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2. A Graphite Furnace Atomic Absorption Spectrophotometer: a Medical Laboratory
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3. Third Country Training Programme - International Seminar on Biotechnological Technique
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AFLATOXINS - HEALTH EFFECTS AND IMPLICATIONS FOR CONTROL

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The outbreak of acute hepatic encephalopathy due to aflatoxicosis in Perak, Malaysia resonated throughout the country and generated much interest locally in aflatoxins and their effects on health. This article examines the effects of aflatoxins on health, the evidence for their role in the aetiology of primary hepatocellular carcinoma and some implications for control.

According to the monograph *Mycotoxins* by the Council for Agricultural Science and Technology (USA), aflatoxins are produced by some strains of *A. flavus* and most strains of *A. parasiticus* and *A. nomius*. The four major aflatoxins, B₁, B₂, G₁ and G₂, and two additional metabolites, M₁ and M₂, are important as direct contaminants of foods and animal feeds. The aflatoxin M toxins were first isolated from the milk of lactating animals fed aflatoxin preparations, hence the M designation.

Foods from which *A. flavus* have been found include wheat, flour, bread, cornmeal, popcorn, peanut, in-shell pecans, meat pies, cooked meats, cocoa powder, hops, cheese, aged salami, sausage, country cured ham, dry beans, soybeans, corn, sorghum, barley and refrigerated and frozen pastries. In Malaysia, Isa and Tee found aflatoxins in a variety of local foods, including peanuts, soysauce and tapioca flour.

Many of the fungi capable of producing mycotoxins are also frequently contaminants of food and agricultural commodities. Most foods and feeds are susceptible to invasion by fungi during some stage of production, processing, transport, or storage. Mycotoxins may be produced when fungal growth occurs. Postharvest contamination can occur if crop drying is delayed and during storage of the crop, if water activity is allowed to exceed critical values for mold growth. In the 1988 Perak outbreak, the possibility existed for preharvest and postharvest mold growth and production of aflatoxins in the raw ingredients used for noodle manufacture. Preharvest mold growth and production of aflatoxins are associated with conditions that would reduce plant vigour, including both water stress or prolonged drought, high temperatures and high levels of insect activity. Postharvest mold growth and production of aflatoxins on corn and peanuts is favoured by warm temperatures and high humidity, which is typical of tropical countries. Dampness in bags of grain increases the possibility of mold growth and aflatoxin production.

Aflatoxins are potent liver toxins. In animals, the effect varies with dose, duration of exposure and diet or nutritional status, and may be lethal if consumed in large doses. Clinical and pathological signs include decreased rate of weight gain, decreased feed conversion efficiency, toxic hepatitis, bile duct hyperplasia, nephrosis and systemic haemorrhages. Chronic toxicity is produced with sublethal doses and Wogan has found that cancer can be caused with low level chronic exposure. He found that Aflatoxin B₁, M₁ and G₁...
causes hepatic, renal, and colonic neoplasm in rats given 0.2 to 0.12 μg/day. Others were able to induce hepatic neoplasm in ducks, ferrets, mice, guppies and monkeys.

In man, aflatoxin can induce toxicity (causing cell death and consequent increase in cell replication), DNA damage (and mutation) and possibly immunosuppression. Acute aflatoxicosis can give rise to vomiting, diarrhoea, jaundice, fits, and subsequently hepatic coma, if the dose is high enough. Pulmonary oedema, fatty infiltration, centrilobular necrosis of the liver have been described. Shank in 1977 described cases in Taiwan and Uganda. Outbreaks of acute aflatoxicosis have occurred in Kenya, Thailand, India and Malaysia. Ngindu et al. described an outbreak in Kenya, involving twenty hospital admissions, with a case fatality rate of 20%. Maize contaminated with aflatoxins was the cause of the outbreak. Krishnamachari et al. described the outbreak in India which affected more than 200 villages. The case fatality rate was 9.8% among 994 reported cases examined. Corn contaminated with 6-16 mg aflatoxin/kg (ppm) was consumed.

Lye et al. described the outbreak in Malaysia in 1988, where 17 people, mostly children were admitted to various hospitals in the state of Perak with signs of acute poisoning. Fourteen subsequently developed acute hepatic encephalopathy. The fatality rate was 17.4%. The outbreak was due to contaminated Chinese noodles. High levels of aflatoxins and their metabolites were found in the blood, brain, kidney, lung, and other tissues of 10 children. Histologically, there was biliary hyperplasia and centrilobular necrosis of the liver. The Malaysian outbreak differed from those in Kenya and Thailand in that the incubation period for the Malaysian patients was very short - eight hours compared with a period of days to weeks of consumption of corn for the Kenyan and India outbreaks. The Kenyan outbreak reported up to 12,000 ppb of aflatoxin B1 in maize grains. The intake of aflatoxins in the Malaysian outbreak was estimated to be 3 mg in a bowl of noodles.

Evidence that aflatoxins, especially aflatoxin B1, is a potent carcinogen in animals has generated interest in its carcinogenic effect in man. The IARC has classified aflatoxin B1 as a probable human carcinogen. The question of whether chronic low-dose exposure to aflatoxins causes liver cell cancer has not been conclusively resolved, although evidence is accumulating that strengthens this hypothesis from many well-conducted studies.

Early studies (before 1980) measured the intake of aflatoxins and related this to the incidence of liver cancer. At the time of these studies, Mozambique had the highest incidence of liver cancer in the world, with an estimated daily per capita intake of aflatoxins several times greater than Thailand and Swaziland. Ingestion of aflatoxins ranged from 3 to 322 ng/kg body weight/day. These studies concluded that a positive association existed between consumption of aflatoxins and liver cancer though unfortunately, they did not take into account the importance of hepatitis B virus (HBV).

The finding that aflatoxin B1 forms tight covalent bonds with DNA in vitro facilitated the measurement of aflatoxin exposure in humans. Seminal work by Groopman et al. in China showed that the major DNA-adduct (more specifically, AFB1-N7-guanine) excreted in urine is appropriate to monitor aflatoxin dietary exposure. This was utilised by Ross et al. who conducted a first ever cohort study.
study of 18,244 middle-aged Chinese men in Shanghai and found a strong interaction between serological markers of chronic HBV infection and aflatoxin exposure, as measured by urinary DNA-adduct, in liver cancer risk. This was the first cohort study that took into account HBV infection in an attempt to elucidate the effect of aflatoxin exposure. In aflatoxin negative individuals, the relative risk (RR) of liver cancer for those with Hepatitis B infection was 4.8, whereas in aflatoxin positive individuals, the RR increased almost twelve-fold to 60.1.

Hollstein et al. observed mutation of the p53 tumour-suppressor gene with a high prevalence in diverse types of human cancer. The specific base changes are typically dispersed over a 200-codon conserved region of the gene, made up of the six classes of base substitution, base-pair additions and deletions. According to Hollstein, the exception to this characteristic mutation diversity occurs in hepatocellular carcinoma in regions where high exposure to aflatoxins is expected to occur as determined by aflatoxin levels in food. Almost all mutations were G to T transversions in the 3rd nucleotide of codon 249. This mutation is consistent with AFB1-induced DNA damage since AFB1 has been shown to cause this type of basic change. Twelve out of 15 patients had the null genotype for glutathione S-transferase mu (GST), an enzyme possibly involved in the detoxification of AFB1. Other enzymes of specific interest to aflatoxin include CYP3A4, CYP1A2, CYP2D6. Knowledge of aflatoxin metabolism and the development of appropriate assays allows characterization of individuals to predict susceptibility to harmful effects of the toxin. Work on these enzymes is also being conducted currently at the Institute for Medical Research, Kuala Lumpur, with an ongoing case-control study of hepatocellular carcinoma. This study will also examine the interactions of aflatoxin markers with markers of HBV and HBC infections.

In a more recent study, Wild et al. looked for the relative contribution of, and possible mechanism of interaction between, aflatoxin and HBV infection in the development of primary hepatocellular carcinoma, using aflatoxin-albumin adducts as an exposure marker. According to Wild, "the study showed an association between AF-alb adducts and ALT and postulates that this may be a direct consequence of aflatoxin-induced hepatotoxicity, but the observation is also consistent with the hypothesis that liver damage could increase activation of carcinogens and consequently increase hepatic DNA damage, as one component of the multistep process of carcinogenesis."

Although other studies did not find a relationship between aflatoxin contamination in food and liver cancer, these studies were mostly conducted in developed countries, such as the USA, where the liver cancer incidence is relatively low. Similarly studies in Taiwan, Hong Kong showed no evidence of aflatoxin involvement in liver cancer.

Establishing a causal relationship between aflatoxin exposure and human disease is difficult because of methodological issues related to human epidemiological studies. One of the major sources of uncertainty has been the accurate assessment of human exposure. With the development of newer molecular techniques, methods of measurement for various markers are becoming more accurate and precise, and hopefully lead to data that will elucidate further the relationship between aflatoxin and liver cancer.
Given the forgoing evidence, it would be wise to protect ourselves against overexposure to aflatoxins. Hall and Wild propose interventions against aflatoxins in a number of ways: (1) preharvest measures, by controlling irrigation and pest infestation and by producing genetic crop variants resistant to fungal infection (2) postharvest, by improved storage and sorting techniques (3) postingestion, by modifying the biological effects of aflatoxins. A method of reducing aflatoxin-induced DNA damage is the use of Oltipraz, an antischistosomal drug which increases inactivation of aflatoxin in rats. The more practical interventions however would consist of measures to prevent fungal growth during the preharvesting period, harvesting and storage. The FDA has established specific guidelines on acceptable levels of aflatoxins in human food and animal feed. The Malaysian Food Act contains regulations which allow for no more than 35 ppb of aflatoxin in food.

References


The power of labels is patent, as evinced in advertising and the reinforcement of socialisation. However, with the near-escape velocities of change in today's world, the notion of a defined concept may itself seem simplistic if not anachronistic. This could also include two established or at least, regularly-used terms concerning human behaviour, culture and community, as well as their relation to the concept of health and to behaviour linked with health status. I will attempt to both distinguish and confirm these two very important and basic concepts and touch on their relation to health in this brief paper.

The two have been of concern to many thinkers and doers for millennia; in the West, Augustine, Thomas More, Francis of Assisi, Darwin, Marx, Durkheim and Weber are prominent names. Perceptions and assessments of these two have been varied: in the more recent past, the University of Chicago social scientist Robert Redfield articulated various ideals about community from fieldwork in a Mexican village, followed with fieldwork in the same village and area by Oscar Lewis who saw harshness, basic survival and stoicism where Redfield saw cooperation, harmony and beneficence. The majority of such concerns would tend towards a more balanced assessment, yet it is important to realize that they link to questions in research which have been always present concerning the interpretation of data, and have continued into more contemporary debate about the constraints of methodology and the nature and validity of social data. Most recently, hermeneutic, deconstructivist and "post-modernist" critiques have questioned the accessibility and meaning of any scientific data, e.g. whether in the behavioural, biological, medico-health, physical or social sciences.

Interest in the concept of culture was evident before the turn of the century for earlier thinkers and researchers. The concept itself, and its relation to patterns of behaviour given the wide diversity of ethnic groups in the world attracted strong and continued research interest, e.g. earlier ethnography after the turn of the century. The formal study of culture increased markedly since World War II, as it became clearer through improved field and analytical methodology that elaborate formal relations existed in culture and were amenable to assessment, cognition and indigenous perceptions. They were especially evident in the United States in parallel with British interests which more focused on social organisation and kinship, granting a degree of reciprocity.

Community on the other hand, fared somewhat differently: it had both practical and theoretical sanctions, was accessible via "communities" which were easier to locate and quantify, and occupied a great deal of sociological thought and research in Europe and the Americas from the 1920s on. These
Studies focused on the organisation and structure of communities, and included some very detailed and valuable work, e.g. that of Dollard and Warner. In positing that there is both a functional contrast and a complex and inevitable relation between culture and community, one may cite a watershed volume by Arensberg and Kimball. This monograph usefully linked the research of anthropologists, economists, sociologists and social-welfare efforts in a broader context concerned with prime aggregative characteristics of the human condition. The volume was appropriately titled *Culture and Community* and its authors were respectively, an anthropologist and a sociologist. The work merged two major and formally distinguished areas of study and suggested some new ground-rules for research in these hitherto-disparate areas of inquiry. We can also see this in its relation to concerns about the quality of human life, i.e. elements we now include in the concept of health.

The 1960s and '70s saw a heavy politicising of culture in many parts of the world. Gradually, what had been the study of culture also became the politics of culture. More recently, there has been a degree of return to theories of culture with attention to meaning, communication and identity, given also confounding and at times disruptive sociopolitical efforts based in part on distorted conceptions of culture and community. The notion of community fared somewhat less dramatically at this time, other than as a perceived sanction for sporadic efforts at communal living, in that it was generally taken as clearer, less abstruse and more accessible for programmes and research.

A further strong impetus for attention to these two came from a major meeting at Alma Ata in 1978, which saw the birth of the concept of Primary Health Care (PHC) with its focus on the most local and immediate levels of the world's populations. PHC was endorsed by the members-states of the United Nations and brought a real and needed focus on health in communities in the Third World plus its corollary, a realised quasi-institutional notion of "the community". Attention to this entity has proceeded full-bore in international and non-governmental organisations (NGOs), health groups and governments, related publications and the media. This emphasis on the community and its local context continues, having taken on a renewed reality and dynamics of its own and has not abated. These tides have in their own way also led to intensive assessment of the concept of health, especially by the World Health Organisation which developed the ideal and ideas of PHC and has carried them into newer areas of health concerns.

Working definitions for each are useful here. These were developed by the author through teaching and research concerning concepts, perceptions and issues about the nature and dynamics of human organisation and values, and also their relation to health, plus experience in the behavioural sciences and fieldwork. A nuts-and-bolts approach to culture first:

A specific system of beliefs, values and attitudes characteristic of the group into which one is born, which provides conscious and unconscious guides for living in that group, and is passed from generation to generation particularly through language.

And similarly for a definition of community:

A group of individuals for whom experience is personally and regularly shared, in which information has mutual
and direct meaning, with a usually-continuous area as a daily living space.

These have the consistency of being time-tested and functionally-tuned. Their thematic thrusts are evident: the first focuses on longer-term issues of values, meaning, explanation and continuity across generations; the second, living and doing whatever must be done, daily and for the shorter term, in a given collective locus. Both are related, but each has its own structural and functional aspects. We may push a bit further and suggest that they are intimately involved in three preoccupations of Homo sapiens: basic survival as such, coping behaviour, and transcending activities. The first involves staying alive in terms of basic needs, survival and continuity; the second, adaptability to changing situations (something humans are extremely good at), and the third, concern for 'what's it all about' and thus e.g., art, religion, ritual, philosophy and comprehensions of living and dying. It is from and for these needs that community and culture have mutually and symbiotically evolved.

We may thus say that "community" provides the nexus for the immediacy and practical aspects of living in groups, which through human psychobiological givens we all do; and "culture" for the need to deal with living and comprehend its meaning, e.g. birth, growth, rites of passage and death. Both have a primary function of helping the group and the individual to survive with respect to the life-cycle, external and internal demands, drives and needs, intentions and at times, onslaughts. Clearly, these two link together well in the traditional, small-scale, subsistence and nonliterate societies so characteristic of our earlier human history. Indeed, despite vast changes in these "third world" and partly-rural populations, many are still perceived as closer to this earlier state (often seen by implication as an ideal), especially where developmental programmes are involved.

One could see the two domains intertwined as a sort of spiral helix of social topology writ large, a meta-helix with an importance for daily life comparable to that of contemporary genetics. This dyad still has distinct structural/functional modalities. Yet through sociocultural change, new and varied exposures and contacts, the stresses of acculturation and introduced diseases, weapons, food and political systems, each has diminished or altered viability and has separated from the other to a considerable degree. This separation also reflects the disruptions and stress of rapid economic growth, urbanisation and environmental degradation. Since functionally the one still buttresses the other, strange variations can occur: regenerated and created neo-cultures, momentary gatherings assumed as communities, transient groupings termed communities, commercially-maintained images of traditional cultures, and institutional models of both with assumed stable characteristics despite changing realities.

Some of these variants are imperative and historically legitimate, in that they reflect a search for what was valuable in the cultural/communal archetype and lost in the colonial experience, e.g. cultural preservation in Papua New Guinea, Afro-American culture or the economic integration of major cultural traditions in contemporary Malaysia. Each of these has its own dynamics, sociopolitical goals, identities and emerging politico-economic structures. A simple diagram may explicate some possibilities in relation to this community/culture dyad or bimodality, using a prime (') to indicate the community mode, e.g. T'. Noting valutational and behavioural contrasts
distinguishing that which we may term "traditional" or "modern," the following can be outlined:

<table>
<thead>
<tr>
<th>COMMUNITY</th>
<th>Traditional</th>
<th>Modern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional</td>
<td>T/T'</td>
<td>T/M'</td>
</tr>
<tr>
<td>Modern</td>
<td>M/T'</td>
<td>M/M'</td>
</tr>
</tbody>
</table>

The categories from this dyadic 2x2 matrix indicate some possible combinations for the domains of culture and community in various contemporary environments. One could, for example, take T/T' as a fully "traditional" tribal society, T/M' as workers on a coffee or rubber plantation, M/T' as a squatter settlement and M/M' as an emerging "modern" professional class in a developing country. There are more groupings possible, e.g. via the diagonals, inversion of the combinatorials or through expansion into e.g., 3x3, 4x4 or MXN matrices. Such cells reflect the collective behavioural realities in real space-time today, using our two concepts as referents. It is these behavioural sets and not an idealised perception or situation, which are the realities for ameliorative, developmental and promotive programmes as well as research, including medico-health concerns.

My intention in this paper has been to review two major and long-standing concepts for the behavioural sciences. These have also been used or evoked in teaching, aid programmes, field training and research with very interchangeable and often, even looser meaning. The distinctions made here about them have been bare-boned to the point of perhaps appearing simplistic yet are intended to make their contrasts and conjunctions relatively clear, given also their importance for health programmes and medical concerns. With respect to traditional and small-scale societies, a strong connection between culture and community remains since our basic human needs and characteristics continue, despite the onslaught of new technologies and changed environments.

It is evident that the function and importance of language per se have not been considered here. There are those who hold that culture, and by implication, human communities would not exist without language, an interesting cognitive problem if somewhat oversimplified in relation to our knowledge of socialisation, semiotics, evolutionary and developmental sequences. There are also those who see language as moulding the very nature of culture, its weltanschaung or worldview and thus one's view of reality, i.e. the famous Sapir-Whorf Hypothesis; this is a hypothesis difficult to prove or disprove since it requires the use of language to confirm or deny the function of language.
It is also evident that we have not considered the concept of health or its vital biobehavioural relata in any detail. Discussion and definition of these are better left for another paper, since they link the two domains discussed here to larger populations, perceptions of illness and etiology, health programmes and the situation of the individual as such. Health is a continuing psycho-physiological state reflecting both individual and collective exposure and experience, developmental processes, nurturance, nutrition and learning as well as endemic, recurrent, emergent or re-emergent pathogens. Health status benefits and also suffers from the extremely rapid sociocultural and technological changes of today's world, positive and negative. It has evolved from an earlier and essentially disease-oriented focus into an entity involving multiple factors including economic, individual, political, psychophysiological and sociocultural elements, behavioural styles and a growing concern for the quality of life. It would also appear to be undergoing further expansion given the impact and potential of the new information age, medical technology and their implications for the human condition.

To conclude, a few things seem relatively clear: the nature and function of culture seen formally are not those of the nature and function of community seen formally; these two are linked; and neither of them equates with polity. However, elements of culture are closely associated with the last and with health, particularly in developing nations. What the situation is now for culture and community, and what will happen to their behavioural and adaptive bases are realistic and continuing questions. The present desires to bind culture, community and polity into something catering equally for every level of social scale, so to speak, in the 21st century are basically a political issue with an increasingly environmental aspect; clearly, this also has major implications for health. Meanwhile the importance of these two entities, culture and community, and their relation to health status, disease etiology, acceptance of health services and environmental status increase dramatically, with particular import for the quality of our lives.

Selected References


Articles

*Consultant, Social and Health Behaviour, World Health Organization.
The statements here are solely the author’s and do not necessarily represent the World Health Organization or endorsement by that organisation.

**This paper is adapted from one originally presented at the Philosophy Seminar Series (1995) at the University of Papua New Guinea and a subsequent related paper, both by the author.
BODY FAT STATUS OF MEDICAL LABORATORY TECHNOLOGIST TRAINEES AT THE INSTITUTE FOR MEDICAL RESEARCH, KUALA LUMPUR

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Division of Human Nutrition, Institute for Medical Research

Abstracts

A study to assess the body fat status was carried out on 69 Medical Laboratory Technologist (MLT) trainees (33 males and 36 females) of the Institute for Medical Research, Kuala Lumpur. The height and body weight of subjects were measured using the SECA weighing balance with height attachment. Skinfold thickness of biceps, triceps, subscapular and suprailiac were measured using Harpenden Calipers. Percentage of body fat was calculated from the sum of 4 measurements of skinfold thickness. The mean weight and height of male subjects were 62.2 ± 8.2 kg and 1.69 ± 0.07 m, respectively, while for females were 50.4 ± 6.9 kg and 1.55 ± 0.05 m, respectively. Based on body mass index (BMI), 76% of males and 72% of females were classified as normal, 12% and 20% as underweight while 12% and 8% as overweight. The mean percentage body fat of male and female subjects were 16.0 ± 7.6% and 26.7 ± 6.0%, respectively. Fifteen percent (15%) of males and 17% of females were found to have percentage body fat above the normal range, while 24% of males and 17% of females had low percentage body fat. It was noticed that the incidence of obesity among the subjects became more higher when based on percentage of body fat than compared to body weight.

Introduction

Obesity can be defined as an excessive accumulation or storage of adipose tissue or fat in the body. The basic cause of obesity in most people is that they consume more calories than they expend, and the surplus of food energy is converted into body fat. Persons with excess body fat have an increased risk of developing a number of chronic diseases, including non-insulin dependent diabetis mellitus, hypertension, cardiovascular disease, stroke, gallbladder disease, osteoarthritis and cancer of the uterus and breast. Excess body fat also has a significant deterrent effect on physical performance. Thus the measurements of the total body fat provides useful information. Unfortunately, the data available on body fat measurements of Malaysian population is very limited. The objective of the present study is to assess the body fat status of the MLT trainees at the Institute for Medical Research, Kuala Lumpur.

Subjects and Methods

A total of 69 Medical Laboratory Technologist (MLT) trainees of the Institute for Medical Research, Kuala Lumpur, were selected for this study. The subjects comprised 33 males with ages ranging from 21 to 44 years and 36 females with ages from 21 to 29 years. The height and body weight of subjects were measured using the SECA weighing
Articles

balance with height attachment. Skinfold thickness measurements were taken using Harpenden Calipers at 4 sites (biceps, triceps, subscapular and suprailiac) as recommended by Durnin and Rahaman. Fat content as percentage of body weight was calculated from the sum of the 4 measurements of skinfold thickness. Classification of body fat was determined as described by Garrow.

The body mass index (kg/m²) was also calculated for each subject. Body weight classification of subjects were determined as described by WHO. The physical characteristic of subjects was compared with other selected local subject groups. Statistical difference of body fat of different groups were assessed by Student’s t-test.

Results and Discussion

The mean physical characteristics of male and female subjects are shown in Table 1. The mean height and body weight of male subjects were 1.69 ± 0.07 m and 62.2 ± 8.2 kg, respectively while for females were 1.55 ± 0.05 m and 50.4 ± 6.9 kg, respectively. The mean body mass index (BMI) for males and females was 21.8 ± 3.4 kg/m² and 21.2 ± 2.7 kg/m², respectively, while the mean percentage of body fat was 16.0 ± 7.6% and 26.7 ± 6.0%, respectively.

Table 2 shows the body weight and body fat status of the subjects. The BMI based on the classification by WHO has shown that 76% of the males and 72% of the females were classified as normal (BMI 18.50 - 24.99). The incidence of underweight (BMI < 18.50) was 12% for males and 20% for females while the incidence of overweight (BMI > 25.00) was 12% for males compared to 8% for females. Although the problem of overweight of the MLT trainees was lower compared to 36.8% of male and 39.3% of females of the government office workers in Kuala Lumpur as reported by Fatimah et al., the problem of obesity of the MLT trainees became higher in terms of their body fat status. Fifteen percent of males and 17% of females were classified as high-fat or having problems of obesity according to the classification by Garrow.

Table 1. Physical characteristics of male and female subjects

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Males (n = 33)</th>
<th>Females (n = 36)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± SD</td>
<td>Range</td>
</tr>
<tr>
<td>Age (yr)</td>
<td>25.1 ± 5.5</td>
<td>21 - 44</td>
</tr>
<tr>
<td>Height (m)</td>
<td>1.69 ± 0.07</td>
<td>1.58 - 1.83</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>62.2 ± 8.2</td>
<td>44.0 - 82.0</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>21.8 ± 3.4</td>
<td>15.4 - 31.6</td>
</tr>
<tr>
<td>Body fat (%)</td>
<td>16.0 ± 7.6</td>
<td>5.9 - 45.0</td>
</tr>
</tbody>
</table>
**Table 2. Body weight and Body fat status of male and female subjects**

<table>
<thead>
<tr>
<th></th>
<th>Male (n=33)</th>
<th>Female (n=36)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Body weight status:</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight</td>
<td>BMI &lt;18.50</td>
<td>4 (12)#</td>
</tr>
<tr>
<td>Normal range</td>
<td>BMI 18.50 - 24.99</td>
<td>25 (76)</td>
</tr>
<tr>
<td>Grade 1 overweight</td>
<td>BMI 25.00 - 29.99</td>
<td>2 (6)</td>
</tr>
<tr>
<td>Grade 2 overweight</td>
<td>BMI 30.00 - 39.99</td>
<td>2 (6)</td>
</tr>
<tr>
<td>Grade 3 overweight</td>
<td>BMI ≥40.00</td>
<td>0 (0)</td>
</tr>
<tr>
<td><strong>Body fat status:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low fat</td>
<td>Male &lt;12%; Female &lt;22%</td>
<td>8 (24)</td>
</tr>
<tr>
<td>Normal</td>
<td>Male 12 - 22%; Female 22 - 30%</td>
<td>20 (61)</td>
</tr>
<tr>
<td>High fat</td>
<td>Male &gt;22%; Female &gt;30%</td>
<td>5 (15)</td>
</tr>
</tbody>
</table>

* WHO (1995)
** Garrow (1987)
# Values in parentheses indicate percentage of subjects

As shown in Table 3, there were no significant differences of body fat between MLT trainees when compared to local university students as reported by Ismail and Zawiah, however, both MLT trainees and these university students had higher body fat when compared to selected national athletes from an earlier study. The significant difference of the body fat content of the MLT trainees and university students when compared to national athletes could be explained by the different level of physical activity. Most of the time spent by MLT trainees could be considered as sedentary activities such as attending lectures, doing laboratory practicals, walking, standing and sitting. Although the study on the physical activity of the MLT trainees was not done, however Ismail and Zawiah reported that 80 - 85% of the day of university students were spent on sedentary activities, while Wan Nudri reported that national athletes spent about 4 hours per day in heavy activities such as physical exercise and training. This report suggests that beside nutrition, physical activity is very important in the prevention of obesity. It may be useful to encourage MLT trainees and even all individuals to participate in recreational activities. Exercise was reported to reduce some risk factors for chronic diseases, improve human functional status and metabolism and also improve psychological status and capacity to cope with stress. Fat cell size does not decrease with weight loss, but it can be dramatically reduced by diet and exercise.
Table 3. Mean physical characteristics of subjects as compared to other selected local subject groups

<table>
<thead>
<tr>
<th>Age (yr)</th>
<th>Height (m)</th>
<th>Weight (kg)</th>
<th>BMI (kg/m²)</th>
<th>Body fat (%)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Male:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MLT trainees (n=33)</td>
<td>25.1</td>
<td>1.69</td>
<td>62.2</td>
<td>21.8</td>
<td>16.0&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>University student (21)</td>
<td>22.8</td>
<td>1.66</td>
<td>54.8</td>
<td>19.9</td>
<td>16.5&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>National athletes (n=84)</td>
<td>23.9</td>
<td>1.73</td>
<td>68.8</td>
<td>22.9</td>
<td>13.8&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Female:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MLT trainees (n=36)</td>
<td>23.6</td>
<td>1.55</td>
<td>50.4</td>
<td>21.2</td>
<td>26.7&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>University student (37)</td>
<td>21.9</td>
<td>1.55</td>
<td>47.1</td>
<td>19.6</td>
<td>27.4&lt;sup&gt;c&lt;/sup&gt;</td>
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<tr>
<td>National athletes (n=24)</td>
<td>21.1</td>
<td>1.66</td>
<td>58.0</td>
<td>20.9</td>
<td>24.7&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

* Within column, figure with different superscripts letter are significantly difference at p < 0.05

Conclusion

Assessment of body fat is very important for everybody to determine obesity and risk factor of many chronic diseases. Based on body weight, prevalence of overweight or obesity of male and female MLT trainees at Institute for Medical Research were 12% and 8%, respectively. However, the prevalence of obesity based on body fat of the male and female subjects became higher, which was 15% and 17%, respectively. A healthy diet, with regular physical exercise is recommended in the control of body fat and in the prevention of many chronic diseases of affluent societies.

Acknowledgements

The author wish to thank the Director of the Institute for Medical Research, Dr. Tee E Siong, Ms. Rajamanohari, Medical Laboratory College and all the MLT trainees involved in this study.

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RANCANGAN MAKANAN TAMBAHAN SEKOLAH
(School Supplementary Feeding Programme)

Aziz Ibrahim
Bahagian Pemakanan, Institut Penyelidikan Perubatan.

Pengenalan

Rancangan Makanan Tambahan (RMT) yang sedang dilaksanakan di sekolah-sekolah rendah di seluruh Malaysia pada hari ini merupakan salah satu usaha murni pihak Kementerian Pendidikan Malaysia dalam membantu meningkatkan taraf pemakanan dan kesihatan kanak-kanak sekolah rendah. Rancangan ini bertujuan untuk memberi makanan percurna kepada murid-murid sekolah rendah terutama dari luar bandar dan dari golongan berpendapatan rendah secara imbuhan dan buat sementara waktu untuk memperbaiki taraf pemakanan dan kesihatan mereka sebagai satu usaha yang selaras dengan Dasar Pembangunan Negara. Rancangan ini sebenarnya tidak bermaksud untuk mengambil alih tugas ibubapa dalam memberi makanan kepada kanak-kanak tetapi ialah adalah sejadar membekalkan 25 % - 33 % dari keperluan kalori harian kanak-kanak tersebut\(^1\). Di samping itu program RMT juga dirangka dengan beberapa objektif khusus iaitu termasuklah; (i) untuk memberikan makanan tambahan yang berzat dan dapat mengimbangi pengambilan zat-zat makanan harian kanak-kanak terbabit, (ii) untuk menyelenggarakan pendidikan kesihatan dan pemakanan secara tidak langsung, (iii) untuk mengendalikan tabiat-tabiat sopan santun, disiplin, timbang rasa serta amalan-amalan yang diingini berkaitan dengan kebersihan diri, kebersihan makanan dan kebersihan alam sekitar dan (iv) untuk menggalakkan penglibatan dan penyertaan masyarakat dalam usaha-usaha sekolah mengelolakan RMT\(^2\).

Rasional perlunya pelaksanaan RMT ini diteruskan adalah berdasarkan kepada beberapa laporan dan kajian oleh Kementerian Pendidikan yang menunjukkan bahawa; (i) di antara 15 % - 20 % dari jumlah murid datang ke sekolah tanpa sarapan atau makan tengahari di rumah dan 1/6-1/3 daripada mereka mengalami kelaparan tersembunyi, (ii) lebih kurang 35 % murid sekolah rendah menunjukkan tanda-tanda salah pemakanan dan (iii) salah pemakanan dan kesan bersama yang diakibatkan oleh salah pemakanan (malnutrition) dan serangan penyakit (infection of diseases) menimbulkan masalah-masalah dari segi pembesaran, pencapaian dalam pembelajaran dan lain-lain lagi\(^1\).

Sejarah Pelaksanaan RMT

RMT telah mula diadakan selepas Perang Dunia ke-2 oleh Pemerintah Tentera British sebagai satu usaha kecemasan. Dalam tahun-tahun tujuh puluhan beberapa pertubuhan kebajikan dan agensi kerajaan seperti Persatuan Kebajikan Kanak-Kanak Malaysia, Majlis Pusat Kebajikan dan FELDA telah menjalankan Rancangan Makanan Tambahan kepada beberapa buah sekolah yang terpelihara terutama di luar bandar. Dalam tahun 1974 Kerajaan Negeri Selangor telah memulakan projek perintis...


**Menu Makanan RMT**

Kriteria Pemilihan Murid Untuk Menerima RMT

Beberapa kriteria pemilihan murid yang layak menerima bantuan program pemakanan ini, mengikut prioriti adalah seperti berikut:

I. Taraf sosio-ekonomi keluarga
Keutamaan akan diberikan kepada murid-murid daripada golongan termiskin iaitu murid-murid daripada keluarga atau ibu bapa atau pengajak yang mempunyai pendapatan bulanan RM 150.00 dan kurang atau juga boleh digunakan kriteria pendapatan per kapita di mana murid yang datang dari keluarga yang mempunyai pendapatan per kapita setakat RM 35.00 dan kurang adalah layak dipertimbangkan ke dalam program ini.

II. Saiz enrolmen sekolah
Kelengkaran adalah diberi khusus kepada sekolah rendah dengan bilangan murid 100 orang dan kurang. Murid-murid daripada keluarga atau ibu bapa atau pengajak berpendapatan bulanan RM 400.00 dan kurang adalah layak menerima bantuan ini.

III. Status pemakanan
Murid-murid yang mengalami salahpemakanan (malnutrition) dengan pengesanan dan pengesahan oleh pegawai perubatan adalah layak menerima bantuan pemakanan ini.

IV. Jarak rumah dari sekolah
Murid-murid yang tinggal jauh dari sekolah dan tidak mempunyai kemudahan pengangkutan juga perlu diberi pertimbangan dalam program ini.

Aktiviti Pendidikan Yang Disemai Melalui RMT

Di antara aktiviti-aktiviti pendidikan yang disyorkan melalui program ini termasuklah:

I. Mementingkan kebersihan makanan dan mengawas segala peraturan kebersihan terutama sekali semasa menyelia dan menghidang makanan kepada murid-murid untuk mengelakkan dari berlakunya keracunan makanan dan penyakit-penyakit yang berjangkit.

II. Membasuh tangan sebelum makan.

III. Menjaga kebersihan gigi dengan cara yang betul.

IV. Berkelakuan baik, sopan santun di meja makan serta duduk dengan cara yang betul dan mengunyah makanan dengan baik.

V. Membuang sampah dan menjaga kebersihan sekeliling dengan cara yang betul.

VI. Membincang dan memberi pandangan tentang kandungan zat makanan yang seimbang.

VII. Membawa balik pengetahuan, sikap dan amalan yang dipelajari di sekolah kepada keluarga masing-masing dalam masyarakat.

Kajian Keberkesanan RMT Ke Atas Peningkatan Taraf Pemakanan Kanak-Kanak Miskin

Terdapat beberapa siri kajian yang bertujuan untuk menilai perlaksanaan dan kesan program RMT ke atas peningkatan status pemakanan dan kesihatan telah dijalankan oleh beberapa penyelidik tempatan. Kajian terawal ke atas program RMT telah dijalankan dalam tahun 1980...

Rujukan


Introduction

The rapid socio-economic development in the country has brought about significant changes in the life styles of Malaysians, including food habits, and food purchasing and consumption patterns. In turn, these changes have resulted in a definite change in the food and nutrition scenario in the country. The overall nutrition situation in the country has improved tremendously although pockets of undernutrition exist among various rural and urban underprivileged communities. On the other hand, significant proportions of the affluent segments of the population are now known to be afflicted with various non-communicable diseases associated with overnutrition, namely obesity, hypertension, coronary heart disease and cancer. Nutrition activities and programmes in the country are being directed to tackle both facets of the malnutrition problem in a rapidly-developing economy. The recently formulated National Plan of Action on Nutrition (NPAN) for Malaysia will provide a framework for improving the nutrition situation in the country.

The ultimate strategy towards achieving a healthy nation is the promotion of a healthy lifestyle. The Ministry of Health has taken cognizance of this and launched a comprehensive campaign for the promotion of healthy lifestyles among Malaysians. The Healthy Lifestyle Campaign was launched in May 1991 with its first thematic campaign, cardiovascular diseases. For six consecutive years, one thematic campaign per year was carried out, namely, sexually transmitted diseases (1992), food safety (1993), childhood diseases (1994), cancer (1995) and diabetes mellitus (1996). These programmes focussed on creating awareness and educating the public with regards to these diseases. In almost all the campaigns in the past five years, a great deal of emphasis has been given to practising a healthy dietary pattern and taking up regular exercise programmes.

It is important that these promotional activities and programmes continue to be given focus and the required impetus to achieve the desired results. The Ministry of Health Malaysia has planned another series of activities to be carried under the second phase of the Healthy Lifestyle Campaigns (1997-2002). The theme for the first year of this phase shall be “Healthy Eating” and was launched by the Hon. Minister of Health of Malaysia on 4 January 1997.

Prime messages and target groups

The Healthy Eating Campaign focuses on four main topics emphasising on dietary practices, body weight, food and nutrition labelling as well as food hygiene. These topics and the messages that are to be disseminated to the consumer are as follows:
Adoption of desirable dietary practices
- eat a variety of foods guided by the food pyramid
- balance the food one eats with physical activity
- choose a diet with plenty of cereals and legumes
- eat more vegetables and fruits
- choose a diet moderate in sugar and salt
- choose a diet low in fat and cholesterol
- drink plenty of plain water
- eat clean and safe food
- nutritional practices should be based on facts and not fallacies

Make dietary modifications
- plan healthy menus
- modify recipes
- adopt healthy food preparation and cooking procedures

Maintenance of a desirable body weight
- eat to meet a desirable body weight
- have regular exercise

Understanding food and nutrition labelling
- be an informed consumer

Provision of healthy food at food outlets
- choose stalls, canteens, restaurants and other outlets that are clean to ensure foods served are safe

The food pyramid is introduced for the first time in the country. It is based on four layers and five food groups, and serving sizes appropriate for local populations.

The Campaign has been targeted to most sub-groups of the community, including the following:

- Primary School children (7 to 12 years and below)
- Adolescents (10 years to 18 years and below)
- Adults, including the working population and housewives
- Elderly
- Food handlers

For the last group, messages to encourage food handlers to adopt healthier food handling, preparation and storage practices have been prepared. Emphasis is also given to personal hygiene of the food handlers.

Approaches and evaluation

The Ministry of Health has identified various organisations for collaboration in order to disseminate the Health Eating messages. These include working closely with Radio and Television Malaysia (RTM) for airing messages on healthy eating, and collaborating with Education Ministry in strengthening activities in schools. Existing collaboration with the Malaysian Agriculture Research and Development Institute (MARDI) and the Federal Agriculture Marketing Authority (FAMA) shall be strengthened. Emphasis shall also be given to a variety of work places to provide healthier food choices in canteens. The professional bodies in the country (such as the Malaysian Dietitian Association & Nutrition Society of Malaysia, MASSO, etc) have been invited to participate and contribute to these activities.

A multi-media approach through the use of the following has been planned:

- TV
- Radio
- Cinema advertisement
- Billboards
- Bus panels advertisements
- Publication of advertorials, feature articles, quizzes in the local vernacular
newspapers, magazines on healthy eating
- Messages on Ministry of Health vehicles

The print media to be produced by the Health Education Division include posters, booklets and leaflets. The leaflets and booklets give detailed messages and instructions on food choice, food selection and preparation, the food pyramid, weight measurements and focus on several selected nutrients. Several non-print media to be utilised include trailers, documentary films, interactive computer quiz, TV programmes and jingles and radio commercials.

A knowledge, attitude and practice (KAP) study of food and nutrition among the various target groups is to be carried out to obtain baseline data prior to the dissemination of the messages on healthy eating throughout the country. These data can be used to determine effectiveness of the programme when the study is repeated several years later. The baseline study is to be conducted throughout the country on all the five target groups identified in the campaign.
A COMMUNITY-BASED INTERVENTION PROGRAMME
FOR DENGUE CONTROL IN URBAN MALAYSIA

Haliza Mohd. Riji and K J Pataki-Schweizier
Institute for Medical Research

Background

The incidence rate of dengue in Kuala Lumpur in 1991 was 132.48 per 100,0001 which illustrates the fact that dengue still remains a significant health problem in urban centres in Malaysia2. As is already known, in addition to fogging (spraying) and vector control measures, part of the control strategies undertaken by the health authorities are health education activities. These are aimed at improving the awareness of the population, hence making them more responsive toward control methods. Yet in spite of these efforts, it is difficult for control teams to get full community support.

Thus in view of the dengue problem prevailing in Kuala Lumpur, a community-based study has been planned. The study employs a behavioural approach and focuses on the processes of how communities can better understand dengue, what appropriate behaviour they could adopt to reduce breeding of Aedes aegypti in their areas and how to promote the use of personal protection against infective bites.

This research is part of a national study, funded by the Intensification of Research in Priority Areas (IRPA) and involves researchers from the Institute for Medical Research (IMR), Universiti Malaya, Universiti Sains Malaysia, Institut Teknologi MARA, and the Dewan Bandaraya Kuala Lumpur (DBKL) Health Department and Vector Control Department, Ministry of Health. The national project includes four study sites, namely Kuala Lumpur, Pulau Pinang, Johor Bharu and Sibu, Sarawak and is coordinated through the Division of Social and Behavioural Research at the IMR3.

Conceptual Framework

In vector-borne disease such as dengue, the role of humans is a key factor which contributes to initial transmission and also leads to disease continuation. In order to control the disease, the chain of transmission has to be broken and this therefore entails the modification of human behaviour. The assumption here is that if humans can change their behaviour, this will contribute to the elimination of mosquito breeding. Accordingly, it is very necessary that efforts be directed toward this while at the same time, people should reduce their immediate exposure to infective bites by increasing personal protective measures.

Dengue-infected areas have regularly attracted entomological surveys and fogging activities. This means that the population has acquired some knowledge of the disease, the vector and control activities. But because their participation in these activities has not been total so as to effect mosquito density and avoid infection, it is appropriate that they be brought into the process of identifying their own perceptions of the disease and
determining what strategies they can undertake to overcome the problem.

**Study Communities and Methodology**

Three study and three control communities have been chosen for the Kuala Lumpur research. These six sites are based on socio-demographic indicators, including socio-economic levels as indicated by types of house structures and site environment status. The study communities are Taman Tun Dr. Ismail (TTDI) representing a high-income level population, Taman Wangsa Maju representing a middle-income level, and Kampung Abdullah Hukum representing a low-income level. The control sites are Bangsar Park, Pandan Indah, and Kampung Pasir with similar criteria. A total sample of 3000 households will be surveyed through random stratified cluster selection, using a protocol developed with pre-testing in the site areas.

**Focus Group Discussions**

After the sample interviews and before attempting to develop the intervention phase of research for the target population, several focus group discussions (FGD) will be held with groups comprising of 6-9 residents in each study area. The main purpose of these FGDs is to allow the population to voice their feelings and indicate their attitudes on specific themes and questions. Initial FGDs with residents in three areas show that the residents do have basic knowledge about vectors and that they are especially concerned with the abundance of mosquitoes in certain areas. They are also concerned over the disposal of rubbish and clogged drains which they think are contributing to the dengue problem. The results of the completed FGDs in conjunction with findings from the interviews will be used by the research team for the intervention fieldwork and to formulate intervention strategies.

**Survey of Aedes aegypti Breeding Areas**

The Environmental Health Research Centre, IMR is collaborating in the Kuala Lumpur study by providing data on the ecology, local environment and types of natural and man-made areas that can breed *Ae. aegypti* and *Ae. albopictus*. This survey team has designed a format that will assess site environments and determine types of containment for stagnant water and the number of larvae or pupae contained in these overall. The households and compounds to be studied are to be chosen from the study sites. These findings will also be used as indicators for behavioural change intervention.

**Intervention Strategies**

Three key behavioural indicators are being considered at this stage for the study communities. They are:

i) source reduction activities (e.g. cleaning existing water receptacles and storage sites, reducing the number of existing containers);

ii) increasing use of personal protective measures, and;

iii) community effort in reducing potential breeding areas.

The actual intervention programme will in all probability also include other indicators as determined through analysis of the full set of FGDs and reference to the interview data.

**References**


The biological utilization of carotenoids is related to their provitamin A activity and the efficiency of their absorption and conversion to retinol and also their function as antioxidants. For practical purposes, various authorities have taken the efficiency of conversion of β-carotene to retinol to be in the ratio of 6 : 1, and that of other provitamin A carotenoids as 12 : 1. This paper presents results of a study carried out to determine the bioavailability of carotenoids present in two carotenoid-rich vegetables (namely carrot and swamp cabbage, kangkong) and aims to provide further information on the nutritional value of these important sources of provitamin A compounds. The growth and the levels of retinol and carotenoids in the liver and serum of rats provided with these carotenoids in the daily diet were monitored. These results were compared with the biological utilization of crystalline retinol and β-carotene concentrates. Two different experimental procedures were adopted for the study, namely supplementation and depletion-repletion procedures using the rat as the test animal. Both procedures showed that the bioavailability of the major carotenoids in carrot (α- and β-carotene) and kangkong (β-carotene) was high, as evidenced by the accumulation of retinol in the liver of the experimental rats, in relation to crystalline retinol concentrate. The provitamin A activity of α- and β-carotenes in the vegetables approximates the commonly used factors of 1/12 and 1/6 that of retinol, respectively. Either one of the experimental procedures may be used for the study of bioavailability of carotenoids in plant sources. The supplementation procedure, however, takes a shorter time to carry out and could be advantageous. The 4-week supplementation period was quite sufficient to obtain clearly observable differences. To further reduce time and cost of analysis, a 2-week supplementation would suffice, and liver retinol and carotenoid concentrations could be determined before and after supplementation. Such studies on the bioavailability of carotenoids should be extended to human subjects. Copyright (C) 1996 Elsevier Science Ltd.

BLOOD LEAD LEVELS AND OCCUPATIONAL EXPOSURE AMONG VARIOUS OCCUPATIONAL GROUPS IN KLANG VALLEY, MALAYSIA

N M Amal, K G Rampal, M S Lye, E S Tee, H R Gudum and A M Anuar

Int J Epidemiol 1996 (in press)

With increasing industrialization and urbanization in Malaysia, it is anticipated that lead intoxication will become an increasing problem in the country. In view
Abstracts of the potential health problems arising from industrialization, a cross-sectional study was conducted to determine the extent of lead exposure and absorption among battery factory workers, traffic policemen and office workers in the Klang Valley which is the most industrialized region in the country. A total of 248 subjects (63 battery factory workers, 129 traffic policemen and 56 office workers) were included in the study. Physical examination was carried out and blood samples were taken for haematological and lead analysis (by method of graphite furnace atomic absorption spectrophotometry). Personal breathing zone sampling was carried out on randomly selected battery factory workers according to their job-title groups.

The mean blood lead level of the battery factory workers (65.1 ug/100 ml) was significantly higher than that of the traffic policemen (6.5 ug/100 ml) and the office workers (3.9 ug/100 ml) (p<0.001). Analysis also showed that the mean blood lead level of the traffic policemen was significantly higher than that of the office workers (p<0.001). 89% (56/63) of the battery factory workers had blood lead levels above the permissible limit of 40 ug/100 ml according to the Malaysian Factories and Machinery (lead) Regulation 1984. Personal air sampling showed that 50% of the samples in one of the battery factories had lead-in-air levels exceeding the permissible exposure limit (PEL) of 150 ug/m³ of air averaged over an eight-hour period in the regulations. The highest lead-in-air levels were found in the formation and cutting sections. Two workers with high blood lead and lead-in-air levels also had positive symptoms and signs of lead toxicity on physical examination.

The study clearly showed the poor compliance of the battery factory employers with the regulations, in spite of the fact that this regulations were in force more than 10 years ago. Therefore a close and continuous monitoring is recommended with more regular visits and enforcement being made by the relevant authorities.

**SPARGANA INFECTION OF FROGS IN MALAYSIA**

*A B Mastura, S Ambu, O Hasnah and R Rosli*


Frogs caught from two states (Selangor and Kedah) in Malaysia were examined for spargana of *Spirometra sp.* Infected frogs usually show no marks of infection but some had swelling and bleeding at the infection site. The size and weight of the infected frogs did not correlate with the infection status. The infection status in relation to human health is discussed.

**A PRELIMINARY REPORT ON MORPHOLOGY OF AN ADULT STAGE OF SPIROMETRA SP. (MUELLER, 1937) - MALAYSIAN STRAIN**

*A B Mastura, S Ambu and O Hasnah*


This preliminary report described the morphology of an adult worm of *Spirometra* found from a cat, orally infected with spargana. The entire strobila is from 55-71 cm and the length of scolex is from 3-13 mm. The *Spirometra* (Malaysian strain) seems to concur with...
the morphology of *S. erinacei* but conformation needs further study.

**PLASMODIUM FALCIPARUM**

**INCREASED PROPORTION OF SEVERE RESISTANCE (RII AND RIII) TO CHLOROQUINE AND HIGH RATE OF RESISTANCE TO SULFADOXINE-PYRIMETHAMINE IN PENINSULAR MALAYSIA AFTER TWO DECADES**

*S Lokman Hakim, S W A Sharifah Roohi, Y Zurkurnai, A Noor Rain, S M Mansor, K Palmer, V Navaratnam and J W Mak*


Uncomplicated falciparum malaria patients were randomly assigned to receive either 25mg/kg chloroquine (CHL) over 3 days or a statin dose of 25mg/kg sulfadoxine (SDX) plus 1.25mg/kg pyrimethamine (PYR). Patients were followed up for 28 days and the parasite response graded according to World Health Organization criteria. Overall resistance to CHL was 63.3% and 47.4% to SDX-PYR. RI, RII and RIII rates were 9.1%, 42.4% and 12.1% for CHL and 10.5%, 21.1% and 15.8% for SDX-PYR, respectively. Degree and rates of resistance to CHL were significantly correlated with pre-treatment parasite density, but not those to SDX-PYR. Plasma CHL and SDX/PYR levels were within the reported ranges and were not significantly different in patients with sensitive and resistant responses.

**MOLECULAR ANALYSIS OF HLA-B IN THE MALAYSIAN ABORIGINES**

*K Hirayana, A S M Zaidi, S Lokman Hakim, A Kimura, K J Ong, M Kituchi, H A Nasuruddin, S Kojima and J W Mak*


We have examined 56 unrelated aborigines from Malaysia for their DNA polymorphism of the HLA-B gene by sequence specific oligonucleotide probe (SSO) method. Using the SSO hybridization, we found that one specific DNA allele with a B*1513 like pattern of epitope combination (ECB 1513) was dominant among the Melayu Asli (Af=41.9%) and the Senoi (Af=24%). To determine the nucleotide sequences of ECB 1513, a DNA fragment spanning from the beginning of exon 1 to the middle of exon 4 of the HLA-B gene was amplified by polymerase chain reaction (PCR) from two ECB1513 positive individuals, and the PCR products were cloned and sequenced. This sequencing analysis confirmed that ECB1513 was identical to HLA-B*1513 in exon 1,2,3 and 4. Amino acid sequence of this major allele, HLA-B*1513, in the aborigines especially around the peptide binding groove (B and F pockets), was compared with the African B*5301 that had been suggested to confer resistance to malaria infection in Africa. The amino acid residues composing of the F pocket were completely identical in B*1513 and B*5301. These observations suggest that a common environmental factor, the malaria infection, might have independently enhanced the selection of functional changes in the polymorphic portion of HLA-B gene in Africa and in Southeast Asia.
The host susceptibility of Malaysian Paragonimus westermani was observed in cats, dogs and rats, infected with metacercariae. In rats, worms were harboured in the muscles and the flukes were morphologically similar to the excysted metacercariae except for their slightly larger size. In cats, about a half number of the flukes were from muscles and 40% from cysts found in the lungs. Majority of the flukes from these cysts were mature. In dogs, few mature flukes were obtained from cysts in the lungs and about 90% of flukes were recovered from muscles. The flukes from the muscles of the cats and dogs were of the same juvenile stage as those from rats. The juvenile flukes recovered from muscles of the animals were orally given to dogs and cats. Majority of the flukes were found in cysts in the lungs and most of them were fully mature. However, some juvenile flukes still remained in the muscles of cats and dogs. Therefore, the Malaysian P. westermani has a higher final host susceptibility than those from other localities. The present study suggests that many species of animals living in Malaysian jungle serve as paratenic hosts and may play an important role in the completion of the life cycle of P. westermani in Malaysia.

Immunological response of Acanthamoeba castellani infection has been carried out in experimental animals; BALB/c mice and rabbits. The experimental animals were infected with 20,000 trophozoites stage of Acanthamoeba castellani using intraperitoneal and intranasal routes. The immune response of these animals were monitored using ELISA. Intraperitoneal infection of mice with the parasite generally induced higher immune response than intranasal infection during the early period. At 30-35 days post-infection the humoral response in intranasal infected mice were very much higher. After 2-3 weeks, the mice showed ruffled and loss of fur followed by 70% of these mice (intraperitoneal infection) died but the mice with intranasal infection also showed signs of sickness and fur loss but only one death was noted. Rabbits were also found to be susceptibles to intraperitoneal infection, with intranasal infection the experimental rabbits look normal.
RESTRICTION ENZYME DIGESTION OF NATIVE AND PCR-AMPLIFIED DNA OF AN ACANTHAMOEBA CASTELLANII ISOLATE

A Noor Rain, Q Rommel, S Sajiri and Y Normaznah


This study attempted to verify the validity of using restriction fragment length polymorphism (RFLP) patterns of the genomic DNA and polymerase chain reaction (PCR) products of Acanthamoeba castellanii as an aid for identifying and classifying the parasite. Both the genomic DNA and the PCR products of the A. castellanii using a genus-specific set of primers A3 (TCCCCTAGCAGCTTGTG) and A4 (GTAAAGGTCTCGTTCGTTA) were digested using 27 restriction endonucleases. The patterns of the digested products were analysed by electrophoresis on agarose gel. The RFLP patterns of the genomic DNA showed different banding patterns with only enzyme Sma I, which did not digest the DNA. The restriction endonuclease-digestion patterns of the PCR products showed that 4 restriction endonucleases; Alu I, BstN I, Hinf I and Msp I digested the DNA. Our results showed that the RFLP patterns of the genomic DNA and the PCR products may be of use in identifying and classifying A. castellanii isolate that we have.

THE EFFECTIVENESS OF PERMETHRIN-IMPREGNATED BED NETS FOR MALARIA CONTROL IN KG. GANOH, AN ORANG ASLI AREA OF ROMPIN DISTRICT, PAHANG, MALAYSIA.

N M Amal and S Yussof


Malaria is by far the most important insect-borne disease with 100 million persons being infected each year throughout the world. In Malaysia, malaria is still a major public health problem especially among the aboriginal population (Orang Asli). Control of malaria transmission by DDT house spraying, although successful in most other areas in the country, has experienced many problems in Orang Asli areas, particularly due to their poor acceptance of the spraying and their nomadic way of life.

In view of the problems, a time-series, field (quasi) pre-experimental study was carried out to evaluate the effectiveness of permethrin-treated bed nets as a method of malaria control among Orang Asli in Kampung Gano, a rural village of Rompin district, Pahang, Malaysia, that is known to be highly endemic for Plasmodium falciparum infection. The study was conducted using 169 subjects, all Orang Asli families in the village. A total of 80 units of permethrin-treated bed nets were distributed to all the families. A series of yearly number of confirmed malaria cases prior to the intervention which took place in February 1991, from 1985 to 1990 were compared with post-intervention from 1991 to 1994. A total of 67 malaria cases reported prior to the intervention as compared to only 3 cases after the intervention. When compared with the average pre-intervention number of cases per year, we observed a marked and significant reduction in the incidence
of malaria cases after the intervention (11.2 cases per year before and 0.8 case per year after the intervention, \( p < 0.01 \)). Regression analysis showed a significant difference in the slopes of the regression lines for pre-intervention and post-intervention, \( p < 0.05 \).

This study revealed that permethrin-treated bed nets offer an effective method for controlling malaria in an Orang Asli area and such programmes can be extended to other parts where malaria control is problematic. Provision of permethrin-impregnated bed nets into the existing country's broad primary health care programmes can also be considered.

**CONCORDANT CHILDHOOD ACUTE LYMPHOBLASTIC LEUKEMIA IN MONOZYGOTIC TWINS**

*Y M Chin, A Wan Ariffin, H P Lin and Y S Chan*


Two 4-year-old monozygotic Chinese, female twins developed concordant childhood acute lymphoblastic leukemia (ALL) within an interval of about 2 weeks. Based on morphology and cytochemistry findings of the bone marrow blast cells, a diagnosis of ALL, L1 was made. Immunophenotyping showed the blast cells of both twins expressed similar antigens, i.e. HLA-DR, CD10, CD13, CD19, CD22 and CD34.

Identical blood group, same HLA (human leucocyte antigen) genotype, sex and similar appearance suggest that the twins are monozygotic. Since the bone marrow leukemic cells of both twins were identical in morphology and expressed the same antigens with almost similar percentages of positivity, it is likely that the blast cells were derived from the same single clone. Based on the single clone hypothesis, the leukemogenic event must have arisen in utero in one twin and the cells from the abnormal clone then spread to the other twin via shared placental anastomoses.

**ACUTE RESPIRATORY INFECTION IN MALAYSIAN CHILDREN**

*M S Lye, U Deavi, K P F Lai, H Kaur, R C Nair and K E Choo*


A cross-sectional community-based survey was conducted to determine the prevalence of acute respiratory infection (ARI) in children below 7 years of age and to obtain baseline information for an intervention programme. A total of 6190 households comprising 38 632 persons with 12 273 children (32 per cent) below 7 years of age were surveyed. Information on socio-demographic variables, environmental sanitation, occurrence of ARI and diarrhoea, treatment seeking behaviour during episodes of those illnesses and immunizations among children were obtained. Thirty per cent of children had experienced ARI in the 2-week period prior to the interview, and 94 per cent had mild ARI, 1 per cent had moderate and 5 per cent had severe ARI. There was lack of concurrence between mother's perception of severity and that of the investigators' (Kappa coefficient = 0.083 (95 per cent CI = 0.01 7-0.149). Twenty-four and 39 per cent of severe and moderate ARI, respectively, were reported by mothers to be mild. There is cause for concern as these children may not receive timely and appropriate treatment. The findings from this study contribute to
identification of target populations and priority areas for health education of the population. The survey has provided useful baseline data for the implementation of an intervention programme for the control of ARI in children.

**EVALUATION OF COLD CHAIN MONITORING IN KELANTAN, MALAYSIA**

*K Hanjeet, M S Lye, M Sinniah and A Schnur*


An analysis was carried out on a total of 883 cold chain monitor (CCM) cards, which had been attached to batches of poliomyelitis, measles, DPT (diphtheria, pertussis, tetanus) and hepatitis B vaccines, during their transport and storage from the central store in Kuala Lumpur to Kelantan, a state in north-eastern Malaysia. 234 freeze watches attached to hepatitis B vaccines were also analysed. The monitor cards and freeze watches were observed at six levels between the central store and the periphery during distribution of the vaccines, and a colour change in any of the four windows (A, B, C, D) on the CCM cards or the freeze watches was recorded. In addition, 33 unopened vials of oral polio virus vaccine (OPV), collected from refrigerators in 29 health facilities in Kelantan, were tested for potency using the tissue culture infective dose 50 (TCID$_{50}$) method. 14 of them (42%) did not meet the WHO criteria for potent vaccines.

The results showed that at the final destination 13.4% of all cards remained white while a colour change to blue was observed in 65% in window A, 16.6% in window B, and 4.4% in window C, none had turned blue in window D indicating that the vaccine had not been subjected to temperatures $\geq 34^\circ C$ for 2 hours. All but 2 of the 234 freeze watches had turned purple, which indicates exposure of the hepatitis B vaccines to temperatures below $0^\circ C$. These results will assist health planners to correct the weaknesses identified in the cold chain system.

**AUTOTYPES AND SEROGROUPS OF TETRACYCLINE-RESISTANT NEISSERIA GONORRHOEAE ISOLATED IN MALAYSIA**

*A S Koay, M Y Rohani and Y M Cheong*

*J Clin Microbiol 1996;1863-5.*

Between 1992 and 1994, 253 tetracycline-resistant *Neisseria gonorrhoeae* (TRNG) strains were isolated and characterized by auxotype and serogroup (A/S) classes to study TRNG prevalence in different years. TRNG accounted for 28.1, 42.5 and 51.7% of strains isolated in 1992, 1993, and 1994, respectively, showing a significant increase in each successive year (chi square = 26.7, $P < 0.001$). There was no significant increase in penicillinase-producing TRNG, which accounted for 53.1, 53.8, and 63.2% of the TRNG isolates. The 253 TRNG isolates belonged to 53 A/S classes. Eighteen A/S classes not observed in 1992 were detected in 1993, and 11 A/S classes not observed in 1992 and 1993 were isolated in 1994, indicating dissemination of the tetracycline resistance gene among the *N. gonorrhoeae* strains in Malaysia. Its emergence and subsequent rapid spread are alarming. The plasmid is capable of selftransfer (S.A. Morse, S.R. Johnson, J.W. Biddle, and M.C. Roberts. *J. Infect. Dis.*55:819-822, 1987) allowing further dissemination of tetracycline resistance.
IN VITRO DEMONSTRATION OF THE INVASIVE ABILITY OF CAMPYLOBACTERS

Sun Tee Tay, Shamala Devi, Savithri Puthucheary and Ingrid Kautner


By means of the gentamicin Hep-2 cell invasion assay, it was demonstrated that 82% of the Campylobacters tested were cell-invasive, including 83% of isolates from bloody diarrhoea and 80% of isolates from watery diarrhoea. The large number of invasive strains from watery diarrhoea suggests the possible role of invasiveness in the production of watery diarrhoea. Whether this stage can progress further to more severe symptoms such as bloody diarrhoea remains to be elucidated. Whether this progression to bloody diarrhoea occurs as a result of toxin production is still debatable. In Vero cells, invasion was less efficient and intracellular multiplication was not observed.

ADA ACTIVITY IN TUBERCULOUS PLEURAL EFFUSIONS IN MALAYSIA

Issa Rahizan, Md Yasin Rohani, Ahmad Norazah and Cheong Yuet Meng


The activity of adenosine deaminase (ADA) in the pleural effusions of 64 patients was studied. This was done in the period of November 1992 till May 1994 in Malaysia. Based on clinical findings, the patients were divided into the following groups: I) pulmonary tuberculosis; II) pulmonary malignant tumour; III) bacterial pneumonia; and IV) non specific pleural effusions. Patients with pulmonary tuberculosis presented with a significantly higher mean ADA activity. Analysis studied between groups implied highly significant differences (p<0.0005).

INDIRECT HEMAGGLUTINATION ANTIBODIES AGAINST BURKHOLDERIA PSEUDOMALLEI IN NORMAL BLOOD DONORS AND SUSPECTED CASES OF MELIOIDOSIS IN MALAYSIA

A Norazah, M Y Rohani, P T Chang and A G Mohamed Kamel


Interpretation of the indirect hemagglutination test (IHA) for melioidosis in endemic areas is difficult because of the presence of antibodies in apparently healthy individuals. Fifty-three out of 200 healthy blood donors in Malaysia showed positive antibody titres (≥ 1 : 40) against Burkholderia pseudomallei. Seven percent had an IHA titer of 1 : 40, 11% had an IHA titer of 1:80 while 8.5% had a titer > 1:160. Out of 258 sera sent for melioidosis serology, 7% of the patients had an IHA titer of 1:40, 9% had an IHA titer of 1:80 while 20% had an IHA titer of ≥ 1: 160. If a titer of ≥1:80 is taken as a cut off point for positivity, 29% of the patients had positive melioidosis serology. Increasing the positivity threshold may jeopardize the sensitivity of the test. A more specific and sensitive test is needed.
STRENGTHENING OF MEDICAL RECORDS SYSTEMS IN HOSPITALS

The objectives of the study are to:

i) determine the magnitude and factors contributing to the problem of inaccurate, incomplete and delayed documentation and compilation of the inpatient medical records at Hospital Ipoh.

ii) facilitate Hospital Ipoh staff in developing and implementing strategies to improve their system of documentation and compilation of inpatient records.

iii) evaluate these strategies and make further recommendations.

A notified intervention study to assess the status of completeness, accuracy and compilation of medical records was carried out in Hospital Ipoh from January 1992 to December 1993. Focus group discussions were held with doctors and nurses from the hospital to obtain their perception of the problems on medical records documentation and the associated reasons. Medical records of inpatients in Hospital Ipoh admitted to all the major specialities were randomly selected and assessed. A set of criteria for defining accuracy, completeness and systematic compilation of a medical record was prepared. Formats based on the agreed criteria were developed and utilised. Prior to data collection, all instruments were pretested and data collectors trained and assessed. During the period of data collection, inter-rater and intra-rater reliability assessments were carried out.

The study is currently in the stage of data analysis. Findings of the study will be presented to the Heads of Departments and Medical Superintendent of Hospital Ipoh, followed by a workshop to develop recommendations and a plan of action for implementation over a 6 month period, with a subsequent re-evaluation of the recommendations. The instruments used for this study can be expanded to other hospitals in the auditing of medical records. The final recommendations proposed can be used to improve the medical records systems in other hospitals.

Contributed by:

A B Azman¹, A H Maimunah¹, R A M Raja Jamaluddin¹, P Kandasami² and S Mohd Omar³

¹. Medical officer of Health, Public Health Institute, Ministry of Health Malaysia, Kuala Lumpur. ². Medical officer, Hospital Ipoh, Perak. ³. Lecturer, Faculty of Medicine, Universiti Malaya, Kuala Lumpur.
REVIEWS OF THE PROGRESS IN THE IMPLEMENTATION OF THE HEALTHY LIFESTYLE CAMPAIGN BY MINISTRY OF HEALTH, 1991

The Healthy Lifestyle Campaign (HLSC), was officially launched by the Ministry of Health in May 1991. The campaign had six themes. A specific theme was given each year. At the end of first thematic campaign an assessment was carried out to determine the extent of success and to plan for the subsequent thematic campaigns.

This study attempted to describe the campaign’s activities carried out by various levels of Ministry of Health personnel and explored factors that influenced the campaign activities.

Instruments used for the collection of data were self-administered checklists and structured questionnaires. The questionnaires were distributed to respondents. They comprised Ministry of Health personnel in 68 districts in Peninsular Malaysia, selected by proportionate random sampling method.

The findings revealed only 2 out of 6 respondent states had fully implemented the activities at state level. 96.6% of the health and hospital managerial personnel partially implemented the HLSC activities. The number of activities increased, notably after mid 1991. Reasons cited for the partial implementation were delay in receiving instructions, insufficient reference materials, transfer of personnel and commitment in other activities. Clarity of instructions was not found to be significantly associated with the progress in implementation. The study also showed that the front line personnel had the least knowledge about the campaign activities.

The study pointed to weaknesses in the implementation of HLSC. Recommendations to overcome them included printing of education and training materials, distribution of materials prior to actual implementation, strengthening of training session, and formulating a Plan of Action based on the study’s findings.

Contributed by:

H Abdul Razak, D Rokiah, Rugayah Bakri, and M J Ahmad Nordin


ASSESSMENT OF THE POTENTIAL USE OF ALTERNATIVE STRATEGIES TO REDUCE HOSPITALISATION

Hospitalisation, from the medical point of view, is a means of providing the patient with needed care. Therefore care which has no effect or adverse effects on health is considered inappropriate hospitalisation. Factors related to inappropriate utilisation may be related to patients and their family and/or support systems, the physicians and hospital policies.

The study was aimed at determining the magnitude of inappropriate utilisation of acute hospital beds and assessing the need for alternative strategies to optimise utilisation of government hospital beds.

A cross-sectional assessment of the appropriateness of stay, and the
appropriateness of admission of patients in nine government hospitals was conducted. The appropriateness Evaluation Protocol (AEP) was adopted with modification and used as the objective criteria. Assessment based on subjective criteria was carried out by seeking clinicians' opinion on the necessity of patients' presence in the ward. The clinicians' opinion was also sought on the suitability of these patients to be managed by lower-level alternative care.

On applying the objective criteria, 41.4% of the patients in the wards were found to be inappropriately present and 53.1% of them were inappropriately admitted. Based on subjective criteria, 31.1% of the patients were considered inappropriately present, and 34.1% were inappropriately admitted. It was found that a total of 17,579 bed-days could have been saved from patients who were inappropriately occupying the acute hospital beds. If the admission and/or delayed discharges of these patients could be avoided, an absolute cost at hospital level of RM900,000 to RM2,000,000 could be saved. The main reasons given for delayed discharges an inappropriate admission were those related to treatment/observation and lack of social support. The clinicians had positive opinion towards the use of the ambulatory care, home visit nursing, and alternative institutions as alternative lower-level services to reduce hospitalised bed-days. The characteristics of the patients who were thought to benefit from these alternative services were also analysed.

The modified AEP was found to be practical and applicable for use as an objective screening procedure in the acute hospital setting. Measures to reduce unnecessary admissions, as well as measures for early discharges, were recommended.

The findings of this study were presented at an action meeting among hospital managers. Plan of action to reduce unnecessary admissions and promote early discharges was developed. It was agreed to pilot-test the plan at Hospital Ipoh and Hospital Pulau Pinang. The results of the pilot studies will be subsequently reviewed.

Contributed by:

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The Ministry of Health recognized that the healthy lifestyle campaigns previously carried out need to be given further impetus to achieve the desired improvements among the communities. Realising that the inculcation of a culture of healthy eating is the ultimate strategy towards improving the nutritional health of the population, the theme of the first year of the second phase of the Healthy Lifestyle Campaign of the Ministry of Health Malaysia is Healthy Eating.

A nationwide study is proposed, aiming at obtaining baseline data on the knowledge, attitude and practice on food and nutrition amongst various segments of the community and food service providers, prior to the implementation of the Healthy Eating Campaign in 1997. Results obtained would then be used for monitoring and evaluation of the campaign. Budget for the implementation of the study has been requested through the National Plan of Action for Nutrition (NPAN), Ministry of Health Malaysia.

This descriptive study will be implemented through observations, interviews and self-answered questions using structured questionnaires specified for each target group. Households will be selected by using the sampling frame used for the Labour Force Survey of the Statistic Department. Selected households shall be visited and all target groups in the household shall be studied, ie adults, elderly, adolescents and primary school-age children. Selected food handlers in registered food premises will also be interviewed.

The Technical Working Group on Research (TWG-R) of the National Coordinating Committee on Food and Nutrition (NCCFN) was requested by the Healthy Lifestyle Campaign Committee, Ministry of Health, to carry out the baseline study. The Human Nutrition Division of IMR was given the mandate to lead this 15-member TWG-R which comprised mainly professionals in research, nutrition and health, from local universities and other government agencies related to food and nutrition activities.

Putting the study as an early priority, the group has been preparing and discussing the protocol, questionnaires and implementation of the study in the monthly group meeting since the last quarter of 1996. A workshop was successfully held on the 18 to 19 November 1996 in Kuala Lumpur to plan the implementation of the study. The workshop was officiated by Dato' Dr Hj Abd. Aziz bin Mahmood, the then Director of the Family Health and Development Division of the Ministry of Health and was well attended by 58 officers all over the country mainly the State Nutrition Officers, Family Health and Development Officers and Health Education Officers. The
workshop discussed the questionnaires and achieved consensus on logistic and implementation issues of the study.

A pretest was subsequently carried out between December 1996 to January 1997 in six states namely Kedah, Kelantan, Selangor, Johor, Sabah and Sarawak. Based on the feedback, the TWG-R is now moving towards improving the questionnaires and other final issues on sampling and logistics before the data collection begins in March 1997.

Contributed by Anisah Abu Bakar
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Institute for Medical Research

NATIONAL DENGUE CONFERENCE 1996, MINISTRY OF HEALTH

The National Dengue Conference 1996 was held at the Institute for Medical Research (IMR), Jalan Pahang, Kuala Lumpur from 9 to 11 May 1996. The conference was organised and sponsored by the Ministry of Health. The Institute for Medical Research assumed the major responsibility for running the conference. The organisation of this conference was a result of the consensus reached at the meeting held at Awana Golf and Country Club, Genting Highland in 1995 in which dengue was identified as one of the priority areas in view of the increasing number of cases in several states.

The objectives of the conference were to highlight the upsurge of dengue control activities, identify problems in implementing dengue control and to make recommendations for an early warning system in dengue surveillance. A total of 60 participants from the Ministry of Health, Ministry of Housing and Local Government, Ministry of Welfare and Social Development, local universities and non-government agencies attended the conference. The participants comprised of public health officers including State Deputy Directors (Public Health), Clinicians, Medical Officers, Public Health Engineers, Legal Advisors, Entomologists, Scientific Officers, Research Officers and Health Inspectors.

The conference was declared open by the Minister of Health. Six working papers were presented by 6 speakers from the Ministry of Health, Kuala Lumpur City Hall and University of Malaya. On the second day of the conference, participants were divided into 3 working groups. They were asked to work and come up with recommendations on 3 major topics respectively, i.e. effective implementation of dengue control, improving surveillance and research for effective dengue control. On the final day of the conference, each group presented their recommendations and followed by panel discussion which was chaired by Deputy Director General of Health (Research and Technical Support), Ministry of Health.

Contributed by Amal Nasir Mustafa
Division of Epidemiology
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FOURTH ADVANCED ASIAN COURSE IN TROPICAL EPIDEMIOLOGY, 28 OCTOBER - 8 NOVEMBER 1996

The Advanced Asian Course in Tropical Epidemiology is held annually in rotation by SEAMEO member countries at their respective TROPMED National Centres. This is the fourth of its kind, having been successfully hosted before in Bangkok, Manila and Jakarta. The role of SEAMEO-TROPMED is to promote health and to prevent and control disease in the region. This course is the result of collaborative work and cooperation among SEAMEO member countries in an effort to strengthen institutional capabilities in research and human resource development by upgrading knowledge and skills of health personnel in epidemiology and biostatistics in line with the role and objective of SEAMEO-TROPMED member countries.

This intensive course was conducted over ten working days and was designed for health professionals who are already well grounded in basic epidemiology and biostatistics and wish to further advance their knowledge along the same lines in research methodology and in enhancing epidemiological thinking. A total of 43 participants participated in this course of which 17 were from other countries, namely, Cambodia, Vietnam, Thailand, Indonesia, Philippines and Lao PDR. The Fourth Advanced Asian Course in Tropical Epidemiology organised by the Institute for Medical Research (IMR) Malaysia which is the SEAMEO National Centre for Tropical Medicine in Malaysia.

Among the objectives of the course were to describe design options in observational studies, select appropriate type of observational study for specific epidemiologic situations, discuss various aspects in the design of epidemiological studies, critique the study design presented in published epidemiological papers, describe conceptual basic for the statistical analysis of epidemiological studies, select appropriate statistical technique for data analysis, interpret the results of these statistical procedures and draw appropriate conclusions and to interpret and critique the statistical methodology presented in published epidemiological papers. The course was sponsored by SEAMEO TROPMED and the Ministry of Health and there were ten private candidates sponsored by their local authorities; 3 locals and 7 foreigners. There were 8 lecturers for the course; 3 locals, one from Canada, 2 from the Philippines, one from Thailand and one from Indonesia. Among the major topics covered were types of epidemiologic studies, statistical analysis and computer application. The participants were required to deliberate on a variety of problems, study designs and data analyses. The course was completed successfully.

Contributed by Hanjeet Kaur and Amal Nasir Mustafa
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HAEMOGLOBIN ANALYSIS WORKSHOP, 17-19 SEPTEMBER 1996, KUALA LUMPUR

The Haemoglobin Analysis Workshop was organised by the Division of Haematology, Institute for Medical Research, Kuala Lumpur from 17-19 September 1996. The objectives of the workshop were to increase
knowledge on the advances in haemoglobinopathies and to introduce current techniques in the detection of the disease.

A total of 30 participants comprising of Medical Officers, Scientific Officers and Medical Laboratory Technologists from the General Hospitals throughout the country attended the workshop. The participants were exposed to conventional and current techniques in the diagnosis of haemoglobinopathies. The current techniques demonstrated include isoelectric focussing, densitometry and DNA analysis.

Haematologists from Thailand, the local universities, government and private hospitals were invited to conduct lectures at the workshop. Professor Elizabeth George from Universiti Kebangsaan Malaysia, Kuala Lumpur gave a lecture on Haemoglobin and DNA analysis in the alpha thalassemias. Professor Suthat Fucharoen from Mahidol University, Bangkok gave an overview of the current and future techniques in the diagnosis of haemoglobinopathies as well as the management of the disease.

The participants were presented with attendance certificates at the end of the workshop.

*Contributed by Chin Yuet Meng*

*Division of Haematology*

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