Economic Crisis and Health Development

Role of the World Health Organization in the Economic Crisis*

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Introduction

THE economic crisis facing several countries in Asia presents a great challenge to the progress that these countries have made in many of their indicators for health, including increases in life expectancy (e.g., from 45 years in 1967 to 63.9 years in 1997 in Indonesia and decreases in infant mortality rates (e.g., from 145 per 1 000 live births in 1967 to 54 in 1996 in Indonesia.

The goal of sustainable development cannot be achieved in a society if its peoples suffer ill-health. However, healthy people can contribute to the achievement of sustainable development. Therefore, health is a part of the goal of sustainable development and, in turn, helps to achieve that goal. In this sense, especially in a crisis, health is everybody's business.

It is fully understood that health is not isolated from other issues affected by an economic crisis, including levels of poverty, transportation infrastructure, water and sanitation. However, this paper focuses on the "sphere of influence" that we have in the health sector and what role the World Health Organization (WHO), in partnership with government, development and donor allies in the health sector, plays to help alleviate the negative impacts on health brought about by this economic crisis.

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Roles of WHO in an Economic Crisis

WHO, as a specialized agency of the United Nations (UN) system, has unique roles, to provide technical assistance. These roles become even more critical in a time of economic crisis. Specific roles, and concrete examples of how these roles have been implemented in Indonesia, include the following:

Advocacy for a social safety net, including health

In January 1998, WHO convened a meeting of representatives of UN agencies in Jakarta to alert the UN agencies of the threats to the health of the most vulnerable groups in Indonesia due to the economic crisis and to note that the UN agencies, working together, could play a significant role in ameliorating the effects of the crisis on health. This led to such innovative approaches as the UNIDO effort to explore the potential of the Indonesian fine chemical industry to manufacture the raw materials needed by Indonesian pharmaceutical manufactures to continue to make essential drugs.

In February, April, and July of 1998, WHO either chaired, or co-chaired, with the Ministry of Health, informal donor meetings in the health sector on the economic crisis and its impact on health. These meetings brought together government agencies, UN agencies, development banks, bilateral development assistance agencies, and nongovernmental organizations to discuss the impacts of the crisis on health, the needs of the government to address these impacts, and the willingness of donors to help meet these needs. Such meetings helped to keep health high on the list of government and donor priorities for inclusion in a "social safety net."

Throughout the crisis, WHO has met with numerous donors and potential donors to advocate the important "link" that health should play in a "social safety net" in Indonesia, including provision of information on: gaps developing for needed raw materials for essential drugs; essential imported medical supplies (x-ray films, sutures, IV kits and blood bags, test kits and reagents); and the operational costs for providing services to the poor by village midwives (bidan di desa), health centres (puskesmas) and first referral-level hospitals (district hospitals).

In addition, WHO, at the regional level, called a Meeting on the Economic Crisis and its Impact on Health in Bangkok in March 1998, and supported a Regional Meeting of Parliamentarians on the same subject in Jakarta in December 1998, to draw linear attention to the crisis, and for countries to share their experiences in coping with the crises. At the global level, WHO has been involved in advocacy for health under times of economic crisis. As recently as

December 1998, WHO headquarters called a special meeting in Geneva to review the experiences with structural adjustments and their impacts on health and to recommend ways that WHO can be even more proactive and effective at global, regional and country levels during times of economic crises.

Technical assistance to government in assessing the likely impacts of the crisis on health and developing interventions to ameliorate those impacts

WHO prepared materials, in collaboration with government counterparts, on the likely early effects of the economic crisis on health, including availability of essential drugs and vaccines, declining health status of the poor and near poor population, increase in the utilization of government health services, and decrease in the demand for private sector health services. Short-term interventions recommended to address these likely impacts included: issuing Ministry of Finance letters of credit to immediately import at least a six-month supply of critical consumables (e.g., x-ray films and laboratory reagents) and the raw materials to make essential drugs; halting of non-essential new civil works, construction and equipment purchases; reprogramming donor-assisted projects to the highest priority needs; targeting scarce resources to the priorities of maternal and child health care in areas of greatest need; maintaining the distribution of doctors and village midwives in the poorest rural areas; paying subsidies to support operational costs of health centres and hospitals in areas with a high proportion of poor; rapidly developing the kartu sehat (health card for the poor) system to correct its deficiencies; and establishing a sensitive monitoring system for the health effects of the crisis. Intermediate and longer term recommended actions included: encouraging increased use of generic drugs and promoting health insurance with cross-subsidies for the poor.

As the crisis unfolded, WHO continued its dialogue with the Ministry of Health and the central planning bureau (BAPPENAS) to identify additional areas of impact of the crisis on health and to refine cost-effective recommendations on interventions. Such work is based upon the technical expertise of in-country WHO international and national staff as well as selected visits of technical experts from its Regional Office and headquarters (e.g., a consultation by the headquarters' Drug Action Programme on the issues of rational drug use, drug dispensing policies, and drug registration procedures).

Technical assistance to the government in developing monitoring systems

WHO provided technical assistance to the Government in developing monitoring systems (with recommended outcome health indicators, such as levels of malnutrition in children, and process indicators, such as essential drug prices and availability). Such monitoring, although still at an early stage, will ultimately help to determine the actual impacts of the crisis on the health status and delivery of health services, target interventions to the areas of greatest need, and assess the effects of interventions. For example, WHO is working with the Ministry of Health to improve the collection and analysis of information about drug supplies at the district level. In addition, support is being given for a rapid assessment of drug supplies and prices at all administrative levels. In Indonesia, the Ministry of Health has created a crisis centre to be a focal point for this monitoring activity and WHO provides the services of international and national staff in supporting this activity.

It is a challenge to balance the needs of a streamlined, timely, complete and focused monitoring system at a time of crisis versus the routine reporting systems for health data. In addition, more needs to be done to link information with interventions and to provide data useful to decision-makers. Ideally, the monitoring systems in the crisis can be a stimulus to a more effective routine data collection system that will remain in place after the crisis – rather than a parallel system that is only temporarily established and then dismantled after the crisis has passed.

Supporting coordination efforts of the government

WHO works to support the government's efforts in coordinating inputs by the international community (UN agencies, development banks, bilateral development assistance agencies, and nongovernmental organizations) to avoid duplication of efforts and reduce gaps in critical areas. Such support ranges from helping to organize informal donor meetings of all donors in the health sector, to providing the services of in-country WHO international and national staff to work, together with Ministry of Health counterparts, on a one-to-one basis with donors to develop and refine their individual project or sector loans and grants.

Technical assistance to others in the international community

WHO also provides technical assistance to others in the international community, both on request and through proactively offering, regarding their project or health sector loans or

grants to help maximize the impacts of these loans or grants on improving health. In Indonesia, examples have included: consultations with UN agencies (such as UNICEF, UNFPA, and UNIDO), development banks (such as World Bank and the Asian Development Bank), bilateral development assistance agencies (such as US Agency for International Development , Japanese International Cooperation Agency, and the Australian Agency for International Development), and nongovernmental organizations (such as PATH and UPLIFT International).

Limited Funds

Although WHO is primarily a technical assistance agency, it sometimes provides limited funds for critical shortfalls where other donors may not be able to mobilize funds quickly. In Indonesia, examples have included: providing $100 000 for an emergency purchase of HIV test kits to ensure continuity of testing for blood safety while other donor funds were being mobilized to assure a longer term supply of the test kits, helping to support the establishment of a Health Development Reform Task Force, and assisting in the formation of a crisis centre within the Ministry of Health.

Lessons Learned

The economic crisis provides an opportunity to learn what approaches work and don't work that may be useful as the crisis continues and may have applicability to other countries experiencing a similar crisis. Some of these lessons learned in Indonesia, to date, include the following:

Crisis as opportunity

At first, the crisis seems overwhelming in its nature. From the WHO side, we appreciate that, in a crisis situation, it is often difficult to look ahead from the immediate crisis at hand to the looming crises yet to come. However, the crisis forces a "new look" at virtually all policies, strategies and programmes due to the threats of contracting funds. Often the problems existed before and are only exacerbated by the crisis. In this way, the crisis can also be seen as an opportunity to solve key problems and make significant improvements in both government and donor programmes and interactions.

In the health sector, this means that we also need to view the crisis as an opportunity for change and to improve efficiency. In Indonesia, such opportunities include: (a) developing timely and comprehensive monitoring systems to look at utilization rates of health centres and hospitals, availability and costs of essential drugs, and increases in diseases (especially those associated with poverty) to assess trends and the effects of interventions; (b) increasing the proportion of

government budgets to the social and health sectors (real increases as compared to increases due only to the donor projects being valued at a higher rate of exchange due to their dollar-based funding); and
(c) Improving the procurement of raw materials, finished products and medical equipment being imported for the health sector.

Importance of priority setting

In a situation of scare resources, decisions must be made on funding priorities. For example, is it better to use public funds for the medicines needed to keep 1 000 terminally-ill cancer patients alive for a few months longer, or to use these funds to provide the antibiotics needed for treating pneumonia in 100 000 children? In an ideal world, all medical care needed for all peoples would be available. We do not live in that ideal world in any country and, in Indonesia, some of these choices may have to be made. In the absence of consensus on such issues, conflicts over the use of funds will arise and often the most vocal, rather than the most needy, will win. The government should focus its resources on subsidizing public goods and cost-effective interventions. On the other hand, such insurance schemes should be established as would enable all people to have access to treatments for more costly diseases, such as cancer and renal failure.

Potential to lose priority setting pressures in the face of additional funds

The pressures brought by an economic crisis to prioritize, may, however, be deferred as additional funds are provided by the donor community. There is a balance between providing a safety net whereby extremely difficult choices (such as whether or not to use the funds to save 100 000 children from pneumonia or 100 000 children from diarrhoeal diseases) do not have to be made, and between providing a surplus of funds that allows cost-inefficient programmes to easily continue (including non-competitive procurement of medical equipment and imported raw materials for the manufacture of essential drugs, practices of corruption, and non-rational drug prescribing practices).

Donor driven or inappropriate consumer driven programmes

A crisis may result in donors with good intentions providing materials that may not be in the best interests of the country. A good example is the donation of medical supplies and pharmaceuticals. In Indonesia, for example, dialysis supplies have been sent by donors without first checking to see if they are compatible with the dialysis equipment used in the country. Pharmaceuticals have been donated that were short-dated or not in the drug formularies of the country.

Consumers, too, can put pressure on the government to supply items that may, in fact, worsen the situation. An example in Indonesia has been the concerns expressed by some mothers about the prices of infant formula. Importation and distribution, by the government and donors, of infant formula may create the impression that infant formula is preferable to exclusive breast-feeding for the first 4-6 months of life. Rather than the protective effect of exclusive breast-feeding (and the fact that breast milk is free), infants will potentially be weaned to an infant formula that may be overly diluted (because of its expense, even if subsidized) and prepared with contaminated water (because of the difficulty and expense of boiling or using bottled water for proper formula preparation) in situations with unsafe water supplies.

Disbursement of funds without clear guidelines

In the good-intentioned effort to disburse funds quickly to create a social safety net, there must first be a well thought-out guideline as to how to use the funds. For example, in Indonesia, a social safety net programme disbursed funds (10 000 rupiah per poor family) to district levels to support health services for the poor by village midwives and health centres. However, many midwives and health centres delayed drawing on these funds because of their initial concerns that there was not sufficient guidance on exactly what the funds could be used for. They feared that if they used the funds without detailed guidelines, they might later be subject to an audit that could accuse them of not properly using the funds.

Paucity of data for decision making

Of great concern to many donors, and to the government as well, is the difficulty of activating the routine information systems to rapidly report, in a timely and complete manner, essential indicators by which to measure trends in health status and the provision of health services, to target the vulnerable populations in greatest need, and to determine the effect of intervention programmes. In Indonesia, these concerns have led, in some cases, to the development of parallel information systems that may duplicate the work of the routine system, or overlap with the work of other parallel information systems being set up by different units within the government, funded by different donors. In addition, there is a tendency to set up an elaborate, centralized reporting system. Interventions are conducted locally and useful information is most needed at these levels to guide local efforts. The establishment of a crisis centre, with a mandate to oversee all data collection efforts to monitor the crisis, may help to stimulate the routine system and maximize the benefits of specialized reporting systems. This will

ensure that the data for decision-making are readily available and will also provide donors with the confidence that their contributions are accounted for and making an impact on ameliorating the effects of the crisis.

The effects of other sectors on health

There are many other sectors whose activities have direct or indirect impacts on health. Transportation affects the distribution of food, medicines and referral medical care. Agriculture and the availability of agricultural products affect the nutritional status of the population. Education levels affect basic health knowledge and literacy has been demonstrated as a factor in improved health. Family planning limits the too many, too often, too young and too old pregnancies that lead to high maternal mortality rates and a cycle of poverty. Industry and employment affects the levels of poverty. Environment and public works affect the availability of safe water and adequate sanitation. It is a challenge during a crisis to see how to maximize the positive impact of the different sectors on health and, in turn, how good health can lead to positive impacts in the other sectors (e.g., a healthy worker is a more productive worker in industry or agriculture).

Conclusion

It is clear that the Government of Indonesia and its Ministry of Health are very concerned about the implications of the economic crisis on the health of the Indonesian people. It is also recognized that, in addition to health, there are great concerns regarding the entire social sector and the need to establish a "social safety net" to protect the most vulnerable segments of society.

The development and donor community in Indonesia, including WHO, is also very concerned about the health implications of the economic crisis and is showing an unprecedented degree of flexibility of approach to ensure that loan and grant projects are suitably adapted to the new realities.

Is the common goal to achieve sustainable development of the Indonesian people threatened by the potential of this economic crisis to take back many of the hard-won development gains, including those in health, such as decreases in infant and childhood mortality rates, increases in life expectancy, and decreases in fertility rates?

No one person or agency has all the answers; and no one, alone, can solve all of the problems. But, working together, creative and innovative ways can be found to help ensure that the most vulnerable groups will continue to have access to primary health care services. After the process of overcoming this crisis, it may be

possible to ultimately look back at some future time and realize that such a crisis has provided the impetus that was needed for improving efficiencies in the health system; strengthening competition in such areas as pharmaceuticals, medical equipment and vaccines in the era of globalization; and establishing reforms for health financing to protect the poorest of the poor.

WHO's role is to advocate and provide technical assistance to those working on structural adjustment policies, to encourage placing "a human face" on such adjustments and to put into place the "social safety net" that prevents the most vulnerable segments of our society from plunging into a cycle of poverty and ill-health – each conspiring to create an inescapable spiral of needless suffering, disability and even death.

Disease Control

Prevention and Control of Malaria through Community Effort: Experiences of a Tribal Community in Rural Orissa, India

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Abstract

The Christian Hospital, Bissam Cuttack, is situated in an area of hyperendemic malaria. In its community health programme, it introduced a community-based malaria control strategy. This was founded on intensive health education, with the introduction of multiple, risk-reduction options, including insecticide-treated mosquito nets (ITMN). This article reports good community response to the concept. The programme is self-financed, with no subsidy involved. Cost recovery has been satisfactory. Data to date show a marked decrease of 30 to 40% in fever cases, hospital admissions for malaria and fever-related mortality in the community, in comparison with the corresponding period in the previous two

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years. The authors suggest that such people-based micro-programmes can significantly contribute to the control of malaria, even in difficult areas.

Introduction: Quantifying the Burden of Malaria

INDIA is in the 50th year of her independence. Great progress has been made in many spheres. However, there is enormous variation in achievements from area to area. In 1992, the official infant mortality rate for India was 79 per 1 000 live births. But the state-level figures ranged from Kerala's 17 to Orissa's 115'. Orissa is also a stronghold of malaria in India. The offical report for 1991 states that almost 20% of the malaria cases and 55% of the malaria deaths reported in India, occurred in this state[2]. Within Orissa, the bulk of the malaria cases (70%) is known to be in the tribal areas[2].

According to the 1991 Census, there were six blocks in Orissa that showed a negative growth rate. Of these, the saddest pictures were of two adjacent blocks in Rayagada District, Chandrapur and Bissam Cuttack, with figures of – 10.3 and – 8.2 respectively[3]. Disaggregated data indicate that the fall was primarily in the tribal population, which forms over 60% of the community. Migration is virtually non-existent in this community. The findings can only be explained by extremely high mortality. Two community diagnoses come to mind. One, the winter epidemics of meningococcal meningitis that swept the area from 1987 to 1991. And, two, malaria – unrelenting, perennial, under-reported, rampant malaria.

Official data on malaria are self-acknowledgedly inaccurate. The National Malaria Control Strategy document suggests that only one in a hundred malaria cases and deaths actually figure in the official reports[4]. This probably holds true in this area too.

Sentinel data available from local sources indicate that malaria is clearly the public health problem No. 1. The authors of this article operate a Management Information System (MIS) in 38 villages covered by our community health programme. In this programme, covering a population of 9 045, about 60 people have been dying each year of fever, probably malaria, amounting to a proportionate mortality rate of 33%. An unpublished report of a study done in this area in May 1996 by the authors and Malaria Research Centre (MRC) of the Indian Council of Medical Research (ICMR), found that up to 88% of the fever cases tested in one village were positive for the malaria parasite. There

is no doubt that a significant proportion of the morbidity and mortality in this area, which gives rise to the negative growth rate, can be attributed to malaria.

An Alternative Strategy for Malaria Control

Christian Hospital, Bissam Cuttack (CHB) is a 150-bed Mission hospital, serving the people of this area since 1954. The Community Health Department of CHB covers 9 045 people in 38 villages through its MITRA Programme. It works towards comprehensive health, education and development, through people's participation, demand generation and social mobilization. Based on the MIS data, the team decided to prioritize on malaria. However, the traditional strategies failed to pay off. Flooding the area with chloroquine depot-holders did not make a dent. It was obvious that a totally different approach, focusing more on prevention, was called for. This would require a much deeper understanding of malaria in its local flavour.

The team approached malariologists in WHO, MRC and Vector Control Research Centre (VCRC) for advice and information. We also reviewed literature on alternative strategies used in different regions, especially in Africa. We visited projects in the state that work with malaria. We learnt that the predominant vector in this region is *Anopheles fluviatilis,* and that this mosquito breeds in running water. Mountain streams are innumerable in this hilly area, and villages are placed conveniently close to them. Bio-environmental measures to reduce vector breeding become irrelevant in an *A. fluviatilis* area[5]. Residual insecticide sprays have limited desirability for environmental, logistic and socio-cultural reasons.

The obvious inference is that the only effective strategy would be one based on personal protection measures, to be adopted on a mass scale. This would call for a kind of people's movement against malaria[6]. This, in turn, would be dependent on empowerment of people, with a good working knowledge of the essentials of the epidemiology of malaria, in a demystified, digestable form. One hundred years after Ronald Ross' sensational discovery that the mosquito transmits malaria, the prevalent thinking in the local community here is that it is contracted through drinking contaminated water. Logically therefore, the first step would need to be an effective public awareness campaign, to enable villages to launch and run their own micro-programmes for malaria control. Multiple options for risk reduction were put into a menu format, including neem oil-based repellents and insecticide treated mosquito nets (ITMN). Villages were encouraged to choose options from the menu.

A Progress Report

Through 1996 and early 1997, village after village opted for malaria education and for self-financed ITMNs. There was no subsidy involved. The people agreed to repay the cost in instalments. The uptake of nets was beyond expectations, given the circumstances. The economic losses due to malaria far outweighed the cost of the nets. A review of the data at the end of 15 months (as of 30.6.97) indicates the following:

Malaria education sessions:	50% of the population attended.
No. of nets in the area:	(as of 1-4-96) = 15 (pre-intervention)
	(as of 31-12-97) = 1 045 (treated)
Cost recovery of ITMN	(as of 31-12-97) = 85%

The impact on fever is given in the Table below.

Table. Distribution of fever cases and fever deaths in the community, with hospital admissions for malaria from the same community, 1995-1997

Indicators	1995	1996	1997
Fever cases seen	1432	1678	1073
Fever deaths	64	73	44
Hospital admissions for malaria	43	61	25

Discussion and Conclusions

The data show a dramatic fall of over 30.6% in fever cases in 1997, as compared to the average of the two preceding pre-intervention years. Deaths due to fever show a decrease of 35.5%. Hospital admissions for malaria from this community show a drop of 50.5%. Preliminary data from neighbouring areas not covered by the programme indicate unchanged morbidity and mortality. The results are similar to those reported from ITMN programmes in many African countries, and elsewhere.

Many pertinent questions arise. Is this change sustainable? Isn't the population base too small to be relevant? Aren't the indicators used too non-specific? And so on. Time will tell. However, the authors' purpose in writing this article is to share the lessons learnt.

Malaria can be countered and reduced, with effective health education, vibrant people's empowerment and participation, and the introduction of powerful tools like ITMN, even in difficult areas like the forested hills of Bissam Cuttack.

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Differentials of the Immunization Programme in Rural Bangladesh and the Issue of User Fee

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Abstract

This study investigated some aspects of the sustainability of the immunization programme by exploring the association between immunization coverage and price affordability with some selected socioeconomic variables in rural Bangladesh. It was conducted in 75 villages in 10 districts. Eligible interviewees were 1 145 resident mothers having a child of age 12 to 23 months. Both paternal and maternal education were found to have a significant influence on immunization. There was no significant association between immunization coverage and the child's sex, household's cultivable land, labour sale and NGO involvement. Exposure to media like radio increases predictability of immunization by about two folds. Most people wish to pay none or minimal user fee; therefore restrict the financial sustainability of the programme on its own. An increase in parental education enhances the willingness to pay user fees.

Introduction

IN TERMS of cost, efficacy and efficiency, immunization presents one of the most important means to improve the health status of whole population.[1] In recognition of its importance, immunization has always been a cornerstone of various child survival programmes in recent

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decades. Of all global indicators on PHC services, immunization coverage (IMC) is the most reliable and comparable since its definition and calculation methods are clear, standardized and widely available in almost all developing countries.[2] Some have already suggested it as a proxy indicator for the availability of PHC services[3]. In Bangladesh, although other development efforts suffer from setbacks, stagnation or reversals, IMC has shown a significant increase. Its Expanded Programme on Immunization (EPI) is heavily subsidized by foreign donors with the national exchequer bearing only 30% of the expenditure. If the donor funds are withdrawn or reduced, the government will have to make the difference either through diversion of funds from other activities or through service charges to the community or individual. The major problem areas for research are the socioeconomic determinants of IMC in the rural perspectives of Bangladesh and the financial sustainability of the programme. Whatever success has been achieved so far is largely due to highly infused supply side initiatives. The demand side responsiveness still requires much study as people's self-inspired participation is the key to political, social, organizational and financial sustainability of the programme. This present study correlates selected socioeconomic indicators with childhood immunization and examines the prospect of introducing service charges on immunization coverage.

Methods and materials

The sample population included 75 villages from 10 districts of Bangladesh. However, the study itself did not select these study areas; rather the study was conducted in those specific villages that had previously been chosen for the health, demographic and socioeconomic surveillance project of the Bangladesh Rural Advancement Committee (BRAC), one of the world's largest indigenous nongovernmental organizations (NGO)[4]. As core elements of the project, data were being routinely collected on demographic, health and development indicators to monitor the outcomes of various health and non-health interventions that were being implemented for more than a decade in the rural areas. The surveillance villages are dispersed over diverse geographic terrain and socioeconomic enclaves. The selection was not random, rather purposive to comprise villages from the flood-free highland, the famine-prone northern areas, the less accessible marshy land, the 'close to the capital' central districts and the cyclone-prone coastal areas. Placement of BRAC programmes, provision of residence to the field staff and easy accessibility of these villages to the supervisory staff were other

important criteria for the selection. In these villages, BRAC operates its micro-credit, education, training, health and population interventions for the landless rural poor. Households belonging to both members and non-members of BRAC were included in the study. First, a census of all households was done in the sample villages, and all mothers having a child of age 12 to 23 months were listed as units of the analysis. The total eligible mothers were 1 145. Data were collected in January 1995 through household visits through a pre-tested, structured questionnaire. The interviewers were BRAC's field staff working as data collectors for its surveillance programme known as 'Watch project'. The interviewers were mostly college graduates with 12 to 14 years of education. Their field experience ranged from 6 to 12 years. The interviewees were usually the mothers of the children or other caretakers in the households. No incidence of failure in obtaining the data was noted. To validate consistency with the responses, immunization cards were checked, the mothers asked about the procedural specifics of various vaccination and the children examined for BCG scar. Children who had received all the required doses of BCG, DPT, polio and measles were labelled as fully immunized; those who had received even a single dose less than the required doses were categorized as partial; and those who had not received any vaccine at all were categorized as "none".

Regarding user fee, the respondents were simply asked whether they were willing to pay any fees for the immunization services that were being made available to their communities. If the answer was in the affirmative, then they were asked how much they were ready to pay for it. The study also collected data on various household assets, including radio. It tried to explore whether there existed any correlation between the possession of a radio in the household and the vaccination of children. The study did not collect any data on whether the respondents received any particular massage on immunization from radio or not. Since the government-owned radio disseminates a lot of health massages, it was assumed that such transmission would promote immunization among the recipient households. The association between immunization coverage and socioeconomic factors were examined through bi-variate tables and Chi-square test. A multivariate analysis was done with polio (third dose received), DPT (third dose received), both DPT and polio (third doses of both polio and DPT received), and the full coverage (BCG, polio, DPT and measles are received in full doses) as dichotomous variable (yes or no). Odd ratios were calculated for children's sex, parents'

religion and education, NGO membership, household's cultivable land, labour sale and possession of radio in households.

Results

Table 1 shows that of 1 145 children, 52.1% were males. The sex ratio of the study children is comparable to the national estimate. Ninety per cent of the children were Muslims and the rest Hindu. A majority of the children (51.9%) belonged to poor households having no cultivable land. About 14% of the households had land up to 50 decimals. Forty five per cent of the families had at least one member who sells labour for at least 100 days a year. About 20% of the households had at least one member associated with BRAC. Of mothers, 59.3% had no education, 8.5% had 1-3 years of schooling, and 19.3% had been to school for 4-5 years. Only 12.9% of the mothers had more than five years of schooling. Of fathers, 57.6% had no education, 7.9% had 1-3 years and 12.6% had 4-5 years of schooling. About 22% of the fathers had been to school for more than five years.

Table 1. Socioeconomic characteristics of study population

Variable	Number	Percentage
Children *(age 12 to 23 months)*		
Total	*1145*	*100*
Male	*59*	*52.1*
Female	*548*	*47.9*
Religion		
Muslim	*1031*	*90.0*
Hindu	*114*	*10.0*
Land		
0	*598*	*51.9*
1- 50 decimals	*159*	*13.8*
51 – 200	*234*	*20.3*
201 or above	*154*	*13.4*
Labour		
Sells labour	*520*	*45.4*
Do not sell	*624*	*54.5*
BRAC membership		
BRAC member	*227*	*19.8*
BRAC non-member	*918*	*80.2*
Mother's education *(in years of schooling)*		
0	*679*	*59.3*
1-3	*97*	*8.5*
4-5	*221*	*19.3*
5+	*148*	*12.9*
Father's education *(in years of schooling)*		
0	*660*	*57.6*
1-3	*91*	*7.9*
4-5	*144*	*12.6*
5+	*250*	*21.8*

Table 2 shows the immunization coverage. The coverage rate (94.7%) for BCG was the highest among all components of the government's immunization programme (EPI). It was the lowest for measles (79.5%). For DPT (three doses) and polio (three doses), the coverage rates were 86.9% and 87.6% respectively. Those who

received both DPT and polio (three doses) were 86.6% of the children. Of all 12-23 month old children, about 78% had completed the immunization schedule.

Table 2. Immunization coverage of children 12 to 23 months

Immunization	Number	Percentage (n=1145)
BCG	*1084*	*94.7*
DPT (3 doses)	*993*	*86.7*
Polio (3 or 4 doses)	*1001*	*87.4*
Polio and DPT (full doses)	*991*	*86.6*
Measles	*906*	*79.1*
Complete	*890*	*77.7*

Table 3 shows that the immunization coverage increases with years of schooling of mothers: 86.5% of children of mothers with more than five years of education were fully covered, and about 92% had received the third dose of both polio and DPT. In respect of mothers with no schooling, the full coverage rate was 74.1%. Among children of mothers who had received education up to the third standard, 78.4% had full immunization and about 92% received third dose of both polio and DPT. Compared to maternal education, the impact of paternal education is less pronounced; 83.6% of children of fathers with more than five years of schooling had full immunization, and 90% had received the third dose of both polio and DPT. Among children of fathers who had had no schooling, 74.2% had received full immunization and 83.6% had received the third dose of polio and DPT. Among children of mothers with education up to the third standard, 79.1% had full immunization, and about 90% had received the third dose of both polio and DPT. Such group-wise difference in coverage formalities was statistically very significant ($p<0.01$). But for paternal education, the group-wise difference is very significant ($p<0.01$) only in regard to the third doses of polio and DPT, and less significant ($p<0.05$) for the whole schedule.

Household's cultivable land has no discernible impact on immunization coverage. Table 4 shows that the immunization status of children does not improve with the increase in household's land; even children of families with more than 200 decimals had a lower immunization coverage than the landless. However, such variation is not statistically significant.

Table 3. Immunization coverage of children, by years of schooling of parents (percentages)

Year of schooling	Immunization coverage (in percentage)		
	None	Polio and DPT	Complete
Mother			
None	*6.4*	*83.6*	*74.1*
1-3	*1.0*	*91.8*	*78.4*
4-5	*4.5*	*89.7*	*83.4*

5+	*2.7*	*91.9*	*86.5*
Significance level	p<.01	p<.01	p<.01
Father			
None	*6.4*	*83.6*	*74.2*
1-3	*5.5*	*90.1*	*79.1*
4-5	*1.4*	*92.4*	*83.4*
5+	*3.6*	*90.0*	*83.6*
Significance level	p<.05	p<.01	p<.05

Table 4. Immunization coverage status of children by household land (percentages)

Immunization status	Land in decimal			
	None	1-50	51-200	201 and above
Complete (p>0.1)	*76.6*	*84.3*	*77.8*	*75.3*
Polio and DPT (p>0.1)	*85.8*	*91.2*	*88.0*	*82.7*
None (p>0.1)	*5.2*	*3.8*	*5.1*	*6.5*

Most people, irrespective of schooling, can afford only a very minimal service charge. Of mothers with no schooling, 44.1% said that they would pay not more than Taka 10 (Taka 45 = US$1). Surprisingly, even fewer mothers with 1-3 years of schooling were willing to pay more than Taka 10. However, with more than third standard of maternal schooling, the situation significantly improves. With 4-5 years of schooling, about 63% of the mothers became ready to pay more than Taka 10, and with more than five years of schooling, such willingness was found among 70% of the mothers. It is noteworthy that willingness to pay more than Taka 20 consistently improves with the year of maternal schooling after third standard. On the other hand, 46.2% of respondents with no paternal schooling wish to pay fees up to Taka 10. Unlike mothers, even 1-3 years of paternal schooling significantly enhances affordability of paying more than Taka 10. The effect of paternal schooling on affordability of fees more than Taka 20 is comparatively less pronounced than maternal education. Such differences between various education groups vis-à-vis affordability of user fees are statistically very significant (p<0.001).

Table 5. Percentage distribution of affordability of charges for immunization by years of schooling of parents

Years of schooling	Affordable charges in Taka		
	1-10	11-20	20+
Mother (p<0.01)			
0	*44.1*	*37.9*	*18.0*
1-3	*48.7*	*34.6*	*16.7*
4-5	*37.3*	*40.4*	*22.3*
5+	*28.1*	*31.7*	*40.3*
Father p<0.01)			

0	*46.2*	*37.4*	*16.4*
1-3	*38.9*	*34.7*	*26.4*
4-5	*41.6*	*35.2*	*23.2*
5+	*28.4*	*38.6*	*33.0*

Multivariate analysis was carried out to assess the relative influence of some sociodemographic characteristics on probability of childhood immunization. The analysis was done using dichotomous dependent variables like: (a) DPT third dose received (yes or no), (b) polio third dose received (yes or no), (c) both polio and DPT third dose received (yes or no) and (d) complete immunization against six diseases e.g. tuberculosis, diphtheria, pertussis, tetanus, polio and measles (yes or no). The selected explanatory variables included sex of the child, mother's age and education, father's education and religion, labour sale and membership of the nongovernment organization (NGO) of any household member, cultivable land and a household radio. Table 6 depicts the results of the analysis through Odds ratio and the level of significance.

Table 6. Log odds ratios of some selected variables to predict the probability of immunization

Explanatory Variable	Immunization type			
	Polio	DPT	Polio & DPT	Complete
Sex of child +	*1.06*	*1.11*	*1.11*	*1.11*
Paternal factors				
Mother's education	*1.08*[a]	*1.07*	*1.07*	*1.08*[b]
Father's education	*1.06*[a]	*1.06*[a]	*1.06*[a]	*1.04*
Age of the mother	*0.96*[c]	*0.96*[c]	*0.96*	*0.98*
Household factors				
Cultiviable land	*1.0*	*1.0*	*1.00*	*1.00*
Labour sale	*0.83*	*0.85*	*0.86*	*0.73*[a]
NGO membership	*1.42*[a]	*1.22*	*1.24*	*1.27*
Radio	*1.73*[b]	*1.99*[c]	*1.91*[b]	*1.81*[c]
Religion	*0.44*	*0.47*[c]	*0.47*[c]	*0.53*[c]

+ reference category is male
[a] p<0.10
[b] p<0.05
[c] p<0.01

Table 6 reveals that maternal education enhances the chances of full immunization; however, the impact of paternal education is insignificant. It is noteworthy that increasing age of mother significantly reduces the probability of getting three doses of polio and DPT. But it has no significant predictivity for full coverage. A radio in a household significantly improves the chances of full immunization. The probability of getting an immunized child in such families is about twofold higher than those without it. Unexpectedly, a household's cultivable land has no impact. A household's labour sale does not have any significant influence either. Surprisingly, religion has a very significant predictivity; children from Hindu family are less likely to be immunized than the Muslim cohort.

However, the influence of religion on receiving three doses of polio is insignificant. NGO membership has no significant predictive power for full immunization but significantly enhances the chances of receiving full doses of polio.

Discussion

The 1993 evaluation of government's Expanded Programme on Immunization (EPI) in Bangladesh showed reasonably impressive national coverage of 89% for BCG, 63% for three doses of both DPT and OPV and 59% for measles[5]. The present study being two years later, probably shows an even higher coverage. It is evident that the immunization coverage increases with the increase in parental education. This broadly falls in line with the observation that education probably enhances the knowledge of parents to effectively prevent, recognize and treat childhood illnesses[6]. Mothers' knowledge of polio and DPT vaccines was positively correlated to the education of mother[7]. Land holding did not have any impact on coverage. There is no explanation why Hindu children should have a lower coverage. Additional studies are needed in this regard. Moreover, it has a policy implication too. Since increasing age of mother significantly reduces the chances of getting full doses of polio and DPT, immunizing the children of older mothers should get more emphasized. Exposure to media, such as radio, has been found to have a positive impact. This may indicate the effect of the health education programme of the national broadcasting system. Since the study did not collect data on receiving any message on immunization from the radio, it was restrained from directly correlating such a positive impact to any specific radio transmission. However, the finding reinforces the importance of radio as an IEC (Information, Education and Communication) tool in a developing country like Bangladesh. The study found that only 25% of the households had a radio. National policies that can enhance the availability of radio at an affordable price even by a poor family may contribute to the programme. It may contribute to the dissemination of other health and educational massages, and thus reinforce the importance of immunization in the public conscience.

Since the study was designed to examine the rural profile, it faces limitations in generalizing the results in the national perspectives. Moreover, the study is restricted, by its small sample size, to reveal even a picture of the rural whole. It was designed to look into the issues after the children had enjoyed full opportunity of vaccination till their first birthday, hence restrained from evaluating immunization profile in under-one children. Although the sample population was not randomly selected from all over Bangladesh, the villages come from a diverse geographic and

socio economic terrain. Since each village is a politico-cultural unit with all possible elements of socio-economic diversities, the census survey of a whole village - as was the case in this study - gives opportunities to reveal valuable information vis-à-vis rural Bangladesh.

There are indications that increased coverage may be due to the availability of free immunization, backed by media publicity. In this context, there emerge some important questions. Is the EPI programme financially sustainable in Bangladesh? If funding agencies shift their priority from EPI, can the government continue with the immunization programme? Are alternative approaches available to a country like Bangladesh? Most of the rural people can afford only a very minimal service charge, even less than half of the population are willing to pay more than Taka 10. The study shows that parental education up to fifth grade does not contribute to accepting a user fee above Taka 10. However, more than five years of schooling significantly enhances affordability to pay comparatively higher charges. In the Bangladesh perspective, such issues have important policy implications.

Published data suggest that once donor countries withdraw their support or when private market forces are allowed to play a major role in the provision of immunization, there is a decline in coverage. The best example is China. The whole world applauded China for its rural health care system. With the trickle down economics of the late 1970s and 1980s, the cooperative medical system disappeared. The current unresponsive free market economy, combined with political repression, has resulted in the decline of the economic and social base for equitable rural health services[8]. The experience of Swaziland is probably one of the best-documented ones. In 1984, the Government of Swaziland raised its health fees and regulated mission health services. Immunization and outpatient preventive visit charges were increased by US$0.50. As a result, outpatient services in the government came down by 32% and increased in the mission services by 10% resulting in a combined decline of 17%. Even though the increase in fee was considered relatively low by World Bank standards, this fee was beyond the budget of 17% of Swaziland's population[9].

A review of eight Aga Khan Foundation-funded projects reveals that there has been only minimal cost recovery for services, including immunization[10]. It is being increasingly articulated that continued large amounts of additional donor support to fund immunization activities are not expected[11]. There is increasing anticipation that private voluntary organizations and private sector participation will fill the gap when donor agencies withdraw funding[12]. It

also anticipated that the immunization commodities of USAID, a leading donor to EPI in Bangladesh, will be phased out soon[13]. What will be the implications of such potential major changes for EPI? Local governments must share costs and volunteers contribute more[14]. In addition, the country will have to look more seriously at non-financial strategies which may ensure sustainability. These include an increased role by the private sector, effectively integrating EPI within the health services delivery,[15] giving more responsibility to the community and the use of revolving funds,[16] targeting specific age group of 0-11 months, increased provision of fixed centres, quantifiable monthly targets at the local level, supervisory functions at all local vaccination centres and modifying the immunization calendar[17].

From the available literature it is clear that Bangladesh, which had achieved a "near miracle"[18] in immunization, is likely to face problems of long-term sustainability. Countries which have been forced to take on sustainable strategies have faced problems, and Bangladesh is no exception. The people are not ready to meet the cost of EPI on their own. Since, for a significant positive outcome, education should be more than five years, as the present study reveals, compulsory schooling of all children at least for the secondary level should receive some rigor. To enhance social sustainability, efforts should be made to bring forth participatory strategies between the community organization, the grassroots NGOs, the private sector and the government.

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Tobacco and Health

Tobacco Smoking and Risk of Age-related Cataract in Men

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Abstract

A group-matched, case-control study was carried out at Government Medical College Hospital, Nagpur, India, to investigate the association between tobacco smoking and age-related cataract. The study included 275 male cases of age-related cataract and an equal number of controls group-matched for age. Prevalence of smoking in cases and controls was calculated to be 33.4% and 15.3% respectively. A significant risk association between smoking and age-related cataract was observed (OR =2.90, 95% CI =1.92-4.39). The overall estimates of attributable risk proportion and population attributable risk proportion were calculated to be 0.66 (0.48-0.77) and 0.23 (0.13-0.35) respectively. Stratified analysis revealed dose and duration response relationship between tobacco smoking and age-related cataract. The current study thus identified the significant role of smoking in the outcome of age-related cataract.

Introduction

CATARACT is a major cause of blindness worldwide, including India. By the year 2025, it is estimated that 40 million people in the world will be blind from this disease[1]. Currently, over half of the world's blind population, in excess of 15 million people[2], are blind because of

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cataract, and virtually all of them live in developing countries.

One approach to developing preventive measures is to identify the etiological factors through epidemiological investigations. Such studies[1,3,4] have already suggested a number of possible risk factors, but none has been identified as the specific cause of the majority of age-related cataracts. Of the multi-faceted etiology of cataract[1,3,4], a striking epidemiologica1 observation is that cigarette smoking leads to an earlier onset of cataract[5,6], while stopping smoking correspondingly reduces the risk[7]. The two prospective studies of smoking and risk of cataract extraction added significantly to the growing evidence that cigarette smoking is linked to cataractogenesis[5,6]. But there are a few retrospective studies[4,8] which failed to recognize an association between cigarette smoking and age-related cataracts. Although consistency among studies has not been obtained, this is certainly a plausible cause, and dose-response relations have been demonstrated[6]. However, very few studies have been performed in the South-East Asian Region to explore this relationship[4,9].

With this background and fortified by the fact that both age-related cataract and tobacco smoking are widely prevalent in the Indian population, we conducted a case-control study to evaluate the role of tobacco smoking in the outcome of age-related cataracts in men.

Material and Methods

The present study was carried out at Government Medical College Hospital, Nagpur, India. The study was designed as a group-matched, case-control study. We used known confounding factor age as a matching variable.

Sample size

Based on the findings of a pilot study on 100 cases and 100 controls, (a) the estimate of relative risk of cataract in exposed (smokers) group was 1.80, (b) proportion of exposure (smoking) in control population was 0.27, (c) desired level of significance was 0.05, and (d) power of the study was 0.90; the sample size was estimated to be 275 cases and an equal number of controls.

Cases

Cases of age-related cataract were selected from male patients attending the Ophthalmology Clinic at Government Medical College Hospital, Nagpur. Considering the low prevalence of tobacco smoking among females in the local population, and also its non-reporting by female smokers, it was decided not

to include females in this study. Cases were subjects aged 35 to 85 years, with a lens opacity sufficient to reduce corrected visual acuity to 6/60 or worse in the affected eye, whose cataract could not be attributed to diabetes, eye trauma or a potential congenital cause. Recruitment of cases was done over a period of 18 months.

Controls

The controls were selected from male patients attending the study hospital for conditions other than cataract, aged 35 to 85 years (group matched with cases), with no lens opacity and whose corrected visual acuity was 6/12 or better in both the eyes.

Measurement of risk factor

All the study subjects were classified into three categories of smoking. Following definitions were used for this purpose[10].

Smoker: Someone who, at the time of the study, smokes any tobacco product either daily or occasionally.

Non-smoker: Someone who, at the time of the study, does not smoke at all.

Ex-smoker: Someone who was formerly a daily or occasional smoker but currently does not smoke at all.

To evaluate dose and duration response relationship, quantification of tobacco smoking was performed by calculating smoking index for smokers and ex-smokers. Smoking index for an individual was equal to multiplication of the average number of cigarettes/bidis smoked per day and duration (in years) of tobacco smoking, Further, study subjects were classified into three categories of exposure level, on the basis of smoking index, i.e. <100, 100-200 and >200 smoking index.

Statistical analysis [11]

The odds ratios (OR), their 95% confidence intervals (CI) and Pearson's chi-square were calculated to ascertain the association between age-related cataract and smoking. Additionally, a stratified analysis was also performed to account for the stratified nature of exposure. Further, attributable risk per cent (ARP) and population attributable risk per cent (PARP) and their 95% CI were estimated.

Results

Table 1 shows the distribution of subjects by age and smoking status. The majority of the subjects belonged

to 51-60 years and 61-70 years age groups. The prevalence of exposure i.e. smoking was 33.4% and 15.3% in cases and controls respectively. Because of the small number of ex-smokers (2.9%), they were excluded from further analysis. The majority of smokers in both the groups i.e. cases and controls, were classified in <100 and 100-200 smoking index categories.

Table 1. Distribution of study subjects by matching factor and risk factor

Factor	**Cases n= 275** (Percentages in parentheses)	**Controls n= 275**
Age (years)		
≤ 50	22 (8.0)	23 (8.4)
51-60	104 (37.8)	101 (36.7)
61-70	110 (40.0)	110 (40.0)
≥ 71	34 (14.2)	41 (14.9)
Smoking status		
Non-smokers	172 (62.5)	228 (82.9)
Ex-smokers	11 (4.0)	5 (1.8)
Smokers (by Smoking Index)		
< 100	36 (13.1)	25 (9.1)
100 - 200	40 (14.5)	14 (5.1)
>200	16 (5.8)	3 (1.1)

Table 2. Results of stratified analysis

Smoking Index category	Odds ratio (95% CI)	Chi-square (p-value)	ARP (95% CI)	PARP (95% CI)
< 100	1.91 (1. 11-3.28)	5.48 (0.0192)	0.48 (0.10-0.70)	0.08 (0.01-0.18)
100-200	3.79 (2. 01-7. 12)	20.11 (0.0001)	0.74 (0.50-0.86)	0.14 (0.06-0.26)
> 200	7.07 (2.16-23.03)	11.62 (0.0004)	0.86 (0. 54-0.96)	0.07 (0.01-0.22)
Overall	2.90 (1.92-4.39)	26.43 (0.0001)	0.66 (0.48-0.77)	0.23 (0.13-0.35)

The significant risk association between tobacco smoking and age-related cataract was evident from Table 2 (overall OR =2.90, 95% CI =1.92-4.39). The overall estimates of ARP and PARP were calculated to be 0.66 (0.48-0.77) and 0.23 (0.13-0.35) respectively. Stratified analysis identified an increased cataract risk with the increasing smoking index.

Discussion

With the litany of ills associated with cigarette smoking comes evidence

that cataracts should also be added to the list. Evidence is accumulating that cataracts can be added to the list of illnesses that are at least partially attributed to smokings[1]. Two case-control studies[4,8] have failed to find an association between smoking and cataracts, but other cross-sectional, case-control, and prospective cohort studies have found an association and a dose-response relation as well [1,5-7].

The Italian-American Cataract Study[8] found no association between smoking and cataract, but a careful analysis of the quesionnaires revealed that present and past smokers were lumped together, and this certainly could have biased the results toward null. Contrary to the above finding, the current study recognized significant association between smoking and age-related cataract (OR = 2.90, 95% CI = 1.92-4.39). Moreover, other prospective data suggest that only current smoking, not the past smoking dose of ex smokers is a risk factor for cataract progression[12]. Hence exclusion of ex-smokers from analysis in this study could be justified.

The India-US Case-Control Study[4] had a more complete classification of smoking status, but no relation was found. However, the percentage of people who smoked and the amount they smoked were not further elaborated upon. Against this background, we have assessed smoking status by calculating the smoking index, which accounted for both dose (average number of cigarettes/bidis smoked per day) and duration (in years) of smoking.

The present study identified that with increasing smoking index, the estimates of odds ratios also increased correspondingly; thereby suggesting dose and duration response relationship between smoking and age-related cataract. This kind of dose-response relationships have also been demonstrated in earlier studies[7,13]. Additionally, from the overall estimates of ARP and PARP, it can be inferred that 66 % (48-77%) of age-related cataract risk in smokers is attributed to smoking and about 23% (13-35%) of all age-related cataracts are attributed to tobacco smoking. Thus, the estimates of OR, ARP, PARP and observed dose and duration response relationship in this study, confirmed the significance of tobacco smoking as important risk factor for age-related cataract.

Thus, in conclusion, this study identified the significant role of smoking in cataractogenesis. Given the biological plausibility of the smoking-cataract hypothesis from laboratory studies[9,14] and the potential public health importance of this relationship, more studies need to be done to clarify the association between tobacco smoking and age-related cataract. Clearly, further investigations are warranted on the precise mechanisms by which smoking damages the lens. For now, it appears that the litany of ills associated with smoking is growing, as we add to it

cataracts, the world's leading cause of blindness.

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Tobacco Control in Sri Lanka

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THE use of tobacco has become a worldwide epidemic. According to WHO estimates, each year tobacco kills nearly 3.5 million people across the world[1]. In the UK, it is estimated that tobacco kills 80 times as many people as AIDS and 85 times as many people as illicit drug use[2]. Smoking as well as oral use of smokeless tobacco is widely prevalent in South Asian countries. Studies conducted in India and Sri Lanka have shown that the habits of tobacco chewing and smoking are highly associated with oral cancer and pre-cancer[3,4] with oral cancer being one of the commonest cancers in Sri Lanka. The dangers of tobacco are not confined only to its adverse health effects; the socioeconomic and environmental consequences of tobacco have even greater adverse effects on the world population. Direct loss caused by fires related to smoking in the USA in 1991 was estimated at $ 552 million[5]. Tobacco depletes soil nutrients at a much faster rate than many other crops and per year an estimated 1.2 million to 5 million hectares of open forests are used for tobacco curing[6].

The use of tobacco in the form of chewing with betel and arecanut has been a widespread habit among Sri Lankans since ancient times. Historical evidence shows that during the British rule 1823-1948, tobacco was an important commercial crop and was grown mainly in the northern part of Sri Lanka. Today, thousands of rural farmers grow tobacco in their lands by replacing their traditional food crops. Cigarettes, beedi and cigars are the three main types of tobacco smoking products that are used by the people in Sri Lanka. During the Second World War period, the use of cigarettes increased significantly among Sri Lankans and, at present, smoking is a widespread male habit. The Ceylon Tobacco Company Limited CTC, which is affiliated to the British American Tobacco Company BAT, has the monopoly for producing cigarettes in Sri Lanka. Beedi is the cheapest smoking product, which is used mainly by low socio-economic groups. At

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present, the demand for beedi and cigars is abating.

Tobacco Cultivation and Production

Tobacco has become a highly profitable commercial crop in Sri Lanka. Farmers in many parts of the country are now rapidly moving towards growing tobacco instead of food crops [7]. (See Table 1.)

Table 1. Tobacco cultivated area and production

Year	Cultivated area in hectares	Quantity produced in metric tons
1991	7993	9122
1992	8389	9250
1993	9429	11697
1994	9536	12257
1995	8577	11383
1996	8195	10720
1997	7829	9995

Source : Agrarian Research Training Institute, Sri Lanka

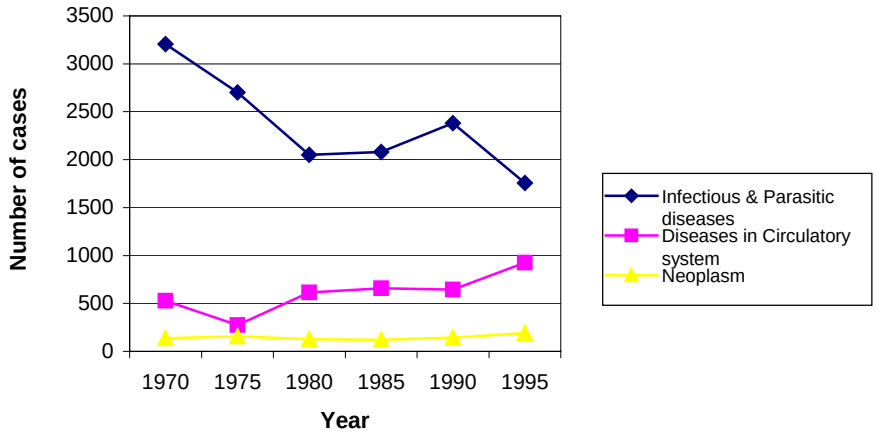
During the past decade, many incentives, such as technical advice to rural farmers, provision of fertilizer and seeds etc., were given by CTC to promote tobacco cultivation. However, data in Table 1 show that neither the quantity of land used for tobacco cultivation nor the quantity of tobacco produced has changed significantly over the period 1991-1997. Since the adverse environmental consequences of tobacco farming, such as deforestation and depletion of soil nutrients, are serious, the tobacco industry is shifting from helping farmers in one area to another area where the soil is fertile. Thus cultivating tobacco, in the long run, causes more harm than short-term benefits to most of the tobacco farmers in the country.

Health and Tobacco

Tobacco is a highly addictive and hazardous substance. Tobacco dependency has been classified as a behavioural disorder in the WHO International Classification of Diseases. It is predicted that, if the current trends of tobacco use remain unchanged, by the year 2030, the annual worldwide death toll due to tobacco will be around 10 million and nearly 70% of such deaths will be from the developing world[1]. It is shown that strong associations exist between tobacco use and many diseases, including lung cancer, oral cancer, coronary heart diseases, stroke and chronic bronchitis[8]. Passive smoking is also identified as a major cause of morbidity.

It is observed that the morbidity patterns in Sri Lanka have completely changed during the last few decades Figure 1. In the early 1960s, infectious diseases and diseases of infancy were the leading causes of mortality in Sri Lanka. Today, circulatory and respiratory system diseases and malignancies have become the

Figure 1. Trends in hospitalization for selected diseases 1970 - 1995
For 100 000 population



Source : Annual Health Bulletin, Sri Lanka 1994 and 1995, Ministry of Health, Sri Lanka

leading causes of morbidity in Sri Lanka. A significant proportion of these ill health conditions can be due to tobacco use but further research is needed to confirm this conclusion.

No nationwide survey has been conducted on the prevalence of tobacco use in Sri Lanka. However, small-scale surveys[9-11] conducted during the period 1970 to 1990, indicated an increasing trend of smokers in Sri Lanka. In the early 1990s, on an average, nearly 50% of adult males and 1% of adult females were smokers. According to Excise Department statistics, 5004.9 million sticks of cigarettes were produced by CTC in 1994; for 1995 the corresponding figure was 5198.1 million. However, at present a slight fall in tobacco consumption is evident. There was a 11% decline in tobacco production by CTC in 1997[12]. However, the real decline in the rates of tobacco consumption cannot be identified easily as a significant number of low cost, low quality tobacco products and smuggled cigarettes have now entered the market.

Poverty and Tobacco

At present, tobacco causes an estimated annual loss of US $ 100 billion to the economy of the developing world. This amount is more than 50% of the total annual health expenditure in those countries[1]. The worst affected are the families of

smokers in the lowest socioeconomic groups where a greater proportion of the family income is spent on tobacco, thus widening the gap between the rich and the poor in many third world countries, including Sri Lanka.

Tobacco industry in Sri Lanka

A survey[11] identified cigarettes as the most popular 75% of the smokers reported that they preferred cigarettes form of smoking tobacco product in Sri Lanka. CTC, which holds the monopoly for tobacco in Sri Lanka, has been successful in creating a tolerant attitude among politicians so as to expand the sale of their products. Tobacco taxes comprised a significant proportion of total government revenue Table 2 and CTC claims that they have generated nearly 300 000 jobs nearly 8% of the total in Sri Lanka[13] but official figures estimate that in 1997 there were only 8 437 tobacco farmers in Sri Lanka[14].

The tobacco company spends millions of rupees to promote its products. Tobacco advertisements are not permitted in the electronic media, but indirect smoking promotional scenes can be seen in teledramas on television. In the printed media, the tobacco company aggressively advertises its products targeting mainly young people and women. CTC is also involved in sponsoring cultural and sports events throughout the country.

Table 2. Government Tax Revenues
(in million Rs.)
(Percentages in parentheses)

Year	Total tax revenue	Tobacco excise Tax	
1988	35946	2665	(7.4)
1989	47513	3855	(8.1)
1990	61206	5461	(8.9)
1991	68157	6884	(10.1)
1992	76352	5573	(7.3)
1993	85891	6866	(8.0)
1994	99417	7888	(7.9)
1995	118543	8788	(7.4)
1996	130202	12833	(9.9)
1997	151451	15175	(10.0)*
1998	164049	16295	(9.9)*

* Approved estimates

Source : Central Bank of Sri Lanka Annual Report - 1997

Beedi and cigars are manufactured as small-scale business in the north, east and north central parts of the country. Since cigarettes are not freely available in the north and east due to civil disturbances, beedi consumption is supposed to be relatively higher in those areas.

Control Measures

Although the governments in the past seemed to support the anti-tobacco campaign, little action was apparent. The National Transport Commission in Sri Lanka had introduced a ban on smoking inside public transport some

years ago, but it has so far not been fully implemented. Ministries, such as Youth Affairs and Sports, still get sponsorships from CTC. The Ministry of Trade has enforced the printing of health warnings on packets of cigarettes, but this warning is indecipherable. In 1976, the Sri Lanka National Federation on Smoking and Health was formed with support from the Ministries of Health and Education as a coordinating body for tobacco control measures in Sri Lanka but there was no apparent effective contribution from it to control tobacco use in Sri Lanka. Again, in 1996, as a result of a workshop conducted by Sober - Sri Lanka, a national co-ordinating committee on alcohol, tobacco and other substances was formed and, in 1997, as an outcome of that committee, a profile of tobacco and alcohol, was prepared.

The Presidential task force on formulation of a national health policy, appointed in 1992, had made very valuable recommendations for prevention and control of smoking but implementation procedures were weak. A similar type of Presidential task force was appointed again in 1997 by the present president of Sri Lanka. This task force has prepared a national policy and programme on tobacco and other substance uses aiming at improving the health and wellbeing of the people, increasing productivity by achieving a sustained reduction in the use of these substances and a reduction and eventual elimination of harm related to these substances. As a result, advertising of tobacco and alcohol in all media was going to be banned from January 1999. CTC is strongly opposing this ban and is continuing its efforts to pursuade government authorities to lift the ban.

A large number of nongovernmental organizations NGOs are engaged in tobacco prevention activities in Sri Lanka. With technical and instrumental support from the WHO's global programme on 'Tobacco or Health' and financial support from local as well as foreign donor agencies, many of these NGOs have successfully challenged the social image of smoking in Sri Lanka. However, the lack of real cooperation and friendship among NGOs has set the overall progress back. It is observed that many NGOs do action-oriented work to satisfy their donor agencies, and proper evaluations are very rarely done on their tobacco prevention activities.

The population of Sri Lanka consists of nearly 70% of Buddhists, 15% of Hindus and 7% of Muslims. These three religions strongly oppose substance use. At the beginning of this century, there was a sober movement originated by Buddhist monks and other supporters which was able to generate strong community support to minimize tobacco and alcohol use. In fact, this religious movement was able to control to a significant level the use of these substances. However, at

present, due to various political influences, the unity of this religious movement has been demolished. Nevertheless, the islandwide network of this movement still exists and it is the responsibility of those who are honestly involved in tobacco prevention to make efforts to reactivate this movement by obtaining support from other religious groups.

Policy issues

To reduce tobacco consumption in Sri Lanka, efforts should be made to reduce production, availability, social acceptability and affordability of tobacco and related products.

A real 'inflation adjusted' price increase seems to be the most effective method of tobacco control, especially among young people. In the long run, a substantial increase in tobacco taxes would strengthen the economy of the country because it would increase government income and reduce tobacco-related health expenditure. The government could allocate some percentage of such tax revenues to develop the anti-tobacco campaign.

Restrictions on tobacco advertising and sponsorships can minimize the attraction of young people to smoke. However, the anti-tobacco lobby should be aware of the whole marketing process of the industry to achieve better results. The government can also adopt a minimum age for the sale of tobacco, which would significantly control the use of cigarettes by school children. The Victorian Government in Australia has shown effective results instituting "on the spot" fines to vendors who sell cigarettes to minors, restricting tobacco sponsorship and advertisements and by establishing a network of over 5000 organizations in Australia to combat the epidemic[15].

- The government should immediately identify the harm that tobacco causes to agriculture and eventually to the net food production of the country. Provision of facilities and incentives to grow food crops would help tobacco farmers to turn away from tobacco cultivation.

- Only a handful of health and other professionals are actively engaged in tobacco prevention activities. It also seems that tobacco prevention activities take place in the main cities and are confined only to certain activities on special days, such as World No-Tobacco Day etc.

- Research on various aspects of tobacco use are rarely done and, as a result, issues such as tobacco consumption pattern in rural areas, the effects of advertising on various

community groups, socio-cultural values attributed to tobacco chewing, the effect of tobacco cultivation etc. are less known.

- Continuous efforts should be made to get support from experts from the fields other than medical and all available resources put together to avert this public health problem. Attention should be paid to strengthen the National Coordinating Committee on alcohol, tobacco and other substances which can act as the main coordinating body of tobacco control activities in Sri Lanka. This Committee should have strong linkages with anti-tobacco activities in the South Asian Region.

Conclusion

In spite of being a poor agricultural country, the health status of the people of Sri Lanka is better, compared to many other developing nations. However, the sustainability of such health conditions will be compromised if the Government and the people of Sri Lanka fail to recognize the health damage caused by tobacco. Moreover, to improve the economy of Sri Lanka and to protect its environment, the war against tobacco should be accelerated. Raising awareness among policy makers of the manifold harmful effects of tobacco and strengthening research into tobacco-related issues are increasingly important. Collaborative research activities with experts in the Region should be encouraged and special emphasis given to monitoring and evaluation of tobacco related issues and activities. Strengths and weaknesses of the tobacco control strategies that have been used in the past should be identified and combined efforts made under the national coordinating body to combat future health and socioeconomic implications of tobacco use in this country.

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Health and Behaviour

Use of Smokeless Tobacco – A Community-based Study of Behaviour, Attitudes and Beliefs

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Abstract

The present community-based cross-sectional study was carried out at Hanumannagar area of Nagpur city, India. A total of 1 168 study subjects included 590 males (50.5%) and 578 females (49.5%). Of the females, 12.6% were using smokeless tobacco while 30.8% of the males were consuming tobacco of which 148 (25.1%) were daily tobacco chewers . With increasing age, the prevalence of tobacco chewing was found to increase whereas it decreases with the level of educational attainment. Though 82.8% of the study subjects agreed on the harmful effects of tobacco chewing on health, only 23.9% of the users were concerned about their own health. Health education and mass media should be used to control the epidemic of tobacco use.

Introduction

CONSUMPTION of tobacco in any form is the single most important preventable cause of most of the noncommunicable diseases[1,2]. When used in the form of smoking, it acts as a risk factor for coronary heart disease, cerebrovascular disease, lung carcinoma etc. whereas in the smokeless form, it is an epidemiologically and experimentally proven risk factor for various forms of cancer, particularly oropharyngeal cancers[3-5]. Haemoglobin adducts to

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carcinogens, present in smokeless tobacco products, are measurable in the blood of smokeless tobacco users, indicating that smokeless tobacco-related carcinogens circulate throughout the body. This emphasizes a concern that smokeless tobacco may increase the risk of other cancers as well[3]. Also, because of the pharmacological properties of nicotine and other constituents of smokeless tobacco, there is concern that smokeless tobacco products may lead to cardiovascular diseases as well[3]. Despite strong campaigns against tobacco use through mass media and educational, legislative and other measures, the prevalence of tobacco use is still increasing in most of the developing countries[1,2]. Hence in order to formulate and implement any control programme for tobacco use, apart from assessing the extent of the problem and identifying the risk factors, an understanding of the prevalent tobacco use behaviour, attitudes and beliefs among the community is also necessary[6]. With this background, the present study was undertaken to assess and examine the prevalence of smokeless tobacco use, people's behaviour and attitudes towards it and beliefs about tobacco use in relation to socio-demographic information.

Materials and Methods

The present community-based, cross-sectional study was carried out among the population of Hanuman nagar area of Nagpur City in Central India. All those individuals who were, at the time of study, aged 20 years or more were considered as eligible population and were included in the study. Of the total of 1 307 eligible individuals in the study area, only 1168 individuals were included in the final analysis, as 36 individuals who had been living away from home for more than a year, and 103 individuals who could not be contacted after repeated efforts, were excluded. By the interview technique information was recorded on the standard questionnaire developed by the World Health Organization[7]. To keep interviewer bias to the minimum, proper care was taken in structuring the question and selecting interviewers. Tobacco chewing behaviour and the attitudes and beliefs of the study subjects were recorded. Statistical analysis included calculation of percentages and proportions and use of chi-square test as a test of significance.

Results

The distribution of study subjects according to the socio-demographic profile is shown in Table 1. The present study included 590 males (50.5%) and 578 females (49.5%). The mean age of males was 34.23 ± 2.11 years while that for females was 33.70 ± 3.82 years. Of the study subjects, 35.95% had education up to the secondary school level while only 8.73% were illiterate.

Table 1. Socio-demographic

characteristics of study subjects.

Characteristics	Males (N=590) (Percentages in parentheses)	Females (N=578)
Age group (in years)		
20-24	213(36.1)*	177(30.6)
25-44	168(28.5)	173(29.9)
45-64	131(22.2)	145(25.1)
≥64	78(13.2)	83(14.4)
Educational status		
Illiterate	35(5.9)	67(11.6)
Primary	104(17.6)	135(23.4)
Secondary	217(36.8)	203(35.1)
Higher Secondary	172(29.2)	134(23.2)
Graduate or above	62(10.5)	39(6.7)

Table 2 shows the prevalence rate of smokeless tobacco use and tobacco chewing behaviour according to age and educational status among the study subjects. The overall prevalence of smokeless tobacco use was 12.6% among females and 30.8% among males. None of the female was occasional tobacco chewer, whereas among males, 148 (81.32%) were daily tobacco chewers and 34 (18.68%) were occasional tobacco chewers. A higher prevalence of tobacco chewing was seen in the 20-24 years and ≥64 years age groups. While most of the tobacco chewers in the 20-24 years age group were consuming it in the form of gutkhas, the chief mode of consumption in the ≥64 years age group was either in the form of betel quids or khaini. It can also be seen from Table 2 that there is an inverse relationship between the level of educational attainment and the prevalence of tobacco chewing. In males, other common forms of tobacco consumption were cigarettes and bidis which were being prevalent in 63% while none of the females used tobacco in this form.

Table 2. Tobacco use prevalence rate and behaviour according to age and educational status of study subjects.
(Percentages in parentheses)

Groups	Tobacco chewing behaviour						
	Males N = 590	Females N = 578	Daily		Occasional [1]	Non-chewers	
			Males	Females	Males	Males	Females
Age in years							
20 – 24	213(36.1)*	177(30.6)	58(27.2)	3(1.69)	10(4.7)	145(68.1)	174(98.3)

25 – 44	168(28.4)	173(29.9)	33(19.6)	14(8.1)	8(4.8)	127(75.6)	159(91.9)
45 – 64	131(22.2)	145(25.1)	23(17.6)	18(12.4)	16(12.2)	92(70.2)	127(87.6)
≥ 64	78(13.3)	83(14.4)	34(43.6)	38(45.8)	--	44(56.4)	45(54.2)
Educational Status							
Illiterate	35(5.9)	67(11.6)	24(68.5)	28(41.8)	--	11(31.4)	39(58.2)
Primary	104(17.6)	135(23.4)	37(35.6)	23(17.0)	6(5.8)	61(58.7)	112(76.6)
Secondary	217(36.8)	203(35.1)	46(21.2)	17(8.4)	19(8.6)	152(70.0)	186(91.6)
Higher Secondary	172(29.2)	134(23.2)	20(11.6)	4(3.0)	11(6.4)	141(81.9)	130(97.0)
Graduate and above	62(10.5)	39(6.7)	16(25.8)	1(2.6)	3(4.8)	43(69.4)	38(93.3)

[1]None of the female was occasional tobacco chewer.

Table 3. Attitudes and beliefs of the smokers
(Percentages in parentheses)

Statement	Responses			
1. Tobacco chewing is harmful for health	Agree 967 (82.8)	Disagree 56(4.8)	Indifferent 145(12.4)	Total 1168(100.0)
2. Concern about own health[1]	Concerned 61(23.9)	Not concerned 194(76.1)		Total 255[1]
3. Tobacco sale should be banned	Agree 871(74.6)	Disagree 103(8.8)	Indifferent 194(16.6)	Total 1168(100.0)
4. Stopping tobacco[1] chewing (desire, action, achievement	Thought of 117(45.9)	Seriously attempted 57(22.4)		Successfully stopped 28(10.9)

* Includes only tobacco users.

Table 3 shows the attitudes and beliefs of the study subjects: 82.8% believed that tobacco chewing is harmful for health, while only 4.8%

disagreed with this. When asked in terms of the disease that it causes, most of the subjects (63.1%) responded by saying cancer. Other responses included the occurrence of aphthous ulcer, heart disease, hypertension etc. Only 61 tobacco chewers (23.9%) were concerned about their own health though 74.6% of the subjects were in favour of banning tobacco sale. Other public action, such as non-tobacco use by elders and teachers, banning of advertisements of tobacco products etc., were also strongly endorsed by most of the study subjects (73.8%). The intensity of endorsement of public action against smoking was signficantly and negatively associated with the age of the subject ($\chi^2 = 44.4$, df = 1, $p < 0.001$) and signficantly and positively associated with the level of education ($\chi^2=75.9$, df = 1.$p < 0.001$). When asked about the reasons for tobacco consumption, 159 (62.4%) responded that it keeps the bowel habits normal while the motives for non-use of tobacco were preventing disease, promoting health and wellbeing.

Discussion

In the present study, the prevalence of smokeless tobacco use was 12.6% among females and 30.8% among males, thereby giving an overall prevalence of 21.8%. The younger (20-24 years) and the elderly (≥ 64 years) subjects were maximally involved in the practice of tobacco chewing while the practice shows a declining trend with the level of education.

The higher the level of educational attainment, the stronger the endorsement of public action against tobacco use. Non-users endorse the public action more strongly as compared to the users. Most of the subjects considered tobacco use in the form of smoking against social norms while the use of smokeless tobacco is not considered to be against social norms.

Prevention of disease, promotion of fitness and wellbeing and saving of money are the accepted motives for not smoking while, keeping the bowel habits normal was the motive for its use. Banning the sale of tobacco products, banning of advertisements of tobacco products, non-use of tobacco by elders and teachers are the most intensely endorsed public action against tobacco smoking.

The study has, on the other hand, revealed a gloomy picture regarding concern about the harmful effects of tobacco use on their own health. Another important fact revealed by the study is that a large percentage of study subjects who expressed a desire to stop tobacco use, have been unable to do so. Helping them to succeed in their objective should be a matter of priority. A health education programme against tobacco use

should be directed and information disseminated which not only makes people aware that tobacco causes oropharygeal cancer and other cancers because of the carcinogens present in it[3,7], but also instils and supports the desire to stop tobacco chewing.

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Risk Behaviours, Attitudes and Subjective Norms among Ninth Standard Students in Hlaing Township

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Abstract

This paper measures the ninth-standard students' high-risk behaviours, attitudes and subjective norms regarding hygienic practices, smoking, alcohol, drugs and sex. Baseline data were collected from a total of 199 students who completed a self-administered questionnaire. Significant differences in the practice of hand-washing was found between the sexes. Most of the students did not use soap but used only water, drank water which was sifted, and used sanitary fly-proof latrines. Significant differences between male and female students were found in smoking and alcohol drinking. Smoking and alcohol drinking (ever used) was considerably high among male students (43.9% and 47.4% respectively). Drug use and unprotected sexual exposure are quite low. Attitudes and subjective norms are also measured so as to identify areas to be reinforced for the adoption of healthy behaviours.

Introduction

THE second decade of life is a period of rapid growth and development, especially in terms of physical, mental and social change. It is a period that will shape the future of individuals, communities, societies and countries. As a result of the achievements of child survival and development, more and more children around the world would live to become adolescents. In Myanmar, young people (10-24 years) constitute 29.3% of the total population of around 46 million with 14.97% males

and 14.33% females. (Statistical Year Book, Central Statistical Organization, 1997). With their energies, ideas and enthusiasm, young people are a key resource for promoting their own health and development and also contributing to the health of their families and communities.

Trying out new things and making first-time choices are part of growing up. This however should not result in taking risks which are detrimental to the health of the adolescents, now and in the future. In addition, the risk-taking behaviour may not reflect the attitudes of adolescents but may be due to the pressures exerted on them by their peers or adults, by the examples set by the adults in society, and subjective norms.

In Myanmar, the student population (primary to higher level) comprises approximately 8.25 million. Adolescents make up 25.7% of the student population. School-dropout rate is highest in the 10-14 year age group which accounts for 44.5% (Summary report on situation analysis of adolescent Reproductive Health).

Young people are highly vulnerable to the profound changes in the social environment that have occurred recently and which can have considerable effect on their health. Changes in social and sexual mores have increased the risks of STDs, including the threat of HIV/AIDS. Tobacco and alcohol are easily available and the propensity for young people to experiment with such substances is frequently exploited for financial gain. In order to know how best to educate young people about avoiding health-risk behaviours, an understanding of current prevailing behaviours, attitudes and subjective norms is required (Bassen-Engquist *et al*.). Only then can the existing theory and knowledge about health-risk behaviour be applied to the problems identified.

Objectives

(1) To identify risk behaviours among ninth standard students in Hlaing Township.

(2) To assess the attitudes of the ninth standard students regarding behaviours that are detrimental to health.

(3) To identify some subjective norms that could influence the behaviours of the students in the study.

(4) To formulate or recommend effective intervention strategies for reducing health-risk behaviours and promoting healthy lifestyles which are culturally acceptable.

Methods

Design: A cross-sectional study was conducted in Hlaing Township during January 1998.

Sample: There are four high schools in the township of which one was randomly selected by draw of lots.

There were 217 male and 223 female students (total 440) in the ninth standard. From separate lists of male and female students, a systematic sampling was applied. (Every alternate student of each sex group was selected for the study starting from a randomly-chosen number between 1 and 10, and 100 males and 100 females were selected for the study.)

Procedure: A self-administered questionnaire in an envelope was distributed to the sampled students in the classroom. A brief explanation of the purpose of the study was explained by the school health officer. Participation in the study was entirely voluntary. To enhance honest disclosure of information, the questionnaire was anonymous and protected from disclosure by allowing each student to return the filled questionnaire in a sealed envelope. A large room was used and seating was arranged in a way that each participant had privacy in responding to the questionnaire. Only one male student returned the questionnaire unfilled.

Measures: A self-administered questionnaire covering general demographic variables, 18 behavioural questions, 12 attitudinal questions and 10 questions on subjective norms were constructed and pretested among five focus groups of adolescents. The questions were pilot-tested among high school students in another township before being finalized for application in the study.

Behaviours: Hygienic behaviours comprising hand-washing practice, type of drinking water used and type of latrine used was included in the first part of the questionnaire so as to make it more acceptable, both to the study population as well as the teachers and parents, and make it culturally more acceptable. High-risk behaviours covering smoking, drinking alcohol, drug abuse and unprotected sexual exposure were measured by items in the questionnaires.

Attitudes: The attitudes on general hygiene practices, namely, hand washing, water and sanitation, and high-risk behaviours (smoking, alcohol, drug and sex) were measured using the Likert method of summated ratings which was developed to be culturally appropriate. A format employing five response options was chosen for this scale with responses ranging from "strongly agree" to "strongly disagree". For favourable statements, the "strongly agree" response is given a weight of 5 and the "strongly disagree" response a weight of 1 with other responses scored accordingly. For unfavourable statements, the scoring is reversed. The higher scores indicate more favourable attitudes towards the behaviour mentioned in the item.

Subjective norms: To measure the subjective norms relating to healthy behaviour, in tandem with the construction of behavioural and attitudinal questionnaires, the students

were asked how family members, relatives and friends felt about matters relating to hygienic behaviour (hand washing, type of drinking water and latrine used), alcohol, smoking drugs and sex.

The internal consistency reliability for the measure of attitudes and subjective norms relating to health behaviours was measured by a standardized Chronbach's alpha using STATA software version 5. Regression analysis was also carried out.

Findings

The demographic characteristics of the sample are presented in Table 1.

Table 1. Characteristics of the study population

Variable	Frequency	Percentage
Gender		
Male	99	49.7
Female	100	50.3
Age		
10 –14 years	2	1.01
15 –19 years	195	97.98
20 or older	2	1.01
Race		
Bamar	168	84.4
Kayah	6	3.0
Shan	4	2.0
Indian	4	2.0
Rakhine	3	1.5
Chinese	3	1.5
Other	11	5.6
Religion		
Buddhist	183	92.0
Christian	7	3.5
Islam	3	1.5
Others	6	3.0

A vast majority of the students (97.98%) are between the ages of 15 and 19 years. Most of them are Bamar (84.4%) and 92% are Buddhists. All of them were unmarried.

Table 2. Hygienic behaviours

Behaviour	Male	Female	Total
	(Percentages in parentheses)		
1. Hand washing			
(a) Hand washing before meals[1]			
Use water only	76 (76.7)	67 (68.4)	143 (72.6)
Use soap and water	21 (21.3)	16 (16.3)	37 (18.8)
Do not wash hands	2 (2.0)	15 (15.3)	17 (8.6)
(b) Hand washing after toilet use[2]			
Use water only	49 (51.6)	39 (40.2)	88 (45.8)
Use soap and water	31 (32.6)	24 (24.7)	55 (28.6)
Do not wash hands	15 (15.8)	34 (35.1)	49 (25.5)
2. Drinking water			
Sifted	71 (74.0)	67 (67.7)	138 (70.8)

Boiled	9 (9.4)	6 (6.1)	15 (7.7)
Untreated (raw)	16 (16.6)	26 (26.2)	42 (21.5)
3. Latrine use			
Water carriage latrine	61 (61.7)	75 (75.0)	136 (65.1)
Sanitary fly-proof latrine	28 (28.2)	17 (17.0)	45 (21.5)
Unsanitary/surface latrine	10 (10.1)	18 (18.0)	28 (13.4)

[1] = p <0.001, [2] = p <0.01

Most of the ninth standard students, both males and females, washed their hands with water only. Male students washed their hands more than female students, both before having meals and after going to the toilet, which was found to be significant.

70.8% of the students drank water which was sifted, and 21.5% drank untreated water. No statistical difference was found between the sexes. A vast majority (91%) of the students used sanitary latrines (water carriage and fly-proof) and 9% utilized unsanitary/ surface latrines.

Table 3. High-risk behaviours

Behaviour	Male	Female	Total
	(Percentages)		
Smoking (ever smoked)[1]	43.9	3.03	23.3
Alcohol drinking[1]	47.4	14.1	31.2
Drug use (ever used)	12.4	5.4	8.8
Unprotected sexual exposure	5.3	1.3	2.9

[1] = p <0.001

Generally, male students were found to be engaged in high-risk behaviours compared to female students. A statistically significant difference was found in smoking and drinking of alcohol where male students vastly exceed female students. The percentage of students who had used drugs was 8.8% and the percentage of those who had engaged in unprotected sex was 2.9%, but no statistical difference was found, which may be due to the small number of students engaged in these high-risk behaviours.

Table 4. Attitudes on health-related behaviours

Attitude	Sex	Mean	SD	Positive	Negative	Not sure
				(Percentages)		
1. Must wash hands with soap and water before having meals	M F	4.52 4.69	0.83 0.63	93.8 95.9	3.1 1.0	3.1 3.1
2. Everyone should use sanitary fly-proof latrines	M F	4.68 4.67	0.53 0.59	96.9 95.9	- 1.0	3.1 3.1

Attitude	Sex	Mean	SD	Positive	Negative	Not sure
				(Percentages)		
3. Using soap to wash hands is important	M F	4.33 4.37	0.83 1.91	87.8 89.7	4.1 8.2	8.1 2.1
4. Smoking does not endanger health	M F	2.02 1.18	1.31 1.32	15.5 15.0	76.3 85.0	8.2 -
5. Smoking enhances one's image	M F	1.94 1.63	1.10 0.98	10.3 7.2	76.3 87.6	13.4 5.2
6. Experimenting with narcotic drugs is not dangerous	M F	1.87 1.81	1.08 1.07	5.2 5.1	73.7 73.7	21.1 21.2
7. Needle sharing cannot transmit HIV/AIDS	M F	2.11 1.76	1.42 1.16	20.6 11.8	77.3 84.9	1.1 2.3
8. Sexual abstinence by adolescents should be encouraged	M F	4.10 4.44	1.24 1.07	82.2 89.9	11.5 8.1	6.2 2.0
9. One should engage in sex only after marriage	M F	3.76 3.92	1.38 1.25	72.9 77.1	20.8 13.5	6.3 9.4
10. Engaging in premarital sex is acceptable	M F	2.06 1.90	1.20 1.21	15.6 14.41	71.9 76.3	12.5 9.3
11. It is acceptable for adolescents to drink alcohol[1]	M F	2.05 1.79	1.02 1.21	8.4 11.1	71.6 79.8	2.0 9.1
12. Drinking alcohol cannot cause ill health[1] .	M F	1.94 1.68	1.09 1.13	11.3 11.1	79.4 87.9	9.3 1.0

[1] = p <0.01

The internal consistency reliability for the measure of attitudes towards health-risk behaviours was measured by standardized Chronbach's alpha, which was 0.6453 and the average inter-item co-variance was 0.1317.

Table 5. Subjective norms on health-related behaviours

Item	Gender	Yes	No

		(Percentage)	
1. Parents/elders will be angry if we do not wash our hands before having meals	M F Total	85.7 83.7 84.7	14.3 16.3 15.3
2. Our relatives and friends do not use sanitary fly-proof latrines	M F Total	32.0 48.5 40.3	68.0 51.5 59.7
3. People in our ward/village drink sifted water	M F Total	80.6 63.0 71.7	19.4 37.0 28.3
4. In my family one or both of my parents smoke	M F Total	52.6 60.0 56.3	47.4 40.0 43.7
5. Smoking is considered part of growing up into adulthood in my society	M F Total	50.5 56.7 53.7	49.5 43.3 46.3
6. My parents and relatives would be angry if I experimented with drugs	M F Total	95.7 94.9 95.3	4.3 5.1 4.7
7. I have refrained from using drugs because of religious teachings	M F Total	68.5 76.6 72.7	31.5 23.4 27.3
8. My parents would not approve of me having sex before marriage	M F Total	87.9 94.8 91.5	12.1 5.2 8.5
9. Premarital or extra-marital sex is highly disapproved in my society	M F Total	54.3 54.3 54.3	45.7 45.7 45.7
10. Alcohol drinking is socially accepted among my circle of friends	M F Total	13.0 11.5 12.2	87.0 88.5 87.8

The measure for subjective norms on health-related behaviours had an internal consistency, as measured by standardized Chronbach's alpha of 0.8508 and an average inter item covariance of 0.9225.

Discussion

The students have positive attitudes towards general hygiene practices of washing hands, using soap to wash hands and the use of sanitary fly-proof latrines, which are also accepted as social norms. But the use of soap is not

reflected in actual practice where only 21.3% of male students and 16.3% of female students used soap to wash hands. It is also apparent that drinking water after sifting is the usual practice in the community. Although the students have a negative attitude on smoking, the subjective norm reveals that smoking by one or both parents is present in 56.3% of the respondents' families and smoking is considered as part of growing up into adult hood in society by 53.7% of the students. This may account for a high percentage (43.9%) of male students smoking, which was significantly higher than female students.

The students have a negative attitude towards the use of narcotic drugs and they expressed that it is highly against the social norm; 95.3% stating parental disapproval and 72.7% stating religious influence against the use of drugs. Only 8.8% of the students had ever used drugs in spite of these negative attitudes and the influence of the social norms which should be reinforced.

Most of the students expressed positive attitudes regarding sexual abstinence during adolescence and engaging in sexual relationship only after marriage. A majority expressed negative attitudes regarding premarital sex (71.9% of male students and 76.3% of female students). Although parental disapproval of premarital sex is very high in subjective norms (91.5%) only 53.4% stated that premarital or extramarital sex is disapproved in his/her society. This may be due to the influence of the exposure to western culture in the form of both print media and TV/videos. However, unprotected sexual exposure is low (2.9% overall) among the students.

The students have negative attitudes towards drinking of alcohol, which was significantly higher in female students than male students. The proportion of students who responded that alcohol drinking was not socially acceptable was 87.8%. This may be a reflection of the religion of the students, 92% of whom are Buddhists. However, a substantial percentage of male students (47.4% and 14.1% of female students had ever drunk alcohol, which may be a reflection of the commercial advertisements of all forms of alcoholic beverages.

Recommendations

1. To stress the importance of using soap in hand-washing in health education, especially in primary schools.
2. As smoking is found to be highly prevalent among parents and male students, anti-smoking campaigns should be conducted, both targeted at adults as well as school children.
3. The high level of alcohol drinking among male students (47.4%) and female students (14.1%) in spite of

the negative attitudes expressed by the students and the subjective norms prevailing against alcohol may be due to advertising alcoholic beverages on TV and print media. Appropriate measures should be taken against advertising of alcohol and the sale of alcoholic beverages to minors i.e. under the age of 18 years.

4. High-risk behaviours related to drugs and sex are quite low, which is in accordance with the negative attitudes on premarital sex, and the corresponding subjective norms. The positive attitudes against drugs, sexual abstinence by adolescents and subjective norms on premarital sex should be reinforced in schools. Voluntary, religious classes or seminars should be conducted in schools to prevent experimenting with high-risk behaviours, especially relating to sex and drugs.

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Risk Behaviours, Attitudes and Subjective Norms among Ninth Standard Students in Hlaing Township

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Abstract

This paper measures the ninth-standard students' high-risk behaviours, attitudes and subjective norms regarding hygienic practices, smoking, alcohol, drugs and sex. Baseline data were collected from a total of 199 students who completed a self-administered questionnaire. Significant differences in the practice of hand-washing was found between the sexes. Most of the students did not use soap but used only water, drank water which was sifted, and used sanitary fly-proof latrines. Significant differences between male and female students were found in smoking and alcohol drinking. Smoking and alcohol drinking (ever used) was considerably high among male students (43.9% and 47.4% respectively). Drug use and unprotected sexual exposure are quite low. Attitudes and subjective norms are also measured so as to identify areas to be reinforced for the adoption of healthy behaviours.

Introduction

THE second decade of life is a period of rapid growth and development, especially in terms of physical, mental and social change. It is a period that will shape the future of individuals, communities, societies and countries. As a result of the achievements of child survival and development, more and more children around the world would live to become adolescents. In Myanmar, young people (10-24 years) constitute 29.3% of the total population of around 46 million with 14.97% males

and 14.33% females. (Statistical Year Book, Central Statistical Organization, 1997). With their energies, ideas and enthusiasm, young people are a key resource for promoting their own health and development and also contributing to the health of their families and communities.

Trying out new things and making first-time choices are part of growing up. This however should not result in taking risks which are detrimental to the health of the adolescents, now and in the future. In addition, the risk-taking behaviour may not reflect the attitudes of adolescents but may be due to the pressures exerted on them by their peers or adults, by the examples set by the adults in society, and subjective norms.

In Myanmar, the student population (primary to higher level) comprises approximately 8.25 million. Adolescents make up 25.7% of the student population. School-dropout rate is highest in the 10-14 year age group which accounts for 44.5% (Summary report on situation analysis of adolescent Reproductive Health).

Young people are highly vulnerable to the profound changes in the social environment that have occurred recently and which can have considerable effect on their health. Changes in social and sexual mores have increased the risks of STDs, including the threat of HIV/AIDS. Tobacco and alcohol are easily available and the propensity for young people to experiment with such substances is frequently exploited for financial gain. In order to know how best to educate young people about avoiding health-risk behaviours, an understanding of current prevailing behaviours, attitudes and subjective norms is required (Bassen-Engquist *et al*.). Only then can the existing theory and knowledge about health-risk behaviour be applied to the problems identified.

Objectives

(1) To identify risk behaviours among ninth standard students in Hlaing Township.

(2) To assess the attitudes of the ninth standard students regarding behaviours that are detrimental to health.

(3) To identify some subjective norms that could influence the behaviours of the students in the study.

(4) To formulate or recommend effective intervention strategies for reducing health-risk behaviours and promoting healthy lifestyles which are culturally acceptable.

Methods

Design: A cross-sectional study was conducted in Hlaing Township during January 1998.

Sample: There are four high schools in the township of which one was randomly selected by draw of lots.

There were 217 male and 223 female students (total 440) in the ninth standard. From separate lists of male and female students, a systematic sampling was applied. (Every alternate student of each sex group was selected for the study starting from a randomly-chosen number between 1 and 10, and 100 males and 100 females were selected for the study.)

Procedure: A self-administered questionnaire in an envelope was distributed to the sampled students in the classroom. A brief explanation of the purpose of the study was explained by the school health officer. Participation in the study was entirely voluntary. To enhance honest disclosure of information, the questionnaire was anonymous and protected from disclosure by allowing each student to return the filled questionnaire in a sealed envelope. A large room was used and seating was arranged in a way that each participant had privacy in responding to the questionnaire. Only one male student returned the questionnaire unfilled.

Measures: A self-administered questionnaire covering general demographic variables, 18 behavioural questions, 12 attitudinal questions and 10 questions on subjective norms were constructed and pretested among five focus groups of adolescents. The questions were pilot-tested among high school students in another township before being finalized for application in the study.

Behaviours: Hygienic behaviours comprising hand-washing practice, type of drinking water used and type of latrine used was included in the first part of the questionnaire so as to make it more acceptable, both to the study population as well as the teachers and parents, and make it culturally more acceptable. High-risk behaviours covering smoking, drinking alcohol, drug abuse and unprotected sexual exposure were measured by items in the questionnaires.

Attitudes: The attitudes on general hygiene practices, namely, hand washing, water and sanitation, and high-risk behaviours (smoking, alcohol, drug and sex) were measured using the Likert method of summated ratings which was developed to be culturally appropriate. A format employing five response options was chosen for this scale with responses ranging from "strongly agree" to "strongly disagree". For favourable statements, the "strongly agree" response is given a weight of 5 and the "strongly disagree" response a weight of 1 with other responses scored accordingly. For unfavourable statements, the scoring is reversed. The higher scores indicate more favourable attitudes towards the behaviour mentioned in the item.

Subjective norms: To measure the subjective norms relating to healthy behaviour, in tandem with the construction of behavioural and attitudinal questionnaires, the students

were asked how family members, relatives and friends felt about matters relating to hygienic behaviour (hand washing, type of drinking water and latrine used), alcohol, smoking drugs and sex.

The internal consistency reliability for the measure of attitudes and subjective norms relating to health behaviours was measured by a standardized Chronbach's alpha using STATA software version 5. Regression analysis was also carried out.

Findings

The demographic characteristics of the sample are presented in Table 1.

Table 1. Characteristics of the study population

Variable	Frequency	Percentage
Gender		
Male	99	49.7
Female	100	50.3
Age		
10 –14 years	2	1.01
15 –19 years	195	97.98
20 or older	2	1.01
Race		
Bamar	168	84.4
Kayah	6	3.0
Shan	4	2.0
Indian	4	2.0
Rakhine	3	1.5
Chinese	3	1.5
Other	11	5.6
Religion		
Buddhist	183	92.0
Christian	7	3.5
Islam	3	1.5
Others	6	3.0

A vast majority of the students (97.98%) are between the ages of 15 and 19 years. Most of them are Bamar (84.4%) and 92% are Buddhists. All of them were unmarried.

Table 2. Hygienic behaviours

Behaviour	Male	Female	Total
	(Percentages in parentheses)		
1. Hand washing			
(a) Hand washing before meals[1]			
Use water only	76 (76.7)	67 (68.4)	143 (72.6)
Use soap and water	21 (21.3)	16 (16.3)	37 (18.8)
Do not wash hands	2 (2.0)	15 (15.3)	17 (8.6)
(b) Hand washing after toilet use[2]			
Use water only	49 (51.6)	39 (40.2)	88 (45.8)
Use soap and water	31 (32.6)	24 (24.7)	55 (28.6)
Do not wash hands	15 (15.8)	34 (35.1)	49 (25.5)
2. Drinking water			
Sifted	71 (74.0)	67 (67.7)	138 (70.8)

Boiled	9 (9.4)	6 (6.1)	15 (7.7)
Untreated (raw)	16 (16.6)	26 (26.2)	42 (21.5)
3. Latrine use			
Water carriage latrine	61 (61.7)	75 (75.0)	136 (65.1)
Sanitary fly-proof latrine	28 (28.2)	17 (17.0)	45 (21.5)
Unsanitary/surface latrine	10 (10.1)	18 (18.0)	28 (13.4)

[1] = p <0.001, [2] = p <0.01

Most of the ninth standard students, both males and females, washed their hands with water only. Male students washed their hands more than female students, both before having meals and after going to the toilet, which was found to be significant.

70.8% of the students drank water which was sifted, and 21.5% drank untreated water. No statistical difference was found between the sexes. A vast majority (91%) of the students used sanitary latrines (water carriage and fly-proof) and 9% utilized unsanitary/ surface latrines.

Table 3. High-risk behaviours

Behaviour	Male	Female	Total
	(Percentages)		
Smoking (ever smoked)[1]	43.9	3.03	23.3
Alcohol drinking[1]	47.4	14.1	31.2
Drug use (ever used)	12.4	5.4	8.8
Unprotected sexual exposure	5.3	1.3	2.9

[1] = p <0.001

Generally, male students were found to be engaged in high-risk behaviours compared to female students. A statistically significant difference was found in smoking and drinking of alcohol where male students vastly exceed female students. The percentage of students who had used drugs was 8.8% and the percentage of those who had engaged in unprotected sex was 2.9%, but no statistical difference was found, which may be due to the small number of students engaged in these high-risk behaviours.

Table 4. Attitudes on health-related behaviours

Attitude	Sex	Mean	SD	Positive	Negative	Not sure
				(Percentages)		
1. Must wash hands with soap and water before having meals	M F	4.52 4.69	0.83 0.63	93.8 95.9	3.1 1.0	3.1 3.1
2. Everyone should use sanitary fly-proof latrines	M F	4.68 4.67	0.53 0.59	96.9 95.9	- 1.0	3.1 3.1

Attitude	Sex	Mean	SD	Positive	Negative	Not sure
				(Percentages)		
3. Using soap to wash hands is important	M F	4.33 4.37	0.83 1.91	87.8 89.7	4.1 8.2	8.1 2.1
4. Smoking does not endanger health	M F	2.02 1.18	1.31 1.32	15.5 15.0	76.3 85.0	8.2 -
5. Smoking enhances one's image	M F	1.94 1.63	1.10 0.98	10.3 7.2	76.3 87.6	13.4 5.2
6. Experimenting with narcotic drugs is not dangerous	M F	1.87 1.81	1.08 1.07	5.2 5.1	73.7 73.7	21.1 21.2
7. Needle sharing cannot transmit HIV/AIDS	M F	2.11 1.76	1.42 1.16	20.6 11.8	77.3 84.9	1.1 2.3
8. Sexual abstinence by adolescents should be encouraged	M F	4.10 4.44	1.24 1.07	82.2 89.9	11.5 8.1	6.2 2.0
9. One should engage in sex only after marriage	M F	3.76 3.92	1.38 1.25	72.9 77.1	20.8 13.5	6.3 9.4
10. Engaging in premarital sex is acceptable	M F	2.06 1.90	1.20 1.21	15.6 14.41	71.9 76.3	12.5 9.3
11. It is acceptable for adolescents to drink alcohol[1]	M F	2.05 1.79	1.02 1.21	8.4 11.1	71.6 79.8	2.0 9.1
12. Drinking alcohol cannot cause ill health[1] .	M F	1.94 1.68	1.09 1.13	11.3 11.1	79.4 87.9	9.3 1.0

[1] = p <0.01

The internal consistency reliability for the measure of attitudes towards health-risk behaviours was measured by standardized Chronbach's alpha, which was 0.6453 and the average inter-item co-variance was 0.1317.

Table 5. Subjective norms on health-related behaviours

Item	Gender	Yes	No

		(Percentage)	
1. Parents/elders will be angry if we do not wash our hands before having meals	M F Total	85.7 83.7 84.7	14.3 16.3 15.3
2. Our relatives and friends do not use sanitary fly-proof latrines	M F Total	32.0 48.5 40.3	68.0 51.5 59.7
3. People in our ward/village drink sifted water	M F Total	80.6 63.0 71.7	19.4 37.0 28.3
4. In my family one or both of my parents smoke	M F Total	52.6 60.0 56.3	47.4 40.0 43.7
5. Smoking is considered part of growing up into adulthood in my society	M F Total	50.5 56.7 53.7	49.5 43.3 46.3
6. My parents and relatives would be angry if I experimented with drugs	M F Total	95.7 94.9 95.3	4.3 5.1 4.7
7. I have refrained from using drugs because of religious teachings	M F Total	68.5 76.6 72.7	31.5 23.4 27.3
8. My parents would not approve of me having sex before marriage	M F Total	87.9 94.8 91.5	12.1 5.2 8.5
9. Premarital or extra-marital sex is highly disapproved in my society	M F Total	54.3 54.3 54.3	45.7 45.7 45.7
10. Alcohol drinking is socially accepted among my circle of friends	M F Total	13.0 11.5 12.2	87.0 88.5 87.8

The measure for subjective norms on health-related behaviours had an internal consistency, as measured by standardized Chronbach's alpha of 0.8508 and an average inter item covariance of 0.9225.

Discussion

The students have positive attitudes towards general hygiene practices of washing hands, using soap to wash hands and the use of sanitary fly-proof latrines, which are also accepted as social norms. But the use of soap is not

reflected in actual practice where only 21.3% of male students and 16.3% of female students used soap to wash hands. It is also apparent that drinking water after sifting is the usual practice in the community. Although the students have a negative attitude on smoking, the subjective norm reveals that smoking by one or both parents is present in 56.3% of the respondents' families and smoking is considered as part of growing up into adult hood in society by 53.7% of the students. This may account for a high percentage (43.9%) of male students smoking, which was significantly higher than female students.

The students have a negative attitude towards the use of narcotic drugs and they expressed that it is highly against the social norm; 95.3% stating parental disapproval and 72.7% stating religious influence against the use of drugs. Only 8.8% of the students had ever used drugs in spite of these negative attitudes and the influence of the social norms which should be reinforced.

Most of the students expressed positive attitudes regarding sexual abstinence during adolescence and engaging in sexual relationship only after marriage. A majority expressed negative attitudes regarding premarital sex (71.9% of male students and 76.3% of female students). Although parental disapproval of premarital sex is very high in subjective norms (91.5%) only 53.4% stated that premarital or extramarital sex is disapproved in his/her society. This may be due to the influence of the exposure to western culture in the form of both print media and TV/videos. However, unprotected sexual exposure is low (2.9% overall) among the students.

The students have negative attitudes towards drinking of alcohol, which was significantly higher in female students than male students. The proportion of students who responded that alcohol drinking was not socially acceptable was 87.8%. This may be a reflection of the religion of the students, 92% of whom are Buddhists. However, a substantial percentage of male students (47.4% and 14.1% of female students had ever drunk alcohol, which may be a reflection of the commercial advertisements of all forms of alcoholic beverages.

Recommendations

1. To stress the importance of using soap in hand-washing in health education, especially in primary schools.
2. As smoking is found to be highly prevalent among parents and male students, anti-smoking campaigns should be conducted, both targeted at adults as well as school children.
3. The high level of alcohol drinking among male students (47.4%) and female students (14.1%) in spite of

the negative attitudes expressed by the students and the subjective norms prevailing against alcohol may be due to advertising alcoholic beverages on TV and print media. Appropriate measures should be taken against advertising of alcohol and the sale of alcoholic beverages to minors i.e. under the age of 18 years.

4. High-risk behaviours related to drugs and sex are quite low, which is in accordance with the negative attitudes on premarital sex, and the corresponding subjective norms. The positive attitudes against drugs, sexual abstinence by adolescents and subjective norms on premarital sex should be reinforced in schools. Voluntary, religious classes or seminars should be conducted in schools to prevent experimenting with high-risk behaviours, especially relating to sex and drugs.

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Resear
ch

Checklist Questions to Make Your Research Report Good

*Dr Myint Htwe**

This article is aimed at young researchers who would like to improve their report on research study, especially quantitative research.

Why is it Important?

RESEARCHERS may be able to conduct research by applying the principles of "responsible conduct of research" and appropriate research methods. Research process and findings need to be transformed into a research report, that is readable and also technically acceptable. Otherwise, the importance and usefulness of its striking findings may not be discerned by policy-makers and health programme managers. If one cannot produce a good research report, the whole purpose of the research study will be lost. Therefore, research report writing is one of the important components in the research cycle, i.e. research planning, conduct of research, research management, report writing, research utilization, and finally, research evaluation.

Research report writing skill is really an art. All researchers may not possess it fully. It has to be acquired through practice and experience. It requires a

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special talent. It is different from skills necessary for acquiring technical knowledge for conducting research. Report writing is the most challenging task for researchers. It will determine whether the research conducted is a good piece of work or not. Actually, a good research report is one that takes the reader on a journey of discovery.

Style of Writing

The primary aim is to achieve a clear, logical, coherent and concise write-up. The principles of "keep it simple, concise, objective and straightforward" and "clear organization and presentation" must be adhered to whenever possible. Simplicity by way of presenting only the essential issues, precision in quantification, specificity with little exaggeration, proper attention to formatting and layout, and paying attention to the target audience are some of the issues to be taken into account in finalizing a research report. Vague expressions, such as "it seems", and "it may be" are better avoided. The aim is to have a report which can stimulate the interest of the reader without bias. It is to be noted that a research study report differs somewhat from a thesis or a dissertation, where there is an official manual developed by respective graduate schools or departments to which the candidate must conform strictly. The research report should describe and explain rather than try to convince or move to action. In doing so, one should take into account certain conventions related to the layout, structure and style of writing. The format, of course, must be in conformity with the requirements of the journal or bulletin one intends to submit the manuscript for.

Preliminary Assessment

There are a few general issues which need to be sorted out before the first draft is made. The following questions can be used for this purpose:

- Are you satisfied with the overall output or findings or results of your study?
- Have you noted down the additional literature which you may have come across during the process of analysis? Is your research study redundant?
- Have you made enough cross-references to the tables generated? Are there contradictory results across the tables? If so, have you sorted out the reasons?
- Have you collated all the salient discussion points and decisions made by the team members, especially during the data analysis stage?
- Have you grouped both the supportive and the nullifying

points in the context of objectives of the study?

- Have you cross-validated the data?
- Have you consulted a statistician regarding the statistical procedures used in the study? Have you also discussed your research project with the "subject authority"?

NB: *If you can generally respond to these questions in the affirmative, you are on the right track to go ahead and write the research report.*

Follow the Checklist

The following checklist includes important questions which would ensure that the research study report is composed of essential facts:

Section	Evaluative questions
Title	• Is it concise, self-explanatory and clearly indicative of the purpose of the study? • Are key words mentioned in the title? (A total of 15-20 words is optimum for the title)
Abstract	• Are the main hypotheses and problems of the study included? • Are synopsis of basic procedures (selection of study subjects or experimental animals; observational and analytical methods) and design of the study included? • A summary of major findings (specific data and their statistical significance, if possible) in terms of public health or clinical significance elucidated? • Have you included the principal conclusions? • Have you mentioned (below the abstract) 3 to 10 key words or short phrases that will assist indexers in cross-indexing the article? (Terms from the medical subject headings (MeSH) list of *Index Medicus* should be used). **NB**: *A good abstract (not more than 250 words) will increase the readership of the research report. The purpose is to provide the reader with a general overview of what you have done.*
Introduction	• Have you given clear and definitive statements on the problem and purpose of your study? • Have you indicated that the problem is important in terms of theory and practice? (Theoretical background of the problem under study).

Section	Evaluative questions
	• Have you mentioned previous situations, scenarios or studies necessitating this research study? • If so, what does your study logically add to these previous situations, scenarios or studies? • Have you included the implications of your findings in the context of improving the health care system or a particular scenario?
Objectives	• Have you stated your objectives clearly? • Have you checked whether the objectives, hypothesis and design of the study are well integrated?
Hypothesis	• Have you clearly stated each hypothesis to be tested? • Have you neglected to cite reports that go against your hypothesis or direction?
Literature Review	• Is the literature cited directly relevant to the hypothesis or problem or topic of the study? • Have you checked whether your citations are accurate and not surplus to your requirement? • Have you referred to the reference list provided? • Are your references drawn from recent literature? • Is a wide variety of sources represented? • Have you summarized the state-of-the-art literature related to the subject of your study?
Methodology (General)	• Have you mentioned "What, why and how of the actual procedures you used to generate data and information?" • If you have deviated from your original design, have you explained to what extent and why? • Have you put forward the resultant or possible bias at every important stage of your research study? • Have you used sub-headings to divide the text into clear sections? (**Caveat**: *Too few, the reader gets lost: Too many, the reader gets confused*).
Methodology (Contents)	Questions that need to be posed are slightly different for different study designs. However, the following questions may be applicable for a general assessment of a research report: • Is the study design (clinical trial, case control, cohort, cross-sectional) clearly depicted? • Have you explained clearly the sampling frame, sampling techniques and sample size computation of the study?

Section	Evaluative questions
	• Have you spelled out the time and area of the study? • Have you explicitly explained (defined, if necessary) the data collection techniques, measurement devices, experimental treatments, assignment of subjects or types of randomization, methods used to control confounding, inclusion and exclusion criteria of subjects, procedures for follow-up of patients, numbers lost to follow-up, blinding procedures, method of control group selection, response rate, compliance, external and internal validity, independent and dependent variables, etc.? • Are the methods applied for data analysis and statistical tests sufficient and appropriate? • Have you provided information on the computer hardware and software version used in analysing the data? • If ethical issues are involved, have you indicated whether the procedures used were in accordance with the prevailing ethical principles? • Have you checked if important points relevant to the study are omitted or misplaced? • Have you mentioned all the above facts in a logical order to the extent possible? **NB**: *The purpose is that enough information must be included to permit replication. A complex design, questionnaire and a battery of complex tests may be annexed.*
Findings	• Is your presentation systematic, clear, sequential and logical? • Do the results relate to the research questions posed or the objectives of the study? • Are the study findings substantiated by a reasonable number of tables and appropriate graphs? • Have you cross-referenced your findings with similar studies, and especially with the theory underlying such studies? • Are the groups similar on baseline measures? If not, were appropriate analyses done to take differences into consideration? • Are all relevant outcomes reported? Are actual values reported and not just the results of statistical tests? • Have you made any redundant comparison? • Have you performed inappropriate statistical tests? • If the results are statistically significant, do they also have clinical or public health significance? (unconstructive, negative or unimportant criticism should be avoided.) • Have you summarized your major findings in a logical manner?

Section	Evaluative questions
	• Have you elucidated the findings in a correct chronological sequence? • Have you cited books and articles in the text of the report by giving the author's last name and date of publication? [e.g. (Bem, 1994)]. For details, please refer to http://library.whosea.org/manuscript/uniform.html **NB:** *Cohort, case control, clinical trials, decision analysis, and meta analysis have different evaluative questions.*
Discussion and Conclusion	• Have you referred back to the objectives, hypothesis and literature reviewed in discussing the findings? • Have you indicated clearly whether your hypothesis is supported or rejected? • Are the questions posed in the study adequately addressed? • Are shortcomings or limitations of the study adequately explained and conservative suggestions given for further research? • Have you compared the findings of the study with that of previous research studies? • If unexpected results have been obtained, have you discussed the possible reasons? • Are the conclusions justified from the data? • Do you make extrapolation on the data without substantive reason? • Have you discussed the clinical, public health and scientific implications of your findings? • Have you explained how your findings can/will be incorporated, established or put into practice?
References	• Do you follow the pattern required by the journal you wish to submit your research study report to? • Is all the literature discussed in your research report mentioned in the reference? **NB:** *References are those that are cited in the research study report. Bibliography includes reference plus other publications that may be relevant to the subject under study.*
Annexes	• Are all the tables, flow-charts, definitions of variables, conceptual framework, questionnaires or interview schedules, list of abbreviations, technical specifications, and extracts from an interview transcript, mentioned as annexes?

Overall Assessment

- Have you included all the important findings?
- Are there any contradictory results among your findings?
- Are data in the text agreeable with the data in tables? Are tables and figures referred to correctly?
- Do the conclusions follow logically from the findings and in order of importance?
- Are weaknesses of the study revealed and explained?
- Is it still possible to condense the report without losing its quality and important findings?
- If credit is due, credit should be given to those who had helped in the acknowledgement section.

General Note for Fine-Tuning

- What you have actually done or completed, i.e. research procedures, should be written in the past tense.
- Discussions, conclusions, recommendations and table descriptions should be explained in the present tense.
- Conventionally, personal pronouns (I, me, we) should be used the least possible or not at all (there are different schools of thought).
- If you have used a lot of abbreviations in the text, the full or the expanded version of these should be given alphabetically.
- Avoid using long phrases and complicated sentences. Try not to posture but to communicate.
- Non-sexist writing is appreciated.
- Give sufficient "elapse time" between drafts so as to have "fresh idea and fresh eye". Do not write the whole report at a stretch.
- Ask your colleagues to make a critique but "bear with him/her" (don't want to lose a good friend – professionalism) on any negative comments put forward. If they find something unclear, do not argue with them. This is important because, the sentences or connotations that are clear to the author may prove quite confusing to other people. You must be willing to restructure your research study report.
- Even skilful and experienced writers revise the text many times before submitting a manuscript for publication.
- The final caveat is that there is no single set of rules and guidelines for preparing a research report which

encompass all situations and provides a universally accepted convention.

- When writing a research report, you may wish to have the following items:
  - a dictionary
  - a spelling guide
  - a handbook of style
  - a thesaurus
- Based on the number of affirmative responses with respect to the questions posed above, you may wish to decide whether to polish your research study report again or not.

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Research Prioritization

*Dr Myint Htwe**

This article is an attempt to highlight general issues inherent in the research priority setting process. These issues may be considered before one embarks on prioritization of research areas in the research system of any country.

Introduction

RESEARCH prioritization is a dynamic process. It is usually done at different hierarchical levels of the health research system i.e., national, institutional, departmental, or programme. It needs to be reviewed and updated after a certain period of time. It should be part of the planning exercise and its effectiveness and applicability are determined, to a large extent, by its integration into the planning context. Research priorities need to be established because research planning also confronts a scarcity of human and financial resources. Another reason is that determinants and pattern of diseases or conditions and their effect on the population at large are constantly changing. This leads to inequality in the health status of the people. This entails reconsideration of balance and relevance of health research areas in the context of allocation and management of finite resources for research. The whole process of research prioritization must therefore be inherently linked to the functions of the national health system. In other words, research prioritization must be undertaken within the framework of the overall national policies and goals, national health policies and national health research policies. Actually, research prioritization is one of the key nodal points in the research cycle i.e., research planning, research priority setting, strategies and implementation of research priorities, research utilization, research

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monitoring and evaluation (part of the research information system) and overall research management. The final aim of research prioritization is "how best well balanced research can support and complement the health system to achieve the national goals for health". This way a forward-looking research system can be established firmly.

Prerequisites

Certain prerequisites are to be fulfilled before one initiates the research prioritization process. This is to pave a correct path in achieving the objectives of a research system i.e. well-balanced and relevant priority research domains/areas/topics. Basic prerequisites can be attained by responding to the following questions:

- As much as possible, how should one acquire "valid, reliable and sufficient data/information" necessary for the measurement tool(s) selected?
- What are the national health research policies? What is the acceptable range of research domains among the choices to be made?
- How should one explore to obtain a range of practical and technically sound methodologies for research prioritization?
- How should one get a consensus on the selection of the best methodology and correct line of approach for research prioritization? (This depends on the level of research prioritization to be made.)
- How much time and money should be spent on the prioritization process?
- Who should be in the technical advisory group to give overall guidance throughout the process of research prioritization and how this group should function?
- Who should be in the core working group to actually do the prioritization and how this group should function?

Core Working Group and Advisory Group

The core working group is the one actually doing the prioritization process. Sub-groups can be formed for undertaking specific tasks, e.g., measurement and tool group, criteria group, research domain/area/theme identification group, logistic and coordination group. These groups should meet as and when necessary throughout the process. The team leader of the core working group must be a senior person who is not only

technically sound and administratively competent, but also possesses leadership quality. It is extremely important to have a well-functioning core working group. The group members should comprise professionals from different disciplines and specific areas of technical expertise. The leader of the core working group should ensure that there will be no domination of the discussion by any group member. Participation, working mechanism, logistics and dynamics of the group must be carefully worked out and properly managed. A senior facilitator may be required for each sub-group. The role of the facilitator is just to facilitate but not to direct. The facilitator must have broad experience in fostering group interactions, and also well-versed in techniques employed in the priority-setting process. The main task of the advisory group is to give overall guidance on the prioritization process in the context of health and research policy issues.

Process

The whole process of prioritization should be well documented for future reference or ironing out any controversial issues that may emerge later. Rationale, different schools of thought put forward, justification for selecting a particular measurement tool or approach should also be noted. The process differs depending on whether it is done at the national, or institutional, or departmental, or programme level. In considering the overall process for developing a conceptual framework for prioritization, the following issues must be taken into account.

- To ensure that all leading agencies responsible for funding, major research players, research institutions, and senior programme managers of the Ministry of Health are involved to the extent possible. If it is not feasible, they should at least be consulted or communicated for information exchange throughout the process. This participatory approach is essential in order to have better decisions and high probability of successful implementation of priority research areas identified.
- To emphasize the process rather than the outcome.
- To ensure that the process should be information driven with supporting facts and justifiable opinions.
- To ensure that methods of consultation are as much as possible objective and transparent.
- To ensure that the process itself has a built-in monitoring or assessment mechanism.

- To solicit the experience of those who have already undergone the process using similar measurement methods.

Methodology

Method/measurement tool

The selection of appropriate *method or measurement tool* is the most crucial part of the whole process of research prioritization. One should be aware of the fact that each method has its strengths and weaknesses. Placing too much emphasis on theoretical issues is usually counter-productive. The following points must be given due attention:

- No one method is superior to the other. It is all relative and depends on the requirement of the prevailing situation.
- The methods vary in complexity, flexibility, rigour and other characteristics. No one method is best suited for all situations.
- In selecting the methodology on measurement tool, a compromise is usually to be made between the theoretical or technical requirement and the practicability or feasibility of applying the method.
- Whatever method is selected, it is beneficial to obtain concurrence from the gatekeepers or research policy makers through the advisory group on the prioritization process.
- The pitfalls of prioritization must be made known and discussed amongst the core working group members who do the research priority setting.
- Qualitative methods are equally as robust as quantitative methods. One should not hesitate to use qualitative methods. As quantitative information is usually incomplete or insufficient in developing countries, it may sometimes require expert judgement or opinion.
- The method selected must be flexible enough to adapt to the prevailing scenario, yet maintain its robustness. This also implies that the method must be able to entertain new opportunities and challenges that may emerge.
- The selected method or measurement tool should be subjected to sensitivity analysis. This involves changing or shifting weights on parameters or criteria to know the robustness of the results of priority setting method, i.e., the degree of its insensitivity to changes in assumptions. It can be accomplished through group

analysis and discussion or by means of mathematical procedures. The sensitivity analysis is possible for single criterion methods as well as for multiple criteria methods.

- Priority setting method or measurement tool or methods may themselves be compared by applying certain criteria in order to get the best method or measurement tool.

Criteria

Criteria for priority setting should be logically related to the stated policy, objective or mission statement of the research organization or institute. Selection of criteria usually underpins the process of prioritization. Each stage of prioritization may require different sets of criteria. Sufficient attention must be given to identifying criteria reflecting the impact on economic and societal aspects, e.g., monetary cost of treating the disease, the years of productive life lost due to a particular disease or condition. Criteria should be clearly spelled out and must be independent of each other. The weightage given to criteria must be thoroughly discussed and consensus obtained among the core group members. The aim is that criteria must be used in a balanced way. It is also beneficial to consider knowledge-based criteria or non-numerical criteria which call for human expert judgement. The criteria for selection of priority areas of regional research used by the South-East Asia Advisory Committee on Medical Research (1976) are mentioned in the Annex.

The following issues usually serve as an important input in developing criteria:

- Will the issue to be addressed have a significant impact on the current and future health status of the people with respect to mortality, morbidity, quality of life, cost of health service?
- Will the outcome of the proposed research have a significant impact on the issue to be addressed?
- Are there sufficient research capability and capacity so that the issue can be addressed with confidence?

Classification

Expected prioritized research areas should be classified in order to facilitate implementation by certain organizations or groups. It can also be classified according to five major domains of global health e.g., disease conditions and health impairments, health care system, environmental determinants, food and nutrition, socio-cultural characteristics. The following generic areas may be used for classification (the list is not exhaustive):

- Thematic areas

- Technologies and methodologies related areas
- Management and organization of a system
- Disease specific
- New interventions/methods development
- Effectiveness and efficiency of current and past interventions
- Social and community needs related

Conclusion

In the research prioritization process, different interest of researchers and end-users should be well balanced. It can be achieved through intensive consultation throughout the process with those who had the experience and knowledge in research prioritization. The basic requirements for research prioritization are sound reasoning and unbiased judgement coupled with analytical capacity. In order to create a sense of ownership, delineation of the boundaries of research domains must be made. Broad-based priority setting exercise can guide and promote long-term growth of research and scientific enterprise. Research prioritization is a dynamic process which needs to be reviewed and updated as and when necessary. The timing of the review process is closely related to any change in the overall national policy or national health research policy or national health policy or framework and *modus operandi* of the national health research system. The priority setting process is usually complex and multi-tiered, possessing both quantitative and qualitative component. The issue facing us is the political weights *versus* scientific weights in making the final decision on prioritized research areas and also for allocation of funding among the research areas identified. This poses a challenge to most of the researchers in a research system. The caveat is that research prioritization process should not be put solely into the hands of research scientists. Last but not the least, the outcome of the priority setting process should be widely disseminated to the concerned foci in the Ministry of Health and related ministries.

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Annex

Criteria for Selection of Priority Areas of Regional Research (SEA/ACMR : 1976)

1. The research area should relate to a priority health problem in the countries of the Region.
2. The problem should be of major importance in terms of its relationship to socioeconomic development of the countries of the Region.
3. The problem should have a demonstrable potential for solution or clarification and there should be a strong probability of the solution being applied within a reasonable time and at reasonable cost.
4. The solution or clarification of the problem should lead to the development or improvement of a broad national health programme destined ultimately to strengthen national and/or international health development involving large numbers of people.
5. The research should lead to the development of new scientific knowledge and/or adaptation of knowledge in various national contexts.
6. The problem should require *regional* collaborative efforts taking into account, for example, one or more of the following:
   a) Variations in the frequency and distribution of a disease in different geographic areas,
   b) Differences in ecological settings that influence manifestations of a disease as well as its response to health intervention,
   c) The opportunity it would provide for pooling together the resources of the countries of the *region* for studying common problems.

People and Health

A Gift of Blood: The Central Blood Bank, Yangon

*Jitendra Tuli**

THE Central Blood Bank attached to Yangon's General Hospital opens every day at 9.30 a.m. Within half an hour of its opening, most of the wooden benches in the waiting hall are occupied. There are young men, some women and, always, there are the red-robed monks. On an average, the Bank receives nearly 100 donors daily, of whom 50% are monks.

On a visit to the Bank one bright and cool morning in January, one found over 40 persons waiting to donate blood. All of them were young, most were males, including the monks, with a sprinkling of women. After their physical examination, including a blood pressure check-up and other formalities, they were taken to an adjacent ward where the sisters on duty drew blood.

What makes the Blood Bank a special place is its serene atmosphere. There is no fuss, no bother, no noise. Nobody is rushing around. It is almost as if you are in a temple, preparing for meditation. Perhaps it is the monks, sitting calmly on the benches, telling their rosaries that helps to spread the peaceful vibrations.

Inside the ward, the beds are occupied as the sisters go about drawing blood into the plastic sachets. According to Dr Tun Myint, Chief Medical Officer of the Central Blood Bank, they are able to fulfil their monthly requirement of 2 500 units of blood from donors. Naturally, the blood is screened for HIV, VDRL, malaria and hepatitis B, before it is given for transfusion. In December 1997, for example, of the 1951 units screened, 13 were found positive for

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HIV while 107 units were positive for HBsAs. "This was the worst month. Normally, only 5% of the blood drawn is not used", he explained.

Most of the country's requirement of blood is met through voluntary donations. People donate blood on special occasions like birthdays or other auspicious days. There are some people who donate blood regularly. Like young Myo Min, for instance. When we met him, the 26-year-old taxi driver was lying in bed, donating his 13th packet of blood. In the past five years he has been to the Bank 12 times, "to make a deposit", as he says with a broad smile. When asked what brought him there repeatedly, he explained that he was aware that there was always a requirement of blood. "It makes me feel good to know that I have helped and, perhaps saved a life. I am young and healthy and can easily donate blood", he says.

The eldest of seven brothers and sisters, Myo Min helps to support his family. His sister and father also work. The other children are at school. He has no intention to continue his education (he studied up to the 8th standard) as he makes good money – nearly 1000 Kyats a day after paying off the owner of the taxi. He is aware that even experienced professionals do not make that kind of money. "I work hard and honestly." What he would like one day would be to have his own taxi. But that's a dream, really, because a taxi costs over 1.3 million Kyats.

Till then, Myo Min hopes to continue to work hard and be healthy. "It is most important to stay healthy. Fortunately, I am rarely ill. When I do fall sick, I go to a private clinic as it is quicker and I really cannot afford not to be driving my taxi". His family, however, goes to the local government hospital whenever they need medical attention. "It is good and it is free", he says.

Since time is money, how does he manage to spend nearly 2-3 hours at the blood bank? "Well, this is only three or four times a year. Moreover it is well worth it for it makes me feel very rich and good. You cannot compare this with money". He is right. For there can be nothing more precious than life. And nothing nobler than helping to save another's with a gift of love. A gift of blood.

Vision 2020: The Right to Sight

WHO Director-General Launches a Global Initiative to Combat Avoidable Blindness

In order to drastically reduce the global burden of blindness, which currently affects an estimated 40-45 million people worldwide, the World Health Organization (WHO) and a broad coalition of international nongovernmental and private organizations launched in Feb 1999 in Geneva a global initiative "**VISION 2020: THE RIGHT TO SIGHT"**. The objective of the new initiative is to eliminate avoidable blindness by 2020.

Today, there is an estimated 180 million people worldwide who are visually disabled. Of these, between 40 and 45 million persons are blind and, by definition, cannot walk about unaided. Around 60% of the world's blind reside in sub-Saharan Africa, China and India.

In spite of the international efforts made so far, the global burden of blindness was increasing because of the population growth and ageing and, if the present trend persisted, it could double by 2020.

Five conditions have been identified as immediate priorities within the framework of VISION 2020. These are *cataract, trachoma, onchocerciasis, childhood blindness* and *refractive errors and low vision.* Their choice was based on the burden of blindness they represent and the feasibility and affordability of interventions to prevent and treat them.

Under VISION 2020, major concerted international efforts will be made in such areas as advocacy and resource mobilization, joint planning and strengthening national capacities through human resource development and the transfer of appropriate technologies to developing countries.

VISION 2020 will place emphasis on the training of mid-level personnel who are the backbone of national programmes for the prevention of blindness. In this respect, Africa is recognized as the priority region with the greatest need for such personnel. The transfer of technology to developing countries is another important element of the initiative.

VISION 2020 will be implemented through four five-year plans, the first one starting in 2000. The choice of the

countries, where VISION 2020 will be implemented, is to be regionally prioritized on the basis of the burden of blindness and of available resources.

Comment on Coronary Heart Diseases in Indonesia*

We have read the article by Boedhi-Darmojo R *et al* (1997; 1:17-23) with interest. This study is an eye-opener for conducting health promotion activities in reducing the burden of cardiovascular diseases, especially coronary heart disease (CHD) and hypertension, in the community. Before concluding the ineffectiveness of health intervention programme by the authors, we need to assess the possible biases which may be responsible for the results observed.

The study population has been reported to be the same in both surveys conducted in 1988 and 1993. Jakarta, being a fast-growing city, may be having a high population migration rate, as seen in several metropolises of developing countries. A high population migration will have adverse outcomes on the ongoing health promotion activities because of the labile population needing more health promotion information. So, an estimate of migration rate in the study population will be helpful in arriving at the conclusions.

The study has used the criteria of old myocardial infarction (OMI) by the presence of Minnesota codes 1.1 – 1.3 in ECGs. However, the authors have not clarified whether the study subjects also included those who were surveyed in 1988. If a large number of them were included in the survey sample in 1988, the observed higher rates of CHD in the 1993 survey could be because of addition of more new cases. The ECG status of those previously suffering from myocardial infarction and who have been included in the 1988 and 1993

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surveys need to be analysed for getting this information. Moreover, an estimate of the incidence of CHD during the five-year interval would give us a meaningful insight into the dynamics of CHD occurrence in the population.

An analysis of the reported risk factors of CHD shows that the prevalence of obesity has increased significantly ($p<0.05$), while the other risk factors, such as hypercholesterolaemia, smoking, physical inactivity and hypertension did not show significant differences between the 1988 and 1993 surveys. It is not clear from the study how the average increasing risk factors of 1.9% was calculated. Instead, a better indicator is population attributable risk (PAR) (incidence of CHD in population – incidence of CHD among those persons not exposed to risk factor/incidence of CHD in population x 100). PAR helps us to identify the role of each of the risk factors under study. Similarly, the relative risks of these factors could have been meaningfully calculated had the incidence of CHD been estimated among those exposed and non-exposed to the risk factors.

Lastly, there are a few discrepancies in figures and typographical errors. Though the total number of participants was reported to be 2012, only 2003 subjects were studied for hypertension (Table 1) and 940 were included in the blood sampling for estimation of serum cholesterol and HDL-cholesterol. Clarification on the selection of persons for blood sampling will help in ruling out selection bias leading to abnormally higher serum values of these parameters. Mean ± SD is difficult to identify for blood pressure measurements and cholesterol levels from the text. The criterion of obesity (BMI), shown in Table 5, seems to be wrongly written as ≥ instead of ≤30.