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In India until 1977, health programs mainly focused on family planning, but eventually the need to reduce neonatal and child mortality became a priority. In 1983, the National Health Policy gave more focus to maternal and child health needs. By 1985, programs were created to advocate for universal immunization of six preventable childhood illnesses, clean delivery practices and skilled birth attendants. These strategies evolved into the Child Survival and Safe Motherhood (CSSM) program in 1992. CSSM, funded by World Bank and UNICEF, yielded notable success in improving the health status of pregnant women and under-five children. Eventually, CSSM was integrated into the Reproductive and Child Health (RCH) program in 1997. Government of India, Ministry of Health and Family Welfare introduced RCH programme as a horizontal approach to the reduction of infant and child morbidity and mortality to India’s health system. As a result of efforts like this, over time there has been a substantial decline in Infant Mortality Rate (IMR). Health indicators for neonates and under-five children in India still need improvement, especially if India is to reach the Millennium Development Goal regarding under-five mortality by 2015. This alone would require a reduction from 87 to 41 deaths per 1000 births.

There is great variance in female child mortality across India. In India as a whole, child mortality between months 1 and 12 is 40 percent higher for girls than for boys. While Haryana has the worst male to female child mortality than any country in the world, Tamil Nadu is only behind four other countries. Yet, female infanticide, sex-selective abortion and neglect of female children are not uncommon. Therefore, addressing gender disparities experienced by women and children in India will be necessary if the country is committed to achieve Millennium Development Goals - Four & Five, i.e. to reduce the under-five mortality rate by two thirds between 1990 and 2015 respectively and to reduce the maternal mortality ration by three quarters between 1990 and 2015.

Child survival inequalities in India are social as well as economic. The women are disproportionately poor in India and hold a low social status compared to men. The women’s position can be measured in terms of literacy, decision-making and social access, all of which are an integral part of engaging in care seeking behaviours. There is also a strong bias that exists in care taking and seeking practices for a female child, compared with male children in India.

Children of women belonging to scheduled castes and scheduled tribes have higher rates of infant and child mortality than children of women belonging to other backward classes or “other” women. Children of “other” women have by far the lowest rates of infant and child mortality. As expected, all indicators of infant and child mortality decline substantially with increase in the household standard of living. There are 84.3 million members of Scheduled Tribes in India, which is about 8.2 percent of the total population. Members of these groups as well as those of scheduled and backwards castes are often geographically and socially isolated from the rest of the population. Throughout India, health inequalities and health disparities between hierarchical caste levels are common. Such inequalities often result from the social marginalization and discrimination; and social disadvantages such as a lack of economic and educational opportunity. These social inequalities experienced by scheduled castes or scheduled tribes serve as a barrier to health care and in turn contribute to an increased likelihood of mortality for members of these groups.

According to UNICEF’s State of the World’s Children Report, income disparities often contribute to disparities in the nutritional status of children. This has a profound effect on the health of children under five years of age. It is currently estimated that 53 percent of all child deaths can be attributed to being under weight. Additionally, poor children are more likely to experience negative health outcomes that rich children because poverty increases their chances of under nutrition and other health risks, making them more susceptible to disease. Also contributing to increased susceptibility in poor children is poor water and sanitation. The need to focus on inequalities is also apparent in the finding that poor children.
NFHS (1998-99) data illustrates that for children and adults up to age 45, there is excess mortality among indigenous people when compared to non-indigenous. Regarding infants under-five year of age the same was concluded, but the statistical significance was less. However, mortality differences were more attributed to socio-economic status than indigenous status. Also another study utilizing NFHS (1998-99) data examining mortality risk, found that the mortality risk for children under-one year in the lowest quintile of the standard of living index used, was 2.73 times higher than infants in the highest quintile, but that results for gender and caste were not statistically significant. The mortality risk in children aged 2-5 years from scheduled tribes and backwards castes was not much different from children in other castes, but children from scheduled castes in the same age group did have a significantly higher mortality risk.

Both economic and gender inequalities are compounded by reduced financial or geographic access to preventive and curative interventions at the primary level. According to the Bellagio Study Group, 2/3 of child deaths worldwide could have been prevented if effective child survival interventions had reached children and mothers who needed them. Jones et al. (2003) have also shown that available low cost interventions could potentially prevent 63 percent of the child deaths. As despite increased spending on health, disparities in morbidity and mortality indicators will continue to persist if utilization of health at primary health care services is hindered by income and cultural factors.

According to Bangdiwala and colleagues (2006), the decision to seek care for newborns and pregnant mothers is primarily made by husbands, particularly so in rural and tribal areas. Additional reasons for not seeking care included lack of transportation, lack of money, lack of time and rumors about the health system. Rural and tribal communities often practice harmful newborn care practices such as with holding early breastfeeding, not feeding colostrum, application of unhygienic things, immediate bathing after birth etc.

In addition to decreasing disparities in health care service utilization due to social, economic and gender inequalities efforts to improve home-based care have proven successful at improving child survival as well. An example of a successful scale up home based care efforts that draw on community resources was implemented by the Society for Education, Action and Research in Community Health (SEARCH) in Gadchiroli, Maharashtra, India. An evaluation of the efforts found that home based neonatal care efforts reduced NMR from 62 to 25 in intervention areas, which was 70 percent more than in control areas.

Integrated Management of Neonatal & Childhood Illnesses (IMNCI) efforts are intended to serve as a process to reduce child survival inequities related to geography, caste and gender in India; and in turn inequalities that contribute to child morbidity and mortality rates. Child health researchers, academicians, the Indian Academics of Pediatrics (IAP) and National Neonatology Forum (NNF), have developed the IMNCI strategy. According to Operational Guidelines developed by the Ministry of Health and Family Welfare, Govt. of India, the IMNCI package includes:

i. Care of newborns and young infants (under-two months), ii. Care of infants (2 months to 5 years), iii. Home visits, iv. Training, v. Improvements to the health systems, vi. Improvement of Family and Community Practices, vii. Collaboration/Co-ordination with other departments, Panchayati Raj Institutions, Self Help Groups etc.

Implementation of IMNCI, in the districts is a component of the Child Health Strategy under the National Rural Health Mission (NRHM)/Reproductive and Child Health (RCH) Programme Phase – II. Under NRHM, the Government of India is promoting access to improved health care at the household level through a female link volunteer, called Accredited Social Health Activist (ASHA), strengthen Sub-centers, Primary Health Centre (PHCs), Community Health Centres (CHCs) and devise new health financing systems. The health worker, ASHA will serve a population of 1000. The Government of India aims to train more than 4 lakhs trained women as ASHA community health workers (resident of the same village/hamlet for which they appointed as ASHA).

It is anticipated that the National Rural Health Mission (NRHM) will accelerate achievement in respect of Maternal Mortality Rate and Infant Mortality Rate. The NRHM will target 18 States (Uttar Pradesh, Bihar, Rajasthan, Madhya Pradesh, Chattisgarh, Uttaranchal, Jharkhand, Orissa, Assam, Manipur, Megalaya, Nagaland, Mizoram, Arunachal Pradesh, Sikkim, Tripura, Himachal Pradesh and Jammu & Kashmir).
all of which have weak public health indicators and/or weak health infrastructure. The mother and child health programs will continue to be the major focus of public health activities under NRHM. Lessons of last sixty years teach us that impact of NRHM initiative and IMNCI program on the health of our women and children squarely rests on the intentions, zeal and sincerity of the key stakeholders, namely the government health machinery, the profession, and the civil society. The community will look forward to confidence building measures in public health. Increased resource allocation should hopefully facilitate these goals.

References:


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Effectiveness of Bacillus Calmette Guerin (BCG) Vaccination in the Prevention of Leprosy: A Population-Based Case-Control Study in Raipur, India

Nishikant P. Rahete1, *Sanjoy P. Zodpey2, K. M. Kamble3

Introduction

Bacillus Calmette Guerin (BCG) vaccine is generally rationalized and used for prevention of tuberculosis. However Fernandez in 1939 injected BCG into healthy children, who were lepromine negative, and found lepromine conversion over 90%. He thus concluded that BCG might be efficacious in the prevention of leprosy1,2. Shephard, later provided the first experimental evidence of the protective effect of BCG against leprosy in mouse footpad infection 2. This observation was subsequently confirmed by several researchers and lead to a series of studies to evaluate the protective efficacy of BCG against leprosy3-5. Findings of the three studies which investigated role of BCG in prevention of tuberculosis and leprosy simultaneously in the same population recognized that the BCG vaccine provides greater protection against leprosy than against tuberculosis6-8.

So far several investigators published studies, which evaluated the role of BCG in prevention of leprosy using varying designs i.e. trials, cohort studies and case control studies. These studies reported wide variations in the estimates of protective effect from the different parts of the world. Of the available literature, very few studies have been reported from India5,9. Moreover India alone contributes 55% of the global leprosy burden10.

With this background and substantiated by the fact that no exhaustive information is available on the role of BCG vaccine in prevention of leprosy across the country, the present study was carried out to estimate the effectiveness of BCG vaccination against leprosy using case-control design.

Summary

Objective: To estimate the effectiveness of BCG vaccination in the prevention of leprosy. Methods: Study Design: Population-based pair-matched case-control study. The study was carried out in the field operation area of Regional Leprosy Training and Research Centre, Raipur, Chattisgarh, India. It included 201 cases of leprosy (diagnosed by WHO criteria), born onwards 1964. Each case was pair-matched with one neighbourhood control for age and sex. BCG vaccination status was assessed by examination for the presence of BCG scar, immunization records if available and information from subjects/parents of children. Subjects uncertain about BCG vaccination were not included. Results: A marginally non-significant protective association between BCG and leprosy was observed (OR = 0.65, 95% CI 0.40-1.04). The overall vaccine effectiveness (VE) was 35%. The BCG effectiveness was lower for pauci-bacillary leprosy as compared to multi-bacillary leprosy. The sub-group analysis revealed that the BCG effectiveness was statistically non-significant in less than or equal to 14 years of age and females category. The overall prevented fraction of leprosy was calculated to be 20% (95% CI -1.8 - 41.4). Conclusion: The current study identified a marginally beneficial role of BCG vaccination in the prevention of leprosy in study population.

Key words: BCG, effectiveness, leprosy, case-control study, India
Materials and Methods

The present study was designed as a population-based pair-matched case-control study. It was carried out in the field operation area of Regional Leprosy Training and Research Centre (RLTRI), Raipur (Chhattisgarh). A total of 2,53,000 estimated rural population is catered by Regional Leprosy Training and Research Institute, Raipur. During the period of January 1999 to March 2000, 446 cases were registered in the Field Operation area. They were investigated by both active and passive methods of case detection.

The eligibility criterion for the cases was age less than or equal to 35 years. This age group was necessarily selected as the National Tuberculosis Control Programme was launched in 1962, which included wide spread use of BCG vaccination. In the initial period of couple of years, the BCG vaccination was not implemented exhaustively. Hence it was decided to include the cases of leprosy who were born onwards 1964. The diagnosis of the leprosy case was done as per the guidelines laid down by WHO11. Finally a total 201 cases of leprosy meeting the pre-decided eligibility and diagnostic criteria were included in the current study.

For the recruitment of the cases in the study, a list of addresses of all registered leprosy cases meeting the eligibility and diagnostic criteria was procured. Home visits were made by the investigators to recruit cases and neighbourhood controls as comparison group. 201 controls were included in the study, as it was decided to have 1:1 case control ratio. Each case was pair-matched with one control for sex and age within one year. The exclusion criteria for the controls were history suggestive of leprosy or tuberculosis in the past, recent family history of chemo-prophylaxis or chemotherapy with INH and individuals suffering from leprosy or tuberculosis.

The evidence of BCG vaccination was determined by direct observation of the vaccination scar at the insertion of deltoid muscle, immunization records if available and the information from the study subjects (or parents in case of children). The measurement of exposure was thus carried out as per the guidelines given by P. G. Smith12.

The odds ratio (OR) and their 95% confidence intervals (CI) were calculated to estimate the strength of association between the BCG vaccination and leprosy. McNemars’ Chi-square test was used as test of significance for paired data analysis. Subgroup analysis for matching variables was also carried out separately. The vaccine effectiveness and its 95% CIs were calculated on the basis of estimates of OR. We also estimated the prevented fraction of leprosy i.e. the proportion of potential new cases of leprosy that was prevented.

Results

A total of 446 cases of leprosy were registered from the field operation area of RLTRI, Raipur during the study period. Out of these, 201 cases meeting the inclusion and exclusion criteria were included in the present study. There were 39 (19.4%) of Multi-Bacillary (MB) and 162 (80.6%) Pauci-Bacillary (PB) cases of leprosy.

Table 1 shows the distribution of the subjects by study characteristics. The study subjects were predominantly females and in the age group of more than 14 years. The prevalence of exposure i.e. BCG vaccination was 39.8% in cases and 47.3% in controls.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Cases (n=201)</th>
<th>Controls (n=201)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>£ 14</td>
<td>82 (40.8)</td>
<td>82 (40.8)</td>
</tr>
<tr>
<td>&gt;14</td>
<td>119 (59.2)</td>
<td>119 (59.2)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>95 (47.3)</td>
<td>95 (47.3)</td>
</tr>
<tr>
<td>Female</td>
<td>106 (52.7)</td>
<td>106 (52.7)</td>
</tr>
<tr>
<td>Exposure to BCG</td>
<td>80 (39.8)</td>
<td>95 (47.3)</td>
</tr>
</tbody>
</table>

Table 2 describes the analysis of the paired data. Although the point estimate of odds ratio (OR) was 0.65, thereby confirming the protective association between BCG vaccination and leprosy, it was marginally statistically non-significant and the confidence intervals ranged from 0.40 to 1.04. It was not significant as it included unity. The non-significance
was also confirmed by McNemar’s Chi-square value. Similarly the point estimates of OR was protective for both MB and PB type of leprosy, but they were non-significant as reflected from the 95% CI. The OR for the age of more than 14 years was statistically significant. The OR for male category was also statistically significant.

Table 2: Subgroup analysis of paired data

<table>
<thead>
<tr>
<th>Groups</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>McNemar’s Chi-Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Pairs</td>
<td>0.65</td>
<td>0.40-1.04</td>
<td>3.1690</td>
</tr>
<tr>
<td>Leprosy Type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MB</td>
<td>0.55</td>
<td>0.18-1.66</td>
<td>1.1428</td>
</tr>
<tr>
<td>PB</td>
<td>0.67</td>
<td>0.39-1.14</td>
<td>2.1228</td>
</tr>
<tr>
<td>Age (Years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>£ 14</td>
<td>0.71</td>
<td>0.34-1.47</td>
<td>0.8620</td>
</tr>
<tr>
<td>&gt; 14</td>
<td>0.44</td>
<td>0.25-0.80</td>
<td>7.6923</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0.4</td>
<td>0.19-0.83</td>
<td>6.4285</td>
</tr>
<tr>
<td>Female</td>
<td>1.0</td>
<td>0.52-1.92</td>
<td>—</td>
</tr>
</tbody>
</table>

Table 3: Estimates of BCG effectiveness & prevented fraction calculated from odds ratios

<table>
<thead>
<tr>
<th>Groups</th>
<th>BCG Effectiveness</th>
<th>%</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Pairs</td>
<td>35</td>
<td>-4-60</td>
<td></td>
</tr>
<tr>
<td>Leprosy Type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MB</td>
<td>45</td>
<td>-64-82</td>
<td></td>
</tr>
<tr>
<td>PB</td>
<td>33</td>
<td>-14-61</td>
<td></td>
</tr>
<tr>
<td>Age (Years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>£ 14</td>
<td>29.41</td>
<td>-47-66</td>
<td></td>
</tr>
<tr>
<td>&gt; 14</td>
<td>56</td>
<td>20-75</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>60</td>
<td>17-81</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>0</td>
<td>-92-48</td>
<td></td>
</tr>
</tbody>
</table>

Prevented Fraction: 20% (-1.84 - 41.4)

Discussion

In the present study, the effectiveness of BCG vaccination was observed to be 35%, which however was marginally non-significant. Earlier studies carried out in India reported varying protective effect of BCG vaccine in prevention of leprosy3,5,6,9,13,14. The estimates of protective effect observed in the present study fall in this range. The marginal non-significance can be attributed to the sample size and the use of retrospective study design. The subgroup analysis recognized moderate estimates of vaccine effectiveness however they too were non-significant as reflected from 95% CIs except for the category of age more than 14 years and males.

The current study used case-control study design for evaluation of vaccine effectiveness. In fact, since P. G. Smith12 recommended the use of this design to evaluate the effectiveness of BCG against tuberculosis, many researchers have used this approach for evaluating the role of BCG vaccine in the prevention of leprosy5,8,9,14. Although, this design has obvious advantages, it is also known that this is a susceptible design for biases. This methodological issue has also been attributed to the differences to the vaccine program.
estimates measured by different study designs\textsuperscript{5,9}. However, considering the fact that, because of recommended use of BCG vaccine in National Immunization Programmes, further trials are unlikely to be there, this approach provides the feasible way to evaluate the role of BCG in prevention of leprosy. Additionally, as vaccine effectiveness is variable from one population group to another, and few studies have been carried out in India, there is a need to make available estimates of effectiveness of BCG vaccine across different population groups. These estimates can be made available using case-control approach.

In the present study the BCG was found to be more effective against MB leprosy as compared to PB leprosy. However the difference in the point estimates was not statistically significant. Similarly, the earlier case-control study in India by J. P. Muliyil\textsuperscript{14} has also come out with different level of protective efficacy for different types of leprosy. However, he too did not observe significant effectiveness of BCG vaccine against different subtypes of leprosy.

In recent times, a comparative leprosy vaccine trial was carried out in South India\textsuperscript{15}. Four vaccines viz. BCG, BCG+ killed M. leprae, MW and ICRC were studied in comparison with normal saline as placebo. The protection observed against leprosy in this study was 65.5%, 64%, 34.1% and 25.7% respectively for ICRC, BCG, BCG+ killed M. leprae, BCG and MW vaccine. Looking at the fact, whatever protection against leprosy has been obtained from BCG vaccine is additional one, because BCG is basically used and incorporated in immunization programme for prevention of tuberculosis, even the protection of around 35% is beneficial for leprosy prevention.

The story of vaccine against leprosy is unusual for its irony, although some claim that there is no anti leprosy vaccine\textsuperscript{16}, more people alive today have received anti leprosy vaccine than received any other vaccine. The vaccine is BCG, and irony arises because the vaccine is so widely considered to be directed against tuberculosis, that many have forgotten its important implication for leprosy\textsuperscript{17}.

The effect of BCG vaccine can be evidently visualized from the estimate of prevented fraction. The prevented fraction indicates the proportion of potential new cases that was prevented by an ongoing vaccination programme\textsuperscript{18}. In the present study, BCG vaccination prevented 20 out of every 100 cases that would have occurred in its absence. This definitely has practical implication in the sense we are using BCG vaccine for prevention of tuberculosis, however it is simultaneously preventing leprosy up to certain extent.

Thus the current study recognized moderately protective association between BCG vaccination and leprosy in rural population in Raipur. This finding is certainly encouraging for prevention of disease that has been more prevalent in India compared to other parts of the world and presently no vaccine has been used on mass scale for leprosy prevention.

Acknowledgements
Authors acknowledge the support and help from Dr. D. C. Mohapatra, Mr. Ramawat Patel, and the field staff of RLTRI, Raipur for the conduct of this study.

References:
1. P. C. Sen Best Paper Awards on Rural Health Practice

2. S. D. Gour Best Paper Awards on Environmental Health

Announcement for Awards

Members interested to participate in the competition for these awards are requested to send six copies (along with a floppy/CD) of the article with a certificate stating that paper has neither been published nor been considered for publication in any journal anywhere. The paper should be sent to the Secretary General at the IPHA HQ, Kolkata by 30th September 2007. Papers will be screened by the Award Committee and sent to a panel of reviewers for assessment. If the article obtains 50% marks then this will be allowed to be presented during the conference. Presentation will once again be judged by a panel of judges and marks will be allotted up to a total of 50. Best paper will be judged out of 100 marks with a minimum eligibility criteria of 50 marks. These criteria subject all to periodic revision by the Award Committee.

Prof. Madhumita Dobe
Secretary General, IPHA
Original Article

Evaluation of a New Premedication Protocol for Administration of Equine Rabies Immunoglobulin in Patients with Hypersensitivity


Introduction

Human rabies is endemic in India and annually an estimated 20,000 persons die of this disease. But these deaths are largely preventable by timely and proper use of modern rabies vaccines and immunoglobulins. The Rabies Immunoglobulins (RIGs) in particular are life saving in severe (WHO category III) exposures. Presently both human rabies immunoglobulins (HRIGs) and purified equine rabies immunoglobulins (ERIGs) are available. But HRIGs are imported, expensive and ERIGs which are indigenously produced are less expensive, affordable and more widely available. Still the availability and use of ERIGs is limited to metro and bigger cities. One of the main reasons for this is that despite its high grade of purity following heat treatment, pepsin digestion and enzyme refinement with very low protein content (<3%) still a reported 1-11% hypersensitivity is known after preliminary skin test. If the skin test is positive, WHO recommends treatment with ERIG or preferably HRIG should proceed, but special precautions should be taken if ERIG are used (e.g. Pretreatment with adrenaline/epinephrine intramuscularly and with antihistamine) and the patient observed for at least one hour after the injection. Besides WHO observes that techniques of skin testing have not been standardized and national guidelines to be followed. However, there are no national guidelines available in India.

In this background, this pioneering study was undertaken to standardize skin testing and to develop a safe and effective premedication protocol for administration of ERIG in those with skin test positivity/hypersensitivity.

Materials and Methods

The study was conducted in the anti-rabies clinic of Kempegowda Institute of Medical Sciences (KINIS) hospital, Bangalore and during April 2004 to March 2006. The ERIGs used included Equirab (Bharat Serums and Vaccines Ltd, Mumbai), Zyrig (Zydus...)

Summary

Objectives: The present study was undertaken to standardize skin testing and to develop a safe and effective premedication protocol for administration of ERIG in those with skin test positivity/hypersensitivity. Methods: A method of grading of skin testing was developed using injection histamine as a positive control. This was evaluated by using it on 517 subjects who had severe (WHO category III) exposure to rabies. A premedication protocol consisting of injections pheniramine, ranitidine, hydrocortisone and adrenaline was evaluated by using it on fifty one subjects who were skin test positive/hypersensitive to ERIG. Results: The premedication protocol was safe and effective as all the 51 subjects could be administered the full dose of ERIG despite being skin test positive/hypersensitive to ERIG. Besides the premedication drugs/protocol did not affect the immune response to vaccine and ERIG therapy.

Keywords: Rabies, Equine rabies immunoglobulin, Skin test, Premedication.
Alidac, Ahmedabad) and Carig (Cadila pharmaceuticals, Ahmedabad). The institutional ethics committee approval was obtained and signed informed consent was taken from all subjects.

A total of 517 subjects with severe rabies exposures / rabid animal bites (WHO Category III) were enrolled. The detailed clinical examination also included an enquiry of receiving equine immunoglobulins / sera in the past viz. anti-diphtheria serum (ADS), anti-tetanus serum (ATS), anti-snake venom serum (ASVS), anti-gas gangrene serum (AGS) or even anti-rabies serum (ARS) and report of any hypersensitivity / allergy. All the subjects were provided the WHO standard rabies post exposure prophylaxis (PEP) of wound care, modern rabies vaccine by Essen regimen and ERIG.

Skin test for administration of ERIG

Procedure

Step I

Using an insulin syringe with 26 Gauge needle, 0.1mL of normal saline was injected intradermally (ID) in the right forearm (as negative control). Then 0.1mL of 1:10 dilution (in sterile normal saline) of ERIG was given ID in the left forearm (as test dose) This was done by using an insulin syringe, wherein 4 units of ERIG was drawn in and then normal saline was drawn up to 40 units, thus giving a 1 in 10 dilution of ERIG in normal saline. Both the injections produced a wheal of 8-10 mm in size in the two forearms.

The patients were observed for 20 minutes for any increase in the local wheal of over 10-12 mm in size with or without erythema in the ERIG ID test site and no change in the control (saline) ID site and for any systemic complaints of significant tachycardia (increase in pulse rate of more than 20% from baseline value), significant hypotension (fall in blood pressure of more than 30% from baseline value), fainting, vomiting, breathlessness, chest pain, itching, wheeze or stridor, angioedema or collapse. If one or more of these were present then the test was considered as “positive”. If none of these were present than the test was considered as “negative”. A positive skin test was followed up as follows.

Step II

Additionally 0.05mL of 1:10,000 dilution of histamine was injected ID (as positive control) into the right forearm at a site away from the previous ID site. This produced a wheal of 3-5 mm in size. The patients were further observed for another 20 minutes

Grading of skin test

Grading of the skin test was done based on the wheal developed at the site of ERIG skin testing and as compared between positive and negative controls.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Assessment</th>
<th>Skin test results</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No reaction</td>
<td>The wheal of ERIG is equal to wheal of normal saline.</td>
</tr>
<tr>
<td>1</td>
<td>Mild reaction</td>
<td>The wheal of ERIG is more than that of normal saline but less than or equal to that of histamine</td>
</tr>
<tr>
<td>2</td>
<td>Moderate reaction</td>
<td>The wheal of ERIG is more than that of histamine or with pseudopodia</td>
</tr>
<tr>
<td>3</td>
<td>Severe reaction</td>
<td>The wheal of ERIG is of any size but with systemic symptoms and signs*</td>
</tr>
</tbody>
</table>

*Significant tachycardia (increase in pulse rate of more than 20% from baseline value), significant hypotension (fall in blood pressure of more than 30% from baseline value), fainting, vomiting, breathlessness, chest pain, itching, wheeze or stridor, angioedema or collapse.

Premedication drugs and protocol

The WHO recommended pretreatment protocol of injection adrenaline / epinephrine with antihistamine was discussed by a KIMS consultative committee of preventive physicians, anesthesiologists, and allergologists. It recommended using adrenaline / epinephrine only to manage or counter an anaphylactic reaction following either skin test or full dose
administration of ERIG. This was because adrenaline is known to have drastic effects on the cardio-vascular system and may be particularly deleterious in the elderly patients, who may have coincidental myocardial decompensation. Consequently, the drugs, their dosage and route of administration identified for KIMS premedication protocol was as follows:

<table>
<thead>
<tr>
<th>Drug</th>
<th>Brand</th>
<th>Dose</th>
<th>Route of administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injection Pheniramine</td>
<td>Avil</td>
<td>0.8mg/kg</td>
<td>Intravenous</td>
</tr>
<tr>
<td>maleate (anti-histamine)</td>
<td></td>
<td>body weight</td>
<td></td>
</tr>
<tr>
<td>Injection Ranitidine</td>
<td>Rantac</td>
<td>2mg/kg</td>
<td>Intravenous</td>
</tr>
<tr>
<td>hydrochloride (H₂ blocker)</td>
<td></td>
<td>body weight</td>
<td></td>
</tr>
<tr>
<td>Injection Hydrocortisone</td>
<td>Efcorlin</td>
<td>2mg/kg</td>
<td>Intravenous</td>
</tr>
<tr>
<td>hemisuccinate (short acting steroid)</td>
<td></td>
<td>body weight</td>
<td></td>
</tr>
</tbody>
</table>

The premedication protocol evolved and used in our study was as follows.

<table>
<thead>
<tr>
<th>Grade of Skin test</th>
<th>Drugs indicated</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (no reaction)</td>
<td>None</td>
</tr>
<tr>
<td>1 (mild reaction)</td>
<td>Inj.Pheniramine + Inj. Ranitidine</td>
</tr>
<tr>
<td>2 (moderate reaction)</td>
<td>Inj.Pheniramine + Inj. Ranitidine + Inj. Hydrocortisone</td>
</tr>
</tbody>
</table>

* To be used only to counteract anaphylaxis

Full dose ERIG administration

If there was no reaction to skin test (Grade zero) then ERIG was administered but with a sense of preparedness still for any eventuality but without any premedication. However, following skin test positivity viz. grades I to III, an intravenous line was started and the appropriate premedication drugs were administered intravenously. Subsequently after about 30 to 45 minutes of premedication, the administration of full dose of ERIG was done in the intensive care unit under the supervision of critical care wing of the Department of Anesthesiology. As per the WHO guidelines 40 IU/kg body weight of ERIG was administered into and around the animal bite wounds as much as possible, at all the anatomically feasible sites, and the remaining if any was administered intramuscularly at a site away from the site of vaccine administration. If ERIG was insufficient, it was diluted with sterile normal saline to a volume sufficient to infiltrate all wounds and administered. Subsequently, the subjects were monitored for a minimum of 6 hours for blood pressure, pulse and oxygen saturation. In the event of any adverse reaction the patients were to be managed as per the standard protocol and with the help of the critical care unit personnel.

Assessment of reactogenicity

The occurrence of adverse reaction was recorded only if the subject spontaneously manifested or complained of a problem to a question on general well being i.e., unaided recall.

Follow up of subjects

All the subjects were followed up for a fortnight for any possible delayed adverse effects. A blood sample was drawn on day 14 from those consenting subjects for rabies virus neutralizing antibody (RVNA) titre estimation by rapid fluorescent focus inhibition test (RFFIT) at National Institute of Mental Health and Neurosciences (NIMHANS), Bangalore. After six months the subjects were again contacted through telephone calls, reply post cards and house visits to ascertain their survival status.

The details of the study are summarized in a flow diagram (Figure-1).

Results

Five hundred and seventeen persons who had severe exposure to rabies (WHO Category III) were subjected to skin test for assessing hypersensitivity to ERIG. Fifty eight (11.2%) of them were positive and of these 51 subjects gave consent for premedication protocol. None of them had received any equine serum in the past. Thirty one of these subjects could be graded using histamine (Grade I-15, Grade II - 16, Grade III - nil). The RVNA titre assessment was done in 20 subjects of whom 12 subjects had received inj.hydrocortisone as a premedication drug.

Socio-demographic profile

Majority of subjects were from urban area (61.5%), adults (55%), males (69.6%), and belonging to poor and low income group (79.8%). (Table 1)
Use of ERIG

The ERIG used include Equirab (n = 393, 76%), Zyrig (n = 123, 23.8%) and Carig (n = 1, 0.2%). The skin test was positive in 58 (11.2%) subjects. The skin test grading could be done in only 31 subjects using histamine, of whom 15 had grade I (mild) reaction, and 16 (51.7%) grade II (moderate) reaction and none had grade III (severe) reaction.

Premedication protocol

Fifteen (48.3%) subjects who had grade I (mild) reaction received injections pheniramine and ranitidine.
by intravenous route, 16 (51.2%) subjects with grade II (moderate) reaction received additionally inj. hydrocortisone. As none had grade III (severe) reaction the need to use inj. adrenaline did not arise.

**Administration of full dose of ERIGs**

About 30-45 minutes after administration of premedication drugs, the full dose of ERIGs was administered to all 51 subjects. Of these only 2 (4%) had immediate adverse effect viz. one subject had itching at wound site which subsided with additional dose of inj. phenaramine; another had epigastric pain and vomiting which was managed with inj ranitidine, inj. phenaramine, inj. hydrocortisone and oxygen. The need to use injection adrenaline did not arise.

**RVNA titers**

All the 20 subjects, including 12 subjects who had received inj. hydrocortisone (short acting steroid) for premedication showed satisfactory level of RVNA titers of > 0.5 per mL which is considered as adequate for protection against rabies.

**Follow-up**

All the 51 subjects were found to be healthy and alive six months later.

**Discussion**

Rabies is practically a 100% fatal disease and hence post-exposure immuno prophylaxis is life saving. RIGs are practically life saving in severe (WHO Category III) exposures as vaccine alone would not suffice in these cases. HRIGs are imported, scarce and expensive. Whereas ERIGs are indigenously manufactured, less expensive and more widely available now. However, these enjoy an undeserving poor reputation and the medical professionals hesitate to use it fearing anaphylaxis. The currently available ERIGs are a highly purified product and there is an urgent need to popularize their usage and improve coverage to save more lives from human rabies mortality in his country.

In this regard, the drug law mandates a compulsory skin test to check for hypersensitivity before the full dose administration of ERIGs. The skin test acts as a window, which helps us to identify the possible immunological response that will be mounted by the immune system of an individual to an allergen. But skin testing may detect the rare case of IgE mediated (Type I) hypersensitivity to equine serum protein. However, the majority of reactions to ERIG, results from complement activation and are not IgE mediated and will not be predicted by skin testing. Consequently a negative skin test must never reassure the physician that no anaphylactic reaction will occur. Those administering ERIG should always be ready to treat early anaphylactic reactions with adrenaline/epinephrine. In this context in this study none had any severe reaction either following skin testing or full dose administration of ERIG. Still it is recommended that ERIGs are used only in those facilities where there is skilled manpower and facilities to manage anaphylaxis. Consequently it is advisable that ERIGs are not used in the chambers/clinics of general practitioners and are used only in nursing homes and hospitals in the country.

In the absence of any national guidelines for skin testing the present method is an attempt to evolve one such and is named as “KIMS method of skin testing and grading” of results. Contrary to the recommendation of WHO to use inj. adrenaline/epinephrine and antihistamine for premedication, in the present study none received inj. adrenaline/epinephrine and all were managed with only

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**Table I: Distribution of cases according to area of residence, age, sex, and income (n=517)**

<table>
<thead>
<tr>
<th>Details</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area of residence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>318</td>
<td>61.5</td>
</tr>
<tr>
<td>Rural</td>
<td>199</td>
<td>38.5</td>
</tr>
<tr>
<td>Age (in years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-4</td>
<td>067</td>
<td>12.9</td>
</tr>
<tr>
<td>5-14</td>
<td>166</td>
<td>32.1</td>
</tr>
<tr>
<td>15-44</td>
<td>190</td>
<td>36.8</td>
</tr>
<tr>
<td>45-64</td>
<td>75</td>
<td>14.5</td>
</tr>
<tr>
<td>65+</td>
<td>19</td>
<td>3.7</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>360</td>
<td>69.6</td>
</tr>
<tr>
<td>Female</td>
<td>157</td>
<td>30.4</td>
</tr>
<tr>
<td>Income (Rs. per month)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 1000</td>
<td>125</td>
<td>24.2</td>
</tr>
<tr>
<td>1001-5000</td>
<td>287</td>
<td>55.5</td>
</tr>
<tr>
<td>5001-10000</td>
<td>43</td>
<td>8.3</td>
</tr>
<tr>
<td>&gt; 10000</td>
<td>62</td>
<td>12.0</td>
</tr>
</tbody>
</table>
inj. phenaramine, ranitidine and hydrocortisone. The need to use inj. adrenaline/epinephrine did not arise as none had any severe reaction for which the drug was reserved. Hence, the authors name this method as “KIMS premedication protocol” for administration of ERIG. The KIMS premedication drugs / protocol did not adversely affect the RVNA response in the subjects despite a few receiving inj. hydrocortisone. Lastly, all the subjects were healthy and alive six months later, thus denoting the immunological and clinical efficacy of KIMS premedication protocol. Besides the KIMS protocol was also found safe as there were no adverse effects except in two instances (one mild and one moderate) which were managed satisfactorily.

Till 2000, the ERIG was produced in the country in only one government institution and now it is produced additionally in three private facilities. The availability of ERIG was about 120 liters annually till 2000 and now it is about 8000 Liters. With the socio-economic improvement in the country, there is an increased awareness and affordability for RIG. Consequently, the availability and use of RIG is slowly improving. However, the medical profession is still largely inhibited and hesitant to use ERIG fearing anaphylaxis. But the nonuse of RIG in severe rabies exposure may result in rabies death and the treating physician may be penalized under consumer protection act for negligence and deficiency of service. In this context, the present study assumes importance as it not only shows that ERIGs are safe but also effective. This should instill confidence and encourage physicians to use ERIG.

In conclusion, the KIMS method of grading of skin test results and KIMS premedication protocol for administration of ERIG were found to be safe and effective. However, as the number of subjects studied is small, this pioneering effort may be considered as a “pilot study” and it is recommended for wider clinical application and evaluation.

References:
**Original Article**

**Staphylococcal Zoonosis on Dairy Farms in Assam and Meghalaya**

*Jully G. Tiwari¹, H. K. Tiwari¹*

**Summary**

**Objective:** To assess if Staphylococcus aureus is transmitted between man and animals & vice-versa. **Methods:** Staphylococcus aureus belonging to biotype C (bovine origin) were isolated from nares and hands of workers on six dairy farms of Assam and Meghalaya. The cows on the farms had a high rate of prevalence of mastitis caused by the same biotype of S. aureus. Three strains of S. aureus biotype A (human origin) were isolated from mastitis milk samples from cows on one of these farms, in which one of the workers was having cutaneous lesions (crusty abscess) and one strain of S. aureus biotype A was isolated from a swab sample collected from an abscess on the skin of the worker. **Results:** It has been revealed that all the members of the workers family were suffering from a similar type of cutaneous infection, indicating that it was a case of impetigo. The antibiotic susceptibility pattern of all the three biotype A strains from bovine origin was identical to that of the biotype A strains isolated from the worker. The percentage of resistance to 12 commonly used therapeutic antimicrobial agents was higher among the biotype C strains from human origin than the biotype C strains from bovine origin. Several strains from cattle and human origins showed identical antimicrobial susceptibility patterns against the tested agents.

**Key words:** Staphylococcus aureus, Biotype, Zoonosis, Antibiotic susceptibility.

**Introduction**

Domestic animals usually acquire staphylococcal infections from man¹. Animal to man transfer of staphylococci has also been demonstrated in one well documented study². Staphylococcal infections, whether in man or in animals, are classified as direct zoonosis or sapro-zoonosis, whenever there are cross-infections³. Staphylococci are usually transmitted by direct physical contact or through vehicles, such as, milk, water and other non-living substances. Staphylococci, especially, Staphylococcus aureus, are so versatile in their properties that transmission can even occur through invertebrate hosts, making it a meta-zoonosis too⁴.

Although, it is widely accepted that staphylococci are zoonotically important organisms, there appears to be very scanty well-documented literature describing transmission of any Staphylococcus species from man to animals or vice-versa. Zinn et al¹ and Live² are the only workers, who have demonstrated the zoonotic nature of Staphylococcus aureus through well-documented studies.

The present investigation was undertaken to see if Staphylococcus aureus was transmitted between man and animals and vice-versa.

**Materials and Methods**

The cross-sectional study was conducted during September 1996 - October 1997 in three small dairy farms in the Khanapara region of Assam and another three farms located in the Ribhoi district of Meghalaya. The farms were selected purposefully. The farming community comprised Nepalese people only. Over all 93 cows and 25 farm workers were included in the study.

Isolates: Staphylococcus aureus were isolated from 58 udder quarter milk samples of 43 mastitis
affected cows (diagnosed by the Modified California Mastitis test) and 10 out of 28 swabs-samples (one swab each was dipped in a 0.6 per cent sterile Nutrient agar in a screw-capped test tube, prior to collection) from the nares and hands (inner sides of the nail-tips) of 14 milkers and 10 out of 20 swab-samples from the nares and hands of 11 cowmen and one out of three swab-samples from the nares, hands and skin lesion (abscess) of a milker during the period, September, 1996- October 1997. The isolates were identified, following standard procedures. Although, other mastitis pathogens were also isolated in the process, however, they were excluded from the present study.

**Biotyping:** The isolates were biotyped by following a standard method. The criteria for differentiating the biotypes were staphylokinase production, b-haemolysin production, coagulation of bovine plasma and growth on crystal-violet agar. The crystal violet (CV) growth spots with or without an orange tint were recorded as CV type C (bovine biotype), growth spots with a bright or pale yellow colour and yellow spots with violet margins as CV type A (human biotype) and with white spots or white growth with a blue hue as of CV type B (swine biotype).

**Antimicrobial susceptibility test:** Agar disc-diffusion test was carried out on Diagnostic Sensitivity Testing (DST) agar (HiMedia, Mumbai), using paper discs (HiMedia, Mumbai) of the following antimicrobial agents (the concentration of the discs are indicated within parentheses along with the agents):

- Penicillin-G (10 IU), Ampicillin (10 μg), Cloxacillin (1 μg), Streptomycin (10 μg), Gentamicin (10 μg), Tetracycline HCL (30 μg), Chloramphenicol (30 μg), Erythromycin (15 μg), Lincomycin (2 μg), Nitrofurantoin (300 μg), Co-trimoxazole (25 μg), and Cephotaxime (30 μg). Susceptibility and resistance of test organisms to the concerned agent were interpreted from the chart, provided by the manufacturer of the discs.

**Results**

Farm-wise origin of the S. aureus isolates and their biotypes, isolated from the cows and the workers are shown in Table 1. Among 93 cows, 43 (46.2%) were found to be affected by mastitis and from mastitis quarter milk samples 585. aureus strains were isolated. Majority of the isolates were of biotype C. Among 25 farm workers, 21 S. aureus strains were isolated, mostly being biotype C.

Susceptibility of the biotypes A and C S. aureus, originating from bovine and human, to the tested organisms is shown in Table 2.

**Discussion**

Biotyping of staphylococci is one of the most useful methods currently used in the epidemiology of staphylococcal infections and to establish human-animal contacts. Results in the Table 1 clearly indicated that there was a cross-infection of S. aureus between the animals and the farm workers on all the farms.

Isolation of 58 S. aureus strains, from 94 number of mastitis quarter milk samples from 43 cows on all the farms indicated a very high prevalence of infection rate (46.23 per cent) among the cows by S. aureus only. Usually, the classical mastitis pathogens are the streptococci. Such a high prevalence rate could be attributed to the constant source of infection in the close proximity, because, 20 out of 21 S. aureus biotype C strains were isolated from the workers, who were engaged for either milking or other dairy farming routine works, which included regular handling of the animals. Zinn et al from the United States of America earlier reported the public health significance of staphylococcal infections in cattle. However, they reported a very low rate (9.6 per cent) of colonization of animal staphylococci in humans. The present rate of such colonization was about 95.24 percent. This huge variation in the percentage rate of colonization could be attributed to the illiteracy of the farm workers and their ignorance about personal hygiene and sanitation. Moreover, dairy farming system in this part of the country is still a primitive one. It is no wonder that the subjects of this study even used to share the same room with animals during the night to sleep.

Antibiotic susceptibility test results (Table 2) indicated that the occurrence of strains, resistant to several commonly used antimicrobial agents simultaneously was higher among the strains from human origin than among the bovine origin. This can be inferred by the fact that humans usually come into the contact of antibiotics more frequently than animals.
Six isolates from human origin and 22 isolates from bovine origin of the biotype C showed an identical resistance pattern to the agents. This supported the view that these isolates prevailed in the farm workers and the cows due to cross infections. Further, all these isolates were resistant to Erythromycin and Lincomycin, both of which had never been used for treatment of any animal on the farms. On the other hand, Erythromycin is a frequently used antibiotic in human medicine. Although, Lincomycin is not commonly used in human medicine, Clindamycin, a very closely related antibiotic to Lincomycin, is often used to treat anaerobic infections in humans. Development of resistance by any bacteria to Clindamycin automatically develops resistance to Lincomycin too11. This can also be considered as an added evidence of cross-infections of S. aureus from man to animals.

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All the *S. aureus* type A strains were isolated on the same farm (Farm VI in Table 1). Further, the one, isolated from the skin lesion of a worker, showed an identical susceptibility pattern with the three strains, isolated from cows. This was ample evidence that the cows picked up infections from the worker only.

Upon further investigation, it was revealed that all members of the worker’s family were suffering from a skin disease, which was characterized by initial formation of pustules, followed by yellowish crust formation and rupture and itching. Initially, one of the children had shown the symptoms, but later it spread to all members of the family, clearly indicating that it was a case of impetigo.

Thus, it can be concluded that *S. aureus* infection may easily transmit from man to animals and vice-versa, if they remain in a close proximity.

**Acknowledgement**

The authors are thankful to ICAR for providing the financial help for conducting the research.

**References:**

**Introduction**

Tobacco use is the leading preventable cause of death in developed countries and is the second leading cause of death globally. The Global Burden of Disease predicts that the annual number of deaths from tobacco use will double from 5 million in 2005 to 10 million in 2020. In India, nearly 1 in 10 school students in the age group 13-15 years ever smoked cigarettes and half of such ever smokers reported initiating smoking before 10 years of age.

Government of India has formulated “The Cigarettes and Other Tobacco Products (Prohibition of Advertisement and Regulation of Trade and Commerce, Production, Supply and Distribution) Act”, in 2003, and rules framed there under has provisions for limiting tobacco use among students and school personnel e.g. smoking ban in government buildings (including schools), prohibition of tobacco sale within 100 meters of school premises and ban on sales of tobacco to minors under the age of 18 years.

The World Health Organization’s Framework Convention on Tobacco Control (WHO FCTC) is the world’s first public health treaty. The WHO FCTC was unanimously adopted by the World Health Assembly in May 2003, was signed by 168 nations and, at the time of writing this review, had been ratified by 142 nations. The WHO FCTC systematically addresses the challenges of reducing the chronic disease burden associated with tobacco use and smoke exposure. Among the important areas addressed by the WHO FCTC, strengthening education, communication, training and public awareness about the dangers of tobacco consumption is the primary focus of Article 12. Educators are specifically mentioned as important sources for dissemination of this information.

The Global School Personnel Survey (GSPS), conducted in 6 regions of India in 2006 was designed to collect information on tobacco use, knowledge and attitudes of school personnel toward tobacco use, existence and effectiveness of tobacco control policies in schools, and training and materials available for implementing tobacco prevention and control interventions in schools in order to assess the scope and potential of tobacco control activities in Indian schools.

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*Corresponding author: madumitadobe@gmail.com*
**Materials and Methods**

Global School Personnel Survey (GSPS) was conducted among all personnel working in the schools which had earlier been selected for the Global Youth Tobacco Survey (GYTS). The selection of the schools was done using a two-stage cluster sampling design to select a representative sample of schools proportional to school enrollment size. All personnel working in the selected schools were eligible to participate in the GSPS.

GSPS was performed in six regions in India in 2006: North (Chandigarh, Delhi, Haryana, Himachal Pradesh, Jammu and Kashmir, Punjab, Rajasthan, Uttarakhand and Uttar Pradesh); South (Andhra Pradesh, Karnataka and Tamil Nadu); East (Bihar, Jharkhand, Orissa and West Bengal); West (Goa, Gujarat and Maharashtra); Central (Chattisgarh and Madhya Pradesh) and Northeastern (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura). These regions represent 99.7% of the total population of India. Thirty schools were selected in each region. All school personnel (including non-teaching staff) in the selected schools were eligible to participate. The Overall response rate was 80.6%. In total, out of 3629 school personnel from the 180 schools, 2926 participated in the 6 regional surveys. Data collection was completed during the first half of 2006. The six regional GSPS have been combined into a national estimate - India GSPS 2006.

Current tobacco user/current smoker was defined from response to two questions (i) whether used tobacco /smoked at least 100 times and (ii) daily or occasionally smoking/using tobacco now.

Trained personnel collected data using self-administered, anonymous questionnaire. India GSPS questionnaire 2006 was expanded to include all kinds of tobacco used in India. The draft questionnaire was piloted among school personnel in one school in West Bengal followed by group discussions to address issues of validity and reliability. The questionnaire was designed with no skip patterns to allow all respondents to answer all questions. Participation was voluntary. Surveys were completed at schools, generally at staff meetings or after school.

The data was weighted to adjust for sample selection (school) and non-response (school and individual levels). The computer program SUDAAN® was used to compute weighted prevalence estimates and standard errors of the estimates (95% confidence intervals were calculated using the standard errors). Whenever a denominator was less than 35, the resultant data were excluded. Measures of tobacco use and status of tobacco control in schools were computed as follows:

- Tobacco use prevalence (current cigarette use, current use of tobacco products other than cigarettes, and current use of any tobacco products)
- Existing tobacco use prevention policies and their implementation in schools (percentage reporting that school has a policy prohibiting tobacco use among students and school personnel, percentage reporting that school enforces tobacco policy).
- Existence of tobacco use prevention issues in school curriculum (percent of school personnel who had access to teaching and learning materials about tobacco, had received training to prevent youth tobacco use, or had non-classroom programs to teach students about tobacco prevention)
- Attitudes among school personnel regarding tobacco use (percent who are very concerned about youth tobacco use, percent who strongly agreed that schools should have a policy prohibiting tobacco use among students and school personnel, percent who strongly agree that school personnel should get specific training to teach students to avoid or stop using tobacco).

**Results**

**Tobacco use**

Nearly thirty percent of the surveyed school personnel reported current use of tobacco products. Current use of any tobacco ranged from 20.9% in southern region to 50.3% in the northeastern region. At national level and in the Central, Eastern and Western regions males were significantly outnumbered females as current users of any tobacco products. However in the Southern, Northern and Northeastern regions there was no significant difference between males and females in current use of any tobacco products (Table I).
Status of tobacco control

One in three (34.3%) school personnel reported that their school had non-classroom activities to teach about harmful effects of tobacco use and its prevention. The prevalence of such activities ranged from 28.6% (western region) to 56.4% (northeastern region) (Table 1).

Nearly 40% of the surveyed school personnel reported that their school is tobacco-free, ranging from 22% (East region) to 48.4% (North region).

Nearly one-fourth (25.1%) of the surveyed school personnel reported use of tobacco within the school premises - ranging from 15% in Central region to 42% in Northeastern region. Use of tobacco within school premises by school personnel was reported significantly more from Northern, Eastern and Northeastern regions than from Southern, Western and Central regions (Table 1).

Preparedness of schools for tobacco control

Nearly one in five (16.3%) school personnel reported to have ever received training to implement tobacco use prevention programs among youth. Less than 10% school personnel from 4 (South, West, Central and Northeastern regions) of 6 regions reported to have ever received training to implement tobacco use prevention programs among youth (Table 2).

Nearly one third (34.4%) of school personnel reported to have access to teaching materials regarding tobacco use prevention - this ranged from 13.0% (Eastern region) to 48.0% (Northern region) (Table 2).

Nearly all the school personnel surveyed strongly agreed that schools should have a rule specifically prohibiting tobacco use among students (94.9%) and school personnel (95.2%)

Discussion

School personnel can play an important role in tobacco control because of their status as role models in their communities and through their frequent significant contacts with children. The scope of this potential is efficiently utilized if schools have policy prohibiting tobacco use by school personnel and effectively implement this policy.

Data collected by the India GSPS 2006 have shown that a significant proportion of school personnel used tobacco hence their projection as role models are detrimental for tobacco use among youth in schools.

Studies around world have shown that the existence of robust tobacco control policies and their rigorous enforcement in schools are associated with a lower level of tobacco consumption and prevalence among pupils. Data in addition, policy restricting

Table 1: Tobacco use and school policies prohibiting use of tobacco, India GSPS, 2006

<table>
<thead>
<tr>
<th>Region</th>
<th>Current any tobacco use</th>
<th>School had non-classroom programs or activities</th>
<th>School had a policy declaring it tobacco free</th>
<th>Use of tobacco on school property / premises</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>29.2 (27.0-31.5)</td>
<td>34.3 (30.6-38.1)</td>
<td>38.1 (34.5-41.9)</td>
<td>25.1 (23.0-27.4)</td>
</tr>
<tr>
<td>North</td>
<td>30.8 (27.4-34.4)</td>
<td>30.2 (23.5-37.9)</td>
<td>48.4 (38.6-58.3)</td>
<td>29.2 (26.0-32.5)</td>
</tr>
<tr>
<td>South</td>
<td>20.9 (14.6-28.9)</td>
<td>36.6 (28.3-45.7)</td>
<td>32.6 (26.6-39.3)</td>
<td>16.7 (12.6-21.9)</td>
</tr>
<tr>
<td>East</td>
<td>39.4 (34.8-44.1)</td>
<td>37.6 (29.6-46.3)</td>
<td>22.0 (16.5-28.6)</td>
<td>37.0 (31.9-42.4)</td>
</tr>
<tr>
<td>West</td>
<td>25.7 (22.6-29.1)</td>
<td>28.6 (21.0-37.6)</td>
<td>41.4 (33.6-49.6)</td>
<td>21.5 (17.5-26.1)</td>
</tr>
<tr>
<td>Central</td>
<td>21.1 (16.2-27.1)</td>
<td>33.0 (23.8-43.7)</td>
<td>35.2 (22.9-49.8)</td>
<td>15.0 (8.8-24.5)</td>
</tr>
<tr>
<td>North eastern</td>
<td>50.3 (41.1-59.4)</td>
<td>56.4 (38.9-72.5)</td>
<td>37.3 (22.2-55.3)</td>
<td>42.0 (28.5-56.9)</td>
</tr>
</tbody>
</table>

Figures in percentage (range)
smoking among school personnel must be applied to indoor and outdoor areas of the school premises because visibility of adult smoking even in outdoor areas increases the likelihood of regular smoking among students and decreases the possibility of smoke free environments in schools. The scarcity of tobacco free schools and the high level of tobacco use within school premises by school personnel reported in this study indicate how seriously school practice and staff activities undermine the educational messages and other prevention efforts to reduce adolescent smoking prevalence.

Access to appropriate educational materials is an important element of an effective curriculum to prevent and reduce tobacco use among students. However, the Teachers’ ability to convey effective antitobacco information to students can be diminished if they have not received training to provide tobacco-related information to students or do not have access to adequate teaching materials. Although some teachers reported having access to these materials, the majority of teachers (over two thirds) reported that they do not have adequate teaching materials to support tobacco use reduction and prevention. The results are comparable with earlier GSPS in India. The majority of school personnel surveyed strongly agreed that they should receive specific training to help students avoid or stop using tobacco. For training teachers, the WHO, Regional office for South East Asia Region has prepared a manual which may be used.

Implementation of tobacco free policies in schools is not expected to be a problem because, despite widespread tobacco use among school personnel, support for tobacco free policies among both students and personnel in school were high. Almost all school personnel supported prohibiting tobacco use within school premises.

Tobacco use prevention and reduction among students requires a comprehensive approach involving teachers, administrators, and parents. School personnel participating in GSPS showed willingness to assist in this effort. The majority of school personnel reported that they are highly concerned about youth tobacco use in the country.

The findings in this report are subject to at least two limitations. First the GSPS sample design uses schools selected for the GYTS. Thus, GSPS is not an independent sample of schools. Fortunately, the GSPS school response rate has been greater than 80% in all sites. Second, findings are based on self-reports from school personnel who may under- or over-report their behavior and their knowledge of school policies. GSPS does not include independent validation of school policies and enforcement of school tobacco control policies.

### Table 2: Tobacco-related curriculum, GSPS, 2006

<table>
<thead>
<tr>
<th>Site</th>
<th>Had access to teaching and learning materials about tobacco use</th>
<th>Ever received training to prevent youth tobacco use</th>
<th>Strongly agreed about specific training of school personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>India Region</td>
<td>34.4 (30.6-38.5)</td>
<td>16.3 (14.4-18.5)</td>
<td>88.6 (85.6-91.1)</td>
</tr>
<tr>
<td>North</td>
<td>48.0 (36.4-59.8)</td>
<td>18.3 (14.1-23.5)</td>
<td>95.5 (91.2-97.7)</td>
</tr>
<tr>
<td>South</td>
<td>28.6 (22.1-36.0)</td>
<td>8.9 (6.7-11.9)</td>
<td>81.3 (70.0-89.0)</td>
</tr>
<tr>
<td>East</td>
<td>13.0 (8.7-19.1)</td>
<td>56.8 (47.3-65.9)</td>
<td>89.7 (84.6-93.3)</td>
</tr>
<tr>
<td>West</td>
<td>31.5 (24.4-39.5)</td>
<td>9.0 (5.6-14.1)</td>
<td>82.0 (75.5-87.0)</td>
</tr>
<tr>
<td>Central</td>
<td>43.3 (29.5-58.2)</td>
<td>5.6 (3.4-9.2)</td>
<td>94.1 (89.1-96.9)</td>
</tr>
<tr>
<td>North eastern</td>
<td>29.9 (22.2-39.0)</td>
<td>2.3 (1.0-5.3)</td>
<td>95.7 (90.7-98.1)</td>
</tr>
</tbody>
</table>

Figures in percentage (range)

Indian Journal of Public Health Vol.51 No.2 April - June, 2007
Conclusion

School personnel act as important role models during adolescence which is the period when tobacco use starts. To plan effective interventions, it is thus essential to have information on the extent and types of tobacco use among school personnel, their attitudes toward tobacco control, and the existence of tobacco related policies in schools. The India GSPS provides this information to address several provisions of the WHO FCTC that relate to the role of school personnel in tobacco control. Government of India and different state governments in India can utilize these data to plan, implement, and revise programs to reduce tobacco use among school personnel, improve tobacco control information dissemination to students, and provide school personnel with the resources they need to implement comprehensive tobacco control programs in schools.

References:


Appeal to all Members of IPHA

Greetings to all our Members from the headquarters

We wish to inform all the members of our Association that IPHA Bhavan at Kolkata is almost ready and is shortly going to function as the hub for future activities at the headquarters.

We were happy to organize the CC meeting on April 9th in the new Building. However all members present at the meeting realized that the new building lacks basic logistics like furniture etc. which are essential for carrying out activities in the premises.

We do not have ready funds to spend immediately for the building. So it was decided in the meeting that funds have to be raised to provide:

1. Furniture in-side the Building:

   There are 8 rooms (including guestrooms) in the building which need furniture (like cots and beds, tables & chairs, cup-boards and other furnishings). The cost of furnishing each guest room is estimated to be about Rs. 25,000 = 00.

2. The main seminar hall needs AV equipment (like LCD projector, Lap-top, OHP, and Audio-System), seating arrangements and wall and floor paneling. This may cost about Rs. 3.0 lakhs.

If our Association could acquire these things within the coming one year, then we could implement most of our future planned activities at and from the IPHA Bhaban. This can then be properly utilized and even start yielding revenue. The rooms can be let out for conferences and other teaching/training activities to promote public health. Our members visiting Kolkata can also then avail of the guesthouse facilities at the Bhavan, which is very close to the Kolkata Airport. We look forward to your visits at the headquarters.

So, we appeal to all members to actively participate in the IPHA Bhavan Development Campaign to raise funds from as many sources as possible through individual contributions and contributions from the district and State branches.

The names of the Donors who will donate Rs 25,000 and above will be inscribed in a Tablet on the wall of the room furnished with the donation.

To make a start and inspire others the AP Chapter, Hyderabad is donating Rs. 25,000.00 for furnishing one guest room. We earnestly solicit you to be the next esteemed donor.

Dr. T.S.R. Sai
President

Dr. Madhumita Dobe
Secretary General
Glycated Hemoglobin - A Public Health Perspective

Kavita Venkataraman¹, A. T. Kannan², O. P. Kalra³, J. K. Gambhir⁴

Introduction

Diabetes Mellitus exemplifies the burden chronic diseases are coming to impose on public health infrastructures across the world. The global prevalence of diabetes was estimated to be 4% in 1995 and is expected to rise to 5.4% by 2025. There will be 300 million people with diabetes by 2025. India has been labelled the “Diabetes Capital” of the world with an estimated 19 million diabetics in 1995. By 2025 this number will almost triple to 57 million with an estimated prevalence of 6%.¹ There are significant urban-rural differences in prevalence with urban areas having a prevalence of 12.1%² and rural areas having a prevalence of 4%.³

Approximately, 90% of the burden of diabetes is due to Type 2 diabetes, the occurrence of which is linked to urbanization and lifestyle changes. Indians are also more prone to diabetes as a race. Diabetes has serious economic consequences for individuals as well as the country. It has been calculated that India would have lost 9 billion dollars in national income from premature deaths due to diabetes, heart diseases and stroke⁴. A significant proportion of the morbidity and mortality in diabetes is due to the development of chronic complications in various organ systems. These complications are due to damage to the microvasculature, or due to macrovascular damage. It has been proven that intensive control of blood glucose substantially reduces the risk of complications, especially microvascular, in patients with Type 2 diabetes mellitus⁵. To achieve optimum blood glucose control it is necessary to monitor glycemic status at regular intervals.

Monitoring diabetes control

Blood glucose

The traditional test for monitoring glycemic status has been blood glucose values, random, fasting or post-prandial. With the advent of tests for self-monitoring of blood glucose (SMBG), it has become easier for patients to know how well their diabetes is controlled. However, testing for blood glucose levels only provides information regarding the current status of glucose metabolism. As hour-to-hour variations in blood

Summary

The burden of diabetes mellitus across the world especially in India is substantial, and much of the morbidity and mortality is due to development of diabetic complications. Control of blood glucose is important to reduce occurrence of these complications. Measurement of glycated haemoglobin values provides valuable information about long term glycemic control, and is recommended for routine monitoring by several clinical guidelines on diabetes. Monitoring and appropriate management have been shown to improve outcomes in patients with diabetes in other parts of the world. However, the adoption of glycated hemoglobin as part of routine monitoring of diabetes patients in India will need to answer issues of availability, affordability and accessibility.

Key words: Glycated haemoglobin, Diabetes mellitus, Monitoring control

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Glycated hemoglobin

Proteins with reactive amino groups in the blood condense with glucose to form glycated derivatives. The extent of glycation is proportional to the concentration of glucose that the proteins are exposed to. Hemoglobin is an important blood protein and measurement of its glycation is of clinical value due to its long lifespan. Hemoglobin is most commonly glycated at the N-terminal amino group of the $\beta$ chain of hemoglobin A. This fraction is known as HbA1c. HbA can also get glycated at other locations on the $\alpha$ and $\beta$ chains, and total glycated hemoglobin (GHb) represents the sum of all these fractions.\(^6\)

**Measurement of glycated hemoglobin**

Glycated hemoglobin can be measured by various methods, based on charge differences, chemical reactivity, structural differences or immunochemical techniques. Charge difference between glycated and non-glycated hemoglobin is utilized by ion exchange chromatography and electrophoresis. Colorimetric methods using thiobarbituric acid are based on chemical reactivity differences. Structural differences are used for measurement by affinity chromatography. Immunochemical techniques use antibodies against HbA1c. The most common method for measuring GHb and HbA1c is ion-exchange chromatography.\(^7\)

As RBCs have a lifespan of 120 days, and hemoglobin gets continuously glycated over this period, measurement of glycated hemoglobin gives an indication of glycemic status over the past 10 - 12 weeks. It must be noted, however, that glycated hemoglobin does not reflect blood glucose levels equally over the previous 120 days. Recent glycemia has the largest influence on glycated hemoglobin values. Approximately, 50% of glycated hemoglobin is determined by glycemia in the month immediately preceding the test, and 25% each by glycemia in the previous 2 months.\(^8\) Age, sex, ethnicity and fasting status do not affect glycated hemoglobin measurement, but there are confounders. Hemoglobin variants interfere with glycated hemoglobin measured, especially when ion exchange chromatography methods are used.

**Role of GHb in diabetes management**

Reducing glycated hemoglobin values, as an indicator of glycemic control, has been shown to improve control of diabetes and reduce occurrence of complications.\(^5\) Glycated hemoglobin is now recognized as the standard indicator of long term control of glycemia, and it is recommended that testing for it be undertaken 4 times a year.\(^7\) Some guidelines now recommend that glycated haemoglobin be estimated every 2 to 6 months, depending on the level of control, stability of control, change in blood glucose, and change in therapy in every individual patient.\(^9,10\)

Diabetes management guidelines of several countries now recommend estimation of glycated hemoglobin as part of routine patient management. The ICMR guidelines for management of Type 2 diabetes mellitus also advocate regular monitoring of glycated hemoglobin.\(^11\)

In normal individuals, HbA1c forms less than 6% of the total hemoglobin. Patients with diabetes are said to be in good control if they have HbA1c values of less than 7%. Values higher than 8% indicate poor control of diabetes.\(^12\) There is an ongoing debate about reducing the target for control to 6.5%, as the relationship between glycated hemoglobin and risk of complications is continuous, with no threshold below which risk is sharply reduced.\(^13\) However, risk of hypoglycemia increases with decreasing values of glycated hemoglobin. It is therefore recommended that physicians aim for the lowest glycated hemoglobin value that an individual patient can obtain without experiencing problematic hypoglycemia.

**Burden of inadequate glycemic control**

A large majority of patients with diabetes have inadequate control of diabetes. Studies in the UK and the USA have shown that the prevalence of inadequate glycemic control (HbA1c > 7%) in UK\(^14\) is 76%, and 50% in the USA.\(^15\) Inadequate glycemic control has important implications, not only in terms of patient quality of life, and occurrence of various complications, but also in terms of the cost of care. Inadequate glycemic control increases both short term and long
term costs of diabetes-related care. There is an urgent need to shift from individual patient management towards improvement in glycemic control across the diabetic population.

The New York City Board of Health has adopted a novel response to the diabetes epidemic, by requiring mandatory reporting of glycated hemoglobin values by laboratories to the city’s Department of Health and Mental Hygiene17. This data will be linked to identifying information about the patients and the treating physician. It is hoped that capturing data on glycated hemoglobin will help to map the epidemiology of diabetes and monitor its progression. In another intervention aimed to better control diabetes, a decision support system, the Vermont Diabetes Information System, has been planned as a randomised controlled trial to evaluate if feedback to health care providers and patients based on their test results, including glycated hemoglobin, will improve glycemic status in the patient population18.

Glycated haemoglobin in the Indian context

The cost of care of chronic diseases in India is substantially heavy. At the individual level, the direct costs for diabetes management, monitoring, and consultation have been estimated to be Rs. 4,724 with a total expenditure of Rs. 19,914 per individual per annum for diabetes care19. Duration of illness and number of complications are the most important determinants of cost of diabetes care in India 20. As complications are intrinsically linked to inadequate glycemic control, cost of care can be reduced by achieving optimal control of diabetes. There are several issues, however, which influence use of glycated hemoglobin for monitoring glycemic status in Indian patients.

Unlike in developed countries, the public health system in India is still oriented towards management of communicable diseases. Facilities for diagnosis and management of noncommunicable diseases (NCDs) are limited, even for routine investigations like blood glucose. A majority of primary health centers (PHCs) and even city health centers (CHCs) are ill equipped to cater to the basic investigational needs of patients21. Facilities for measurement of glycated haemoglobin are unavailable in many tertiary care government hospitals in the country. The private sector is estimated to provide 81% of outpatient services and 46% of inpatient services in the country 21. This dominant service sector is, however, unregulated and driven by market forces, with profit as the prime consideration. High-end laboratory support is predominantly in the private domain, putting services like glycated haemoglobin out of the reach of the common diabetic patient.

Another aspect of patient management is that standard management protocols for many NCDs have not been developed for Indian patients, and where they exist, like in diabetes, their adoption by physicians is uncertain. The absence of routine quality audits in the health care delivery system makes it difficult to assess the extent of physician adherence to such management guidelines, and to promote evidence based patient management. Health insurance and managed care, which have made huge differences to patient care in developed countries, have yet not gained force in India, though cost of care has been increasing over the years. Health insurers in the market today have not begun to focus on people with existing chronic diseases as potential clients, and a very small proportion of the population can afford to pay the insurance premiums for such coverage.

Another crucial issue is poor knowledge on part of patients regarding diabetes, its control and the importance of glycemic control. In a study on diabetes in India, only 7% of the 5234 patients with type 2 diabetes had undergone testing for glycated hemoglobin ever, after the initial diagnosis. Overall monitoring of diabetic status was also reported to be poor in this study22. Due to the expenses involved, patients may prefer to avoid investigations, unless prompted by acute or distressing symptoms. Compliance to expensive investigations, like glycated hemoglobin, may be poor because of these considerations, and due to inability to access facilities where such testing is available.

Conclusion

Though national and international diabetes management guidelines now recommend assessment of glycemic status with glycated hemoglobin, the proportion of patients tested remains inadequate. Even in developed countries, less than 60% of the diabetic
population undergoes testing for GHb at least once in a year\(^2\). In India, the major reliance in clinical case management still rests on blood glucose levels.

Diabetes, as an emerging public health problem deserves more attention that it has received. Interventions to prevent development of diabetes like promotion of healthy diet and physical activity are important. Equally important is better patient management to improve diabetes control and prevent development of complications. Regular monitoring of patients through glycated haemoglobin can help by providing critical information about long-term glycemia. It goes without saying that therapeutic decisions based on measured glycated hemoglobin and with the aim to reducing glycated hemoglobin bring about the benefits of such monitoring. Testing for glycated haemoglobin is cost effective in that it reduces diabetes treatment costs, both short term and long term. As with other risk factors in chronic diseases, a population based approach to reduce glycated hemoglobin values across the diabetic population may be more beneficial than targeting individual patients alone.

Issues of availability, affordability and accessibility are key to the adoption of glycated hemoglobin as part of routine monitoring of diabetes patients in India. Both providers and patients need to be orientated towards the importance of such testing for improved patient management, and mechanisms to provide such facilities to patients need to be explored.

References:

14. Fox KM, Gerber RA, Bolinder B, Chen J, Kumar S. Prevalence of inadequate glycemic control among patients with type 2 diabetes in the United


Fellowship Award to Life Members

Nominations are invited for the award of fellowship from life members along with biodata in duplicate duly proposed & seconded by “Fellow Members”, as per norms.

Please enclose the following in the biodata: Name of the candidate, date of birth, qualifications, present position and scale of pay, total professional experience in years, membership record in the IPHA, membership particulars of other association / society, awards, achievements and fellowships of other associations, publications and any other.

The nomination should reach Secretary General, IPHA HQ, Kolkata. The last date of submission of nomination is 30th September 2007. Applications should be accompanied by supporting documents.

Prof. Madhumita Dobe
Secretary General, IPHA
Depression in Geriatric Population in Urban Slums of Mumbai

R. K. Jain¹, *R.Y. Aras²

Summary

A community based study was conducted in an urban slum of Mumbai to assess the epidemiological factors associated with geriatric population and depression. A sample size of 196 was taken according to Lots quality technique, including all elderly above 60 years of age in the study area. Depressed elderly (using Geriatric Depression Scale) constituted 45.9% of the study population and was more in females (57.8%, p<0.05). The significant variables associated with depression were poor socio-economic status, marital status, non-working or dependency and illiteracy (p<0.05). Depressed elderly were more inclined towards substance abuse (58.13%), had disturbed sleep patterns (61.6%) and mostly suffered from acute/chronic illness (p<0.05).

Depression is becoming a public health problem. In an ICMR survey conducted in 1984-85 of elderly persons over 60 years of age attending geriatric clinic in rural India, psychiatric problem was found to be 8.5%. About 6% of the population meets the criteria for major depressive disorder, and 20% of those will have symptoms that persist beyond 2 years. The disorder being highly recurrent, 30% of individuals experience relapses within 3 months of recovery. In the National Health Service, the cost of treating depression exceeds the cost of treating both hypertension and diabetes¹. Days lost from work owing to depression exceeds all other disorders and economic burden on family members and society is considerable². The objective of the study was to determine the epidemiological factors associated with depression and to assess the prevalence of depression.

The cross-sectional epidemiological study was conducted in urban slums of ‘E’ ward of Mumbai in June-July 2005. There are six health posts in the ward. The study area has a population of 4,39,393 with 41.13% of its population living in slum areas. A sample size of 196 was estimated using Lots Quality Technique, (WHO methodology) at 95% confidence limit and ±7% as desired level of accuracy, with each health post acting as a lot. Sampling unit being house, selected with the help of random number table. Individuals above 60 years of age not residing in the study area, residing in old age homes and critically ill were excluded. The questionnaire was based on the semi-structured proforma. Geriatric Depression Scale (GDS)³ was used for assessment of depression. The data was collected by home visits, analyzed by computer software of statistics Epi Info 2000 and SPSS (version 10).

This study revealed that 45.9% of individuals were suffering from depression, while an earlier study showed prevalence of depression as 43%⁴. The mean GDS score calculated was 5.10±8.26. Mean age was 68.07±12.98.

Our study showed no significant relationship between age and prevalence of depression similar to Hussaini⁵. Illiteracy leads to unproductive life and cause greater difficulty in getting jobs, leading to depression, which was well depicted in our study similar to the study done earlier⁶. Elderly suffering from acute/chronic illnesses showed higher prevalence of depression i.e. 61.5% similar to Hughes et al⁷. Foley DJ et al⁸ found depressed mood associated with insomnia same as shown in our study. Thus we can conclude that, depression in elderly is associated with poor socio-economic status, unemployment, disrupted marital status, illiteracy, illnesses and substance abuse.

The elderly should be encouraged for a better living and employment opportunities should also be provided. Old age clubs should be formed. Geriatric Clinic should be introduced in health care services. Referral services to geriatric OPD and psychiatrist for those in need should be made available.

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*Corresponding author.

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### Table 1: Depression in relation to demographic and bio-social characteristics of the respondents (n=196)

<table>
<thead>
<tr>
<th>Characteristics of respondent</th>
<th>Percentage of depression (GDS &gt;5)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-69 (n=103)</td>
<td>48.8</td>
<td></td>
</tr>
<tr>
<td>≥ 70 (n=93)</td>
<td>51.1</td>
<td>N.S</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (n=100)</td>
<td>42.2</td>
<td></td>
</tr>
<tr>
<td>Female (n=96)</td>
<td>57.8</td>
<td>N.S</td>
</tr>
<tr>
<td><strong>Socio-Economic Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class I (n=35)</td>
<td>28.6</td>
<td></td>
</tr>
<tr>
<td>Class II (n=43)</td>
<td>25.6</td>
<td></td>
</tr>
<tr>
<td>Class III (n=22)</td>
<td>54.5</td>
<td>P &lt; 0.05</td>
</tr>
<tr>
<td>Class IV (n=52)</td>
<td>55.8</td>
<td></td>
</tr>
<tr>
<td>Class V (n=44)</td>
<td>63.6</td>
<td></td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living with spouse (n=121)</td>
<td>38.0</td>
<td></td>
</tr>
<tr>
<td>Either spouse expired (n=69)</td>
<td>56.5</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Others (n=6)</td>
<td>83.3</td>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate (n=143)</td>
<td>51.7</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Literate (n=53)</td>
<td>30.2</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Still working (n=42)</td>
<td>28.6</td>
<td></td>
</tr>
<tr>
<td>Not working (n=154)</td>
<td>50.6</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td><strong>Substance abuse</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (n=86)</td>
<td>58.1</td>
<td></td>
</tr>
<tr>
<td>No (n=110)</td>
<td>36.4</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td><strong>Sleep pattern</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfied (n=110)</td>
<td>33.6</td>
<td></td>
</tr>
<tr>
<td>Not satisfied (n=86)</td>
<td>61.6</td>
<td>P&lt;0.05</td>
</tr>
</tbody>
</table>

### References:

Bacteriological Analysis of Street Foods in Pune

Sushil K. Chumber1, *K. Kaushik2, S. Savy3

Summary

This study aimed to analyze the bacteriological profile of street foods sold in various parts of Pune city. A total of 75 randomly collected food samples were included in the study. Samples were processed for the presence of bacterial pathogens only. 88% of the food samples analyzed confirmed the presence of bacterial pathogens, indicating the need for stricter implementation of food sanitation practices to reduce the possible risk of transmission of infection on consumption of these foods. Other aspects related to the trade of street foods in the city like the age and sex profile of food vendors, educational status and the hygienic aspects involved in the preparation, selling and consumption of these items were also reviewed.

Short Communication

Street foods are defined as a variety of ready-to-eat foods and beverages prepared and sold by vendors in streets and other public places for immediate consumption. Selling street foods is an important occupation in many cities particularly in developing countries. The consumption of street foods is also common in these countries where unemployment is high, salaries are low, work opportunities limited and where rapid urbanization is taking place1. There is a general perception that street vended foods are unsafe, mainly because of the environment under which they are prepared and consumed which exposes them to numerous potential contaminants. Street food vendors usually take their products to their customers and therefore operate from public places and street corners where they find numerous clients. These locations usually do not meet the food safety requirements2. A large number of eccremental diseases are spread through the consumption of these foods. Thus, the hygienic aspects involved in the preparation, selling and consumption of these items are a major source of concern. Food borne illness is a major public health problem and an important cause of reduced economic growth3. Hence, a study was undertaken to analyse the bacteriological profile of street foods in Pune, India.

Vendors from all the major roads of the city were contacted on the particular day of data collection and the number came out to be 75. When the vendors were selling only one type of food, that was taken for examination and when more than one type was being sold then the food containing all the basic ingredients was taken for further testing. The vendors were recruited in the study after their verbal consent and under the assurance of total confidentiality.

A structured questionnaire was used to collect information regarding age and sex of the vendor, education level, food items sold, method of preparation and serving of food, method of washing the utensils and knowledge of food borne pathogens.

Samples of about 50 grams of the food item on sale were collected in separate sterile containers and transported to the laboratory within two hours of collection. All the samples were analyzed on the same day. Portions of food weighing 10 grams were diluted at 1:10 with 90ml of Phosphate buffered saline (pH 7.4). Further ten fold serial dilutions were made and each dilution was processed by means of the surface viable count by spreading method on Blood agar and MacConkey’s agar4. After overnight incubation at 37°C, plates were examined and numbers of colonies were counted using a colony counter. Dilutions with 30-300 colonies were selected for further processing. Identification of bacteria was done using standard biochemical methods. The number of colony forming units per g of food (cfu/g) was calculated by multiplying the number of colonies by the dilution5. Control plates were incubated simultaneously to rule out the possibility of laboratory contamination.

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A total of 75 food samples of various kinds were processed. The samples were collected on 3 separate occasions.

In Pune the street food trade is mainly conducted by men aged 30-50 years. Most of the vendors had received no formal education; nevertheless they did possess some preliminary knowledge of hygiene practices to be followed in the preparation and sale of food items. Hand washing was the practice most commonly followed with 74.66% of the vendors maintaining a reasonably good standard (Table 1) as per standards laid down by WHO\(^1\). Out of the total 75 food samples tested, 63 (88%) were found to be contaminated with bacteria (Table 2).

The present study revealed bacterial contamination of the street foods sampled. Isolation of Enteropathogens indicated faecal contamination and the possible risk of transmission of infection on consumption of these foods. Enteropathogens are known to survive on the hands for three hours or longer and defective personal hygiene can facilitate the transmission of these pathogens via food to humans.

Table 1: Characteristics of the under study street food vendors, Pune, India.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Frequency (n=75)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
</tr>
<tr>
<td>&lt;30</td>
<td>23 (30.66)</td>
</tr>
<tr>
<td>30-39</td>
<td>21 (28)</td>
</tr>
<tr>
<td>40-49</td>
<td>21 (28)</td>
</tr>
<tr>
<td>&gt; 50</td>
<td>10 (13.34)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>73 (97.33)</td>
</tr>
<tr>
<td>Female</td>
<td>2 (2.67)</td>
</tr>
<tr>
<td>Education</td>
<td></td>
</tr>
<tr>
<td>Primary school</td>
<td>22 (29.33)</td>
</tr>
<tr>
<td>Secondary school</td>
<td>8 (10.67)</td>
</tr>
<tr>
<td>No education</td>
<td>45 (60)</td>
</tr>
<tr>
<td>Personal hygiene</td>
<td></td>
</tr>
<tr>
<td>Hands washed less than three times daily</td>
<td>13 (17.34)</td>
</tr>
<tr>
<td>Hands washed more than three times daily</td>
<td>56 (74.66)</td>
</tr>
<tr>
<td>Hands not washed throughout the day</td>
<td>6 (8)</td>
</tr>
<tr>
<td>Clean clothes</td>
<td>35 (46.66)</td>
</tr>
<tr>
<td>Fingernails cut</td>
<td>37 (49.33)</td>
</tr>
<tr>
<td>Hair covered</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>

Figures in parenthesis indicate percentage

A total of 75 food samples of various kinds were processed. The samples were collected on 3 separate occasions.

In Pune the street food trade is mainly conducted by men aged 30-50 years. Most of the vendors had received no formal education; nevertheless they did possess some preliminary knowledge of hygiene practices to be followed in the preparation and sale of food items. Hand washing was the practice most commonly followed with 74.66% of the vendors maintaining a reasonably good standard (Table 1) as per standards laid down by WHO\(^1\). Out of the total 75 food samples tested, 63 (88%) were found to be contaminated with bacteria (Table 2).

The present study revealed bacterial contamination of the street foods sampled. Isolation of Enteropathogens indicated faecal contamination and the possible risk of transmission of infection on consumption of these foods. Enteropathogens are known to survive on the hands for three hours or longer and defective personal hygiene can facilitate the transmission of these pathogens via food to humans.

An epidemiological link between street foods and diarrhea has been reported\(^5\). It was observed that most vendors used their bare hands to serve the food.

Staphylococcus aureus was isolated from some samples and is known to cause a serious form of food poisoning mediated by a preformed toxin. Certain foods sold by street vendors e.g. fish and rice have been implicated in food poisoning outbreaks caused by this organism. *Pseudomonas aeruginosa*, a ubiquitous pathogen, was detected in a large number of food items. While it is not known to cause food poisoning it could contribute to food spoilage.

All the food items were sold in open air with high risk of exposure to flies and dust. The container in which the food was served was also important. In most instances, the paper used to serve the food was generally newsprint of questionable origin, which increased the risk of contamination. Our study indicates the need for stricter implementation of food sanitation practices in the trade of street foods.

Table 2: Bacteriological profile of the street foods under study.

<table>
<thead>
<tr>
<th>Food item</th>
<th>No. tested</th>
<th>No. positive</th>
<th>Complement of Bacteria isolated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agra Petha</td>
<td>4</td>
<td>2</td>
<td>Staphylococcus aureus</td>
</tr>
<tr>
<td>Bhel Puri</td>
<td>15</td>
<td>13</td>
<td>Pseudomonas, E.coli</td>
</tr>
<tr>
<td>Badam Milkshake</td>
<td>1</td>
<td>1</td>
<td>Staphylococcus aureus</td>
</tr>
<tr>
<td>Chicken Biryani</td>
<td>5</td>
<td>3</td>
<td>E.coli</td>
</tr>
<tr>
<td>Fried Rice</td>
<td>6</td>
<td>6</td>
<td>Pseudomonas, E.coli, Staphylococcus aureus</td>
</tr>
<tr>
<td>Kacchi Dabeli (Local dish)</td>
<td>7</td>
<td>6</td>
<td>Staphylococcus aureus, Pseudomonas</td>
</tr>
<tr>
<td>Misal Pav</td>
<td>6</td>
<td>5</td>
<td>Enterobacter aerogenes, Staphylococcus aureus, Pseudomonas</td>
</tr>
<tr>
<td>Mutton Gravy</td>
<td>1</td>
<td>1</td>
<td>E.coli, Klebsiella aerogenes, Staphylococcus aureus, Pseudomonas aeruginosa</td>
</tr>
<tr>
<td>Noodles</td>
<td>5</td>
<td>5</td>
<td>Klebsiella aerogenes, Staphylococcus aureus, Pseudomonas aeruginosa</td>
</tr>
<tr>
<td>Pani Puri</td>
<td>12</td>
<td>10</td>
<td>E.coli, Staphylococcus aureus, Pseudomonas aeruginosa</td>
</tr>
<tr>
<td>Sugarcane juice</td>
<td>5</td>
<td>5</td>
<td>E.coli, Pseudomonas aeruginosa</td>
</tr>
<tr>
<td>Vada Pav</td>
<td>8</td>
<td>6</td>
<td>E.coli, Pseudomonas aeruginosa</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>75</td>
<td>63</td>
<td></td>
</tr>
</tbody>
</table>

Chumber SK et al: Bacteriological Analysis of Street Foods in Pune

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factors were identified that could reduce the risk of contamination. Cooking food in an enclosure, use of a clean serving stage, reheating food before sale, serving with a spoon/fork, selling food in containers and health education of vendors were some of them.

In addition, other recommendations laid down to improve the quality and safety of street foods include licensing of street food vendors, training of vendors to implement safer food handling practices and increasing consumer awareness about nutrition and safety of street foods. Action along these lines can improve the safety of street foods and improve the health standards of consumers. The business of street food vending therefore needs to be addressed carefully and in an innovative way in order to derive maximum benefits from it.

References:
Summary

The study was undertaken to establish normograms for PEFR in healthy rural south Indian school children and to derive prediction equations for PEFR with height. PEFR was measured in 1403 children aged 5 to 17 years using Wright’s mini peak flow meter. Prediction equations were derived for PEFR with height in boys and girls. Normograms were plotted based on the observed values of PEFR in the study population. Significant linear correlation was seen of PEFR with height in males (p<0.001, r=0.856) and in females (p<0.001, r=0.762). Prediction equation for PEFR are 4.49 x height (cm) - 384.64 in males and 2.99 x height (cm) -219.44 in females.

PEFR measurement is a simple test of respiratory function used in the diagnosis and prognosis of obstructive airway disease including bronchial asthma. It can be easily measured and correlates well with other lung function measurements. However, for the meaningful interpretation of PEFR results, it is necessary to establish the normal range of observations specific to a population, since there are wide variations of PEFR with geographic, racial, genetic and nutritional background.

PEFR values in Indian adults have been well reported. While normograms for PEFR with height is available for Western children and North Indian children there is a relative lack of data in south Indian children. Few studies have been conducted in this population but lacks reliability because of the small sample size of participants included. Larger studies, while providing useful preliminary data on the subject, have been pointed out to be biased because of unsubstantiated extrapolation of data to children in other diverse geographic regions where differences in nutritional status and racial anthropometric indices could affect the findings. Most of the studies in south Indian children were also performed in urban settings. Hence, there is a lack of data regarding PEFR observations in rural South Indian school children.

The objectives of this study were to establish normal reference values for PEFR with height in children aged 5 to 17 years in rural Palakkad district in south India and to derive prediction equations for this population subset.

This cross-sectional study involved 1403 healthy school children (705 Males, 698 Females) aged from 5 to 17 years living in rural Palakkad district in south India. All children studying in Class I to Class XII were recruited from four schools, randomly selected from the district. Exclusion criteria included known cases of bronchial asthma, chronic cardiopulmonary disease, respiratory tract infection within the previous two weeks, history of smoking and structural abnormalities of thoracic cage and spine. Children who were consistently unable to perform the procedure were also excluded. Written informed consent was obtained from the parent or legal guardian of the children prior to the study.

Trained personnel recorded demographic details in a standard questionnaire. Reported age was confirmed from the school register and socioeconomic class was calculated using modified Prasad’s classification. Weight was measured without shoes and with light clothing on a bathroom scale calibrated daily with a standard weight. Height was measured with a standard portable stadiometer. A detailed history was noted and clinical examination performed by a pediatrician.
PEFR was measured using Wright’s mini peak flow meter (Vitalograph, Ennis, Ireland), which was calibrated initially and on all days of the study. PEFR was recorded in the standing position; at least three readings were taken from every child and the highest reading recorded.

Statistical analysis was done using SPSS software version 10.0. Linear regression analysis was done using PEFR as the dependent variable and height as the independent variable.

Results

Of the 1403 children, a majority belonged to Class III and IV socioeconomic scale by Prasad’s classification. There was no correlation between socio-economic class and PEFR observed. PEFR was observed to increase linearly with height; significant correlation (p<0.001) was seen between PEFR and height in boys (r=0.856) and girls (r=0.762). PEFR prediction equations based on height as a correlate are as follows:

PEFR (males) = 4.49 x height (cm) - 384.64;
PEFR (females) = 2.99 x height (cm) - 219.44.

Figure 1: Normogram for PEFR with height in male schoolchildren

Normograms, for males and females, constructed from the linear regression equation using PEFR as dependent variable and height as independent variable are shown in Figure 1 and 2.

Discussion

Significant correlation has been previously reported for PEFR with height, weight, age, socio-economic conditions, chest circumference and body surface area. We have utilized height as the correlate for PEFR since all studies have shown height to be the most significant correlate. Height is reliable unlike chest circumference that can be affected in an attack of acute bronchial asthma. Height is a better correlate compared to weight as the latter varies significantly with acute disease and nutritional status. This is relevant in India where acute and chronic malnutrition is rampant. The given age of a patient can often be inaccurate especially in rural areas where records of birth are seldom kept. Unlike socio-economic class and body surface area calculation, untrained personnel using minimal equipment can easily calculate height. Unlike other studies that examined the effect of socio-economic status on PEFR in Indian school children, we found no correlation between the two. This could probably be due to a majority of children in our study belonging to Group III and IV resulting in a poor distribution across the socio-economic class gradient.

For the height of 120 cm, Malik and Sanz reported PEFR of 222 L/min, 252 L/min and 205 L/min respectively in males and 216 L/min, 237 L/min.
respectively in females. Our findings for the same height were 166.54 L/min and 137.95 L/min for males and females respectively. Thus our observations are lower than those studies. PEFR observations in south Indian children being lower than north Indian children have been reported before. Our findings are in conformity with the results of Sharma et al. However our observations are higher than those reported by Agaba et al in African children. Anthropometrically bigger stature, better nutrition and higher socioeconomic status could explain the higher PEFR in Western children. As regards Indian data, most studies were carried out in urban areas where again higher socioeconomic class and better nutrition could account for the higher PEFR reported. Smaller chest size in south Indian children as compared to North Indian children could be another factor responsible for the lower PEFR observed in our study.

Considering the wide variation of PEFR in different geographic areas, based on characteristics unique to the local population that includes racial disparity, nutritional variability and socio-economic differences, it is important to establish regional reference values separately in all regions where access to spirometry is limited. Use of height to predict PEFR is ideal in developing countries due to the reasons stated above. In conclusion, this study has established regional reference values and prediction equations for PEFR with height in males and female schoolchildren in rural Palakkad district in south India.

Acknowledgements

We thank Dr. S. D. Subba Rao, Professor of Pediatrics, St. John’s Medical College Hospital, for his guidance and help with data analysis. The clinical assistance offered by Dr. Renjith K is acknowledged. We place on record our gratitude to the local population for their kind cooperation. The authors declare no conflict of interests.

References:

Nutritional Profiles of Adolescents in a Rural Community of Hooghly District in West Bengal

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1 Assistant Professor, 2 Associate Professor, Department of Community Medicine, N. R. S. Medical College, Kolkata, 3 Professor, Department of Community Medicine, Medical College, Kolkata. *Corresponding author.

Summary

This community based study was carried out in Haripal Block of Hooghly district in West Bengal in 2005 to assess the nutritional status of the unmarried adolescents and 204 adolescents were studied. The BMI for age and height for age <5th percentile were used as criteria for thinness and stunting respectively. The overall prevalence of thinness and stunting were 24.48% and 52.45%, thinness was more common among the boys. The other nutritional deficiency disorders were pallor (12.25%), conjunctival xerosis (9.30%), Vitamin B complex deficiency (1.47%), goitre (0.98%) and dental caries (11.76%). An indication of chronic energy deficiency in the study area was observed.

Adolescence is the period of life between 10-19 years¹ ². Their nutritional requirement is more due to the rapid growth spurt and increased physical activities². So a poor intake of nutrients (and in addition menstrual loss among the girls) put them at a higher risk of nutritional deficiencies and their ill effects¹. The malnourished children are likely to grow into malnourished adults with greater risk of disease and death³.

This community based descriptive study was carried out in the villages of Haripal Block of Hooghly district in West Bengal to assess the nutritional status of the unmarried adolescents (boys and girls). Out of 36 villages, 6 villages were selected randomly. Thereafter, 180 households were selected for the study by systematic random sampling (every 3rd household) with a random start. Thus the final sample size comprised of 204 adolescents. Data collection on a pre-designed and pre-tested schedule by house to house survey was done on a cross sectional design by interview and examination. Thinness was assessed by BMI for age <5th percentile of the NCHS standard.

It was observed that by age, the early adolescents (10-14 years) were 31.86% and the late adolescents (15-19 years) were 68.14% and by sex 82(40.19%) were male and 122 (59.81%) were female. The majority came from families below poverty line.

The overall prevalence of thinness was 25.49%; thinness was more common among the early adolescents (33.85%) than among late adolescents (21.58%) and significantly more common among male (36.58%) than female (18.03%) [p<0.05]. Similarly, for stunting the overall prevalence was 52.45%; stunting was more common among early adolescents (56.92%) than among late (50.36%); however, the prevalence of stunting was almost same in male and female (male 52.44% & female 52.46%). The overall prevalence of stunting was significantly more than that of thinness [p<0.001].

Regarding micronutrient deficiencies, prevalence of pallor was significantly higher among the females (16.39% than among males (6.09%) [p<0.05]; conjunctival xerosis was significantly higher among the early (16.92) than among late adolescents (5.75%) [p<0.05]; the prevalence of dental caries was significantly higher among the early adolescents (20.00%) compared to the late ones (7.91%) [p<0.05].

When compared, it was observed that the overall prevalence of thinness in the present study was lower than a school based study (35.5%)[4]. NFHS-2 report
and higher than an observation in a district of West Bengal (14.7%)\(^6\). However, the prevalence of stunting in the present study was observed higher when compared to a study in West Bengal (37.8%)\(^6\) and a study in rural north India (41.0%)\(^7\). These differences might be due to influences of multiple factors like inadequate intake of nutrients or morbidities like repeated attacks of diarrhoea, ARI, worm infestations etc. operating differently in different areas or due to differences in definition criteria. Although, thinness was more prevalent among the boys no difference was observed among them regarding stunting. However, prevalence of pallor (an indirect evidence of anaemia) was more common among the girls. The possible explanation of this might be an inadequate intake of iron-rich foods by the girls coupled with regular menstrual loss.

Adolescent health in an important issue and their needs have to be addressed properly.

### References

How Effective are Radio Programs in Dissemination of Health Messages to the Rural Masses? 

Namrata Sharma¹, S.N. Choudhary²

Summary

An 18-episode radio program was broadcasted in 2004 by Government of Madhya Pradesh to disseminate health messages to the community. The program was evaluated for its outreach and level of retention of the key messages by the listeners. In the households with radio sets only 49% listened to radio programs regularly. Among them 34% had listened to at least one episode of the program under study. The retention rate of key messages by the program listeners was found to be around 30 per cent only. Barriers to use of radio for mass communication of health messages have been discussed.

In a developing country like India where majority of the population lives in villages and significant numbers of them are illiterate, radio as a formal means of mass communication has great potential in dissemination of health messages. With the help of about ninety broadcasting stations in India radio signals cover almost the entire population of the country. Currently, radio broadcasts are received by 17.4 million receiving sets in India¹. Understanding the importance of radio as a mass communication tool government often launches radio programs to disseminate health messages to the masses. However, these programs are seldom subjected to any evaluation so that it is not known if the programs are serving any useful purpose or they have missed their target or lost its punch.

The radio program was evaluated after six months of the last episode to ascertain the outreach of the program and to find out the level of retention of the health messages by the target audience. Two districts from each of the six cultural areas (Malwa, Mahakosal, Nimar, Chambal, Bundelkhand and Baghelkhand) of Madhya Pradesh were randomly selected for the purpose of this study. From each district, two development blocks and from each block four villages were selected randomly. From each of the 96 villages thus selected for the study, 30 households with radio sets were listed. If 30 households with radio sets were not available in a village, the neighbouring village was included. Thus a total of 111 villages had to be visited. From every selected household, one adult member (20-60 years) who was available at the time of home visit was interviewed using a semi structured pre-tested proforma to elicit information about the radio program under study. But the total number of respondents interviewed was 2720 only as in the remaining 160 households none of the adult members had heard at least one episode of Yeh Hai Jeevan Ki Muskan program.

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Analysis of the background of the respondents showed that majority (1224 i.e. 45%) belonged to OBC category, about 18% were illiterate, 27% were landless agriculture labour, and about half of them (1440 i.e. 52.94 %) belonged to BPL (below poverty line) families.

Radio is a popular means of entertainment and information in rural areas of Madhya Pradesh as 1333 (49%) of 2720 respondents listened to radio programs every day, 1278 (47%) listened to radio program occasionally while remaining 109 (4%) did not listen radio program although they had radio sets at their homes. Thus, among the households having radio sets broadcast coverage was as high as 96%.

Out of 2611 respondents who ever listened to radio programs a little more than one third i.e. 965 (36.95%) listened to the specific radio program “Yah Hai Jeevan Ki Muskan” (Table 1). The frequency of listeners of this program varied from district to district ranging between 13 to 53 per cent.

In all 18 episodes of programs were broadcasted in the program. These 18 episodes covered ten subjects as shown in Table 1. When asked about listening to programs on these subjects the recall rate of respondents varied between 17 to 100 per cent.

Table 1: No of persons who had heard broadcast on different subjects of the specific programme

<table>
<thead>
<tr>
<th>Subject of broadcast of the programme</th>
<th>Heard the broadcast No.</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenatal care</td>
<td>632</td>
<td>65.4</td>
</tr>
<tr>
<td>Safe delivery</td>
<td>164</td>
<td>17.0</td>
</tr>
<tr>
<td>Postnatal care</td>
<td>590</td>
<td>61.1</td>
</tr>
<tr>
<td>Child health</td>
<td>481</td>
<td>49.8</td>
</tr>
<tr>
<td>Immunization</td>
<td>813</td>
<td>84.2</td>
</tr>
<tr>
<td>Family welfare</td>
<td>473</td>
<td>49.0</td>
</tr>
<tr>
<td>Adolescent health</td>
<td>239</td>
<td>24.8</td>
</tr>
<tr>
<td>Gender discrimination</td>
<td>434</td>
<td>45.0</td>
</tr>
<tr>
<td>Water &amp; sanitation</td>
<td>618</td>
<td>64.0</td>
</tr>
<tr>
<td>Role of PRLs in health</td>
<td>965</td>
<td>100</td>
</tr>
</tbody>
</table>

of Panchayati Raj Institutions (Gram Sabha and Village Health Committee) towards community health was recalled by all the respondents. Other subjects for which recall rates were higher than fifty percent were: water supply and sanitation (64%), immunization of children against VPDs (84.2%), antenatal care(65.4%) and post natal care (61.1%). Level of recall was low in case of programs on adolescent health (24.8%), and safe delivery services (17%). Other subjects e.g. gender discrimination (45%), health of children (49.8%), family welfare (49%) occupied middle positions regarding recall rates.

DANIDA (Danish International Development Agency) staff responsible for the production of the program was asked to identify most important messages, which they wanted to be delivered through these radio programs. The respondents who recalled having heard a particular program was asked to mention three important messages in the program listened by them. The responses were elicited without any prompting and checked against the DANIDA prepared key messages list.

The recall rates of different messages varied from 4.6 per cent to 78.7 per cent. Median recall rates were around 30 percent when all the ten subjects covered in the program were taken together. Recall rates of some of the key messages by the respondents were: three ANC (33.5%), two doses of TT immunization (37.7%) and extra diet during pregnancy (87.8%); five cleans (45.9%) during home delivery and importance of hospital deliveries (75.2%); early breast feeding and giving colostrum (30.3%) to newborns, exclusive breast feeding up to six months (22.7%), timely and complete immunization (31.0%) of infants; spacing between children (35.5%); prevention of HIV/AIDS (35.1%); physical and psychological changes among adolescents (33.9%); women’s rights (28.8%); use of toilets (44.7%); and role of PRIs in village health and women and child development programs.

Internationally, researches have shown that increase in knowledge about radio program topics leads to positive change in attitude and behavior. In India also, it has been seen that electronic mass media exposure has substantial positive effect on current and intended future use of family planning methods.

Television is more preferred by the community for entertainment and information. But it is costly to own and coverage is poor in areas away from cities.
Further, erratic power supply in most parts of rural India is a big barrier for promoting television as a means of mass communication. Radio, on the other hand, does not suffer from these disadvantages. And the best part about it is that transistor sets are highly transportable and can be carried with ease almost everywhere.

In the present study it was seen that possession of radio sets in the households was not universal. In the households with radio sets although majority (96%) listened to the radio programs but programs on health were not popular as only about 40 per cent had heard the program under study and that too a few episodes only. Further, the recall rate of health messages was low, around 30 per cent for most of the key messages. Therefore, low access to radio sets, health programs being heard by only a small target audience and low retention rate of health messages were seen as important barriers to use of radio for dissemination of health messages. Well-designed studies regarding the outreach of radio programs, radio listening profile of community and impact of radio programmes on behaviour change should be therefore encouraged.

References:

Morbidity Profile of Paediatric Inpatients at a Community Health Centre and a Nearby by District Hospital in Northern India

S. Verma¹, *S. K. Rai², S. Kant², K. Choudhury³

India is home to 19% of the world’s children¹. They are vulnerable to common childhood diseases and are dependent on the local health services. The public health care delivery system in India is a three tier structure viz. primary, secondary and tertiary care level². The community health centre (CHC) and the district hospital at the secondary level, equipped with inpatient facilities, laboratory and a pediatrician are the first appropriate contact for the sick children requiring admission, treatment and referral services. However, there is paucity of published data on the morbidity profile of paediatric inpatients managed at the community and district level in India. The objective of this study is to review the morbidity profile of children admitted at a model CHC and a nearby district hospital over a period of one year.

Study design: Retrospective review. Setting: The Comprehensive Rural Health Services Project (CRHSP), Ballabgarh, a model CHC and Badshah Khan (B.K.) hospital, Faridabad, a district hospital over a period of one year. Diarrhea and pneumonia comprised 64% of all admissions at the model CHC and 30% at the district hospital. Thalassemics requiring blood transfusion formed 21% of inpatients at the district hospital. Common paediatric ailments can be managed appropriately at CHC level, provided the infrastructure as recommended by Indian Public Health standards for CHC under National Rural Health Mission (NRHM) is available. The blood bank or blood storage facility at a CHC is desirable.

In the year 2005, a total of 912 children were admitted at CRHSP, Ballabgarh, a model CHC. Children between the ages 0-5 years contributed 63% (578) of admissions. Sixty percent (543) of the admitted patients were males with male: female ratio of 1.5:1. On an average each child stayed for 2.5 days. At the nearby district hospital, 2117 children were admitted with male: female ratio of 1.67:1. Children 0-5 years contributed 57% (1202) of all admissions and average stay per child was 2 days.

Summary
The study was conducted to ascertain the morbidity profile among children by retrospective review of inpatient data of children admitted to Comprehensive Rural Health Services Project (CRHSP), Ballabgarh, a model CHC and Badshah Khan (B.K.) hospital, Faridabad, a district hospital over a period of one year. Diarrhea and pneumonia comprised 64% of all admissions at the model CHC and 30% at the district hospital. Thalassemics requiring blood transfusion formed 21% of inpatients at the district hospital. Common paediatric ailments can be managed appropriately at CHC level, provided the infrastructure as recommended by Indian Public Health standards for CHC under National Rural Health Mission (NRHM) is available. The blood bank or blood storage facility at a CHC is desirable.

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Diarrheal illness (53%) and pneumonia (11%) accounted for majority of inpatients treated at the model CHC. Among other common conditions treated included seizures (8.5%), febrile illness (7%), malnutrition (3%), enteric fever (3%) and sepsis (2.4%). At the district hospital, diarrhea and pneumonia contributed 24.3% (516) and 4.6% (99) of all admissions. Thalassemia accounted for 21% of inpatients. The other significant category of admissions comprised of febrile illness (16.9%), sepsis (15.4%), and seizures (3.6%) and birth asphyxia (2.1%). (Table-1)

The model CHC referred 3.5% of its admitted patients to higher centers and had 2% deaths predominantly due to severe pneumonia and sepsis. At district hospital 3% of admitted patients died and majority succumbed to pneumonia and diarrheal illness. The proportion of referrals was 2%.

It was observed that common pediatric ailments for example, diarrhea and pneumonia were managed more commonly at the CHC level. Acute childhood emergencies like seizures and accidents/poisoning were also brought more commonly at the CHC. Many factors, including accessibility and user’s perception of quality of care rendered, may have played a role in utilization of services provided at the CHC. The district hospital equipped with the blood bank facility entertained large number of thalassemic children. However, no such children were managed at the CHC due to non-availability of blood bank or blood storage facility.

Our study results reinforces the need to implement recommendations made under the NRHM programme at the CHC level.

References:

Table 1: Morbidity profile of inpatients in a model community health center (CHC) and a district hospital (2005)

<table>
<thead>
<tr>
<th>Diseases</th>
<th>Model CHC</th>
<th>District Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. (%)</td>
<td>No. (%)</td>
<td></td>
</tr>
<tr>
<td>Pneumonia</td>
<td>98(11)</td>
<td>99(4.6)</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>482(53)</td>
<td>516(24.3)</td>
</tr>
<tr>
<td>Febrile illness</td>
<td>64(7)</td>
<td>358(16.9)</td>
</tr>
<tr>
<td>Protein Energy Malnutrition</td>
<td>29(3)</td>
<td>19(0.8)</td>
</tr>
<tr>
<td>Seizures</td>
<td>78(8.5)</td>
<td>77(3.6)</td>
</tr>
<tr>
<td>Acute Flaccid Paralysis</td>
<td>8(0.8)</td>
<td>25(1.1)</td>
</tr>
<tr>
<td>Meningitis</td>
<td>11(1)</td>
<td>2(0.1)</td>
</tr>
<tr>
<td>Sepsis</td>
<td>22(2.4)</td>
<td>327(15.4)</td>
</tr>
<tr>
<td>Enteric fever</td>
<td>28(3)</td>
<td>5(0.2)</td>
</tr>
<tr>
<td>Congenital heart disease</td>
<td>5(0.5)</td>
<td>Nil</td>
</tr>
<tr>
<td>Asthma</td>
<td>7(0.7)</td>
<td>10(0.4)</td>
</tr>
<tr>
<td>Jaundice</td>
<td>16(1.7)</td>
<td>19(0.8)</td>
</tr>
<tr>
<td>Pain abdomen</td>
<td>7(0.7)</td>
<td>28(1.3)</td>
</tr>
<tr>
<td>Surgical conditions</td>
<td>27(3)</td>
<td>6(0.3)</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>6(0.6)</td>
<td>3(0.1)</td>
</tr>
<tr>
<td>Poisoning/Accidents</td>
<td>16(1.7)</td>
<td>9(0.5)</td>
</tr>
<tr>
<td>Nephrotic syndrome</td>
<td>9(0.9)</td>
<td>4(0.1)</td>
</tr>
<tr>
<td>Severe anemia</td>
<td>4(0.4)</td>
<td>41(1.9)</td>
</tr>
<tr>
<td>Thalassemia</td>
<td>Nil</td>
<td>446(21)</td>
</tr>
<tr>
<td>Hemiparesis</td>
<td>2(0.2)</td>
<td>5(0.2)</td>
</tr>
<tr>
<td>Asphyxia</td>
<td>1(0.1)</td>
<td>46(2.1)</td>
</tr>
<tr>
<td>Malaria</td>
<td>4(0.4)</td>
<td>1(0.04)</td>
</tr>
<tr>
<td>Dengue fever</td>
<td>4(0.4)</td>
<td>Nil</td>
</tr>
<tr>
<td>Chronic renal failure</td>
<td>Nil</td>
<td>1(0.04)</td>
</tr>
<tr>
<td>Rheumatoid arthritis</td>
<td>1(0.1)</td>
<td>Nil</td>
</tr>
</tbody>
</table>

Diarrheal illness (53%) and pneumonia (11%) accounted for majority of inpatients treated at the model CHC. Among other common conditions treated included seizures (8.5%), febrile illness (7%), malnutrition (3%), enteric fever (3%) and sepsis (2.4%). At the district hospital, diarrhea and pneumonia contributed 24.3% (516) and 4.6% (99) of all admissions. Thalassemia accounted for 21% of inpatients. The other significant category of admissions comprised of febrile illness (16.9%), sepsis (15.4%), and seizures (3.6%) and birth asphyxia (2.1%). (Table-1)
Short Communication

Percutaneous Injuries among Medical Interns and Their Knowledge & Practice of Post-exposure Prophylaxis for HIV

Joffi Chacko1, *Rajesh Isaac2

Summary

This was a prospective, questionnaire-based study to determine the incidence of percutaneous injury among medical interns in a tertiary care hospital in Punjab. The incidence of percutaneous injury among interns was found to be 157.89 per 100 person-years. Of 38 interns, 31 (81.6%) experienced a lot of anxiety with regard to their occupational risk of contracting HIV, 23 (60.5%) felt that there was no easy availability of materials in the wards to take universal precautions and 17 (44.7%) felt they were not well informed about what to do in case of an occupational exposure to HIV. 7.9% interns always took universal precautions with every patient. Lack of time, lack of materials and emergency situations were the major reasons why universal precautions were not taken at times. 12 out of 38 (31.6%) interns correctly knew when PEP should ideally be initiated.

Percutaneous injuries constitute a major health hazard to health care personnel. Infections such as Hepatitis B, Hepatitis C and HIV are known to be transmitted from patients by this route. Personnel who regularly practice invasive procedures such as blood sample collection and starting of intravenous lines are particularly at high risk to percutaneous injuries. A percutaneous injury is defined as an exposure that might place Health Care Professionals (HCP) at risk for HBV, HCV or HIV infection such as a needle-stick injury or cut with a sharp object, or contact of mucous membrane or non-intact skin (e.g. exposed skin that is chapped, abraded, or afflicted with dermatitis) with blood, tissue, or other body fluids that are potentially infectious.

Medical interns constitute a particularly high-risk group since they are inexperienced in invasive procedures and are harried for time and are often tempted to ignore universal precautions to finish the work assigned to them. They are also likely to be less informed about the dangers of percutaneous exposure to body fluids and the steps to be taken thereafter. This study was designed to measure the incidence of percutaneous penetrating occupational injuries amongst interns working in a tertiary care hospital in India as well as to assess their knowledge & practice regarding post exposure prophylaxis (PEP).

Medical interns working in various departments of Christian Medical College were followed up for a period of 2 months prospectively in the months of June and July 2005. Incidence of percutaneous injuries was determined by weekly follow-ups using a standardized questionnaire. Knowledge and practices concerning post-exposure prophylaxis were also determined using a standardized questionnaire. Total interns in the current working batch in Christian Medical College, Ludhiana was 38. This was finite population; all these interns were followed up exhaustively.

Descriptive statistics were generated using EPIINFO Version 6.04b free statistical software provided by Center for Disease Control, Atlanta. Poisson distribution for probability of percutaneous injuries was calculated using WINPEPI statistical software Version 0.26 © J. H. Abramson, 2003. The study was cleared by the Institutional Research Committee and by the Institutional Ethics Committee. Informed written consent was obtained from each of the study participants.

All the 38 interns were followed up weekly for a period of 2 months. There were 10 instances of percutaneous exposure amongst the 38 interns.

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followed up over the two month period. Thus, for a year this was \((10 \times 6) = 60\) percutaneous injuries per year. Expressing this in terms of exposures per 100 interns per annum, we have \(60 \times (100/38) = 157.89\) (95% C.I. = 75.77 to 290.52) percutaneous injuries. The differential exposure was as follows: Of the 10 total exposures, one intern experienced 4 exposures, one intern experienced 3 exposures and 3 interns experienced one each. We constructed a Poisson distribution for calculating the probability of percutaneous exposure per year. The probability of having no percutaneous exposure in a year was 20.6%, of having a single exposure in a year was 32.6%, 2 exposures per year was 25.7%, 3 exposures per year was 13.5% and more than 3 exposures per year was 7.6%.

An incidence of 157.89 per 100 person years, (95% C.I. = 75.8 to 290.5) in the present study is particularly high compared to a mean of 4.05 which was found in a review by Trim and Elliot. Of these, 7 out of 10 were due to blood-stained, hollow-bore needles. This is a matter for particular concern. Assuming a Poisson distribution for the incidence of percutaneous injuries, it can be seen that the probability of having one event in a year is greater than that of having none (32.6% as against 20.6% respectively).

The incidence of occupational transmission of HIV to health care workers after percutaneous exposure from an infected source is 0.3% for HIV, 3% for hepatitis C and 30% for hepatitis B. India being a moderate prevalence country for hepatitis B and especially hepatitis C, the implications for spread of this infection, especially to unvaccinated health care workers is obvious. A study done among health care workers in rural north India described an incidence of 2.3 needle stick injuries per worker per year which is similar to that described in this study. Another study by Talaat et al. reported an incidence of 490 needle stick injuries per 100 person-years among health care workers in Egypt.

Incidence of percutaneous injury seems to vary widely from region to region and so context specific interventions may need to be planned.

<table>
<thead>
<tr>
<th>Practices</th>
<th>Never</th>
<th>Occasionally</th>
<th>Mos oft the time</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universal precautions with every patient.</td>
<td>1 (2.6)</td>
<td>19 (50)</td>
<td>15 (39.5)</td>
<td>3 (7.9)</td>
</tr>
<tr>
<td>Wearing double gloves before surgical procedures.</td>
<td>8 (21.1)</td>
<td>16 (42.1)</td>
<td>7 (18.4)</td>
<td>7 (18.4)</td>
</tr>
<tr>
<td>Reporting all percutaneous exposures to senior staff.</td>
<td>9 (23.7)</td>
<td>13 (34.2)</td>
<td>9 (23.7)</td>
<td>7 (18.4)</td>
</tr>
</tbody>
</table>

Figures in parenthesis indicates percentages

Emergencies were cited by 19 out of 38 interns (50%) as the reason for not taking universal precautions; 16 (42.1%) cited lack of availability of materials, 11 (28.9%) cited lack of time, 5 (13.2%) cited laziness, 2 (5.3%) cited tiredness and 1 (2.6%) cited lack of knowledge.

Knowledge about infective fluids was inadequate. Out of 38 interns, only 6 (15.8%) correctly identified stool, 7 (18.4%) identified nasal secretions, 7 (18.4%) pericardial fluid, 9 (23.7%) amniotic fluid, 12 (31.6%) cerebrospinal fluid and 20 (52.6%) blood-stained body fluids, as potentially infectious. All these fluids are infective and the fact that the majority considered them non-infectious can pose a serious problem to interns taking adequate precautions. This is compounded by the fact that only 7 interns consistently reported their exposures to senior staff.

Among the 38 interns, 9 (23.7%) never reported percutaneous exposures to senior staff, 13 (34.2%) did so occasionally, 9 (23.7%) did so most of the time and 7 (18.4%) did so always.
Of 38 interns, 31 (81.6%) correctly identified the components of PEP. Of these 12 (31.6%) knew the ideal time within which PEP should be started, 24 (63.2%) correctly identified situations requiring PEP and 19 (50.0%) correctly identified an approved PEP regimen. This may be a factor that delays interns from seeking help early and starting the required treatment. In a study done in the United Kingdom among 26 surgeons in 13 hospitals, only 10 correctly stated the time within which prophylaxis should be obtained.

The incidence of percutaneous exposure among interns in this study is quite high. Though the study has some inherent limitations- the sample size being small and degree of exposure varies in different departments. There are significant gaps in the interns’ knowledge and practices with regard to identifying potentially infectious fluids, taking adequate precautions and about the timing and constituents of PEP regimens. Lack of time and non-availability of materials are the major reasons for not taking universal precautions.

It must be made a priority to provide materials to effect this at an easily accessible location. This is especially so in emergency situations. An education program must be included in the orientation program of interns when they start their internship. The hospital must have specific protocols and personnel in place who can be contacted if any health care personnel have a percutaneous exposure.

References:
Serological Aspects of Dengue Fever and its Correlation with Clinical Features in a Recent Febrile Outbreak

T.K. Chatterjee1, *K. Nayak2, S. Som3, S. Chatterjee4, N. Chaudhuri5, B. Mukherjee6

Summary

The study was done to assess correlation between serology and clinical features of Dengue fever at Burdwan Medical College, where after clinical examination, blood samples were processed by E.I.A. Of 139 cases, mostly between 1 to 20 years, Male-Female ratio was 80:59. Bleeding manifestation was observed only in 3 cases, and Lymphadenopathy, Myocarditis were uncommon features. Few patients have biphasic temperature. Fever and severity of symptoms did not have correlation. Patients’ blood was examined for Dengue viruses, with only 44.6% positivity. Correlation exists between illness duration and antibody titer. \[ r = 0.41; (P <0.01) \]. Fever other than Dengue also exhibited similar symptoms, but optical density in EIA test was less. As high fever with similar symptoms may be due to causes other than Dengue, thorough search for other viral infection namely Chikungunya should be done in endemic areas also.

Recent surge of high fever in West Bengal have received much attention. The peculiarities are that cases had same symptom complexes of viral origin. Since 1980 dengue fever and DHF (Dengue Haemorrhagic Fever) have emerged as most important arthropod borne viral disease of human\(^1\). DHF and DSS (Dengue Shock Syndrome) have a mortality rate as high as 15%\(^2\). In primary infection there is rise in IgM antibodies after 5-6 days of illness and it wanes after 1-2 months, but IgG can be detected even weeks after infection\(^3\). With secondary infection, high level of IgG antibodies are detectable after 2 days of onset.

The present study was done at Burdwan Medical College and Hospital, in September 2005. Of 139 cases (of high fever), 80 were male and 59 were female between 1 to 60 years. All presented with fever, headache, backache, retro-orbital pain and generalized bodyache. Serum samples for IgM antibody were processed by enzyme immune assay (EIA) supplied from Mr. Omega Diagnostics Ltd.

Sex distribution showed the male: female ratio is 56.4:43.6. Morbidity observed between 1 to 20 years sharing 61.3% of cases. Among reactive cases Muslims were 35.5% and Hindus 64.5%. The male: female ratio is 44:33 and vulnerable group was between 1 to 50 years, covering 92% of non-reactive group. In the nonreactive group of cases people above 40 years of age and below 1 year of age are almost free from attack. In reactive group, 7 suffered from joint pain, 14 from myalgia and 6 suffered from both, whereas in non-reactive group, 5 with joint pain, 24 from myalgia and 4 from both.

44.6% cases were identified as reactive for Dengue. Among reactive cases, distinguishing features are myalgia and arthralgia, (32.26% and 21% respectively). Correlation between duration of

### Table 1: Distribution of optical density of IgM reactive cases

<table>
<thead>
<tr>
<th>Duration of illness</th>
<th>0.05-0.15</th>
<th>0.16-0.25</th>
<th>0.26-0.35</th>
<th>0.36-0.45</th>
<th>0.46-0.55</th>
<th>0.56-0.65</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-4 days</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5-7 days</td>
<td>11</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8-10 days</td>
<td>7</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>&gt; 10 days</td>
<td>9</td>
<td>7</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

\(^1\) Asso. Professor, \(^2\) Demonstrator, Department of Micro biology, \(^3\) Asst. Professor, \(^4\) RMO, \(^5\) Prof., Department of Paediatrics, \(^6\) Prof., Department of Community Medicine, Burdwan Medical College. Corresponding author: sabbasom@hotmail.com.

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illness and optical density of serum samples was positive \((r=0.41, p<0.01)\).

Maculopapular rash was observed in 3 cases. Among cases reactive to IgM, bleeding manifestation was observed in 3 only. Neurological symptoms were not observed. There was no Dengue shock syndrome. IgM antibody did not appear according to usual rule of appearance. The titer of IgM had no relation with age and sex. The striking feature was febrile episode and not severity. Quite contrary to Simons\(^4\) and Sabin\(^5\), very few reported to have biphasic type of fever.

Lymphadenopathy, Myocarditis and haemorrhagic manifestation were limited to some patients only. In 2 cases fever continued unabated up to 30 days.

Cases of high fever other than dengue also exhibited similar symptoms, except a remarkable non-reactive optical density. Thus a thorough search for other viral infections like Chikungunya fever should also be considered.

**References:**


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**Corrigendum**

Editorial board regrets the inadvertent mistake of omission of one of the author’s name namely Dr. Ashish Mukhopadhyay, Research Scholar, Department of Anthropology, Vidyasagar University, Midnapore in the article entitled “Age Variations in overweight Men and Women in Rural Areas of Hooghly District, West Bengal” in Vol. 51, No. 1 (January-March, 2007) on Page 59. Please read the author’s list as follows:

S. K. Sadhukhan, K. Bose, A. Mukhopadhyay, M. Bhadra.

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**Dr. Dilip Kumar Das**

Managing Editor
Short Communication

Rapid Assessment of Immunization Practices in Agra District

*M. Chaturvedi¹, Deoki Nandan¹, S. C. Gupta¹

Summary

A cross sectional study was conducted utilizing rapid assessment procedures, covering 516 children of 12-23 months in 80 clusters of both urban and rural areas of district Agra. The results revealed that 41.5% had immunization cards; only 37.2% children were fully immunized and 37.6% children were unimmunized. 43.6% had received measles vaccine. The most common reason for non immunization was obstacles (46%), followed by lack of motivation (22.6%), lack of information (19.4%). 13.8% had received vitamin-A oil along with measles vaccine while only 5.3% had received vitamin A upto three years.

Preventable infections are a major cause of mortality and morbidity in South Asia. Universal Immunization Programme aims at completing the primary immunization (one dose each of BCG and Measles and all the three doses of DPT and oral polio vaccine) for all the children in the country by the time children become one year old¹. The present study was undertaken to find out the immunization coverage, measles vaccination and vitamin A supplementation through Multi-Indicator Rapid Assessment (MIRA) survey techniques in Agra district of UP, India.

A cross sectional study was done utilizing multi stage random stratified cluster sampling and interpersonal communication was done by MIRA survey techniques. A total of 80 clusters- 30 urban and 50 rural, were selected in two stages. In third stage each cluster was divided into four quadrants. In each quadrant, 10 households were visited in continuation after selecting first household randomly; the random number taken as the last digit of currency note. This gave us the 40 households, required from a cluster, making a total of 3200 households for the study. During the last stage of sampling, all the children of 12-23 months were selected for the study. All the mothers of children aged 12-23 months were interviewed during house-to-house visit for immunization card, overall immunization, measles vaccination and vitamin A supplementation status.

The information collected was computerized in specific programme developed on computer software Fox pro (version 2.6) and analyzed with the help of SPSS statistical software (version 10.3).

Mothers, unable to show the immunisation cards, were not considered. Out of 516 study children, only 214 (41.5%) had cards. The percentage of children having immunization cards in urban and rural areas of the district was 53.7% and 35.2% respectively.

Fully immunized children were considered those who had received three doses each of OPV & DPT, and one dose each of BCG and measles vaccine. In the district, 37.2% children were fully immunized, 25.2% were partially immunized while rest 37.6% were unimmunized. 43.6% of the study children received measles vaccine. Urban rural variation was present in mean measles coverage.

Table 1: Immunization status of children in Agra district, UP. (n = 516)

<table>
<thead>
<tr>
<th>Categories of status</th>
<th>Rural (n=341)</th>
<th>Urban (n=175)</th>
<th>Combined (n=516)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No (%)</td>
<td>No (%)</td>
<td>No (%)</td>
</tr>
<tr>
<td>Immunization card</td>
<td>120 (35.2)</td>
<td>94 (53.7)</td>
<td>214 (41.5)</td>
</tr>
<tr>
<td>Fully immunized</td>
<td>105 (30.8)</td>
<td>87 (49.7)</td>
<td>192 (37.2)</td>
</tr>
<tr>
<td>Partially immunized</td>
<td>78 (22.9)</td>
<td>52 (29.7)</td>
<td>130 (25.2)</td>
</tr>
<tr>
<td>Non-immunized</td>
<td>158 (46.3)</td>
<td>36 (20.6)</td>
<td>194 (37.6)</td>
</tr>
<tr>
<td>Measles coverage</td>
<td>134 (39.3)</td>
<td>91 (52)</td>
<td>225 (43.6)</td>
</tr>
</tbody>
</table>

¹Social and Preventive Medicine, S. N. Medical College, Agra. *Corresponding Author: dr.manish.chaturvedi@gmail.com
different categories of immunisation status (Table 1).

The reasons for not immunizing the child were grouped under four categories viz. lack of information, lack of motivation, obstacles and others. Overall commonest reason cited for non-immunization was obstacles (46%) followed by lack of motivation (22.6%), lack of information (19.4%) and others (12.7%). This order was true for rural area, too. In urban area the sequence got altered, though commonest being the same i.e. obstacles (31.8%), but ‘others’ was the second common (30.7%) reason for not immunizing the children (Table 2).

Common obstacles mentioned were ‘ANM not available’ (22.8%), ‘vaccines not available’ (11.7%), ‘mothers busy in the household work’ (4.6%) and ‘immunization site very far’ (4.3%). ‘Lack of Motivation’ group comprised of no faith in immunization (8% in urban and 7.6% in rural) and fear of adverse effects (5.7% in urban and 7.2% in rural). In case of 2.8% children, mothers told that ‘health worker refused to vaccinate the child’. Lack of information was another important reason for not getting their children vaccinated. 9% mother did not know that after the first dose further doses were necessary for protection of the child.

However, 30.7% mothers in urban area and 5.9% in rural areas did not give any specific reason and seemed to be lacking in either proper information regarding immunization or lacking motivation and would have probably had their children immunized with a little more effort by the health care providers.

Out of the 516 study children, only 13.8% had received first dose of vitamin-A along with measles vaccine. In rural and urban area it was 12.9% and 15.4% respectively. In the district, 5.3% children had received five doses of vitamin A up to three years of age. It was higher in urban area (8%) compared to rural area (4.2%).

A study by Panwar² reported 22.6% (urban 29.7% and rural 19.9%) children had immunization cards, which is far below the present study (41.5%) from the same district.

### Table 2: Reasons for partial immunization or non-immunization in Agra district

<table>
<thead>
<tr>
<th>First response as a reason</th>
<th>Rural (n=236)</th>
<th>Urban (n=88)</th>
<th>Combined (n=324)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obstacles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immunization site very far</td>
<td>12 (5.1)</td>
<td>2 (2.3)</td>
<td>14 (4.3)</td>
</tr>
<tr>
<td>Time not convenient</td>
<td>7 (3)</td>
<td>1 (1.1)</td>
<td>8 (2.5)</td>
</tr>
<tr>
<td>ANM not available</td>
<td>52 (22.2)</td>
<td>22 (25)</td>
<td>74 (22.8)</td>
</tr>
<tr>
<td>Mother busy</td>
<td>13 (5.5)</td>
<td>2 (2.3)</td>
<td>15 (4.6)</td>
</tr>
<tr>
<td>Vaccines not available</td>
<td>37 (15.7)</td>
<td>1 (1.1)</td>
<td>38 (11.7)</td>
</tr>
<tr>
<td>Lack of information</td>
<td>50 (21.2)</td>
<td>13 (14.8)</td>
<td>63 (19.4)</td>
</tr>
<tr>
<td>Benefits of immunization not known</td>
<td>7 (3)</td>
<td>3 (3.4)</td>
<td>10 (3.1)</td>
</tr>
<tr>
<td>Place not known</td>
<td>12 (5.1)</td>
<td>2 (2.3)</td>
<td>14 (4.3)</td>
</tr>
<tr>
<td>Don’t know about II/III doses</td>
<td>24 (10.2)</td>
<td>5 (5.7)</td>
<td>29 (9)</td>
</tr>
<tr>
<td>Child unwell</td>
<td>7 (3)</td>
<td>3 (3.4)</td>
<td>10 (3.1)</td>
</tr>
<tr>
<td>Lack of motivation</td>
<td>51 (21.6)</td>
<td>20 (22.7)</td>
<td>71 (22)</td>
</tr>
<tr>
<td>No faith in immunization</td>
<td>18 (7.6)</td>
<td>7 (8)</td>
<td>25 (7.7)</td>
</tr>
<tr>
<td>Fear of adverse effects</td>
<td>17 (7.2)</td>
<td>5 (5.7)</td>
<td>22 (6.8)</td>
</tr>
<tr>
<td>Misconceptions</td>
<td>9 (3.8)</td>
<td>6 (6.8)</td>
<td>15 (4.6)</td>
</tr>
<tr>
<td>Health worker refused to vaccinate</td>
<td>7 (3)</td>
<td>2 (2.3)</td>
<td>9 (2.8)</td>
</tr>
<tr>
<td>Others</td>
<td>14 (5.9)</td>
<td>27 (30.7)</td>
<td>41 (12.7)</td>
</tr>
</tbody>
</table>

Single response was recorded for each child.
NFHS³ and Rapid Household Survey-RCH II ⁴ revealed 42% as the full immunization coverage, slightly higher than the present study (37.2%); which could be due to regional variation and the survey technique adopted. But, various other studies reported lower coverage for full immunisation², ³, ⁵-⁸.

Nandan et al⁹ found 72.2%, 27.8% and 30.9% children to be fully immunized in three rural districts of Almorah, Etah and Mathura following the MIRA survey technique, while MICS⁸ reported somewhat lower coverage (16.1%) in rural areas. Rural urban variation as revealed in the present study was also reported by other studies², ⁴. Panwar² and Chandra et al⁸ reported 45.2% and 46.8% unimmunised children respectively, much higher than the present study.

BCG and measles vaccine had been given to only 49.2% and 43.6% infants respectively. Similar findings for BCG coverage were also reported by Nandan et al⁹ (45.4%) and MICS⁸ (46.1%), while Rapid Household Survey-RCH II ⁴ reported it to be 56.9%. For measles vaccine also, similar coverage was reported by Rapid Household Survey-RCH II ⁴ (45.9%). In contrast Nandan et al⁹ and MICS⁸ noted very poor coverage, 12.9% and 29.7% respectively.

The commonest single reason for non-immunization being the nonavailability of the ANM (22.8%) and in rural areas it was 22%. Same reason was also noted by Panwar⁸ (29.9% overall and 37.2% in rural) in case of partial or non-immunization. Similarly Nandan et al⁹ also reported obstacles, as the most common group, 63.9% and 41.7% in districts of Almorah and Etah respectively.

The present study once again highlighted the need for strengthening IEC activities.

References:
**Short Communication**

**Field Evaluation of a Mechanical Fly Catcher in the Control of Houseflies**

*R. Tilak*, K. K. Dutta Gupta

**Summary**

‘Fly Catcher’, an innovative herbal based mechanical trap was evaluated for its efficacy in reducing fly nuisance in and around messes operating in a large teaching establishment and the adjacent garbage dumps. It is recommended that the ‘Fly Catcher’ may be used as an adjunct to other routinely followed anti fly measures.

During the seven weeks trial period, only one trap which was placed near the Vermi-culture pit was found totally full in 19 days post installation. This area was heavily infested and had excessive fly nuisance due to breeding going on in this site. The traps pending disposal were opened and it was noticed that larvae (all stages) as well as pupae of houseflies were present inside (confirmed by checking emergence of adult houseflies). This is an interesting observation as pupation in houseflies is known to occur in soil or dry area. This is a unique finding of this study as no reference on houseflies’ mentions possibility of pupa formation in liquid media. This has added new perspective to the existing knowledge on housefly biology.

The ‘fly catcher’, a herbal based mechanical trap, is a new and innovative concept in housefly control which poses negligible threat to human health and environment. The study findings recommend that fly catchers may be installed near garbage bins as an adjunct to the routine anti-fly measures adopted.

**References:**


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Dear Editor,

Cryptosporidium parvum is an important diarrheogenic coccidian parasite. Since the reporting of the first case of human cryptosporidiosis in 1976, Cryptosporidium has become one of the most commonly reported enteric pathogens worldwide. The prevalence of infection varies widely, but it appears to be the highest among young children and immunocompromised persons.

The present study was conducted in the department of Microbiology, C.M.C Hospital, Ludhiana. Stool samples from patients of varied age groups, suspected of cryptosporidiosis, were processed over a period of 4 years commencing from January 2002 to December 2005. All the faecal samples were examined both microscopically and macroscopically as per standard procedures. For demonstration of Cryptosporidium oocysts modified acid fast staining using 1% sulphuric acid was done. The oocysts appeared spherical, uniform sized and variably acid fast, some being darker than others. The total number of samples processed was 72, out of which 24 (33.33%) were positive for Cryptosporidium oocysts (Table 1).

Table 1: Prevalence of Cryptosporidium in stool samples

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of samples tested</th>
<th>Positives No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>11</td>
<td>3 (27.27)</td>
</tr>
<tr>
<td>2003</td>
<td>14</td>
<td>4 (28.57)</td>
</tr>
<tr>
<td>2004</td>
<td>14</td>
<td>5 (35.71)</td>
</tr>
<tr>
<td>2005</td>
<td>33</td>
<td>12 (36.36)</td>
</tr>
<tr>
<td>Total</td>
<td>72</td>
<td>24 (33.33)</td>
</tr>
</tbody>
</table>

Three HIV positive patients were also included in this study, out of which one (33.33%) was positive for Cryptosporidiosis. Out of the positive cases, 66.67% were children. Cryptosporidium is a frequent cause of persistent diarrhoea with associated excess morbidity and mortality in young children. No other enteric pathogen was isolated from the positive Cryptosporidium cases.

The infection rates with Cryptosporidium range from 0.6% to 20% in the developed world and 4% to 32% in the developing nations. This difference is attributed to poor sanitation, contaminated water supplies, over crowding and greater contact with domestic animals in the underdeveloped countries. The diagnosis of Cryptosporidium should be considered in all patients with acute and chronic diarrhoea, especially if they are immunocompromised. It will promote appropriate treatment of the positive cases and marked decline in the associated morbidity and mortality.

References:

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