery and overt evidence of thoracic visceral invasion on CT.

Macroscopical tumour clearance was aimed at all cases but no extended lymph node dissection was done. Carcinoma of the oesophagus was classified according to the pTNM criteria for carcinoma of the oesophagus by the American Joint Committee on Cancer(5).

Operative mortality included 30-day mortality as well as any later death occurring during the initial postoperative hospital stay. All major operative and postoperative complications (bleeding, respiratory and anastomotic leak) as well as the minor complications (wound infection) were included.

Patients were followed by direct evaluation, relative consultation or phone interview until death or the end of the present study.

The primary endpoints were hospital mortality and morbidity, ICU admission days, amount of blood transfusion and length of hospital stay. The secondary endpoints were short term outcome and the long survival rate.

All data were analysed using Statistical Package for Social Sciences. version 11 (SPSS Inc, Chicago, IL, USA). Data between the THO and TTO were compared by unpaired Student's t-test (age distribution) and chi-square

analysis (all other variable) as appropriate. Means are reported with standard deviation. P-value of less than 0.05 was considered as significant.

Table I. Lines of treatment used for the 118 patients.

Surgical procedures	Number ( %)
THO	43 (36.44%)
TTO	41 (34.75%)
McKeown	6 (5.08%)
Bypass	3 (2.55%)
Celestin tube	22 (18.7%)
Jejunostomy feeding tube	3 (2.55%)
<b>Total</b>	<b>118 (100%)</b>

*THO: transhiatal oesophagectomy;*

*TTO: transthoracic oesophagectomy.*

### **Results :-**

This is a prospective non-randomised clinical trial was performed over 75 months and included 118 patients with cancer of the oesophagus. 84 patients were submitted either to THO (43 patients) or TTO (41 patients). The remaining 34 patients were unsuitable for either procedure and were excluded due to one or more contraindications, but were treated as clinically appropriate (Table I).

The characteristics and preoperative findings of the selected 84 patients in the two study groups (THO and TTO) are shown in Table II. The commonest symptoms were dysphagia in 81 patients (96.4%), regurgitation in 53 patients (63.1%), and anorexia in 54 patients (64.3%). Weight loss of 10kg or more was recorded in 47 patients (56%). 65 patients (77%) were found to be dehydrated and needed intravenous fluid infusion. Nutritional depletion was evident by hypoalbuminaemia (less than 35g/L in 65.5% of the patients) and by loss of weight in 47 patients (56%). Preoperative preparation included parenteral nutrition for 53 patients (63%) who were unable to swallow even liquids, and

enteral nutrition for 28 patients (33.3%) who were able to swallow liquids or who had a feeding tube. One patient in the THO group required a thoracotomy for control of haemorrhage. A gastric conduit was used in all resectable cases and a finger dilatation of the pylorus was performed in all the cases.

Table II. Demographical characteristics and preoperative findings of the selected 84 patients.

Characteristics	THO (n=43)	TTO (n= 41)	*p-value	Total
Age (years): Mean (sd):	61.19 (8.34)	59.00 (12.37)	0.354	-
Sex: Male	25	19	0.279	44
Female	18	22	-	40
Dysphagia (mean duration in months):	41 (3.73)	40 (3.75)	0.960	81
Weight loss (10 kg or more):	25	22	0.679	47
Tobacco smoker	22	26	0.257	48
†Kat chewer	31	25	0.289	56
Gastro-oesophageal reflux	1	7	0.021	8
Hot food	39	36	0.668	75
Spices	35	36	0.417	71
Dehydration	32	33	0.506	65
Height mean (cm)	156.67 (6.88)	156.71 (8.41)	0.984	-
Weight mean (kg)	43.47 (6.88)	45.11 (8.41)	0.243	-
Arm circumference mean (cm)	20.86 (3.15)	21.05 (2.34)	0.758	-
Haemoglobin mean (g/dL)	12.11 (1.80)	12.58 (1.86)	0.248	-
Serum albumin mean (g/L)	32.65 (6.10)	32.93 (5.68)	0.828	-
Preoperative nutrition:				

Parenteral	24	29	0.218	53
Enteral	18	10	-	28

†*Kat* is a type of green leaf present in Yemen and Africa's horn; \* $p < 0.05$  is significant.

Tumours were located in the upper third of the oesophagus in nine patients (10.7%), in the middle third in 18 patients (21.4%), in the lower third in 57 patients (68%), and in the GOJ in five patients (6%). 44% of the tumours were squamous cell carcinoma and 56% were adenocarcinoma. The pathology in the resected tumours revealed stage II (1.2%), III (94%) and IV (4.8%). Stage 0 and stage I tumours were not recorded in our study.

There were no significant differences between the two groups either in the histology, or the stage of the tumours. Blood transfusion was given to all patients, with a mean of 2.49 units. Transfusion requirements were similar in both groups (2.4 versus 2.6 units) and there was no statistically significant difference ( $p=0.206$ ).

All the selected patients (84) were admitted to the intensive care unit (ICU) for a mean of 3.16 days and there was no significant difference in the median ICU stay between THO and TTO groups ( $p=0.791$ ). The postoperative complications included, anastomotic leak in 14 patients (16.7%), recurrent laryngeal nerve lesion (RLNL) in eight patients (9.5%), and wound infection in 20 patients (23.8%). The differences in the aforementioned complications between the THO and TTO groups were statistically significant ( $p=0.001$ , 0.004, 0.007, respectively). The other complications are shown in Table III.

Table III. Postoperative outcome of the †THO and ‡TTO groups.

Characteristics	THO (n=43)	TTO (n= 41)	*p-value	Total (n=84)
<b>Location:</b> Upper third	6	3	-	9 (10.7%)
Middle third	2	16	0.207	18 (21.4%)
Lower third	34	18	-	52 (61.9%)
§GOJ	1	4	-	5 (6%)
Mean of blood transfusion (units)[SD]	2.37 [0.90]	2.61 [0.80]	0.206	2.49 [0.657]
Mean of ICU admission (days)	3.51	4.12	0.791	3.81
<b>Histopathology</b>				
<i>Squamous cell carcinoma</i>	19	18	0.979	37 (44%)
<i>Adenocarcinoma</i>	24	23		47 (56%)
Pathological (pTNM) staging: II	1	0	0.617	1 (1.2%)
Pathological (pTNM) staging: III	40	39	-	79 (94.0%)
Pathological (pTNM) staging: IV	2	2	-	4 (4.8%)
<b>Complications</b>			-	
<i>Anastomotic leak: cervical</i>	9 (21%)	0		9 (10.7%)
<i>intrathoracic</i>	0	5 (12%)	0.001	5 (5.95%)
<i>Pneumonia</i>	1	1	0.973	2 (2.38%)
<i>Adult respiratory distress syndrome</i>	1	1	0.973	2 (2.38%)
<i>Recurrent laryngeal nerve lesions</i>	8 (18.6%)	0	0.004	8 (9.52%)
<i>Haemorrhage (intra and postoperative)</i>	4	2	0.349	6 (7.14%)
<i>Wound infection</i>	8	12	0.007	20 (23.8%)
Mortality	4 (9.3%)	3 (7.3%)	0.742	7 (8.3%)
Hospital stays mean (days)	21.48	21.70	0.879	21.59

†THO: transhiatal oesophagectomy; ‡TTO: transthoracic oesophagectomy; §GOJ: gastro-oesophageal junction; \*p<0.05 is significant; SD: standard deviation.

Transthoracic leak was the cause of death in two patients, while transhiatal leak resulted in only one mortality. All the cases of recurrent laryngeal nerve paralysis (8 cases) occurred ipsilateral to the cervical incision. The overall mortality (30 days) rate was 8.3% (7 out of 84 patients). The mortality consisted of four out of 43 patients (9.3%) in the THO group and three out of 41 patients (7.3%) in the TTO group. The difference between the two groups was not statistically significant ( $p=0.742$ ). The causes of death included bleeding in two patients, arrhythmia and cardiac arrest in two patients, empyema and sepsis due to intrathoracic leak in two patients, and cervical leak followed by adult respiratory distress syndrome (ARDS) and pneumonia in one patient.

The mean (and standard deviation [s.d.]) hospital stay was 21.95 (s.d. 7.63) days and the difference between the two groups was not statistically significant ( $p=0.875$ ). The follow-up was successful for only 24 patients (28.6%). 11 patients were seen after 3-12 months, six patients were seen after 13-24 months, four patients were seen after 25-36 months, two patients were seen after 37-48 months, and only one patient was seen after 60 months during the follow-up. The mean was 19.92 months, with a minimum of three months and a maximum of 60 months.

### Discussion :-

Most patients with oesophageal cancer in Yemen continue to seek treatment at an advanced stage of the disease. Similarly, Li and Yao(6) found a large portion of cases at an advanced stage because of late diagnosis. In this study, 99% of the tumours were in stages III and IV. Surgical therapy continue to be the cornerstone of nearly all treatment protocols and is the only consistently effective modality for achieving substantial palliation and survival of these patients. However, despite the recent advances, the result of surgery in advanced stages of the disease remains undeniably disappointing(6).

In the last seven years, this type of resection (oesophagectomy) has been performed in at least three centres in Yemen, including the Al-Thawra Teaching Hospital. This has been made possible due to improvement of surgical skills and supportive care, which allowed resection in patients previously considered unfit for surgery. In the present study, there was no randomisation and the patients were selected on the basis of surgeon's criteria,

which may introduce selection bias. Different surgical techniques have been practiced, with their advantages and disadvantages. However, we agree with Nguyen et al's (7) conclusion that the advantages of THO include avoidance of morbidity, including the respiratory compromise associated with thoracotomy, and the fact that if a leak does occur, it will be in the neck where it is more accessible (7). We also agree with Schrupp et al's (8) report that the advantages of TTO include better visualisation and access, resection of the upper two-thirds of the oesophagus and mediastinal disease, and avoidance of blind blunt dissection with tumours of the midthoracic oesophagus (8).

Anastomotic leakage can be a major complication after oesophagectomy, whether it occurs in the chest or in the cervical region (9). In this series, the cause of death was the intrathoracic anastomotic leak in two out of five (40%) leaks, and the cervical leak was the cause of death in one out of eight (11%) leaks. This is in agreement with Boyle et al's (10) conclusion where it was mentioned that anastomotic leaks that occur after cervical anastomosis tend to run a more benign course (10). Similar findings to our mortality due to a leak of an intrathoracic anastomosis were reported by Baulieux et al (11).

The low incidence of recurrent laryngeal nerve lesion (9.5%) in our study was nearly similar to Law et al's (12) results (6%), but less than Bousamra (9) results, and dramatically lower than the up to 70% observed in the Japanese reports (12). This could be explained by the differences in the dissection technique around the recurrent laryngeal nerve. Hulsker et al (13) recommended that in an extended transthoracic resection, the cervical anastomosis should be made on the left side to minimise the risk of bilateral vocal cord paralysis (13). In contrast to Boyle et al (10), the difference in this study between the two groups (THO versus TTO) with regard to the anastomotic leak and RLNL was statistically significant ( $p=0.001$  and  $0.004$ , respectively) (Table III).

Meneu-Diaz et al (14) reported that the majority of tumours were located in the lower third and cardia (71%), and 19% were adenocarcinoma. Our results reveal a similar location (74%), but differ in the percentage of adenocarcinoma (56%). This is in agreement with Bousamra et al (9). In the present study, the pathological staging revealed advanced cancer, where no cases of stages 0 and I were recorded, and only 1.2% of the cases were in stage II. This is in contrast to other studies (9,15) where 62% were in stages I and II.

These findings confirm our belief that most of our patients present in an advanced stage.

The mean postoperative ICU stay in our study was 3.16 days (range: 1-11 days), which is shorter than the 12 days (range: 3-46 days) reported by Meneu-Diaz et al(14). The mean postoperative hospital stay in our study (21.95 days, range: 3-42 days) was similar to that recorded by Meneu-Diaz et al(14) (mean: 25 days, range: 12-36 days). The operative mortality rate of oesophagectomy has been falling over the past three decades(16). Hofstetter et al(17) mentioned that the operative mortality dropped from 12% to 6%(17). Some authors have mentioned that oesophagectomy associated with low mortality rates (ranging from 3% to 14.7%) in many experienced centres(6,18,19). In our study, the operative mortality rate was 8.3%, slightly higher than that reported by some studies(20-24), but lower than that reported by others(25-28). The difference in the mortality in our study between THO and TTO (4 versus 3, respectively) was not statistically significant ( $p=0.742$ ).

Only 24 patients were followed up for a mean of 19.92 months (range 3-60 months), with the other patients being lost in the follow up. Therefore, the long-term survival rate in our study cannot be determined, but we believe that it would be low, because most of our patients were in advanced cancer stage.

We conclude that there were no significant differences between THO and TTO with respect to mortality and short-term survival, while there were significant differences in morbidity (anastomotic leak and RLNL). The long-term survival rate is likely to be low and the strategies to improve the outcome of this distressing disease must focus on earlier diagnosis. Our data do not permit us to make a clear recommendation of one treatment over the other.

At present, the choice for patients with cancer of the oesophagus is between lower morbidity (intrathoracic leak) but with a more serious outcome and the hope of better long-term benefits with TTO; or increased morbidity (cervical leaks, RLNL) but with benign outcome and apparently decreased long term survival with THO.

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