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. Republish of Yemeni health & medical research whish 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.

- 63-
Khat Habit and its Health Effect. A natural Amphetamine

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Key words: Khat/Natural amphetamine/History/Legality/Habit/Health effect.

Abstract:
Chewing the leaves of the khat shrub is common in certain countries of East Africa and Arabian Peninsula mainly Yemen. It has been established that a khat plant leaves contain an active psycho-stimulant substance known as cathinone that is similar in structure and pharmacological activity to amphetamine in affecting the CNS. Intoxication with khat is self-limiting but chronic consumption can cause certain health disturbances in the user and also lead to social and economic damage to the individual and the community. In recent years, several cases of intoxication have been observed outside the area of its use.

In this view, the khat habit, its health effects and socioeconomic aspects are described with the political issue they imply.

Introduction:
During the preparation of my thesis for post-graduation in the Czech Republic, I had to mention to some extend khat (qat), as an explanation of the country profile of Yemen, is not complete without mentioning it. Khat (Catha edulis Forsk) is the silent feature of the social life in Yemen. Going through the literature I was somewhat surprise as a physician and as a person living in this society, surrounded by this habit.
History:

Historically, the original source of khat seems to be obscure. However, there is general agreement that its use was prevalent in Ethiopia and from there, around the fifteenth century, the practice spread to the south-west of the Arabian Peninsula. Arab sources suggested that khat was in Yemen in the sixth century, when the Ethiopians conquered Yemen. Earliest reference to this plant appears to be dated around 973–1053 AD by Al-Biurni, who meticulously compiled information on all contemporary drugs, what he called qat that was imported from Turkistan. It was used to relieve biliousness and to cool the stomach and liver. Haecock and Forrest mentioned (1974) that, it is possible to find a referral to khat as early as 1332 AD in an Arabic manuscript preserved in the Biblioteque National in Paris. The first account of its effects appeared more than seven centuries ago in an Arabic medical textbook in which the leaves of it were recommended for curing depression. The earliest scientific report on khat presented to a Western country was in the eighteenth century, when the botanist, Peter Forskal, identified the plant in Yemen and called it Catha edulis. However, he did not live long enough to publish his finding, which were later edited in 1775 by Niebuhr, the only survivor of the first European scientific expedition to Arabia. Niebuhr, in his general observation, stated that he “never saw the Arabians use opium like the Turks and Persians. Instead of taking this gratification, they chew kaad (khat). These are the buds of a certain tree, which are brought in small boxes from the hills of Yemen”.

In memory of his friend, Niebuhr labeled khat under the generic name of Catha edulis Forsk. Other names were given to the plant by various travelers visiting Arabia and East Africa in the nineteenth century.

Illegality:

Mainly people around the Red Sea, including parts of Ethiopia, Kenya, Somalia, Zimbabwe, Tanzania, Uganda, Malawi and South Africa as well as Yemen use khat. However nowhere else it is as widespread as it is in Yemen.

In Islamic countries like Yemen Republic and Somalia, as among the Muslim members of Ethiopia and Kenya khat is the drug of choice and is legal, for unlike alcohol, it’s use violates no precise proscription of the Koran.
Khat is banned on religious grounds and economic grounds in some other Muslim countries as in Saudi Arabia\textsuperscript{11,12}. In some other countries the penalties are equivalent to those for opium or cannabis for anyone that carries or uses it. This is not so in Yemen, where even religious leaders practice this habit. This may be because, in contrast to opium and cannabis, it produces milder antisocial behavior, and is more akin to amphetamine- or caffeine-type substance\textsuperscript{13}. In Ethiopia and neighboring countries it is commonly used in social gatherings as much as alcohol is used in western countries.

With regard to European countries, it would seem that there is relatively little that they have to fear from khat, not only because of the unattractive mode of consumption of the drug, but also because it is cumbersome and of low potency when compared to its pharmacological analog amphetamine. Nevertheless, the possibility of preventive scheduling should be considered before an increase of the habit, particularly in immigrant circles, which may lead to problems. At this point, khat trade and use is not illegal in the U.K., and it is known that there is a market and a distribution network for the drug, and that in certain locations the use of this plant is substantial. It must also be kept in mind that an attempt to cultivate it in a country of moderate climate for personal use has been reported in the literature\textsuperscript{14}. I know many European people in Yemen who liked the habit of chewing khat and are already used to it, when they leave the country they get a supply of it from time to time. The position of the European countries with regard to khat is not uniform\textsuperscript{15}. It is prohibited in France, Switzerland and Sweden while it is tolerated in the U.K. and in the Netherlands. Outside Europe, it is legal in the U.S.A. and in Australia\textsuperscript{16} indeed, the case of this plant is an equivocal one and the international law on this issue is currently ambiguous.

\textit{Habit}:

Whatever may be the reasons for the use of khat, its pleasure-inducing and stimulating effects seem to have a strong influence on the social and cultural life of the communities who indulge in it. Afternoon khat session in Yemen takes place between 2:00 and 7:00 nowadays it may be continued to late in the evening according to the purpose, studying, working, writing poetry or only enjoying time. These sessions is held in special rooms (muffraj or diwan) designated for this use. These rooms are furnished with comfortable cushions around the walls, and Persian or Bedouin rugs on the floor, upon
which sit low tables with shining brass trays and several large communal tobacco pipes or “Hubbell-bubbles” called madah in the center. Smoking tobacco and cigarettes and drinking cola, weak black tea or just cold water greatly enhance the pleasure of chewing. Some have the habit of using sugared menthol or pieces of sugar or even cardamon to improve the bitter test of khat. It is predominantly consumed in a social setting. The habit in Yemen is socially sanctioned and even prestigious, such sessions are a form of social interaction and status competition. They are governed by subtle rules while being under certain circumstances, of almost ritual importance. It has been suggested that the function of khat in this context is to provide a pretext for a gathering of high social significance rather than to provide pleasurable effects for the individual. Indeed, because of its stimulating and euphoric properties, khat is certainly an appropriate tool for enhancing social interaction. In countries other than Yemen it is consumed in a much less rigidly defined context, frequently by individuals, who are alone. Therefore, it can be assumed that in those countries the psychosocial benefits of its consumption are of secondary importance and that rather it is the pharmacological action that induces the use of this plant. This is also borne out by the fact that khat use tends to be compulsive in certain individuals and the cost of the euphoric effect of the leaf is addiction.17

The young shoots of the khat shrub are harvested in the early hours of the day and sold in markets by the late morning. A khat chewier consumes about 100–200 g of the leaves per person. The leaves are taken one by one from the twigs and thoroughly chewed. They are then kept for some time in the cheek as a ball of macerated material and later spit out. The young leaves, which come from the tips of the branches, are preferred since these are the most potent. Male and female users congregate separately; for male users in particular; the khat session has an important social function since it provides a forum for discussing matters of general interest such as community affairs. The chewier describe the drug as having a number of beneficial effects such as improving their ability to communicate, to generate new ideas and to suppress the feeling of fatigue. The social environment appears to influence the response of the chewier and the effect is more readily perceived by the habitual user12. Women khat sessions were less common until some years ago when the habit of khat chewing increased rapidly causing serious problems for the family and the socioeconomic situation18,19.
Khat is deeply rooted in the sociocultural traditions of several countries, where it was practiced by a limited segment of the population in a well-defined and stable social setting. In recent years, however, the use of this stimulant has expanded beyond these boundaries and has now reached epidemic proportions. This phenomenon can be explained not only by the advent of modern transportation, but also by profound social and cultural changes that have taken place in these countries in the twentieth century.

**Composition :-**

Cathinon and cathine:

There are more than 40 alkaloids, glycosides, tannis and terpenoids in khat in addition to the two phenylalkaminens cathine (norpseudoephedrine) and cathinone (S(-)-alpha-aminopropiophenone) that have amphetamine-like effect\(^2^0\). The chemical constitute of khat have been studied since the late 19th century. Fluckiger and Gerok were among the first who found an alkaloidal fraction in this plant\(^2^1\) and called it “katin”. This was followed by the isolation of many other substances and it was not until the year 1975 that the most important component of khat was isolated and named cathinone {S (-)-alpha-aminopropiophenone}) at the United Nations Laboratories and it is considered the principle stimulant of the central nervous system (CNS)\(^2^2\). Determining the total contents of cathine and cathinone in fresh khat follows. It was found to range from 78–343 mg/100 g fresh khat from different khat samples\(^2^3,2^4\).

Tannin concentration ranges from 9.7 g/100 g of khat leaves as maximum to 3.5 g/100 g as minimum in different types of Yemeni khat. The amino acids: asparaginic acid, thyreonine, serine, glutamine, proline, glycine, alanine, valine, isoleucine, phenylalanine, tyrosine, a-aminobutric acid, histidine, tryptophan, ornithine, arginine and choline were also found to a different concentrations\(^2^5,2^6\). Vitamins and minerals as ascorbic acid and magnesium in a concentration of about 130–160 mg/100 g\(^2^7\) and 6–41 mg/100 g\(^2^4\) were also found.

**Health effect :-**

Khat has a psychological, medical, social and economic effects on human beings. Cathinone is structurally and functionally closely similar to amphetamine and releases catecholamines from pre-synaptic storage sites.
resulting in CNS stimulation and a variety of peripheral sympathomimetic effects such as tachycardia and hypertension. It has been reported that the effects of a portion of khat are very similar to those of about 5-mg amphetamine. Habitual users report increased levels of energy, alertness and self-esteem, sensations of elation, enhanced imaginative ability and capacity to associate ideas. An improvement in the ability to communicate is also reported, which explains the tendency to group interaction and social contact while under the effect of the drug. Some khat users take the drug because it helps them to work either by allowing them to concentrate better or providing additional energy for physical labor. Experienced users better perceive its effect. A common effect of khat use is insomnia, a condition that the users sometimes try to overcome with sedatives or alcohol. Furthermore, it has a pronounced anorectic effect. In clinical terms, khat can be said to induce a state of mild euphoria and excitement, often accompanied by loquacity or even logorrhea. In some cases it can progress to a stage of hypomania. Toxic psychosis may also result from its consumption, and a number of such cases have been described in the literature. The psychotoxicity of khat complicates surgical anesthesia and is particularly evident in the postanaesthetic phase, during which these patients may behave aggressive. A group of expert in WHO has concluded that khat consumption may induce “moderate but often persistent psychic dependence” the withdrawal symptoms after prolonged khat use seem to be limited, however, to lethargy, mild depression, slight trembling and recurrent bad dreams.

CNS tolerance is not usual in khat users probably due to the physical limits on the amount that can be chewed. Mydriasis occurs as a sympathomimetic effect of khat, which also induce hyperthermia and causes dryness of the mouth. At the cardiovascular level there may be arrhythmia’s and moderate increase in blood pressure which can become chronic upon long term use. There is exaggerated cardiovascular response to physical effort under the effect of khat; it can also cause acute cardiovascular problems particularly in elderly people. It is found that certain degree of tolerance develops to these sympathomimetic effects. Khat stimulates the respiratory center and bronchodilation, which can explain the feeling of comfort for asthmatic users. Khat affects the urinary system by relaxation of bladder wall.
and closure of internal sphincter. Urine retention may also occur and maximum urine flow rate is reduced\(^36\). The digestive tract is mainly affected by the presence of tannins in this plant. Gastritis and constipation are some of the main complaints of its users, loss of appetite is also a characteristic of khat. The malnutrition and constipation are attributed to both tannins and norpseudoephedrine. Khat is may be a factor in the development of periodontal and the brownish coloration of the teeth. Toxicity has been evaluated in laboratory animals, and khat extracts have been reported to contain mutagenic factors\(^37-39\). A strong correlation between khat chewing and oral cancer has been reported which could also be related to the insecticides used for the plant\(^32\). Due to the mode of consumption of khat by humans, however, any extrapolation of such data is difficult. Khat consumption is also known to cause spermatorrhea and chronic use may lead to spermatozoa and in the later stage to impotence\(^32\), this effect in a recent study on rabbits was found to be to a large extend a dose related\(^40\).

\[
\begin{align*}
(R) & \quad (S) \\
\text{R/S-(−)-Norephedrine and} & \quad \text{R/R-(−)-Norpseudoephedrine} \\
\text{S/S-(+)-Norpseudoephedrine} & \\
\text{(+)-Cathine} & \\
\text{(S)} & \quad \text{(R)} \\
\text{S-(−)-Catinone} & \quad \text{R-(+)-Catinone} \\
[\text{S-(−)-alpha-aminopropiophenone}] & \\
\end{align*}
\]

**Fig. 1.** Chemical structure of catinone and cathine

- 63-
Cathinone contents in this plant may be partially or totally responsible for the reproductive toxicity in human and in experimental animals. This effect appears to be a decrease in semen output; sperm count, motility and an increase in the number of abnormal sperms. It has been found that khat decrease fertility through this mechanism, which is reversible by withdrawal of its usage.

Khat affects pregnant women by reducing maternal daily food intake and mean birth weight of the offspring. Low birth weight is a contributing risk factor for both prenatal and infant mortality among khat chewers during pregnancy. It can affect fetal growth during pregnancy through placental insufficiency, which could be explained by the high blood pressure registered among these women. In many experiments visceral and skeletal malformations have been reported but have not been proved yet in humans.

Varied and complex factors underlie the use of khat. It is commonly used for social recreation and occasionally as a medicine. Because of its stimulating effects it has been traditionally used as a medicine. By some tribal people when traveling, and in modern times by students for examinations, drivers of motor vehicles especially on long-distance journeys and even soldiers during the war were given khat in order to enhance their performance. The pattern, therefore, of why, how, when, and where khat is used depends on different social and ecological factors.

From the economical point of view khat also diverts household income that could have been wisely used for nutritious food, home improvements, education or other family needs that people on those countries are in very big need for.

Khat needs less water than sorghum and coffee. It is usually planted in terraced or on the sunny sides of the steep slopes. It has mostly replaced the famous Yemeni coffee and seriously damaged the coffee economy. The demand for and the price of the khat plant vary with the soil and climate in which it grows. Finally, despite all the negative aspects of khat chewing the habit is unlikely to change significantly in the coming years and is in fact increasing directly in Yemen.
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Anti - body Responses of Healthy Under Fife to
Hepatitis “B” Vaccine

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Abstract :-

During the period between December 2003 and December 2004 7726 sera samples were collected from various age of healthy under five children and tested for the anti-body response to HB vaccine, which consider anti-cancer vaccine, using micro particle enzyme immunoassay technology (MEIA).

The sero- positively to HB vaccine was 78.3 in the younger age group to 74.0 in those above the age of two year which considers low in comparison with another countries.

In conclusion the present study recommended High quality vaccine, excellent cold chain, good distribution and to do a later fourth and fifth dose according to WHO advising.

Introduction :-

Young children who become infected with HBV are the most likely to develop chronic infection (1).

About 90% of infants infected during the first year of life and 30 % - 50% of children infected between 1 to 4 years of age develop chronic infection, cirrhosis and some progress to hepatocellular carcinoma (2).

The risk of death in these cases from HBV related to liver cancer is approximately 25% (3).
Anti body to HBsAg (anti-HBs) usually appears about 3-6 months and persist for many years or perhaps permanently (4).

Anti-HBs implies either a pervious infection in which case anti –HBc is usually present or previous vaccination if anti-HBc is not present (5).

In Yemen during 1997 through 2001 there were 53 cases of liver cancers as a complication of viral hepatitis especially hepatitis “B” virus (6).

These cancers accounted for 3.1% out of all cancers (male & female) while it was 4.1% among male patients.

Direct reduction in liver Cancer has already been documented in immunized children (7&8).

The use of hepatitis B vaccine both plasma derived and recombinant has resulted in dramatic reduction in the prevalence of carrier in many areas (9).

WHO has targeted hepatitis B as one of the eight infections diseases that should be controlled by vaccine (10).

Yemen is one of the highly endemic areas to take account of HBV vaccination within their national programs of immunization. (11).

Yemen started a program of universal immunization to prevent hepatitis B infection in 1999 (12).

The schedule adapted by the ministry of health was three doses of HB vaccine administered to all infants at 2,3 and 9 month of age to coincide with other compulsory vaccine (13, 14).

The advantage of an early start and short spacing is rapidly attained sera-protection firstly, To guard against early HBV infection and its late sequel especially liver carcinoma (15) secondly, To minimize the carrier state due to prenatal HBV transmission which represent the most important risk factor for the acquisition of infection in children (16).

To the our knowledge there have been no national studies on the efficacy and long term immune response to the HB vaccine for children in our country except one pilot student graduate research (n=60) which had shown the response to hepatitis B vaccine 78.3% (17).
Objectives :-

Main aim

To asses the policy of the ministry of health in Yemen toward HB vaccination.

Specific aim

To detect the response of hepatitis “B” vaccine within Healthy children under five in Sana’a city.

Materials and Methods

A prospective serological study of randomly selected children aged under five (n=7726) attending the maternity and children health centers at Sana’a city was conducted between December 2003 and December 2004.

The study population divided into 5 groups at different post vaccination following the completion of the third dose of HB vaccine :-

1) Group one :- 1-3 Month after the third dose of HB vaccine.
2) Group two :- 1-2 Year after the third dose of HB vaccine.
3) Group three :- 2-3 Year after the third dose of HB vaccine.
4) Group four :- 3-4 Year after the third dose of HB vaccine.
5) Group five :- 4-5 Year after the third dose of HB vaccine.

Informed consent for testing procedure was obtained from all the parents of children before inclusion in the study.

The data and dose interval of HBV were confirmed by checking the vaccination record written on vaccination certificate of each child.

Clinical data were recoded during the child health care visit.

Children with a history of medical conditions that compromise their immune system thus with a history of premature birth, malnutrition and rheumatoid arthritis were not included in the study.

None of the participant had a documented history or clinical evidence of symptomatic HBV infection.
All had no history of increased exposure to HBV infection. None of them had positive result for the anti-HBc test.

For preparation of sera about 2-3 ml of venous blood was collected in plain tubes from each case and then specimens were allowed to clot at room temperature for 20-30 minutes.

Separated sera were centrifuged at 1000g for 15 minutes then were rapidly removed from the cells.

Serum samples for testing for anti-HBs titers were stored frozen at -20C for later testing.

All serum samples for each participant were tested for the anti-body to hepatitis B surface antigen (anti-HBs) and antibody to hepatitis core antigen (anti-HBc) using micro particle enzyme immunoassay technology (MEIA).

Commercially available MEIA kits. (Abbott Laboratory, Illinois USA).

Levels of anti-HBs were expressed in milli-international unites per milliliter (mIU/mL).

Those children with anti-HBs levels more than 10mIU/mL were rated as having immune response to HB vaccine or sera-protected (18).

Data were analyzed using SPSS program, P-value less than 0.05 was considered significant.

**Results:**

IN all vaccinated children among 5 groups, HBV was well tolerated.

No side effect was observed and notified in early post vaccination period.

The result of the serological screening for anti-HBs in 7726 under five healthy children received HB vaccine in infants age by using MEIA technique are shown in table 1.

Antibodies to HB vaccine (anti-HBs) were detected in 75.6% of those investigated.

Our results showed that the drop in anti-HBs titer overtime was significant.
As indicated Anti-HBs is a quite high in the first and second years of immunization 78.3 and 76.3 respectively.

Then there was a bit of decrease in the second, third and fourth year of age 74.8, 74.6 and 74.0 respectively.

Tab.1. Anti-Hbs titers rate to HB vaccine among under-five 2005.

<table>
<thead>
<tr>
<th>Age (Years)</th>
<th>Sera tested (n)</th>
<th>Positive Anti-HBS</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1 Year</td>
<td>1999</td>
<td>1566</td>
<td>78.3</td>
</tr>
<tr>
<td>1-2 Year</td>
<td>1995</td>
<td>1522</td>
<td>76.3</td>
</tr>
<tr>
<td>2-3 Year</td>
<td>1303</td>
<td>975</td>
<td>74.8</td>
</tr>
<tr>
<td>3-4 Year</td>
<td>1150</td>
<td>862</td>
<td>74.6</td>
</tr>
<tr>
<td>4-5 Year</td>
<td>1273</td>
<td>943</td>
<td>74.0</td>
</tr>
<tr>
<td>Total</td>
<td>7726</td>
<td>5850</td>
<td>75.6</td>
</tr>
</tbody>
</table>

Figure 1: Sera – protection rate of the immunized children
Discussion :-

In this study 24.4% of the immunized children (both gender) did not produce an antibody response which is higher than the proportion reported in other studies where it was not more than 5-10% (5,19,20).

It means that a 75.6% of healthy under five children became less at risk to have a liver cancer.

In comparison with a recent study came from Turkey, The Sero-protection rate was 95-100% next to vaccination and it declined to 90% at one year after the Vaccination (26).

The antibody titer among the older age group was lower than the younger age group, which can be explained by the decline in the antibody levels with increasing age.

There were no Significant differences in the mean anti-HBs levels for both male and female.

The absence of gender related differences has also been reported by other authors (16).

In our study non of children had a clinical evidence of symptomatic hepatitis and all had negative results for anti-HBc test while in similar studies they found that some of participants remained a symptomatic and free from HBV infection (21).

Also they found that four out of 1630 individuals in Eskimo, and one out of 180 in Egypt developed anti-HBc (18,19).

Both host and immunization factors affect the immune response to HB vaccine and consequently can influence duration of immunity.

Host factors include age, weight, breast-feeding, nutritional status, immunocompetence of the host, and genetic e.g.

The immunization related factor include the quality of vaccine, the dose of vaccine administration, the site of immunization, the vaccine schedule and the booster dose.
Many others have shown that the antibody levels of HbsAg gradually decline over time and low or indictable level of circulating anti-HBs may not necessarily indicate loss of protection, moreover when a booster dose was administrated to healthy adult with undetectable anti-HBS, 5-7 years after vaccinations an anamnesis response was elicited, implying that immunological memory persists (22,23).

**Recommendation :-**

The study recommended continue the hepatitis B universal immunization with a high Quality vaccine, excellent cold chain good and appropriate transport, storing and handling.

The schedule of three doses in Yemen (0.1. 6. month) seems a good interval but its outcome is low in comparison with another neighbor countries which requires a letter fourth and fifth dose after the primary vaccination as means of improving the antibody level (24).

The schedule which we recommend according to WHO (25) advising is:- 0, 6 weeks, 10 weeks, 14 weeks and 9-12 months, As yet a fourth booster dose has not been included in the routine Yemeni immunization program for infancy and children.

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Malaria and intestinal parasitosis among children presenting to the Paediatric Centre in Sana’a, Yemen

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Abstract :-

We studied the profile of malaria and intestinal parasitosis among children presenting to the Paediatric Health Centre in Sana’a from January 1998 to December 2000. In stool samples from 9014 children, Ascaris lumbricoides, Entamoeba histolytica, Giardia lamblia and Trichuris trichiura were the most common. Infection with parasites of direct life-cycle were similar in boys and girls. Schistosome infection was significantly higher in boys than girls, but girls were more infected with ascariasis. The only species of malaria parasite found in blood samples from 753 children with suspected malaria was Plasmodium falciparum, with the highest rates in April–June. The majority of positive cases were Yemeni children, but 10.8% were Sudanese or Ethiopian.

Introduction :-

The highest rates of protozoa and helminth infections worldwide occur in the tropics. The distribution of these infections depends on conditions such as a suitable climate and human activities such as population movements and poor sanitation.

Malaria is the major public health problem in Yemen [¹], and has the typical frotropical pattern in which the predominant species is Plasmodium falciparum [²,³]. A previous study found that the incidence of P. falciparum
infection among Yemeni returnees in Al-Hodeidah governorate was 13.9%, with some seasonal variations [3].

Transmission of ascariasis and trichuriasis takes place throughout the year in regions with a temperate climate. The soil-transmitted parasites, mainly Ascaris lumbricoides and Trichuris trichiura, are usually more prevalent where there is favourable soil, warmth and moisture together with poor sanitation. Studies in different parts of Yemen have reported prevalence rates of ascariasis ranging from 16%–68% [4–6]. Meanwhile, trichuriasis was reported, mostly from the same areas, in 1%–21% of the population [6,7].

Parasites with a direct life-cycle spread more easily among children and within the household. Various studies in Yemen have been conducted on the different parasites with a direct life-cycle. For example, the prevalence of Entamoeba histolytica has been reported to range from 1.7%–36% [4,7], while for Giardia lamblia it was 9.0%–20.5% and for Hymenolepis nana 2%–8.3% [6,8]. The lowest prevalence was 0%–2% for Enterobius vermicularis [4,6].

The most prevalent water-borne parasite in Yemen is the schistosome. Schistosomiasis is second to malaria in the list of major public health problems in the country [1] and intestinal schistosomiasis has been reported in a number of different surveys [6–12]. Very low rates of infection have been reported for Fasciola hepatica, from 0.5%–2.0% [4,7]. Low prevalence rates of 0.1%–0.3% were reported for Taenia spp. [4,7].

With the exception of Farag’s study in 1985 [4], all other published works from Yemen have focused on schoolchildren and children in the community. None of the studies focused on children at the hospital level and none has investigated malaria transmission in Sana’a, the city capital of the country. The current study therefore aimed to determine the profile of malaria and intestinal parasitic infections among children attending the Paediatric Health Centre in Sana’a.

Methods:-

The Paediatric Health Centre in Sana’a provides services to the community through outpatient clinics and admissions. The centre receives patients from Sana’a city, surrounding areas and sometimes from other governorates, as well as referred cases from private clinics. Children with
suspected infections are referred to the laboratory unit for investigation. In a record-based descriptive study, we reviewed the results of 9014 stool samples from Yemeni children and 753 blood samples from Yemeni and other nationality children who had been referred to the laboratory unit during the period January 1998 to December 2000. For malaria, additional questions about residence, nationality and travel history to known endemic areas were investigated and recorded in the laboratory notes. All stool and blood samples were examined in the centre’s laboratory.

Children being investigated for intestinal protozoa or helminth infections provided a stool sample. A normal saline sedimentation technique was adopted for stool examination. Formal ethyl acetate sedimentation or direct smear methods were also used when necessary. For children who complained of pruritis ani or nocturnal enuresis, transparent adhesive tape was used to take anal swabs.

Children suffering febrile illnesses and suspected of having malaria were asked to give a blood sample. Thick and a thin blood films were prepared for each case. Thin films were fixed with absolute methanol and stained with 3% Giemsa diluted in pH 7.2 buffered water for 30 minutes. Thick films were stained unfixed.

The data were analysed using Epi-Info, version 6.

Results :-

The age of the children ranged from 2 months to 14 years.

Malaria :-

Of 753 children examined for suspected malaria (484 boys and 269 girls), 130 (17.3%) were positive for malaria. The only species of malaria parasite identified was P. falciparum. The distribution of infection among the cases by age group, sex and nationality is shown in Table 1. Twice as many boys (66.9%) as girls (33.1%) were infected. The highest rate of infection was in the age group 6–10 years. The majority of children testing positive (89.2%) were Yemeni, but 8.5% were Sudanese and 2.3% were Ethiopian. Most of the positive cases lived in Hezyaz, 25 km south of Sana’a, but some came from Arrowdhah on the opposite side of the city; some positive cases had never been out of the Sana’a area.
Table 1: Sex, age and nationality distribution of 130 children with a diagnosis of Plasmodium falciparum infection.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Children infected (n = 130)</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td>87</td>
<td>66.9</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td>43</td>
<td>33.1</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 – 5</td>
<td></td>
<td>15</td>
<td>11.5</td>
</tr>
<tr>
<td>6 – 10</td>
<td></td>
<td>89</td>
<td>68.5</td>
</tr>
<tr>
<td>11 – 14</td>
<td></td>
<td>26</td>
<td>20.0</td>
</tr>
<tr>
<td>Nationality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yemeni</td>
<td></td>
<td>116</td>
<td>89.2</td>
</tr>
<tr>
<td>Sudanese</td>
<td></td>
<td>11</td>
<td>8.5</td>
</tr>
<tr>
<td>Ethiopian</td>
<td></td>
<td>3</td>
<td>2.3</td>
</tr>
</tbody>
</table>

n = total number of infected children.

The highest seasonal rates of infection were recorded in the months June, May and April respectively (Figure 1).

**Intestinal parasites:**

Of 9014 children examined, 2477 (27.5%) positive tests for intestinal parasites were found. The intestinal parasites detected among infected children are shown in Table 2. With the exception of Schistosoma mansoni and Taenia saginata, most of the intestinal parasites were those with a feco–oral route of transmission. Four different parasites, A. lumbricoides, E. histolytica, G. lamblia and T. trichiura, had the highest rates.

Overall, the infection rate was significantly higher among girls (1192, 31.5%) than boys (1285, 24.6%) (P < 0.001). Parasites with a direct life-cycle showed a similar sex distribution. However, the rate of A. lumbricoides infection among girls was significantly higher than that among boys. In contrast, the infection rate with E. histolytica was significantly higher among boys than that among girls (P < 0.001).
Figure 1 Monthly distribution of cases among 130 children diagnosed with Plasmodium falciparum infection

Table 2: Pattern of intestinal parasites detected in 9014 tests for parasitic infections among children

<table>
<thead>
<tr>
<th>Parasite</th>
<th>Positive test</th>
<th>Boys (n=1285)</th>
<th>Girls (n=1192)</th>
<th>Total (n=2477)</th>
<th>$\chi^2$</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>Ascaris lumbricoides</td>
<td></td>
<td>235</td>
<td>18.3</td>
<td>286</td>
<td>23.9</td>
<td>521</td>
</tr>
<tr>
<td>Entamoeba coli</td>
<td></td>
<td>258</td>
<td>20.0</td>
<td>248</td>
<td>20.8</td>
<td>506</td>
</tr>
<tr>
<td>Giardia lamblia</td>
<td></td>
<td>226</td>
<td>17.6</td>
<td>188</td>
<td>15.8</td>
<td>414</td>
</tr>
<tr>
<td>Trichuris trichiura</td>
<td></td>
<td>201</td>
<td>15.6</td>
<td>180</td>
<td>15.0</td>
<td>381</td>
</tr>
<tr>
<td>Entamoeba histolytica</td>
<td></td>
<td>160</td>
<td>12.5</td>
<td>129</td>
<td>10.8</td>
<td>289</td>
</tr>
<tr>
<td>Hymenolepis nana</td>
<td></td>
<td>149</td>
<td>11.6</td>
<td>123</td>
<td>10.3</td>
<td>272</td>
</tr>
<tr>
<td>Schistosoma mansoni</td>
<td></td>
<td>37</td>
<td>2.9</td>
<td>16</td>
<td>1.3</td>
<td>53</td>
</tr>
<tr>
<td>Enterobius vermicularis</td>
<td></td>
<td>13</td>
<td>1.2</td>
<td>20</td>
<td>1.7</td>
<td>33</td>
</tr>
<tr>
<td>Fasciola hepatica</td>
<td></td>
<td>4</td>
<td>0.3</td>
<td>2</td>
<td>0.2</td>
<td>6</td>
</tr>
<tr>
<td>Taenia saginata</td>
<td></td>
<td>2</td>
<td>0.2</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1285</td>
<td>24.6</td>
<td>1192</td>
<td>31.5</td>
<td>2477</td>
</tr>
</tbody>
</table>

n = total number of tests.
NA = not applicable.
Discussion:

Our study revealed a parasite infection rate of 17.3% among children tested for malaria. The species of malaria found was exclusively P. falciparum. This is consistent with the documented pattern of malaria in Yemen, which is classified as afro-tropical with P. falciparum as the predominant species. Previous studies in Yemen have found that P. falciparum constitutes 90%–95% of all diagnosed malaria cases [2,3]. The infection rates were highest in June, May and April respectively. This finding indicates that malaria in Sana’a city may have its own pattern of seasonality that is different from Al-Hodiedah governorate.

The present study revealed that 10.8% of the malaria cases were children from Sudan and Ethiopia who may be either immigrants or indiginous. Interestingly, some positive cases in our study had never been out of the Sana’a area, which is supposed to be a non-malarial area due to its high altitude (2400 m above sea level). Most of the positive cases were children living in an area called Hezyaz, about 25 km to the south of Sana’a, which lies on the road that connects the capital with two endemic areas, Taiz and Hodeidah cities. The main activity of the population in Hezyaz, beside agriculture, is serving food for travellers. Therefore, it can be hypothesized that infected mosquitoes hidden in vehicles are responsible for transmission of the disease. Another possibility is that transmission of malaria is taking place in Sana’a city itself. This is backed up by the fact that some cases also came from another area on the opposite side of the city called Arrowdhah.

With the exception of S. mansoni and Taenia saginata, the intestinal parasites diagnosed in the current study are those with a feco-oral route of transmission. It was expected that the infection rate with intestinal parasites would be similar among boys and girls. Surprisingly, however, the infection rate among girls was greater than that among boys. Parasites with a direct lifecycle were found to have a similar sex distribution. This was not the case with S. mansoni, where the rate among boys was higher than that among girls. This can be attributed to boys having more activities involving contact with water than girls through swimming and ablutions. As for ascariasis, the rate of infection was higher among girls than that among boys. This can be explained by girls being involved more with food preparation than boys, exposing them to raw foods contaminated with larvated eggs.
Conclusions:

High rates of infection with protozoa and helminth parasites denote high levels of pollution in the environment of the study area. More efforts are needed to improve environmental sanitation in Sana’a in order to reduce the rate of infection with intestinal parasites. To our knowledge, this is the first report that shows some evidence that malaria is being transmitted in Sana’a city. A special study to confirm or refute the suggestion that the vector for malaria is breeding in Sana’a is urgently needed.

References:


**Household survey of treatment of malaria in Hajjah, Yemen**

**Author :-** A. Abdo-Rabbo¹

¹Department of Pharmacology and Therapeutics, Faculty of Medicine and Health Sciences, University of Sana’a, Sana’a, Yemen.

**Source :-** Eastern Mediterranean Health Journal, Vol. 9, No. 4, 2003 60

**Abstract :-**

The practice of self-medication is widespread in the Republic of Yemen. The objectives of this study were to describe the treatment of malaria in households and to promote rational treatment. We surveyed 201 households with family members suffering from malaria or being treated with antimalarials. Numbers of prescribed and non-prescribed drugs were recorded and treatment rationality assessed. Common patterns of irrational treatment of malaria were observed. Polypharmacy was common, with an average of 3.8 total drugs and 1.3 antimalarials found per encounter. Misuse and overuse of injectable antimalarials was common. People practised self-medication because of belief, experience, lack of confidence in health services and cost of treatment. Most had no knowledge concerning possible risks of antimalarials.

**Introduction :-**

Malaria is thought to kill about 1.1–2.7 million people worldwide each year, of which about 1 million are children under the age of 5 years [1]. The disease is a public health problem in the Republic of Yemen, and cases are reported throughout the year, with some variation from one geographic zone to
another and from one season to another\[^{2,3}\] . It is estimated that 60% of the 18 million population live under the threat of malaria infection and about 2 million are attacked annually. Estimated mortality is 1%, mainly among children below the age of 5 and pregnant women\[^{4}\] . The predominant species of malaria parasite is Plasmodium falciparum, which is responsible for nearly 90% of all reported cases\[^{3}\] . In Hajjah governorate, which is situated in the northern part of the country, malaria is a major health problem. It accounts for about 31.7% of all attendance to health facilities in the districts studied\[^{5}\] .

In addition to being treated at public and private health facilities, self-medication is widespread and is a frequently chosen practice. Many people in malarious areas may not have ready access to antimalarial drugs and to reliable and consistent information about malaria treatment and prevention\[^{6}\] . They may use antimalarials, which may be counterfeit, obtained from informal sources. These drugs may be of variable quality, partially or completely ineffective and they are often used in inappropriate dosage\[^{7}\] .

In the Republic of Yemen as well as in many developing countries there is inappropriate, ineffective and inefficient use of drugs\[^{8-11}\] . The 1985 Nairobi conference on the rational use of drugs organized by WHO marked the start of a global effort to promote rational drug use\[^{12}\] .

Curiously, little effort has been made to improve drug use in malaria-endemic countries and to assess the benefits of such improvement\[^{13}\] . Unfortunately, no single study has yet been undertaken on the rational treatment of malaria in households in the Republic of Yemen.

The WHO Action Programme on Essential drugs (WHO/DAP) and the International Network for Rational Use of Drugs (INRUD) have made serious attempts to examine drug use rationality and have developed indicators for assessment\[^{14,15}\] . The core drug use indicators they developed were used in this study.

The overall objective of this study was to describe the extent of antimalarial drug use and attitudes towards self-medication among families. The specific objectives were:

- to provide information on patterns of antimalarial drug use in households.
to determine the sources of information about self medication.
- to identify the main reasons leading to self-medication.
- to acquire baseline information for future wider studies and for targeting and evaluating interventions.

**Methods:**

This study was a cross-sectional survey conducted during the period January to May 2003. The sample comprised 201 households with members diagnosed with malaria or being treated with antimalarial drugs in 3 malaria endemic districts, Hajjah, Haradh, and Abbs, in Hajjah governorate, Republic of Yemen. Households with members diagnosed with malaria or being treated with antimalarial drugs were identified from prescriptions and patient registration books. The households involved in this study were selected by convenience method.

All prescribed and non-prescribed drugs, including antimalarials, found in households were recorded. The mean number of prescribed drugs only, non-prescribed drugs only, all drugs (prescribed plus non-prescribed) and antimalarial drugs only per encounter were calculated. The types and dosage forms of antimalarial drugs were counted. Drugs were identified from the prescriptions and/or packaging found in households.

A structured questionnaire about knowledge, attitude and practices concerning malaria treatment in households was developed as the instrument of this field survey and covered:

- expectations/motivations with regard to the practice of self-medication.
- alternatives to self-medication in case of no relief.
- knowledge of possible adverse effects and appropriate use of antimalarial drugs.
- sources of information on practicing self-medication.
- manner of requesting drugs from private pharmacies and drugstores.
- who bring the drugs from the private pharmacy or drugstore.

A pilot study was carried out in order to test the questionnaire and train the interviewers. The data was collected by trained health workers supervised by qualified researchers.

Data collectors went from house to house and surveyed those households that had people suffering from malaria or being treated with
antimalarial drugs. It was planned to survey 60 households in each district. In fact, data were collected from 83 households in Hajjah, 58 in Haradh and 60 in Abbs. Only those household members suffering from malaria or being treated with antimalarials were interviewed. All the collected questionnaires were used in the study. All the people interviewed participated voluntarily and were requested to answers the questions freely. No-one refused to participate.

**Results :-**

The results for number of drugs found in the 3 study areas are shown in Table 1. The overall mean number of drugs per prescription was 2.89, mean 1.28 for antimalarials. The highest number of antimalarial drugs on a single prescription was 3. In addition to the prescribed drugs, selfmedicated drugs were found. The overall average was 0.87, with 0.04 for antimalarials. The highest number of non-prescribed drugs found in a single encounter was 3 drugs and 1 antimalarial drug.

The mean number of all drugs (prescribed plus self-medicated) per encounter was 3.76. The mean number of prescribed plus self-medicated antimalarial drugs was 1.32 (Table 1). The highest number of prescribed plus self-medicated drugs found in a single encounter was 8, of which 3 were antimalarial drugs.

The prevalence for different dosage forms of antimalarial drugs was: tablets 43.6%, oral liquids 13.9%, injections 42.5%. The prevalence of injectable antimalarials was 35.3% in Hajjah, 40.7% in Haradh and 53.9% in Abbs (Table 2). There were incidences where 2 different injectable antimalarial drugs were found. Table 3 shows the prevalence for 6 different antimalarial drugs found in use in the survey areas. Three antimalarials were found in some encounters.

The attitude of the people interviewed with regard to self-medication were:

- They were hopeful that self-medication would result in recovery.
- They believed in the effectiveness of self-medication from their previous experience.
- They felt that the disease is simple, can be treated easily and does not require medical consultation.

- 63-
They had no desire to visit the health worker.
They had little confidence in the health worker.
The cost of treatment was lower.

Table 1: Prevalence of prescribed and self-medicated antimalarial and other drugs in 3 areas of Hajjah governorate, Republic of Yemen.

<table>
<thead>
<tr>
<th>Town</th>
<th>No. of encounters</th>
<th>No. of drugs</th>
<th>Mean no. of drugs / encounter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>All</td>
<td>AM</td>
</tr>
<tr>
<td>Prescribed drugs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hajjah</td>
<td>83</td>
<td>218</td>
<td>101</td>
</tr>
<tr>
<td>Haragh</td>
<td>58</td>
<td>178</td>
<td>81</td>
</tr>
<tr>
<td>Abbs</td>
<td>60</td>
<td>185</td>
<td>76</td>
</tr>
<tr>
<td>Total</td>
<td>201</td>
<td>581</td>
<td>258</td>
</tr>
<tr>
<td>Non-prescribed (self-medicated drugs)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hajjah</td>
<td>83</td>
<td>35</td>
<td>1</td>
</tr>
<tr>
<td>Haragh</td>
<td>58</td>
<td>67</td>
<td>5</td>
</tr>
<tr>
<td>Abbs</td>
<td>60</td>
<td>72</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>201</td>
<td>174</td>
<td>8</td>
</tr>
<tr>
<td>Prescribed + self-medicates drugs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hajjah</td>
<td>83</td>
<td>253</td>
<td>102</td>
</tr>
<tr>
<td>Haragh</td>
<td>58</td>
<td>245</td>
<td>86</td>
</tr>
<tr>
<td>Abbs</td>
<td>60</td>
<td>257</td>
<td>78</td>
</tr>
<tr>
<td>Total</td>
<td>201</td>
<td>755</td>
<td>266</td>
</tr>
</tbody>
</table>

AM = antimalarial drugs.

The majority of people interviewed mentioned that they would use any alternatives to self-medication if no relief was obtained. Most of the respondents had no knowledge concerning the possible health risks (adverse effects, contraindications and interactions) of their antimalarial drugs, nor did they have knowledge of the appropriate use of these drugs.

The households obtained their knowledge to practice self-medication with antimalarial drugs from a private pharmacy or drugstore, families,
relatives, friends and acquaintances or through self-knowledge owing to previous treatment.

The manner in which non-prescribed antimalarial drugs were requested by households from private pharmacies or drugstores included giving the name of the drug class (antimalarial) or drug name (e.g. chloroquine), stating the disease directly (malaria), describing the symptoms or complaints (fever), showing an empty drug container or outer packet, describing drug dosage form and colour (e.g. brown ampoule), or taking the patient to the private pharmacy or drugstore.

Most antimalarial drugs required for self-medication were meant for family use within the household. In many cases younger sons, relatives or neighbours were involved in requesting drugs from the pharmacy or drugstore.

Table 2:- Prevalence of dosage forms of all (prescribed and non-prescribed) antimalarial drugs in 3 areas of Hajjah governorate, Republic of Yemen .

<table>
<thead>
<tr>
<th>Health facility</th>
<th>n</th>
<th>Tablet (P = 0.04)</th>
<th>Oral liquid (P = 0.93)</th>
<th>Injection (P = 0.04)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No. ( % )</td>
<td>No. ( % )</td>
<td>No. ( % )</td>
</tr>
<tr>
<td>Hajjah</td>
<td>102</td>
<td>51 (50.0)</td>
<td>15 (14.7)</td>
<td>36 (25.3)</td>
</tr>
<tr>
<td>Haragh</td>
<td>86</td>
<td>40 (46.5)</td>
<td>11 (12.8)</td>
<td>35 (40.7)</td>
</tr>
<tr>
<td>Abbs</td>
<td>78</td>
<td>25 (32.1)</td>
<td>11 (14.1)</td>
<td>42 (53.9)</td>
</tr>
<tr>
<td>Total</td>
<td>266</td>
<td>116 (43.6)</td>
<td>37 (13.9)</td>
<td>113 (42.5)</td>
</tr>
</tbody>
</table>

P-values for $\chi^2$ tests .
AM = antimalarial .

Table 3:- Prevalence of each type of antimalarial drug (prescribed and non-prescribed) in 3 areas of Hajjah governorate, Republic of Yemen .

<table>
<thead>
<tr>
<th>Area</th>
<th>n</th>
<th>CQ (P=0.01)</th>
<th>Q NV</th>
<th>SP (P=0.08)</th>
<th>PQ NV</th>
<th>ART NV</th>
<th>HAL NV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No. ( % )</td>
<td>No. ( % )</td>
<td>No. ( % )</td>
<td>No. ( % )</td>
<td>No. ( % )</td>
<td>No. ( % )</td>
</tr>
<tr>
<td>Hajjah</td>
<td>102</td>
<td>77 (75.5)</td>
<td>0 -</td>
<td>23 22.6</td>
<td>0 -</td>
<td>2 2.0</td>
<td>0 -</td>
</tr>
<tr>
<td>Haragh</td>
<td>86</td>
<td>50 (58.1)</td>
<td>3 3.5</td>
<td>22 25.6</td>
<td>8 9.3</td>
<td>2 2.30</td>
<td>1 1.2</td>
</tr>
<tr>
<td>Abbs</td>
<td>78</td>
<td>45 (57.7)</td>
<td>4 5.1</td>
<td>29 37.2</td>
<td>0 -</td>
<td>0 -</td>
<td>0 -</td>
</tr>
<tr>
<td>Total</td>
<td>266</td>
<td>172 (64.7)</td>
<td>7 2.6</td>
<td>74 27.8</td>
<td>8 3.0</td>
<td>4 1.5</td>
<td>1 0.4</td>
</tr>
</tbody>
</table>

- 63-
P-values for $\chi^2$ tests
NV= $\chi^2$ not valid.
Drugs: chloroquine (CQ), (Q), sulphadoxine / pyrimethamine (SP), primaquine (PQ), artemether (ART) and halofantine (HAL).

**Discussion**

Some patients self-medicated with antimalarial drugs and/or other drugs in addition to the prescribed drugs. All types of dosage forms as well as the different types of essential and non-essential antimalarials were available in the three districts studied and were used for self-medication.

The fact that often a person other than the patient bought antimalarial drugs makes it difficult to predict the extent to which these encounters were effective in informing the patient in terms of receiving information about drug use and related issues. It is clear from the results obtained in this study that inappropriate practices, and consequently inappropriate use of drugs, are going on. This is borne out by results of other studies on self-medication that have been carried out in the Republic of Yemen and other developing countries, [16,17] (O. Attef, unpublished data, 1997) (A. Hattab, unpublished data, 1997).

In developing countries, self-medication should be considered a public health problem owing to lack of appropriate medical education in patients [18]. Although a significant number of people throughout the world practise self-medication, only a very low proportion get information about medicines from sources in the community because very little appropriate information is available at this level [17].

**Conclusion :-**

Inappropriate self-medication in general, and self-treatment of malaria in particular, as found in this study, may result in ineffective and unsafe treatment. This in turn may cause health risks such as adverse reactions and discomfort for the patient. In addition, it may lead to a relapse of the disease and the development of drug resistance.

Although the aim of self-medication is prevention or treatment of disease, it can result in health hazards and economic losses for both the individual and the community [17]. It would not be possible or even desirable
to try to eliminate self-medication completely. It is, however, important to find ways of using this practice to strengthen primary health care through educating consumers in how to avoid the irrational use of drugs. People should be informed about alternatives to self-medication, i.e. seeking qualified advice. The deficiencies identified in this study will serve as a basis for targeting and evaluating future interventions. A proper antimalarial drug policy and adequate flow of reliable drug information is essential.

**Recommendations :-**

- Relevant interventions should be designed to improve the quality of treatment in malaria endemic areas of the country.
- Public health education about appropriate treatment of malaria should be more easily available to encourage people to go to health facilities for treatment when they feel sick and to make them aware of the negative impact of irrational self-medication practices.
- Private community pharmacies and drugstores should not dispense antimalarial drugs without prescription in areas where health facilities are available.

**Acknowledgements :-**

This investigation received technical and financial support from the joint WHO Eastern Mediterranean Region (EMRO), Division of Communicable Diseases (DCD) and the WHO Special Programme for Research and Training in Tropical Diseases (TDR): the EMRO/DCD/TDR Small Grants Scheme for Operational Research in Tropical and Communicable Diseases.

Sincere thanks to the households who allowed us to interview them. Many thanks also to those who assisted in doing this research.

**References :-**


- 63-
Findings of the Training Needs Assessment at the central MoPH&P

Author: Anne – Christine Hanser.

Introduction and Methodology:

The Training Needs Assessment (TNA) was conducted at the central MoPH&P in July - August 2005 as part of the joint activities of a team of dedicated professionals from the Ministry’s General Directorates of Personnel and HRD and the EU funded Support for Administrative Reform project (SAR). Approximately, 300 ministry employees filled in the TNA questionnaires, which is about a quarter of the official staff members employed at the central MoPHP.

Table 1: Staff participation in the TNA according to Staff Categories (in absolute figures)

<table>
<thead>
<tr>
<th>Staff Categories</th>
<th>Female</th>
<th>Male</th>
<th>Not stated</th>
<th>Sub-Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undersecretaries</td>
<td>1</td>
<td>3</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>DGs</td>
<td>3</td>
<td>6</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Head of Departments</td>
<td>5</td>
<td>23</td>
<td></td>
<td>28</td>
</tr>
<tr>
<td>Head of Sections &amp; Units</td>
<td>8</td>
<td>87</td>
<td></td>
<td>95</td>
</tr>
<tr>
<td>Non-managerial staff</td>
<td>37</td>
<td>107</td>
<td>13</td>
<td>157</td>
</tr>
<tr>
<td><strong>Sub-Total</strong></td>
<td><strong>54</strong></td>
<td><strong>226</strong></td>
<td><strong>13</strong></td>
<td><strong>293</strong></td>
</tr>
</tbody>
</table>

The TNA based on a methodology which was developed in another EU project, further elaborated during a workshop in May 2005, and carried out directorate / department-wise, according to the following concept:

1. The employees were asked to assess their current status of most common competencies in the areas of (i) management, (ii) administration & legislation, (iii) communications and (iv) Human
Resources Management & Development and (v) IT, - listed in a 1 page – table.

2. Required minimum levels of competencies were determined according to 5 staff categories, which comprised: (i) Undersecretaries, (ii) DGs, (iii) Head of Departments, (iv) Head of Sections and Units; as well as (v) non-managerial staff.

3. The TNA calculated the Training Need through the gap between the current status of competencies (what the employee is currently able to do) and the required minimum level of competencies (what the employee should know or be able to do as a minimum) with regard to the staff categories the employee belongs to.

4. To countercheck the self-assessment of the employees, the managerial staff was asked in addition to assess the current status of competencies of the staff category working under their supervision.

5. Originally, the TNA had asked the employees and their supervisors also to determine the necessary minimum level of competencies. However, as the outcomes were not fully comprehensible, the project decided to determine these levels in consultation with selected and experienced managers from the Ministry.

Table 2:-Competencies Areas and specific Core Competencies .

<table>
<thead>
<tr>
<th>Management / Administration</th>
<th>Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Strategic Planning</td>
<td>- Conflict Resolution / Negotiation</td>
</tr>
<tr>
<td>- Operational Planning</td>
<td>- Writing Skills: Report, Policy Papers, Instructions</td>
</tr>
<tr>
<td>- Monitoring, Evaluation, Supervision</td>
<td>- Presentation Skills</td>
</tr>
<tr>
<td>- Leadership</td>
<td>- English Language Skills</td>
</tr>
<tr>
<td>- Financial Management</td>
<td>HR Management / Development</td>
</tr>
<tr>
<td>- Health Administration / Management</td>
<td>- Staff Planning</td>
</tr>
<tr>
<td>Legislation / Administration</td>
<td>- Work Planning/ Delegation of Task/Team Work</td>
</tr>
<tr>
<td>- Knowledge of Civil Service Laws</td>
<td>- Staff Appraisal &amp; Motivation</td>
</tr>
<tr>
<td>- Knowledge of Yemeni &amp; international Health Legislation</td>
<td>IT</td>
</tr>
<tr>
<td>- Knowledge and Application of Procedures</td>
<td>- Computer Skills (windows) + (office)+ Internet</td>
</tr>
</tbody>
</table>
Findings:-

Generally, the following trends have been observed all over the TNA:-

- All TNA participants regarded the 5 competency areas (e.g. Management, IT) and the specific competencies (viz. table No. 2) as relevant for their work, while the importance of specific tasks / competencies varies from staff category to staff category.

- The relevance of core competency areas in Management and Communication is decreasing from staff category of undersecretaries downwards to non-managerial staff, whereas presumably the specific professional / technical competencies become more important for head of sections and head of unit and non-managerial staff.

- The data collected show gaps between the required minimum level of skills and the current status of competency for most of the areas and the majority of specific skills/tasks. The overview on training need priorities (table No. 4) lists only the most significant training needs – ranked according to a calculated index (i.e. the statistical mean of relevance multiplied by the Relevance minus current competencies gap).

- The comparison of data compiled through the assessment by the next upper management level and the self-assessment shows that the current status of competency of the itemized core skills/tasks is generally indicated as much higher by the employees themselves than by their supervisors. That means that the staff members themselves have a much better impression on their own skills than their direct supervisors have about them.

- The staff categories with the largest gaps between required minimum level of skills and the current status of competencies – and thus the highest training needs Index - are the DGs and heads of department. This is based on both, their self assessment and the assessment through their supervisors. Whereas, the groups with the lowest discrepancy between minimum required and current level of core competencies are Non-managerial staff and the Undersecretaries.

- Unsurprisingly, the formal qualification (highest level of educational degree) is declining all the way down through the hierarchy (i.e. from staff category of undersecretaries to the non-managerial staff).
The collected information about previous training and its application into practice appeared to be incomplete and inconsistent. This area requires further investigation.

Access to training is as well decreasing from Level of undersecretaries downwards to Level of non-managerial staff. While Non-managerial staff participates on average in 0.6 training over 2 years (i.e. 1 training in 3.5 years) – viz. table No. 3, undersecretaries have unlimited access to training. Judging from the empty tables and the oral statements during the TNA focus group discussions, the majority of staff at any level below the DGs, does not get any training at all. However, there are also significant variations within each group with some respondents attending several trainings.

Table 3: Average Amount of Training attended by Non-managerial Staff over the preceding 2 years

- Average age differs significantly amongst the different staff groups: whereas head of sections and units and DGs are of about the same age (36 / 38 years); the head of departments and non-managerial staff are on average about 10 years older (46). - Age groups and career expectations will have to be taken into account for the subsequent training plan – following this survey.
The managerial staff (undersecretaries – head of sections\units) unanimously defined Management as a top priority need for the entire Ministry and their organizational units.

Almost all staff categories identified IT (computer) skills as the weakest area of current competencies, but quite important for most of the staff categories.

The most relevant competencies identified through the TNA listed for each staff category are:

Table 4:- Overview on Training Need Priorities – according to Staff Categories

<table>
<thead>
<tr>
<th>DGs</th>
<th>Area</th>
<th>TN1 Index</th>
<th>TN2 Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Administration / Management</td>
<td>Man</td>
<td>-8.0</td>
<td>-9.0</td>
</tr>
<tr>
<td>Monitoring, Evaluation, Supervision</td>
<td>Man</td>
<td>-7.0</td>
<td>-8.0</td>
</tr>
<tr>
<td>Leadership</td>
<td>Man</td>
<td>-6.0</td>
<td>-8.0</td>
</tr>
<tr>
<td>Staff Appraisal &amp; Motivation</td>
<td>HRM/D</td>
<td>-10.0</td>
<td>-7.5</td>
</tr>
<tr>
<td>Knowledge and Application of Procedures</td>
<td>Admin</td>
<td>-8.0</td>
<td>-7.5</td>
</tr>
<tr>
<td>Presentation Skills</td>
<td>Com</td>
<td>-9.0</td>
<td>-7.0</td>
</tr>
<tr>
<td>Staff Planning</td>
<td>HRM/D</td>
<td>-6.3</td>
<td></td>
</tr>
<tr>
<td>Knowledge of Yemeni &amp; International Health Sector Legislation</td>
<td>Admin</td>
<td>-6.0</td>
<td></td>
</tr>
<tr>
<td>Operational Planning</td>
<td>Man</td>
<td>-5.3</td>
<td>-5.3</td>
</tr>
<tr>
<td>Work planning / Delegation of Tasks</td>
<td>Man</td>
<td>-5.3</td>
<td></td>
</tr>
<tr>
<td>Writing Skills / Policy papers etc.</td>
<td>Com</td>
<td>-5.3</td>
<td></td>
</tr>
<tr>
<td><strong>Head of Departments</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to work with Data Bases</td>
<td>IT</td>
<td>-10.7</td>
<td>-8.9</td>
</tr>
<tr>
<td>Monitoring, Evaluation, Supervision</td>
<td>Man</td>
<td>-10.0</td>
<td>-8.9</td>
</tr>
<tr>
<td>Statistics (Data Collection and Analysis)</td>
<td>IT</td>
<td>-10.0</td>
<td>-8.6</td>
</tr>
<tr>
<td>Staff Planning</td>
<td>Man</td>
<td>-9.3</td>
<td>-8.2</td>
</tr>
<tr>
<td>Knowledge and Application of Procedures</td>
<td>Admin</td>
<td>-9.0</td>
<td>-7.8</td>
</tr>
<tr>
<td>Work Planning/ Delegation of Task/Team Work</td>
<td>HRM/D</td>
<td>-8.0</td>
<td>-7.6</td>
</tr>
<tr>
<td>Operational Planning</td>
<td>Man</td>
<td>-10.0</td>
<td>-7.5</td>
</tr>
<tr>
<td>Computer Skills (windows) + desktop program (Office) + Internet</td>
<td>IT</td>
<td>-5.3</td>
<td>-5.9</td>
</tr>
</tbody>
</table>

1 Calculated based on the assessment by the supervisors
2 Calculated based on the assessment by the staff group itself
<table>
<thead>
<tr>
<th>Knowledge and Application of Procedures</th>
<th>Admi</th>
<th>-9.9</th>
<th>-7.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to work with Data Bases</td>
<td>IT</td>
<td>-6.9</td>
<td>-6.5</td>
</tr>
<tr>
<td>Computer Skills (windows) + desktop program (Office) + Internet</td>
<td>IT</td>
<td>-5.4</td>
<td>-5.5</td>
</tr>
<tr>
<td>Statistics (Data Collection and Analysis)</td>
<td>IT</td>
<td>-5.2</td>
<td>-3.6</td>
</tr>
<tr>
<td>Staff Appraisal &amp; Motivation</td>
<td>HRM/D</td>
<td>-3.8</td>
<td>-2.4</td>
</tr>
<tr>
<td>Office Management/Efficient Filing</td>
<td>Admin</td>
<td>-4.6</td>
<td>-2.2</td>
</tr>
</tbody>
</table>

### Non-managerial staff

<table>
<thead>
<tr>
<th>Office Management/Efficient Filing</th>
<th>Admin</th>
<th>-3.8</th>
<th>-2.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Skills (windows) + desktop program (Office) + Internet</td>
<td>IT</td>
<td>-1.1</td>
<td>-0.1</td>
</tr>
<tr>
<td>Ability to work with Data Bases</td>
<td>IT</td>
<td>-0.9</td>
<td>-0.6</td>
</tr>
<tr>
<td>Knowledge of Civil Service Laws</td>
<td>Admin</td>
<td>-0.7</td>
<td>-0.5</td>
</tr>
<tr>
<td>Knowledge and Application of Procedures</td>
<td>Admin</td>
<td>-0.4</td>
<td>-0.2</td>
</tr>
</tbody>
</table>

The Training Needs Index was specifically developed for this TNA as a simplified indicator to quantify and rank the potential training needs. The indices between +3 and 0 indicate no training need and indices indicate training needs between – 0.1 (low TN) and -12 (high TN).

### Constraints and Solutions :-

1. The most important issue - Training Needs Assessment had to tackle with was that:
   - the initially identified Training needs were not plausible in some cases.
   - showed gaps in almost all core competencies and for almost all staff categories.
   - indicated for some staff categories significant differences between the perception of the staff themselves and their supervisors.

As the main discrepancies and lack of plausibility could be traced back to the required minimum levels of competencies (also called relevance levels), the SAR project team reassessed and fixed those according to the 5 staff categories.

2. Besides the above mentioned obstacles, it has to be understood that.
the discrepancy between what employees should be able to do and what they are currently able to do is not always a matter of lacking knowledge and skills.
- Training is not always a solution for existing gaps.

Therefore, it will be necessary to analyse the possible causes of underperformance.

3. Individual training needs may significantly differ from the gaps (‘training needs’) identified for the staff category the employee belongs to.

Therefore, project and institutional training plans have to respond more specifically to needs of certain professional groups – such as training in office management for secretaries etc.

**Recommendations for Subsequent Actions :-**

1. Ideally, the Ministry itself, the associated training institutions and the donor (projects) should agree on a joint effort, i.e. an overall training plan to tackle the identify gaps.

2. Although the TNA defined the most significant gaps (‘TN Needs’) amongst the staff categories of DGs and head of departments, training might not be the appropriate and only solution for covering their gaps. Delegation of tasks and general measures to empower middle and lower management should be taken into serious consideration.

3. It is recommended not to exclude any staff category from training but design a training plan according to the TN priorities in each staff category. Complementary tools such as Job descriptions – which are currently being developed - and career paths will need to be introduced at the MoPHP.

4. Complementary activities are being or need to be implemented such as:-

   - Develop job descriptions, departmental work plans.
   - Optimize processes and define transparent procedures.
   - Improve and link remuneration with working performance (such as remuneration, awards etc.) and apply sanctioning mechanisms for insufficient performance.
   - Introduce feedback mechanisms (such as staff appraisal).
   - Empower, authorize and support qualified personnel.
   - Provide adequate working tools and materials (such as computers etc.)
Final statement :-

The SAR project would like to thank:
- all employees, who filled in the questionnaire,
- members of the TNA group
- the head of the General Directorates of Personnel and HRD for their active cooperation

More detailed information:
- about the TNA methodology is provided in the TNA Manual
- about the TNA results is provided in the TNA Report.

Both documents are available in English and Arabic language at the SAR project office.