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Definition of Research Center :

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- 3- Formation of the national health and medical research committee and it's roll especially in ethical review.
- 4- Establishment of the health research brunches in the main cities :- Aden, Al-Hodeidah, Hadramout, and Taiz.
- 5- Establishment of specialized referenced library with update technical methods.
- 6- Coordination and cooperation with health programs, academic institutions, governmental and International organizations to develop and speed up the activities of health research.



**Primary report on Sexually Transmitted Diseases
Among Women in Sana'a Yemen during 2003-2004**

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and Dr/ Hoda Al shamy*

Abstract :-

The objectives of this study were to identify the common sexually transmitted diseases (STDs) the risk factors that play a role in transmission of STDs in Sana'a Yemen. Cross sectional study was carried out. Two hundred women were interviewed at 8 health facilities in Sana'a. Each woman subjected to clinical, laboratory and serological examination. Results; the mean age of 200 women was (28.8 ±7.2) years, 52% were illiterates, 61.5% have ever used contraceptive, 8% were polygamous married and 50% had past history of STDs .

The prevalence of STDs was 18.5 % for trichomoniasis, 46.5% for bacterial vaginosis, 5% for gonorrhoea, 28 % for cervical erosions/ulcers and no cases have been found for syphilis. Hepatitis B and hepatitis C markers were found in poor reproductive women twice as control group the prevalence of HIV was 1%.. The results of this study confirmed that STDs is frequent in women attended health facilities in Sana'a and it lead to chronic pelvic infection and subsequent complications .

Introduction: -

Sexually transmitted diseases are among the most prevalent infectious diseases worldwide. It remains a public health problem in most parts of the world ⁽¹⁾. Worldwide it was estimated that 333 million cases of curable STDs occur annually ⁽²⁾. In the United State STDs were the most common reportable diseases ⁽³⁾ ..

Consequence of STDs including ectopic pregnancy, infertility, foetal wastage, anogenital cancer premature death and pelvic infection are well known ⁽⁴⁾.. Moreover, antimicrobial resistance of several sexually transmitted pathogens is increasing, rendering some regimens ineffective ⁽⁴⁾.

The important and interest for STDs have increased in the era of AIDS. That is because they are transmitted in the same mod as human immunodeficiency virus (HIV) and, they are factor for transmissibility. There is a strong correlation between the spread of conventional STI and HIV transmission ulcerative and non- ulcerative STI act as a factor for increasing risk of sexual transmission of HIV ^(5,6,7,8,9). s. These lead to underestimation of health impact of these diseases in most of the developing countries ⁽¹⁰⁾., However, STDs are more difficult to diagnose in women due to the physiology and anatomy of the female reproductive tract and due to a symptomatic manifestation [silent] infection frequently can result in women being un-aware of STDs which results in delayed diagnosis and treatment.

Information about the prevalence of STDs in Yemen is not known and the majority of cases were not diagnosed.

Objectives: -

The objectives of the study were;

- To identify the common sexually transmitted diseases among women attending gynecological clinics in Sana'a Republic of Yemen.
- To determine the risk factors which play a role in the transmission of STDs .

Material and methods :

This study was conducted between April 2003 –April 2004 in Sana'a area, which provided health service care through a network of hospitals and health centers. Using censuses and records of Ministry of Health and Population, 20 health facilities were visited and 8 were randomly selected. Nested case control study was used and participants were identified. ;

A cross sectional phase to estimate the relative frequencies of STDs influencing reproductive health of women in Sana'a.

All patients underwent proper physical and clinical investigation, as well as, laboratory investigation.

Each patient subjected to a standardized pelvic examination including inspection, palpation, speculum and bimanual examination.

Endocervical secretion was characterized as mucopus (cloudy) or non-mucopus (clear).

Cervico- vaginal swabs were taken from all patients. For each genital swab bacteriological examination for gonorrhoea and trichomonas vaginalis were performed. Specimens for gonorrhoea were inoculated directly on to Thayer- Martin culture medium plates at the examination sites.. The endocervical Gram stain was used for detection of Gram –ve intracellular diplococci. Direct examination of discharge was performed for screening of candidiasis, trichomoniasis and bacterial vaginosis.. Venous blood was aspirated and tested serologically for syphilis (VDRL), HIV, HBsAg and HC Ab using ELISA tests of Abbott Laboratory North Chicago, USA All instruction of manufacture were followed.

Genital herpes, ulcers, warts were diagnosed clinically. Clinical diagnosis of pelvic inflammatory disease was made when moderate to severe cervical, uterine or adnexal tenderness was present and cervical muco-pus was seen.

Statistical Analysis

All data was entered into PC., and statistically analyzed. The final data will be analysis-using PSS packaged. Chi-Square will use to assess association of different variables and level of significance of 5% will adopted.

Results: -

Total patients rolled on this study were 200 women age range between (16-43) with mean \pm SD = (28.8 \pm 7.2).

17 of the study women reported having no live children; 37 had one child; 40 had two children and the remaining had three or more children. 47 women were found to be poor reproductive health and labeled as cases and 153 were good reproductive health and labeled as a control

Overall (20%) of the women reported history of spontaneous abortion, the prevalence of spontaneous abortion in the poor reproductive (29.5%) was higher than in the control group (18.6)($p < 0.05$). Demographic and socioeconomic characters of the women are presented in the table(1).

Table (1); Socio-demographic characteristics of women attending the gynecological and obstetric clinics in Sana'a

Characteristics	Total 200	
	Number	Percent
Age years :		
<20	11	5.5
20 - 30	121	60.5
31 - 40	53	26.5
>40	15	7.5
Residence :		
Urban/	140	70.0
Rural	44	22.0
Sub rural	16	8.0
Socioeconomic		
High class	35	17.5
Medium	86	43.0
Low class	65	32.5
Very low class	14	7.0
University	6	3.0
Secondary	21	10.5
Preparatory	20	10.0
Primary	49	24.5
Illiterate	104	52.0
Occupation		
House wife	163	81.5
Farmer	20	10.0
Employed	17	8.5

Most of the women (60.5%) had age between 20-30 years old. Regarding the residency, 70% were urban, (22%) were rural and only (8%) were living in sub- rural area.. Women with low or very low socioeconomic status were defined as those who lacked tap water and flush toilet in their home and who had no electricity or no radio in their home or their income was less than 9 Thousands Yemeni Rials/month. Consistent with this definition 39% of the women were poor or very poor..

As regarded education, (52%) of them are illiterates only (3%) has university level and (10.5%) had secondary education, (24.5%) were primary and (10%) preparatory graduates. Most of the women (81.5%) attended health facilities in this study were housewife. Only (8.5%) were workers and (10%) were farmer. Gynecological and obstetric characters of the women rolled in this study are shown in table (2). 94.5% of the women were married, 3.5% was divorced or separated and only 2 % was widowed.

Table (2):- Gynecological and obstetric characters of the women enrolled in the study.

Characteristics	Total	
	NO	%
Marital status		
Married	189	94.5
Divorced / widow	11	5.5
Polygamous marriage		
Yes	16	8.0
No	184	92.0
Contraception		
Yes	77	59.5
No	123	61.5
Operation		
Yes	31	15.5
No	169	84.5

Contraceptive methods were uncommon practiced in this community, the majority of cases 61.5% were not used any type of contraceptive. Only (38.5%) were used one or more contraceptive methods, of them (19.5%) used intrauterine loop, (12.5%) were used oral contraceptive pills. Tubal legations and injection were used in (2.5 %&0.5%) respectively. Only (3.5%) their husbands were used condom. .

Past history of operation was detected in 31(15.5)% of the patients, of them 10(5%) subjected to cesarean section and 3% had laparoscopy. Ovarian

cysts removals were performed in 1.5%, other less frequent operations were herniotomy, myomectomy and ectopic pregnancy each of each represented 0.5% of the total operation performed. The presenting complaint and current infection of both groups are summarized in table (3) and table (4)., Vaginal discharge was the common presenting symptoms (73.5%).. The other most frequent symptoms encountered on women were back pain, lower abdominal pain (pelvic pain) and, painful intercourse, which represent (71.5%, 61%, &52.5%) respectively. Symptoms such as irregular menstruation, dysmenorrhoea and frequent micturation were represented of (20%, 22%&31%) respectively. However, the less presented symptom was external genital ulcer lesion, which occurred, in only 2%.

Table (3):- The main clinical findings among women attending health facilities in Sana'a

Characteristics	Total 200	
	NO	%
Vaginal discharge		
Present	147	73.5
Absent	53	26.5
Irregular menstruation		
Yes	47	20
No	153	80
Dysparonea		
Yes	105	52.5
No	95	47.5
Back pain		
Yes	143	71.5
No	57	28.5
Abdominal pain		
Yes	122	61.0
No	78	39.0
Dysmenorrhoea		
Yes	45	22.5
No	155	77.5

The frequency of infection among women is presented in table (4). Bacterial vaginosis was found in (46.5%) it was also found that women with polygamous had a higher prevalence of bacterial vaginosis than single marriage. The second frequent infections isolated from women was trichomonas vaginosis accounted for (18%).It represented 23.4% in poor reproductive health compared to 16.3 % among good reproductive health of

58% women aged less than 30 years were found to have trichomoniasis than women who were at or above 30 years old $P=0.02$. Low socio-demographic character was found to be associated with trichomoniasis.

The other but less frequent infection isolated from women was gonorrhoea represented 5%. The frequency of cervical erosions /ulcers accounted in 28.5% of the women. . Cervical erosions were more frequent with low educational status, (38%) of women who were illiterate had cervical erosion compared to (17%) that had secondary or university study.

Table (4):-STDs and the RH status of women presented to health facilities in Sana'a

Characteristics	Total 200	
	NO	%
Gonorrhoea		
Yes	10	5.0
No	190	95.0
Trichomonas vaginosis		
Yes	36	18.0
No	164	82.0
Bacterial vaginoses		
Yes	93	46.5
No	107	53.5
Cenital ulcers		
Yes	57	28.5
No	143	71.5
Adnexal tenderness		
Yes	89	44.5
No	111	55.5
Hepatitis B		
Yes	9	4.5
No	191	95.5
Hepatitis C		
Yes	2	1.0
No	198	99.0
HIV		
Yes	2	1.0
No	198	99.0

Hepatitis B and hepatitis C markers were found in poor reproductive women twice as good reproductive one.

Discussion: -

This study has shown the STDs are among the frequent infection encountered in women. Almost 50% of the women attended the health facilities had at least one STI in this study. This high prevalence of STI rate confirms the suggestion of health worker that STDs are an important public health problem in Yemen. ;in Tanzania STDs accounted for 68%,Moracco 54% India 42%and in Egypt 52.8% (12,13,14,15)

The mean age of women in this study was 28 years. It was reported in several studies that. All groups in all communities are at risk for STDs, but STDs and their complication disproportionately affect some population group. It was reported in several studies that, young women are more susceptible to certain STDs than are old women (16). The cervix of adolescent females is covered with cells that are especially susceptible to STDs such as gonorrhoea and or/Chlamydia [16]. In this study the overall prevalence of gonorrhoea is only 5%. Which is low compared to other women in developing countries (12,13,14). It could be related to a number of factors. Our cases had chronic pelvic infection and isolation of acute bacteria from them is difficult, alternatively, the low prevalence could be genuine, and reflect the low reservoir of infection in the community, the other possible explanation is that we could have failed to detect some infections for unknown reasons,

Vaginal discharge and vulvovaginitis were frequent complaint of the females presented to the Obs. and Gyni. Clinic. Several authors presented this symptoms and considered that this symptoms are more frequent clinical complaints among women of reproductive age in many parts of the world (17), and considered by them as not discriminating as they are so common non specific and have many non sexual enquired etiology .However, poor hygiene among low social economic level my be the other reason for prevalence of candidiasis and trichomoniasis . The high rate of trichomonal infection found in all groups may reflect rates of acquisition, non- recognition, of symptoms, lack of treatment seeking as well as the natural history of infection. Untreated trichomoniasis in women is thought to persist indefinitely, although it is usually transient in men (18). The association between trichomonal infection and vaginal discharge provide an evidence to include the trichomoniasis as the main causes of vaginal discharge in the symptomatic management of STDS ..

The over all prevalent rates of bacterial vaginosis were high compared to study with other countries. in Brazil bacterial vaginosis was found in 15% of

care seeking patients and in 37% of non pregnant women and 21% pregnant women seeking care in Tanzania . These differences can be attributed to diagnostic methods and criteria, which were used in the diagnoses. . Bacteria vaginosis has been diagnosed in some studies on laboratory results only and using varying criteria while in another a combination of clinical and laboratory characteristics were used. However ethnic or social group may be less susceptible to colonization of certain types of flora. ⁽¹⁹⁾ In this study pelvic inflammatory infection were more frequent, it co-incident with other studies from developed and developing countries.⁽²⁰⁾ .

Abdominal pain is frequent in this study this is may be due to either trichomoniasis cause abdominal pain and has been implicated in ‘atypical’ PID in infertile women. There is suggestive evidence that trichomonal infection may be implicated in upper tract diseases and infertility. Trichomonas have been cultured from the fallopian tubes , and Douglas pouch; and bacteria have been demonstrated to be attached to trichomonas vaginalis in vitro⁽²¹⁾ Relatively few people are infected with HIV in Yemen, particularly compared to neighbor countries even in patients who seek care for sexual transmitted diseases, serosurveys among blood donors in Sana’a city documented HIV prevalence rates of less than (1%). However the potential risk of acquiring HIV in this country is seem to be increasing.

Conclusions and recommendations: -

These data highlight the burden of sexually transmitted disease including pelvic infection are significant in women attended Gyni. and Obs. clinics. The scope of reproductive health must be broadened beyond family planning and maternity care to include prevention and treatment of reproductive tract infections safe motherhood and reproductive health education. The approach to reproductive health care services should be comprehensive, whereby several aspects of reproductive health are integrated into primary health care facilities. The emphasis on prevention and early detection is clearly less resource intensive than dealing with the severe consequences of reproductive tract infection.

Early recognition and prompt treatment will prevent complications such as pelvic inflammatory diseases and its sequelae.

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Prevalence of rubella antibodies among schoolgirls in Sana'a, Republic of Yemen

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ABSTRACT: -

To determine the prevalence of rubella antibodies and age of exposure to rubella among Yemeni schoolgirls, we studied the sera samples of 323 female students (age range 11–21 years; mean age 16.26 ± 1.89 years) drawn from three schools in Sana'a. All samples were screened for rubella IgG antibodies using enzyme linked immunosorbent assay and, if negative, for IgM in order to exclude the possibility of recent exposure. Of 323 sera, 296 (91.64%) were positive for rubella IgG. All IgG negative sera were also IgM negative. Comparable antibody prevalence was observed in all age groups. The prevalence of rubella IgG among Yemeni schoolgirls is high, with most becoming immune between the ages of 11 and 21 years. Although the age of exposure seems to be \approx 13 years, further investigation is needed to confirm this.

Introduction:-

Rubella is a mild illness caused by a non-arthropod-borne member of the family Togaviridae. At least half of all primary rubella infections go undiagnosed because of the sub clinical nature of the infection [1]. However, the disease poses a particular threat to the developing fetus if contracted during early pregnancy. In utero infection of the fetus may result in congenital deformity or other consequences of congenital rubella syndrome [1,2]. It is,

therefore, essential that girls develop immunity to rubella by the time they reach childbearing age to prevent such an outcome.

Rubella epidemics are, or have been, a worldwide phenomenon. Before the introduction of a vaccine in countries such as Australia, the United States of America, the United Kingdom and European countries, rubella epidemics occurred in cycles of 6–9-year intervals [3]. In the USA, before the introduction of the vaccine, a single epidemic resulted in 20 000 infants being born with permanent damage due to intrauterine infection with the rubella virus [4].

Elsewhere, while the immune status of many populations regarding rubella is less clear, some data have been reported. In Saudi Arabia, the antibody prevalence among girls aged 5–25 years has been reported to be 92% [5]. In some African countries, 80% of children have been found to be positive for rubella antibodies by the age of 10 years [6]. Post-epidemic rubella antibody prevalence in Ghana has been found to be 92.6% among pregnant women, with susceptibility associated with a younger age [7]. In Eritrea, the prevalence of antibodies to rubella has been reported to be as high as 99% in some female populations [8]. In Nigeria, rubella antibody prevalence in women of childbearing age has been reported to be 77% [9].

Some of these studies have reported an early age of exposure to rubella [6,7]. In equatorial countries, the highest seroprevalence has been seen in age groups as young as 5–9 years, and in preschool children [10,11]. In India, however, children between 1 and 5 years showed the lowest seropositivity (69.2%) [12]. Lower rates of rubella seropositivity have been found among Nigerian students compared with pregnant women, the explanation given for this being an association between high socioeconomic status and lower seropositivity [13].

In the Republic of Yemen, the epidemiology of rubella remains to be fully elucidated. Rubella vaccination is not part of the Expanded Programme of Immunization nor is the vaccine available in private clinics or hospitals; therefore, immunization through the private sector is non-existent. In this study, we explored the immune status and the likely age of exposure to rubella among schoolgirls in the national capital, Sana'a.

Methods:-

We enrolled 323 schoolgirls in the study (age range 11–21 years; mean age 16.26 ± 1.89 years), from three schools serving major populated areas in three different geographical locations in Sana'a. Age and previous country of residence were documented and all girls who reported previous residence in another country were excluded because of the possibility of a history of immunization. Venous blood was collected and sera were separated and frozen at -20°C until tested.

Enzyme-linked immunosorbent assay (ELISA, Denka Seiken® Company Limited, Japan) was used to screen for rubella IgG and IgM antibodies. Test procedures were performed according to the manufacturer's instructions. All samples were initially screened for rubella IgG. Those testing negative were further tested for rubella IgM to exclude the possibility of recent rubella exposure.

Data were analyzed using SPSS, version 10.05 to calculate mean, standard deviation and chi-squared values. A value of $P < 0.05$ was considered significant.

Results:-

Of 323 sera, 296 (91.64%) were rubella IgG positive. The 27 samples that were negative for IgG were also IgM negative. Only 27 girls (8.36%) therefore had no rubella antibodies. Comparable antibody prevalence was observed in almost all age groups (chi-squared likelihood ratio = 7.32, $P = 0.29$). The prevalence of antibodies in various age groups is shown in Table 1.

Table 1 Rubella IgG antibodies among various age groups of 323 schoolgirls in Sana'a, Republic of Yemen.

Age	No	Rubella IgG No	Positive cases %
11 – 13	30	24	80.00
14	36	33	91.66
15	35	31	88.57
16	66	63	95.45
17	73	67	91.78
18	51	47	92.16
19 – 21	32	31	96.87

Chi – Squared likelihood ratio = 7.32, $P = 0.29$

Discussion

Despite the fact that vaccination against rubella is not part of the Expanded Programme of Immunization in the Republic of Yemen, our data showed that 91.64% of girls aged 11–21 years had antibodies to rubella virus, suggesting previous exposure. Antibody prevalence ranged between 80.00% and 96.87% for the different age groups. The relatively low prevalence in the youngest group (11–13 years) may indicate an age association. Such an association might have been more clearly shown had children aged < 11 years been included in the study. A possible age association could be verified by a future study involving girls aged 5–12 years.

Our findings accord with the pattern of rubella antibody prevalence reported in Saudi Arabia, where a rubella immunization programme was initially implemented 12 years ago. A recent study from Saudi Arabia has reported antibody prevalence among girls aged 5–25 years to be 92% [5]. Similarly high antibody prevalence has been reported in a number of European countries where vaccination programmes against rubella exist. In Italy, an antibody prevalence of 93.3% among girls aged 16–20 years has been reported [14] and in Spain, 81.8% of girls aged 15–19 years were reported to have rubella antibody [15]. However, high antibody prevalence has also been reported in countries where rubella vaccination is non-existent, such as Ghana and Eritrea [7,8].

The prevalence of rubella IgG among Yemeni schoolgirls is high, indicating that the majority of girls become naturally immune by age 11–21 years. The antibody prevalence for the various ages within our sample was comparable. We conclude, however, that a comprehensive seroepidemiological study involving all age and socioeconomic groups in the Republic of Yemen should be a prerequisite to the planning of any future vaccination programme against rubella in the country.

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Knowledge, attitudes and beliefs about HIV/AIDS in Sana'a, Yemen

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ABSTRACT :-

Although HIV prevalence is low in the Republic of Yemen, existing conditions could lead to the rapid spread of HIV/AIDS. Interviewers helped 1033 residents aged 14–49 years from randomly chosen households to complete a survey of knowledge, attitudes and beliefs about HIV/AIDS. General awareness was good, although there were many misconceptions about transmission modes, stigmas and discrimination against HIV positive persons. Knowledge was significantly determined by schooling, residence and sex. Although they recognized the global threat of AIDS, participants underestimated its threat to the Republic of Yemen. Television was the commonest source of information. Fostering public awareness is recommended to facilitate the development of intervention programmes, fight stigmas and ensure delivery of care to those affected.

Introduction

The challenge posed by the global HIV epidemic to both public health and national development continues to grow at an alarming rate. According to estimates by the World Health Organization (WHO) and the Joint United Nations Programme on HIV/AIDS (UNAIDS), 36.1 million people were living

with HIV at the end of 2000. Of these, more than 400 000 people were thought to be living with HIV in the Eastern Mediterranean Region [1].

The Republic of Yemen is facing the challenges of illiteracy, poverty, unemployment, a high population growth rate and widening social gaps. The problem of HIV infection could thrive under these conditions [2]. However, the status of the HIV/AIDS epidemic in the Republic of Yemen is not yet clearly defined due to the lack of reliable data and the absence of a surveillance system [3]. Thus far, official data indicate a low rate of HIV infection in the country. By the end of the year 2000, the cumulative number of reported HIV positive cases in the Republic of Yemen was 960 and 209 of those were AIDS patients [4]. Given that AIDS is largely underdiagnosed and that coverage of health services is limited, these cases are only the tip of the iceberg. Nevertheless, many indices raise concerns about a rapidly increasing trend and, in particular, the vulnerability of women and young people, the latter of whom make up more than half of the population. Most alarming is that the number of reported cases of HIV/AIDS has increased fourfold from 1994 to 1995 and fivefold from 1994 to 1996 [5].

Some efforts are being made to raise awareness about HIV/AIDS, such as youth education and media sensitization supported by the United Nations (UN) and international nongovernmental organizations (NGOs). In order to make these activities more effective, we need to assess where the groups to be targeted for health education currently stand. Such information will serve as a guide for the development of information, education and communication activities for HIV/AIDS prevention and control.

This paper presents the findings of a household survey conducted as a part of a wider HIV/AIDS Situation and Needs Assessment Report [4]. Our objectives were: to assess knowledge about AIDS in terms of causes, modes of transmission, treatment and prognosis; to appraise attitudes towards AIDS and AIDS patients; to determine sources of information on AIDS; and to assess perceptions of risk.

Methods:-

Our study was a survey of knowledge, attitudes and beliefs of the community of Sana'a.

Structured face-to-face interviews were conducted. The questionnaire used in our survey was adapted from the Arabic version of the questionnaire prepared by the WHO Eastern Mediterranean Regional Office and the WHO Global Programme on AIDS Social and Behavioural Research Unit. The questions were mostly open-ended and covered sociodemographic characteristics, knowledge, attitudes and beliefs.

In general, discussions on sexual matters in the Republic of Yemen are taboo and diseases such HIV/AIDS are stigmatizing. Therefore, during the adaptation process, some questions were cut or reworded to be more socially acceptable in the Yemeni context.

Due to the high illiteracy rate, trained interviewers helped to fill out the household survey. An area in Sana'a outside of our study sample was chosen for a pilot study and 50 households were randomly selected and interviewed. All survey steps and methodology were tested and as a result any necessary changes to the questionnaire were made. Throughout the study, the principal investigator and the team leaders met daily with the data collectors to ensure the quality of data collected.

According to a new Ministry of Local Administration law, Sana'a is divided into 10 districts and each district is divided into hai (harat), or 'livelihoods'. From each district, 4-5 hai or harat were selected randomly. From each hai, 20-25 households were chosen randomly so that we would have 100 households from each district and about 1000 households in total (500 males and 500 females). Only residents who were of reproductive age, i.e. aged 14 to 49 years, were included in the survey. We interviewed every eligible person in each selected household. Less than 5% of those eligible refused participation. Male and female researchers interviewed couples separately.

Field data were checked daily. All data collectors carefully checked and coded the data and recorded it on pre-coded forms. After they finished coding,

they passed the questionnaires to the team supervisors for rechecking. When there was doubt about procedures, the supervisor checked with the principal investigator. The questionnaires were then given to the principal investigator who also rechecked them.

Data were tabulated using Epi-Info software (Centers for Disease Prevention and Control, Atlanta, Georgia, United States of America, 1994). Printouts were made and were checked against the original forms. Epi-Info software was also used for statistical analysis. Chi-squared test was used and differences were statistically significant at $P < 0.05$.

Results:-

A total of 1033 interviews were conducted. The mean age and standard deviation of participants was 31.5 ± 9.0 years. The illiteracy rate was 23% and was significantly higher among females (14% males versus 46% females, relative risk (RR) = 2, confidence interval (CI): 1.8 to 2.2, $P < 0.0001$). Of the females, 90% were housewives. Among the men, the most common occupations were soldiers and office workers (21% each) and vendors and small traders (11%); 13% were unemployed.

Knowledge about AIDS :-

Overall knowledge was remarkably good. Only 8% had not heard at all about the disease called AIDS (Table 1). Knowledge was significantly determined by sex, as males knew significantly more than females. Whereas only 4% of males did not know about AIDS, 12% of females did not know ($\chi^2 = 23.91$, $P < 0.0001$, odds ratio (OR) = 3.58, CI: 2.08–6.43).

Schooling was another important determinant of knowledge about AIDS. While only 3% of those with schooling did not know about AIDS, 19% of those who had never been to school did not know ($\chi^2 = 70.25$, $P < 0.0001$, OR = 6.84, CI: 4.04–11.64).

Total 1: Knowledge about AIDS and possible modes of transmission

Item	Yes %	NO %	Do not Know %
Heard about AIDS	92	8	0
Causative agent is a virus	41	20	39
Patient may have no symptoms or signs	46	22	32
An infectious disease	93	4	3
A curable disease	17	67	16
Method of transmission			
Extramartial sex ^a	96	1	3
Blood transfusions ^a	97	1	2
Injections ^a	96	1	3
Sharp blades/instruments ^a	94	1	5
Male to male sex ^a	84	2	14
Female to female sex ^a	68	6	26
Mother to child (e . g pregnancy , breast feeding or other) ^a	86	7	7
Touching	28	59	13
Drinking / eating	41	44	15
Clothes	44	34	13
Kissing	56	27	17
Mosquitoes / insects	68	18	14

^a Correct modes of transmission .

The third determinant of knowledge was residence. In suburban areas, 20% of participants did not know about AIDS compared with 6.3% of those who lived in urban areas ($\chi^2 = 4.9$, $P < 0.05$, $OR = 3.67$, $CI: 1.1-14.90$).

Only 41% knew that AIDS is caused by a virus compared with 39% who did not know and 20% who gave other answers, e.g. bacteria, parasite, genes or punishment from God.

Of those who knew about AIDS, 46% stated that an HIV infected person might not show any symptoms. Of these, 72% believed that infection could be transmitted to others even if an infected person did not show symptoms. Only 4% thought that AIDS is a noncommunicable disease.

Only 17% believed that there is a cure for AIDS, but 44% of these did not know what that cure was. Others mentioned behavioural changes (13%), new drugs (7%), drugs that boost or improve immunity (5%), general drugs (4%) and traditional medicine (2%). Only 34% believed that all patients would die eventually from AIDS and that there is no cure.

Table 1 shows knowledge of modes of transmission of HIV/AIDS. Although the majority seemed to be well informed about the major modes of transmission such as sexual intercourse, homosexual contact and blood transfusions, there were still important misconceptions in that some believed that HIV/AIDS could be acquired through touching, eating and drinking or mosquito bites.

As for mother-to-child transmission, 86% believed that AIDS could be transmitted from mother to child. Of these, 48% believed that this could happen during pregnancy, 38% thought via breastfeeding and 14% thought after pregnancy and breastfeeding.

Attitudes towards AIDS:-

There was a discrepancy between the extent to which AIDS was considered a threat to the world and to the Republic of Yemen. While 69% reported AIDS as one of the most dangerous diseases facing the world, only 28% thought this for the Republic of Yemen (Table 2).

Total (2) Attitudes towards AIDS .

Item	Yes %	No %	Do not know %
Mentioned AIDS as one of the dangerous and important diseases that is facing the world	69	31	-
Mentioned AIDS as one of the dangerous and important diseases that is facing Yemen	28	72	-
Willing to look after their relatives if they have got AIDS	66	28	6
Thought that AIDS patients need to be isolated and cared for at special AIDS hospital ^a	65	-	-
Wiling to be tested for AIDS	86	13	1

^a Originally Where should someone with AIDS be provided with medical care.

' No ' and ' Do not know ' categories were not applicable .

Two-thirds of the sample would be willing to look after relatives who contracted HIV/AIDS compared with 28% who would refuse to do so. There was a common attitude that AIDS patients need to be isolated and should

receive special care in special health settings. Overall 65% thought that AIDS patients needed to be cared for at special AIDS hospital compared with only 17% who thought that AIDS patients could receive care through general hospitals. Approximately 1% believed there is no need to care for AIDS patients and that they should be killed.

About 51% thought only specialized staff should provide care to AIDS patients compared with 16% who thought care could be provided by ordinary health staff. Another 21% thought that family members should provide this care. Others mentioned volunteers or that AIDS patients themselves should care for each other.

Approximately half of the participants thought that the government should pay the expenses for treating AIDS patients. Others thought this was the responsibility of the family (35%) or NGOs (10%).

As for voluntary testing and counselling, 86% of respondents would agree to be tested for HIV/AIDS. Of them, 98% would want to know their results and 87% would accept their family being informed also. However, 81% would prefer to inform their families themselves compared with 17% who would prefer the doctor to inform their families.

Nearly all participants strongly believed that the government should take action to prevent the spread of AIDS. The most commonly chosen actions were awareness raising (33%) and checking airports and foreigners (25%). Other commonly mentioned actions were isolation of patients (19%), prevention of prostitution (11%), ensuring blood safety (7%) and imposing safety measures in health facilities (2%).

Perceptions of risk:-

Only 36% of respondents were aware that there was a possibility that they could get HIV/AIDS compared with 33% who believed that there was no possibility whatsoever that they could get infected (Table 3).

Table (3) Perceptions of risk and behavioural changes

Item	Yes %	No %	Do not Know %
Possibility of getting infected	36	33	9
Which people at high risk of AIDS ^a			
Those who have extramarital sex	54	-	-
Homosexuals	11	-	-
Users of contaminated syringes or surgical instruments	5	-	-
Which people at low risk of AIDS ^a			
Those who stick to religion	56	-	-
Those with a single partner	29	-	-
Those who are aware about transmission method	7	-	-
Behavioural changes			
AIDS can be avoided by behavioural changes	89	5	6
Changed their behaviour after Learning about AIDS	38	57	5
Knew someone who changed behaviour after learning about AIDS	25	54	21
Planning to change behaviour in the future to avoid AIDS	56	38	6

^a Respondents answered query directly ; ' No ' and ' Do not know ' categories were not applicable .

The people thought to be at higher risk of HIV infection were those who have extra-marital sex (54%), homosexuals (11%) and users of contaminated syringes or surgical instruments (5%). Less commonly mentioned risk categories were receivers of infected blood (4%), drug addicts (2%) and relatives of AIDS patients (1%). An additional 5% did not know who was more at risk and 16% gave wrong answers such as foreigners, refugees and children.

The respondents believed that the people who were less at risk were those who were religious (56%), who had a single partner (29%) and who were aware of transmission methods (7%). Categories that were mentioned less often were those who have less contact with patients (4%), who had no blood transfusions (3%), who did not use contaminated syringes or surgical instruments (2%) and who avoided homosexuality (2%).

Most respondents (89%) thought that individuals could avoid infection by behavioural changes. Nevertheless, only 38% mentioned that they had changed their behaviors after learning about AIDS and only 25% knew people

who had changed behaviors to avoid AIDS. These behaviors included avoiding sharing razor blades and shaving instruments, avoiding contaminated medical instruments like syringes and avoiding extramarital sex. A slight majority (56%) was planning to change behaviors to avoid AIDS compared with 38% who were not.

Sources of information

The most common source of general information was television (93%) (Table 4). Television was watched equally by both sexes and 69% of those who watched television did so daily. As regards other sources, 76% listened to the radio; 46% of those did so on a daily basis. Females listened to radio less often than males (72% versus 80%, $\chi^2 = 8.91$, $P < 0.01$, OR = 1.57, CI: 1.2–2.1). Of the literate, 80% read newspapers and of these 18% did so daily. Whereas 29% of females did not read newspapers, only 19% of males did not ($\chi^2 = 9$, $P < 0.01$, OR = 1.6, CI: 1.3–2).

Table 4: Sources of information

Item	Yes %	No %
<i>Sources of general information :</i>		
TV	93	7
TV on daily basis	69	-
Radio ^a	76	24
Radio on daily basis	46	-
Newspapers ^{a'b}	80	20
Newspapers on daily basis	18	-
<i>Sources of information about AIDS:</i>		
TV	40	-
Newspapers	21	-
Radio	19	-
Friends	9	-
Other , e.g. health workers . families and religious leaders	8	-
<i>Discussed HIV/AIDS :</i>		
With friends ^c	39	40
With family members ^d	25	51

a Significant differences between males and families.

b of literate only.

c many times 39%; rarely 20% ; never 40% ; did not know 1%.

d many times 25% ; rarely 23% ; never 51% ; did not know 1%.

Television was the main source of information about AIDS (40%), then newspapers (21%), radio (19%) and friends (9%). Less common sources were families (3%) and religious leaders (2%). It was surprising that health workers were the source of information for only 3%.

Only 25% had discussed HIV/AIDS-related matters many times with family members while 39% had discussed such matters many times with friends.

Discussion

Baseline research and situation analysis is an exercise that should take place prior to educational intervention and should assist in identifying areas for intervention by highlighting gaps or shortcomings. Knowledge, attitudes and beliefs studies are very useful in this aspect as tools to assess the extent to which an individual or a community are in a position to adopt a disease risk-free behaviour. Since the desired outcome of information, education and communication is the sustained practice of a healthy behaviour, it is important prior to developing or introducing activities that pitfalls and shortcomings are properly diagnosed and pinpointed. This assessment should not be limited to looking for obstacles at intra-levels, i.e. within knowledge or within attitudes, but should be also towards inter-levels, i.e. between knowledge and attitudes or between knowledge and practices.

As this is the first knowledge, attitudes and beliefs survey of HIV/AIDS in Sana'a, it will put some light on the community's shortcomings towards this growing health problem. It will also help identify areas for information, education and communication interventions to address those shortcomings.

Similar published studies from Arabic countries are scarce, thus limiting the proper comparison of our findings.

Knowledge:-

Although most had good overall knowledge, there were wide and significant gaps between rural and urban dwellers, male and females, and education levels. These gaps need to be tightened. In a similar survey in Kuwait, the knowledge score was positively associated with education [6]. Geographical differences in knowledge were also found in other studies [7,8].

Misconceptions about modes of transmissions such as touching, eating or drinking, clothes, kissing and insect bites were still widely prevalent. Such

misconceptions were also reported from different countries. In a survey in Kuwait, gaps were found about modes that did not transmit the disease [6]. In a Bangladeshi knowledge, attitudes, beliefs and practices study of HIV/AIDS among people seeking work overseas, most people who knew of HIV had some false beliefs about modes of HIV transmission, for example, believing that HIV could be contracted by touching an AIDS patient or sharing bathing facilities or eating utensils [8]. Therefore, providing information about HIV/AIDS transmission that stresses the lack of scientific evidence for these misconceptions should be a priority.

Attitudes:-

The community underestimates the threat of HIV/AIDS to Yemen. Such false perceptions need to be counteracted, because although Yemen is a country with low HIV prevalence conditions exist that could lead to the rapid spread of HIV/AIDS in the future. Poverty, social disparities, illiteracy and inadequate and low-quality health care services are among the determinants that could lead to the rapid spread of the virus in the country.

Negative attitudes towards HIV/AIDS infected people are rather prevalent and this can lead to an unsafe atmosphere with grave consequences for patients living with AIDS. Therefore, there is a need to develop positive attitudes in term of provision of care and support of these patients.

Many participants suggested checking airports and foreigners for HIV/AIDS; this indicates a common view that AIDS is invading Yemen mainly through foreigners and refugees. Such misconceptions need to be tackled. That Yemeni residents account for more than half of the reported AIDS cases needs to be clearly conveyed.

Perception of risk:-

The possibility of acquiring HIV infection is underestimated by the community and needs to be reinforced through the clear understanding that anyone can be at risk. Because behavioural changes are not total protection from HIV/AIDS, the link between behaviour and HIV/AIDS needs to be emphasized and the role of behaviour in protection must be highlighted. In a separate unpublished study among patients living with AIDS, no patients believed that they could be victims of HIV/AIDS (A.W. Al-Serouri, unpublished report, 2001). Thus, the perception of risk and the importance of behavioural changes need to be stressed.

Sources of information:-

TV is the current and probably the future leading source of knowledge about HIV/AIDS. That TV is the only source of information that is used equally by both males and females is encouraging, as it can be used to minimize the significant gap in knowledge between the sexes. Health workers might have been low on the list of information sources because of their overemphasis on curative care and underestimation of the importance of health education [9].

Another reason could be that discussions of sexual matters are taboo and health workers need to be re-educated about spreading the message to the general public on such a sensitive issue.

In several countries such as Uganda, religious leaders are prominent in HIV/AIDS education in communities [10]. Unfortunately, this is not the case in Yemen where only 2% received information through this channel. As Islam emphasizes that sex should only take place within marriage, this message reinforces our health. Such an important source of information should be tapped as 12% of the participants mentioned religious leaders as one of their preferred sources of information in the future.

Recommendations:-

A high level of public awareness, especially among the young, is critical at this stage to facilitate the development of intervention programmes to protect the community, fight stigmas and ensure a safer environment for those who are affected. The following are our main recommendations.

- Development of public awareness strategies through:
- Creation of effective health education materials to address misconceptions
- Use of TV and radio to publicize AIDS issues on a regular basis
- Fostering of partnerships with religious leaders and NGOs to pass HIV/AIDS-related educational messages to the community;
- Development of core training materials that are appropriate in the local context and that take into consideration the above-mentioned shortcomings and gaps;
- Development of other means of publicity to reach the underprivileged, such as role-playing for rural areas and hotlines in urban areas.

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Load and pattern of patients visiting general emergency Al-Thawra hospital , Sana'a

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ABSTRACT:-

- Aim:** This study aimed to determine the load on General Emergency Department (GED), pattern of admission into Al-Thawra General Modern Hospital (GMH) on 1998 and 1999.
- Methods:** Retrospective study of the medical records of Al-Thawra GMH for the two years 1998 and 1999.
- Results:** 58570 patients sought medical advice in GED of Al-Thawra GMH in 1998, of them 24420 (45%) were admitted to different departments. While 65235 sought medical advice to GED in 1999, of them 14510 (22%) were admitted into the hospital. The average number of admission in 1998 was 67.8 patients per day. While average admission in 1999 were 40.3 patients per day. Admission into obstetric ward topped the list (45%) with normal delivery as the leading cause of admission into this ward. Admission to medical ward was the second (14%) with acute MI and CVA as the commonest cause of admission to the same ward. Admission to surgical ward was the third (10%) with acute abdomen as the leading cause of admission. The rate of admission to the above department respectively was 4.5: 1.4: 1.
- Conclusion:** There was a heavy load on GED of Al-Thawra GMH on 1998 and 1999 with variety of diseases, but with decrease of admission services. So, reevaluation and planning of health services of Sana'a and Yemen is mandatory.
- Keywords:** Sana'a – Yemen- Al-Thawra GMH- load – pattern – emergency department- ward- medical- surgical- obstetric.

INTRODUCTION:

Information on the main causes of ill health and death in a nation is very important for planning, monitoring and evaluation of health services². Routine data collection through vital registration systems, hospital and other health care delivery system, disease notification systems and epidemiological surveys are the conventional sources of data for health care. There has been a tremendous improvement in the provision of health services in the last decade. Records of admission into health care facilities remain one valuable source of data on ill health available to developing country³. Al-Thawra GMH Sana'a is the tertiary hospital of Sana'a as well of Yemen. It is the first teaching hospital. It was constructed in 1964. It has 532 beds and is a well equipped and most of the staff of the consultants are members of the Faculty of Medicine of Sana'a University. It includes all departments and a well-equipped medical and surgical intensive care units⁴. All surgical operations are carried out. In the last two years two cases of kidney transplantation were carried out successfully. This year, cardiac surgical center would start working. There is a busy outpatient department with specialized referral clinics and 24 hours emergency services. There are 128 medical beds (80 male).

Our objectives of this study are to determine the load difference between 1998 and 1999 of cases visiting GED and the pattern of admission to the hospital and to identify and present the size of the problem and load difference yearly to the authority.

PATIENTS AND METHODS:-

Al-Thawra GMH although a tertiary referral hospital center operates as an active primary care with 24-hour accident and emergency coverage to any one and from it nearly all admission occurred. In this study all patients visited ER and those who were admitted to the different wards in the tow consecutive years 1998 and 1999 were trievied from the medical record storage system.

RESULTS:-

Table (1) demonstrates that total number of cases visited the GED of Al-Thawra GMH Sana'a increased in 1999 with a difference of 6665 patients (0.089%). Table (1) also demonstrates that the total admission in 1998 was 24420 (45%) comparing with that of 1999 where the total admission was 14510 patients (22%). Table (2) demonstrates the pattern and frequency of admission to different departments in both years 1998 and 1999 with obstetric cases as the most frequently admission (45%). These results were the same in 1999 regarding the pattern of admission. Table (3) shows the load difference of cases visiting GED with medical causes versus those with surgical causes in the two consecutive years 1998 and 1999 with a load difference of 306 (0.05%) of medical causes, and 1100 of surgical causes (11%). (90%) were admitted to medical ward in 1998, while only (37%) were admitted in 1999 to the same department. (83%) were admitted to surgical ward in 1998, while only (49%) were admitted to the same ward in 1999. This difference in admission in both years may be because the admission in 1998 was free of fees. Table (5) demonstrates that the load difference in GED of patients presented with renal failure increase by 294 patients (4.2%) in 1999. while the load difference of those admitted to renal dialyses unit in both dropped by 396.4 patients in 1999 this discrepancy between increasing the load in GED and decreasing the load of admission may be due to the fees which was started in 1999. Table (6) shows that the load of criminal cases dropped by 589 patients (1.1%) in 1999.

TABLE 1: Load on GED Vs admission to the wards in 1998 and 1999 .

YEAR	NUMBER OF PATIENTS VISITING GED	NUMBER OF PATIENTS ADMITTED TO THE WARDS	PERCENTAGE
1998	58570	24420	45%
1999	65235	14510	22%
DIFFERENCE	6665	9910	59%

TABLE 2: Total admission Vs the year in each department in 1998 and 1999

Department	1998		1999	
	No.	%	No.	%
Gyn.&Obst.	10989	45	6529.5	45
Medicine	3418.8	14	1886.3	13
Surgery	2442	10	1451	10
Neurosurgical	1465	6	870.6	6
Pediatric	1221	5	725.5	5
Renal	976.8	4	580.4	4
ENT	976.8	4	435.3	3
Orthopedic	976.8	4	580.4	4
Ophthalmologic	732.6	3	435.3	3
Urology	732.6	3	435.3	3
Maxillofacial	244.2	1	290.2	2
Psychiatry	244.2	1	290.2	2
TOTAL	24420	100	14510	100

TABLE 3: Comparison between number of medical & surgical cases admitted to GED

	1998	1999
General medicine	4820	5126
General surgery	2928	4028

TABLE 4: Number of patients admitted to medical department commonly

Disease	1998		1999	
	No.	%	No.	%
Acute MI	300	6.1	376	6.9
C.V.A.	280	5.7	392	7.2

TABLE 5: Number of cases visiting GED with renal failure VS the admitted ones

	1998	1999
Cases visiting GED	1232	1526
Cases admitted to the ward	976.8	580.4

TABLE 6: Number of criminal cases presented to GED

1998	1999
5760	5176

DISCUSSION

Al-Thawra GMH Sana'a' medical records are not quite free from criticism of hospital data namely poor record keeping including deficient and diagnostic practice. This is usually consistent finding in most of medical records in developing countries⁵. Lack of trained record keeping staff and high doctor turnover rate is the most important cause of poor record⁶. The total population of Yemen is about 20 millions now, and of Sana'a governorate is about 2 millions. Al-Thawra GMH although the main referral hospital yet is the first hospital in Yemen with its load with 24 hours emergency services. The load to the GED is too much comparing to the referral hospitals in comparative hospitals in the same area⁵. The presence of subspecialties, availability of beds and the gravity of illnesses determine admission of patients to hospital⁷. Similar study from Saudi Arabia and Africa^{8,9}. Patterns differ because of the availability and quality of medical services as well as spectrum of disease in Yemen, and the economic status as well the education level of the people, population distribution, health services and primary health care in Yemen. All of these factors lead to the different load on GED in Al-Thawra GMH comparing that of others. Admission to Obstetric ward is the leading cause to visit ER in Al-Thawra GMH and is much differ from western countries and most of other countries^{10, 11}. Of the cardiovascular disease, acute myocardial infarction and cerebrovascular accident top the list of medical causes of admission, and this is similar to that was seen in the most of other countries¹².

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Bionomics of anopheline vectors in Zabid District, Al-Hodeidah Governorate, Republic of Yemen

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ABSTRACT :-

The bionomics of anopheline vectors were analyzed in randomly selected centres, representing fixed and spot-check stations. Three anopheline species were found. *Anopheles arabiensis* was the most prevalent species (84.2%) with a sporozoite rate of 0.7%, followed by *A. culicifacies adenensis* (14.9%) and *A. rhodesiensis rupicolus* (0.9%). Maximum indoor resting density was recorded during March, July and August. Positive sprayed sites for females were higher in bedrooms (40.4%) than animal sheds (26.9%). A total of 2560 anopheline larvae were collected of which 79.5% were *A. arabiensis*, 19.4% were *A. culicifacies adenensis* and 1.1% *A. rhodesiensis rupicolus*. *A. arabiensis* was assumed to be the most efficient malaria vector based on epidemiological evidence and the finding of natural sporozoite infected females.

Introduction

Malaria is considered the greatest challenge of all health problems in tropical countries. The *Plasmodium* parasite undergoes a complete cycle of sporogony leading to the formation of the infective stages, which propagate the infection during the feeding process of the mosquito. The efficiency of transmission of the disease depends mainly on the presence of favourable environmental conditions for the occurrence of suitable anopheline vectors [1].

Malaria has continued to be a major public health problem in the Republic of Yemen. In 1993, 37 451 malaria cases were confirmed and the slide positivity rate was 22.9% compared with 14% and 4.6% in 1991 and 1985 respectively [2]. The Tihama plain is considered the most malarious area in the

country (Delfini LF, unpublished report, 1986). The steady expansion of agriculture projects in this area has contributed to the increase in breeding of vectors of malaria. Moreover there are five main wadis (Maor, Surdud, Siham, Zabid and Rima) passing through Tihama plain that are also natural breeding places.

The present work aimed to contribute to our knowledge of malaria control by investigating the bionomics of anopheline vectors prevailing in the Zabid district. This area is one of the most endemic malarious areas in Tihama plain under natural field conditions. The ultimate goal is to help in the formulation of a comprehensive malaria control programme in the Republic of Yemen.

Materials and methods Design :-

Longitudinal entomological surveys were conducted in the Zabid district of the Al-Hodeidah Governorate for 6 months from March to August 1994.

Adult mosquito survey :-

By using a stratified random sampling method, five centres were selected to represent fixed catching stations: Zabid, AlQurashiyah Ulya, Al-Maislah, Al-Tuhaytah, and Asslamah. In these centres, 20% of the houses and 10% of the animal sheds were randomly chosen and surveyed monthly for adult mosquitos. Four additional centres were selected to represent spot-check stations: Al-Musawfah, Al-Mahatt, MahallMubarak and Al-Majahsah. In these centres, 10% of the houses and 5% of the animal sheds were randomly chosen monthly for testing in order to supplement and confirm the results of the regularly surveyed localities. Mosquitos were collected by the spray sheet collection technique in the morning between 06:00 and 10:00 [3]. They were collected and identified according to the key of Mattingly and Knight [4]. In addition, the salivary glands of the captured female mosquitos were dissected for the detection of sporozoites [3].

Larvae survey :-

Permanent water sources of the surveyed centres were identified and mapped. The sources of water were irrigation canals, riverbeds, pools of the

mosques and water collection near the pumps that are scattered along the villages. Also, sources inside houses were investigated and recorded, such as storage tanks, artificial containers and basins. The larval survey was done monthly using dipping and netting techniques [5] according to the type and size of the breeding places investigated. Larvae were identified according to the key of Mattingly and Knight [4].

Statistics :-

Data was analysed using Epi-Info and SPSS. A P-value < 0.05 was considered statistically significant. Arithmetic mean and standard deviation were used as summary statistics. The one-sample Kolmogorov-Smirnov Z-test was used to examine the months variation, while the Z-test was used for comparison of two proportions and replaced with Fisher exact test when mandated by sparse data. The chi-squared test for comparison between more than two proportions was used and the Kruskal-Wallis one-way analysis of variance was used for comparison between more than two independent groups.

Results :-

Table 1 shows that the overall percentage of positive sprayed sites for female mosquitos was 39.7%. It was higher in bedrooms (40.4%) than in animal sheds (26.9%), although no significant correlation could be detected. The percentage positive in bedrooms and animal sheds was significantly higher in fixed than spot-check catching stations ($c2 = 9.72, P < 0.01$).

Table 1 Distribution of the sprayed sites for adult female anopheline mosquitos according to the surveyed centers

Surveyed Centers	Sprayed sites for female anopheline mosquitos									FEP test (2-tailed)
	Bedrooms			Animal sheds			Total			
	No. sprayed	Positive		No. sprayed	Positive		No. sprayed	Positive		
		No.	%		No.	%		No.	%	
Fixed stations										
Zabid	120	51	42.5	4	1	25.5	124	52	41.9	0.639
Al-Tuhaytah	108	39	36.1	2	0	0.0	110	39	35.5	0.538
Al-Maislah	80	41	51.3	2	1	50.0	82	42	51.2	1.000
Al-Qurashiya										
Ulya	30	19	63.3	6	2	33.3	36	21	58.3	0.210
Asslamah	24	11	45.8	4	1	25.0	28	12	42.9	0.613
Subtotal	362	161	44.5	18	5	27.8	380	166	43.7	0.455
Spot-check stations										
Al-Majahsah	60	15	25.0	2	1	50.0	62	16	25.8	1.000
Al-Mahatt	30	11	36.7	1	0	0.0	31	11	35.5	1.000
Al-Musawfah	12	3	25.0	3	0	0.0	15	3	20.0	0.529
Mahall-Mubarak	24	7	29.2	2	1	50.0	26	8	30.8	1.000
Subtotal	126	36	28.6	8	2	25.0	134	38	28.4	0.218
Grand total	488	197	40.4	26	7	26.9	514	204	39.7	1.36 ^a

^a Ztest

FEP = Fisher exact probability

Table 2 demonstrates that *A. arabiensis* was the most prevalent species constituting 84.2% of the total collected females (713), followed by *A. culicifacies adenensis* (14.9%). The least prevalent species was *A. rhodesiensis rupicolus* (0.9%). A significant correlation was recorded between percentage of positive sprayed sites and the month of collection ($\chi^2 = 70.23$, $P < 0.01$).

Moreover, a higher indoor resting density (IRD) was recorded during March, July and August for the total of collected females and for each species as indicated by the Kolmogorov-Smirnov Z-test. Dissection of the salivary glands revealed that the sporozoite rate was 0.7% among collected *A. arabiensis* only.

Table 2 Distribution of collected female anophelines according to their species , indoor resting density (IRD) and sporozoite rate .

Data of study		Duration of study						Total	Sporozoite rate		K- SZ
		Mar	Apr	May	June	July	Aug		No.	%	
No. of sprayed sites (bedrooms + animal sheds)	No.	90	84	83	83	88	86	514			
Positive sprayed sites for female anopheline ^a	No.	40	25	9	29	40	61	204			
	%	44.4	29.8	10.8	34.9	45.5	70.9	39.6			
Total number of female anophelinel	No.	132	71	27	96	143	244	713			0.612 ^b
	IRD	3.3	2.8	3.0	3.3	3.6	4.0	100.0			
Anopheline species											
<i>A. arabiensis</i>	No.	113	61	20	87	123	196	600	4	0.7c	0.735 ^b
	IRD	2.8	2.4	2.2	3.0	3.1	3.2	84.4			
<i>A. culicifacies</i>	No.	17	10	7	9	18	45	106	0	0.0	0.735 ^b
<i>adenensis</i>	IRD	0.4	0.4	0.8	0.3	0.5	0.7	14.9			
<i>A. rhodesiensis</i>	No.	2	-	-	-	2	3	7	0	0.0	1.225 ^b
<i>rupicolus</i>	IRD	0.05	-	-	-	0.05	0.04	0.9			

^a $\chi^2_{25} = 70.23$, $P < 0.01$

^b $P < 0.05$

^c Sporozoite rate of *A. arabiensis*

K-SZ = Kolmogorov – Smirnov Z – test for the uniform distribution

Table 3 shows that out of 845 different breeding sites investigated, 42.8% were found positive for anopheline larvae. Over the study months, the percentage of positive sites was significantly higher in August and March ($c^2 = 68.43$, $P < 0.01$).

Table 3 Distribution of breeding places according to catching stations by month

Month	Breeding places investigated									Z-test
	Fixed station			Spot-check stations			Total			
	No. examined	Positive		No. examined	Positive		No. examined	Positive		
No.		%	No.		%	No.		%		
March	112	64	57.1	17	10	58.8	129	74	57.4	0.490
April	120	54	54.0	26	8	30.8	146	62	42.5	1.330
May	122	37	30.3	15	1	6.7	137	38	27.7	0.067 ^a
June	140	41	29.3	20	4	20.0	160	45	28.1	0.866
July	112	42	37.5	30	14	46.7	142	56	39.4	0.911
August	107	72	67.3	24	15	62.5	131	87	66.4	0.447
Total	713	310	43.5	132	52	39.4	845	362	42.8	0.87

^aFisher exact probability (2 – tailed) .

Table 4 shows that out of 2560 collected larvae, *A. arabiensis* was the most abundant species (79.5%), followed by *A. culicifacies adenensis* (19.4%); the least abundant was *A. rhodesiensis rupicolus* (1.1%). Over the study months, maximum mean number of larvae collected and larvae density were recorded mainly in March, July and August (Kruskal-Wallis $c_2 = 15.25$, $P < 0.01$). However, no significant difference could be detected in larval density between the months except for *A. rhodesiensis rupicolus* (Kolmogorov-Smirnov $Z = 1.633$, $P < 0.01$).

Table 4 Distribution of anopheline larvae according to species and larval density by month

Month	No. of dips	Larvae collected		Identified anopheline larvae					
				<i>A. arabiensis</i>		<i>A. culicifacies adenosis</i>		<i>A. rhodesiensis rupicolus</i>	
		No.	No. / dip	No.	No. / dip	No.	No. / dip	No.	No. / dip
March	586	476	0.81	372	0.63	96	0.16	8	0.01
April	341	205	0.60	156	0.46	49	0.14	0	0.00
May	293	111	0.38	93	0.32	18	0.06	0	0.00
June	548	315	0.57	238	0.43	77	0.14	0	0.00
July	482	423	0.88	351	0.73	72	0.15	0	0.00
August	860	1030	1.20	824	0.96	185	0.22	21	0.02
Total	3110	2560	0.82	2034	0.65	497	0.16	29	0.02
K – SZ			0.57		0.69		0.82		1.63 a
$\bar{X} \pm s$		3.33 \pm 0.43		2.78 \pm 0.40		0.52 \pm 0.19		2.33 \pm 2.59	
C_2^2				15.25 b					

a $P > 0.05$ b $P < 0.01$ K – SZ = Kolmogorov – Smirnov Z – test for the uniform distribution.

Discussion:-

In 1993, a survey conducted in the Republic of Yemen revealed that 14 anopheline species were identified, of which *A. arabiensis* and *A. culicifacies adenensis* are still considered to be the most common vector species [6]. This finding corresponds with the results of our study where *A. arabiensis* was the most prevalent species, constituting 84.4% of the total collected adult mosquitos. This observation is similar to the findings of Mattingly and Knight [4] and Kouznetsov [7] who reported that *A. arabiensis* was widely distributed in Tihama. Omer added that it was abundant throughout the year, even during the hot dry season [8]. Zahar emphasized the importance of *A. arabiensis* as a vector for malaria transmission in the Republic of Yemen as well as to the nearby countries of Ethiopia, Saudi Arabia, Somalia and Sudan [9].

According to the findings of our study, a large number of captured females of *A. arabiensis* were from bedrooms rather than animal sheds, which indicates their higher anthropophagic tendency. Furthermore, the finding of natural sporozoites in the salivary glands emphasizes their epidemiological importance in the dynamics of mosquito-borne pathogens responsible for the continued transmission of malaria in the study area. Bassiouny and Al-Maktari reported the hypoendemicity of malaria in the Zabid district based on both parasite and spleen surveys where *P. falciparum* was the most predominant species representing 91.6% (Bassiouny HK, Al-Maktari MT, unpublished data, 1995).

A. culicifacies adenensis was the second most abundant species constituting 14.5%. This finding was confirmed by Kouznetsov [7] and Ahamed [10]. *A. culicifacies adenensis* is still the main vector of malaria transmission in Pakistan and India [11]. *A. rhodesiensis rupicolus* was the least prevailing species (0.9%). This result was also reported by Kouznetsov [7] and Ahamed [10], who recorded a low prevalence of this species in the Tihama region. Its low density was explained by Kouznetsov who noted that after the autumn rains over the Tihama mountains, occasional pools formed that contained anopheline larvae [7]. The pools were, as a rule, rather short-lived, their duration often not sufficient for the completion of the egg-to-adult cycle. Still, *A. rhodesiensis rupicolus* is considered to be one of the non-vector species as reported by the Malaria Control Programme [2].

Our study showed that the three available female anopheline vectors had two peaks of abundance, in March and in August. This finding agrees with those reported by the agrometeorological data summary [12] and Pleijsier [13]. They reported a seasonal activity for the three species that reached a maximum number in the cooler time of the year, such as August which is the rainiest month in the country. The relatively low anopheline numbers during the hottest months between the peaks could be due to a reduction in vector activity, as well as to a general reduction in breeding sources since most of the wadis dry up.

We found that 42.8% of the different breeding sites investigated were positive for anopheline larvae. *A. arabiensis* were collected from all breeding sites, while *A. culicifacies adenensis* larvae were collected mostly from pools of mosques, basins, storage tanks and artificial containers. *A. rhodesiensis rupicolus* larvae were collected from the irrigation canals, riverbeds and water near pumps. Similar results were reported by Kouznetsov [7]. The larvae of the two most common vector species, *A. arabiensis* and *A. culicifacies adenensis*, were found in all pools of mosques in the Zabid district. These pools are open basins of water near the mosques and are used mainly for ritual ablutions and for washing. Merucci noted that these pools were the principal breeding sites for mosquitos, especially *A. arabiensis* [14].

Regarding the abundance of the collected larvae in the studied area, the results revealed that *A. arabiensis* larvae were the most abundant species (79.5%), *A. culicifacies adenensis* larvae were the second most common species (19.4%) and *A. rhodesiensis rupicolus* larvae constituted 1.1%. These findings agree with the previous report of Ahamed [10]. The larvae collected in our study had two peaks of abundance and a larval density irrespective of the species of the anopheline vectors mainly in March and August. These two peaks of abundance coincided with the recorded peaks of abundance of the adult mosquitos. It seems that the temperature during peaks is optimal for rapid and synchronous development and high survival from eclosion through emergence.

Conclusions :-

The large number of captured females of *A. arabiensis* from bedrooms indicates their anthropophagic behaviour. That, in addition to the presence of sporozoites in their salivary glands, are of epidemiological importance in the dynamics of mosquito-borne pathogens responsible for the continued transmission of malaria in the Zabid district. Further investigation is needed in the Republic of Yemen to study the mosquito-host feeding preferences and to

assess the epidemiological effectiveness of the malaria vector, as it is the blood meal identification of a vector that leads to its incrimination. Finally, it is vitally important to increase community participation in environmental concerns. People should be encouraged to drain or fill in any unnecessary water collection systems since this could be an effective component of a vector control programme.

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Ovale malaria: a case report from the Republic of Yemen

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Introduction :-

As a part of a cross-sectional research programme, a malariometric survey was conducted on an indigenous population in randomly selected centres of the Al-Hodiedah Governorate from January to December 1998. A total of 4000 thick and thin blood smears were prepared from the peripheral blood by finger prick using disposable lancets. The essential features for the processing of the slides were the use of Giemsa stain, and examination under standard conditions, i.e. 100 microscopic fields using an optical system of $\times 100$ objective and $\times 7$ eyepiece.

A single case of Plasmodium ovale infection was detected in the Beni-Hussan village, in the Bajil district. The district lies about 70 km north of Al-Hodeidah city on the highway to Sana'a and is located between two wadis; Surdud in the north and Siham in the south.

Case report :-

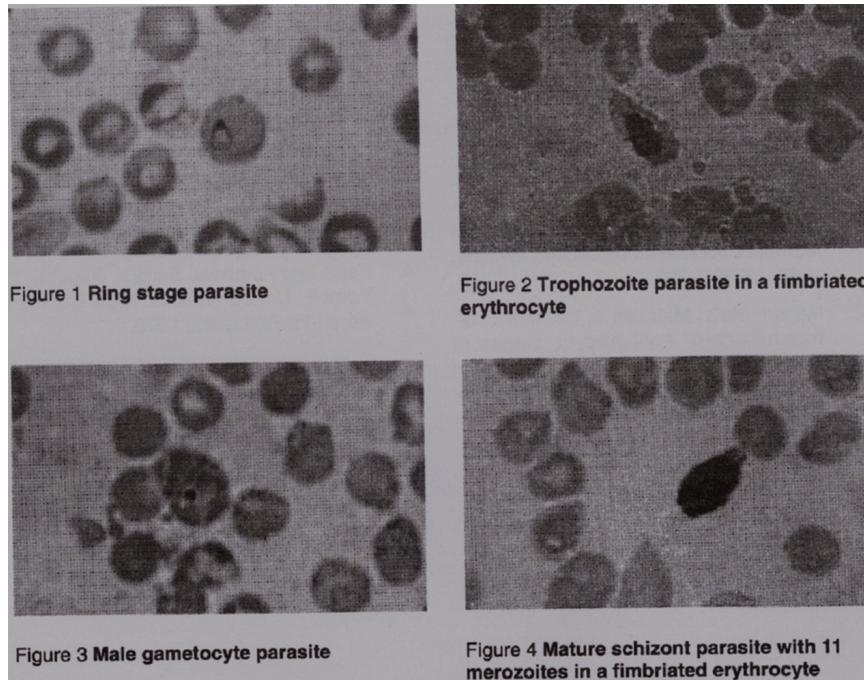
A 26 year-old Yemeni farmer presented to a private clinic in the Bajil district on 14 July 1998, with a history of fever and chills associated with pain all over the body and vomiting. A blood smear was taken and found negative for malaria parasites. He was diagnosed as having a urinary tract infection and treated accordingly, but he did not improve.

The research team took a second blood smear on 23 July 1998. At that time the patient complained of experiencing headache, intermittent fever over a period of 10 days, loss of appetite, cough, and vomiting. He had never been out of the country and he had only travelled within the Al-Hodeidah Governorate. He had no history of receiving a blood transfusion nor parenteral use of drugs.

The blood film was examined on the same day by one of the authors and the patient was diagnosed as having ovale malaria. After initial diagnosis, the patient was treated with chloroquine tablets (25 mg/kg body weight of chloroquine base divided over a period of 3 days) and primaquine tablets (15 mg base daily for 14 days). A follow-up blood smear was taken 15 days after treatment which revealed no malaria parasites.

For further confirmation, the slide was re-examined by the second author and he confirmed microscopically that this was a case of ovale malaria. The diagnosis was based upon the following: about 10% of the infected erythrocytes were distorted and oval in shape, some had fimbria either on one or both sides, and there were irregular sized Schüffner's (James') stippling on most infected erythrocytes. These characteristics confirmed that the erythrocytes were infected with *P. ovale* [1]. The growing trophozoites were compact, not amoeboid which differs from the corresponding stage of *P. vivax* and suggests less active movement. The schizonts were few, and mature forms usually had eight merozoites in a loose cluster. These features further confirmed the infection as being due to *P. ovale* [2].

Figures 1–4 show the parasites on thin Giemsa-stained blood films from the patient with their characteristic features: (1) ring stage, (2) trophozoite in a fimbriated erythrocyte, (3) male gametocyte, and (4) mature schizont with 11 merozoites in a fimbriated erythrocyte.



Discussion

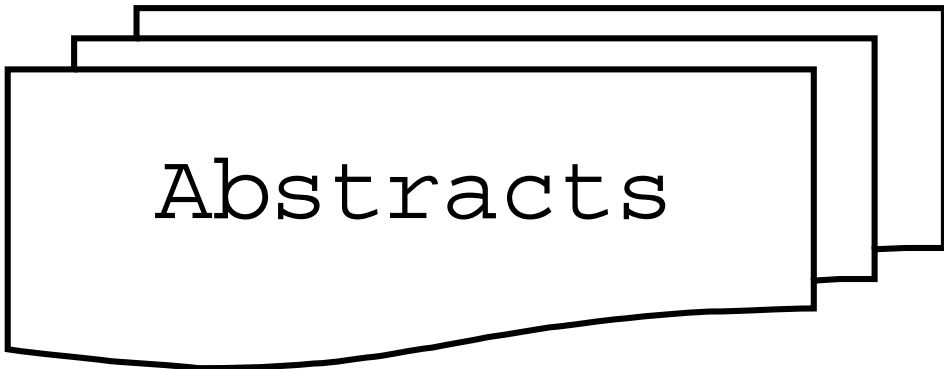
Yemen has been considered free of ovale malaria as there have been no reported indigenous cases since 1993 when two cases of *P. ovale* were recorded for the first time by the Sana'a laboratory of the malaria control programme in March. Both came from the Ramah district in the Sana'a Governorate [3]. Recently however, we found an indigenous case of ovale malaria in a young man who had never been abroad.

P. ovale is often misdiagnosed as *P. vivax*, since proper differentiation requires extensive experience and expertise. Most microscopists find it difficult at times to differentiate between the two, particularly when the diagnosis is influenced by the assumption that ovale malaria is mostly confined to Africa. We think that this case is worth reporting as it was found in a Yemeni patient for the second time in Yemen. It is not certain whether the present case is due to a resurgence of indigenous ovale malaria, or a secondary infection from ovale malaria which has been introduced to the country as many African people come to work and live in the Republic of Yemen, mostly as refugees from Somalia, Ethiopia and Eritrea. According to a 1998 report by the Office of the United Nations High Commissioner for Refugees (UNHCR) [4], 91 000 individuals came to the Republic of Yemen because of political instability and civil wars in these neighbouring countries. Whichever the source of the infection, the presence of autochthonous ovale malaria in the country should require public health workers to consider the existence of this particular plasmodium species when surveying for malaria in the country in the future.

Microscopists working in malaria laboratories and private clinics in the Republic of Yemen should periodically be trained in malaria microscopy by the Ministry of Health. The purpose of this would be to emphasize the morphological details of malaria parasites, since examination of blood film remains the most reliable test for the diagnosis of malaria species.

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Abstracts

Recurrence of Helicobacter pylori infection 1 year after successful treatment: prospective cohort study in the Republic of Yemen.

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Abstract:

Objectives: To investigate the prevalence of Helicobacter pylori infection in dyspeptic patients in the Republic of Yemen and the recurrence rate 1 year after apparently successful eradication.

Methods: A total of 275 patients with chronic dyspepsia seen in one clinic were enrolled. Gastric biopsies were obtained at endoscopy and H. pylori infection was diagnosed using the rapid urease test. Patients with H. pylori infection were given either clarithromycin or metronidazole-based triple therapy. Six weeks later H. pylori status was assessed using the 13C-urea breath test (13C-UBT). Those who were negative for H. pylori had a further 13C-UBT after 1 year to establish the recurrence rate.

Results: The prevalence of H. pylori infection at entry to the study was 82.2% [95% confidence interval (CI) 78-87%]. The overall eradication rate 6 weeks after treatment was 49.1% (95% CI 42.6-55.6%) by intention-to-treat analysis, and 60% (95% CI 53-67%) by per-protocol analysis. Recurrence rate of H. pylori infection at 1 year was 34% (95% CI 14-45%) and the only predictor of recurrence was an excess delta 13C-UBT value less than 3.5 per million but equal to or greater than 2.5 per million at 6 weeks after treatment (odds ratio 2.28; 95% CI 1.17-4.44; P = 0.028).

Conclusion: The prevalence of H. pylori infection in dyspeptic patients in Yemen is very high, the eradication rate with

Assessment of cytokines profile in symptomatic and asymptomatic
Yemeni students infected
with amoebiasis and giardiasis

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ABSTRACT:

The objective of the present study was to detect the common intestinal protozoa among school students, to differentiate between *E.histolytica* and *E.dispar* infections and to study serum cytokine profile in symptomatic and asymptomatic students infected with *E.histolytica* / *E.dispar* or *G.lambliia*. A cross-sectional study was conducted on 516 school students who were symptomatic or asymptomatic from two selected districts representing Al-Hodeidah Governorate. Their ages ranged from 6-14 years with mean of 8.61 ± 1.58 years. They were subjected to interviewing questionnaire and clinical examination. Stool samples were collected and examined using merthiolate iodine formaldehyde concentration technique. A stool ELISA was performed to detect *E.histolytica* coproantigen in *E.histolytica*/ *E.dispar* microscopically positive samples. Serum IFN- γ (Th1 marker) and IL4 (Th2 marker) levels were measured by ELISA. Out of 516 examined students, intestinal parasitic infections were detected in 52.3% of the examined stool samples. Protozoal infection was more common (39.5%) than helminthic infection (12.8%). *G.lambliia* was the most commonly detected protozoa (19.8%). Students in the youngest age groups (6-<10 years) displayed the highest percentage of *G.lambliia* while, in the oldest age groups (10-14 years) had highest percentage of *E.histolytica*/ *E.dispar* infections. As regards serum cytokine pattern, it was observed that, students infected with *E.histolytica* and symptomatic *E.dispar* group had significantly lower level of IFN- γ and higher level of IL4 compared to asymptomatic *E.dispar* or control groups. Symptomatic cases of *Giardia* inhibited significantly lower level of IFN- γ compared to control group. The mean level of IL4 was significantly higher in symptomatic and asymptomatic cases of *Giardia* compared to controls.

From this study it can be concluded that, infections by the two morphologically identical species *E.histolytica* and *E.dispar* are present in the Yemeni population. *E.dispar* was recorded for the first time in Yemen, which is non pathogenic and much more common than pathogenic *E.histolytica*, so many patients were unnecessarily treated with prolonged and potentially toxic courses of antiamoebic drugs. Infections with *E.histolytica* or *G.lambliia* elicit a Th2 cytokine response and suppress Th1 response which may contribute to the establishment of human infection.

Key words: Cytokine, Interferon gamma (IFN- γ), Interleukin-4 (IL4), Protozoa, *E.dispar*, Coproantigen.

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