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(Quarterly Journal of Indian Public Health Association)

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**Vol. 52 No.4 October - December 2008**

The issue is sponsored by  
**52<sup>nd</sup> All India Annual Conference of IPHA 2008**  
Maulana Azad Medical College, New Delhi

Indian Journal of Public Health is published quarterly by Indian Public Health Association.

Manuscripts and correspondence should be addressed to : Managing Editor, Indian Journal of Public Health, 110 Chittaranjan Avenue (3rd floor), Kolkata-700073, West Bengal.

Manuscripts, written in English, should be submitted in triplicate. One copy must also be submitted in electronic format to: [ijph2005@yahoo.com](mailto:ijph2005@yahoo.com), [ijph@iphaonline.org](mailto:ijph@iphaonline.org)

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**Indian Journal of Public Health**  
**Vol. 52 No.4 October - December 2008**

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*Editorial*

## Achieving Universal Immunization in India: the Unmet Challenge

India is implementing Universal Immunization Programme (UIP) since 1985 against six vaccine preventable diseases. The commitment to achieve 100% universal immunization coverage has been spelt out in many government initiatives, policies and plans, but the hard reality remains that routine immunization coverage is still far from adequate and the situation has remained almost stagnant since many years.

The NFHS -2 (1998-99) showed that among the children aged 12-23 months, only 42% were fully vaccinated compared to 36% at the time of NFHS-1 (1992-93)<sup>1</sup>. During the decade (1991 - 2000), there was also decline in reported immunization coverage in few states and wide gap between reported and surveyed figures. To overcome the declining trends and very poor performance in some of the states and introduction of newer issues, Immunization Strengthening Project (ISP) was launched in 2001<sup>2</sup>. Under this project, countrywide trainings of mid-level managers have been undertaken and measures taken to upgrade routine immunization through provision of new equipment and attempts made to improve planning, monitoring and surveillance. In spite of inputs under ISP, results of NFHS-3 carried out in 2005-06 show hardly any improvement in terms of percentage of fully immunized children as the figure increased from 42% (NFHS-2) to just 44% over seven years<sup>3</sup>. If the coverage of primary immunization is looked at by 12 months of age, the coverage dips down further to 36% (NFHS-3), with just one percent increase from NFHS-2 (35%). Even UNICEF Coverage Evaluation Survey in 2005, also brought out that only 39.5% children were fully immunized by 12 months of age<sup>4</sup>.

A good sign is that between these surveys there has been substantial decrease in percentage of children not vaccinated at all. Also, among the eight states which were the poorest performers as per NFHS-2, all except UP have shown some improvement in percentage of children who are fully immunized. However, some of the states which were good performers as per NFHS-2 have shown drop in fully immunized coverage varying from 8 to 19 percentage points.

Under five-year strategic immunization plan 2005-2010, a major training initiative has been undertaken and it is envisaged that refresher trainings would be undertaken every three years through the state

institutes of health and family welfare<sup>5</sup>. However, to improve and strengthen routine immunization, much more than the current organized trainings are required at field level. Much of the trainings organized in the past, refreshed knowledge component but failed to enhance the skills required to deliver proper service. Common Review Mission<sup>6</sup> has shown that although district level plans are available, these are general in nature. These do not include local health service development, programme implementation or community monitoring. Thus, there is an urgent need to develop area specific plans that identify poor performing areas, underserved, uncovered, inaccessible sites and hard to reach locations. The reasons for poor performance in these regions could be specific and so are the remedial measures. In the final run, it is the area specific PHC microplan based on village microplans that will result in meaningful planning leading to efficient programme implementation. To develop such plans there is need to support district level officers and PHC medical officers in the initial stages, besides formal training.

A major component that remains critical to address is to ensure monitoring and supportive supervision at field level. Regular monitoring of the planned sessions being held and monthly performance in these will help in early detection of problems that lead to low coverage. It should be possible through monitoring to track variance and to identify underserved/ uncovered areas and to take timely remedial action. Supportive supervision should be able to address the problem of quality including necessary communication in the immunization sessions and the problem of fixed day outreach sessions not being held regularly. This will go a long way in improving the immunization coverage as 95% of the children have received one or more immunizations but subsequently failed to complete the schedule. Friendly atmosphere in the sessions and appropriate communication will overcome the problem of drop outs.

Although, the programme has matured to a large extent in management of vaccines and logistics, however, problems keep occurring from time to time, affecting the quality and coverage. A recent case is that of disruption of supply of DPT, DT and TT vaccines because the Public Sector units were asked to stop

production, and even not to supply the stock already manufactured. This was due to non issuance of GMP certificates to these PSUs on the plea that these units failed to meet some of the GMP norms. Ironically, the responsibility of meeting up infrastructural deficiencies and meeting GMP norms of these age-old PSUs lied with the Govt. itself.

As a national policy AD syringes are being supplied to all the states and guidelines for their safe disposal have been issued, but their safe disposal still remains a common problem. For the success of the programme, these issues will have to be addressed on a priority basis.

Another critical dimension ignored for improving the routine immunization coverage remains adequate community and social mobilization. There are gaps in information about the need for immunization. Deficiencies remain at the health worker level in informing them adequately about the next due visit, about the timings of outreach sessions and possible common adverse events following immunization and how to manage these. It is imperative to invest in communication for immunization. Health workers need to be equipped with communication skills to deliver effective messages while vaccinating children along with abilities to handle situation of refusal from the communities. Community's concerns towards immunization should be addressed through involvement of decision makers like father, mother-in-law in addition to mother and addressing anti-vaccine misbeliefs and rumors<sup>7</sup>. The importance of effective communication messages by involving faith and religious leaders has been witnessed in regard to polio eradication drive in UP and Bihar. Promoting immunization through community networks is a proven means to build trust and acceptance of vaccines. Mahila mandal groups, self help groups, village health and sanitation committees and rogi kalyan samitis under NRHM, anganwadi centres, school children, youth groups and volunteers can all be utilized to strengthen demand of services. Village health days planned under NRHM provide a platform for enhancing social mobilization. Area specific community mobilization plans should be formulated and efforts to be undertaken as per planned strategies.

For improving immunization coverage, beside the managerial issues, there needs to be strong political commitment, administrative constraints have to be overcome and issues of governance need to be addressed. Bihar, which was the poorest performing state in the country, is an example of such action. Common Review Mission report shows tremendous increase in utilizing public health facilities over last two

years. Percentage of fully immunized children has also increased from 11.0% (NFHS-2) to 32.8% (NFHS-3).

The goal for achieving universal immunization against vaccine preventable diseases requires multifaceted collated response from many stakeholders. In an environment of architectural correction provided by NRHM in health infrastructure, now adequate focus should be paid to effective delivery of process involved in vaccinating children coupled with demand generation by strong advocacy and mobilization efforts. Sincere and concerted efforts will have to be continued with a greater vigor than before as the challenge is not only to improve immunization coverage in areas that are under-covered but also to sustain in areas that are well covered.

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*Original Article*

## Work Capacity and Surgical Output for Cataract in the National Capital Region of Delhi and Neighbouring Districts of North India

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### Abstract

**Objectives:** To ascertain time taken for cataract surgery by ophthalmologists in the National Capital Region of Delhi and neighbouring districts, to determine what work output is feasible with the available ophthalmologists. **Methods:** The time-motion study was conducted during January to June 2006 in the National Capital Region of Delhi and neighbouring districts in North India. Data was collected by observing all activities from entry of a patient into the operating theatre to exit. A total of 156 cataract surgeries performed by 45 ophthalmologists in 38 hospitals were observed. A stop watch was used to record activity time, rounded off to the nearest 10 seconds. Case duration, surgical and clinical times were calculated. **Results:** Ninety percent ophthalmologists completed surgery in 41.3 minutes. The 10<sup>th</sup> and 90<sup>th</sup> percentile for case duration time was 15.5 and 78.4 minutes respectively. Median surgical time was lowest for ophthalmologists working in the NGO sector (10 minutes), compared to the government (23.5 minutes), and private sector (17.3 minutes). Cataract surgical output can be increased in the country if operation theatre time is utilized optimally.

**Key Words:** Cataract Extraction; India; Phacoemulsification; Time Studies

### Introduction

Cataract is the leading cause of blindness in the world<sup>1</sup>. Cataract is responsible for 50-80% of all blindness in South Asia (Bangladesh, India, Nepal and Pakistan)<sup>2-9</sup>. Studies in India have revealed a high prevalence of lens opacities in both the North and the South of the country, irrespective of visual status<sup>10,11</sup>. There has been a steep increase in the number of cataract surgeries in India over the past two decades increasing from 0.5 million in 1981-82 to 4.8 million in 2006<sup>12</sup>. However there are concerns that this increase is inadequate to eliminate cataract blindness over the next two decades<sup>13</sup>. Extrapolating data from one State in India in 2000, it was estimated that 9 million good-quality cataract surgeries were needed annually during 2001-2005 and over 14 million surgeries annually during 2016-2020 on persons most likely to go blind from cataract<sup>13</sup>.

To tackle this load of cataract blindness, a dedicated pool of trained ophthalmologists is needed. In 2002 it was estimated that there were nearly 9500 ophthalmologists in the country<sup>14</sup>. To meet the needs of the country to eliminate cataract blindness, the available human resources need to be used efficiently. Planning for the future requires evidence on the work capacity of the ophthalmologists. Work capacity is correlated with the time taken for different surgical procedures and this is again dependant both on the skills of the personnel as well as the environment in which they work.

The present study was conducted to obtain information on the time taken for cataract surgery by ophthalmologists in different work settings in North India to determine what work output is feasible with the available ophthalmologists in the country.

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## Material and Methods

The study was conducted over a 6 month period from January to June 2006 in the National Capital Region of Delhi and neighbouring districts in North India. The study spanned the districts of Gurgaon, Faridabad, Rewari in Haryana, districts of Noida, Ghaziabad in Uttar Pradesh (UP) and all the districts of Delhi. It was proposed to cover 50 eye surgeons (25 with  $\leq 10$  years of experience and another 25 with  $> 10$  years experience). A sampling frame was prepared wherein all eye care facilities in Delhi and neighbouring districts of Haryana and UP were listed out based on a previous study conducted by the same investigators<sup>14</sup>. This study revealed that there were 692 ophthalmologists in the study area. It was assumed that only 50% ophthalmologists perform cataract surgery<sup>15</sup>. Therefore, there would be 346 eye surgeons performing cataract surgery in the National Capital Region (NCR) of Delhi. It was proposed to cover 15% of the ophthalmologists (50) due to logistical reasons and because it was felt that this number would be adequate to draw meaningful conclusions on time taken for cataract surgery, as it is involved in-depth observation. It was assumed that there were a mean of 1.5 ophthalmologists per hospital (cumulating all types of hospitals-Government/NGO/private sector). Based on an assumed response rate of 85%, 38 hospitals were therefore identified (yielding a total of 57 ophthalmologists of which 85% would respond). This yielded a sample size of 48.5 and was therefore rounded off to 50 ophthalmologists.

Two research assistants monitored by a project manager collected data by observation of all activities since the entry of a patient into the operating theatre (OT) complex to the exit of the patient from the OT complex. Before the study commenced the two research assistants were trained over a fortnight during which they were familiarized with the working of a stop watch, the environment inside the OT and the observational and recording procedures. Inter observer agreement was conducted during the training and the pilot phase between the two research staff.

A list of activities was drawn up for cataract surgery and the elapsed time from the start of each activity to the end of each activity was recorded to the nearest 10 seconds using a stopwatch. The different activities observed and recorded included pre operative

preparation of the patient in the OT complex, transfer to the OT table, preparing the patient on the table, local anaesthetic administration, surgical procedure, immediate post operative care on the OT table, transfer of the patient from the OT table to the post operative patient observation area, time spent in patient observation area and exit of the patient from the OT complex. Time was recorded also for setting up the instruments and equipment for each case, waiting time of surgeons between cases, interactions between the surgeons and other staff, tea breaks etc.

A pilot study was conducted at 2 Government, 1 Non-Governmental Organization (NGO) and 1 private eye hospital. Care was taken to see that the personnel included in the final sample were not included in the pilot. An analysis of the pilot results were presented to a group of experts and their comments were incorporated into the final version of the observational schedule.

It was proposed to observe 5 surgeries of each individual surgeon. However at some hospitals, the operating surgeon performed fewer surgeries as the surgical load was low in these hospitals.

Written informed consent of the hospital administrators was sought for participation of the staff from their institutions. After receiving the consent from the institutions, the hospitals to be contacted were identified randomly. An observational schedule was prepared and pre-tested on a small sample of respondents. The different activities and the time taken for each activity were recorded.

The following definitions were used for the study:

- Start time: Time at which a specified activity started, recorded to the nearest 10 seconds.
- End time: Time at which a specified activity ended, recorded to the nearest 10 seconds.
- Elapsed time: Difference between start time and end time of an activity.
- Case duration time (OR time): Time from the entry of the patient into the OT to the time that the patient leaves the OT<sup>16, 17</sup>.
- Surgical case time: Time taken for each case from the start to the end of the surgery on the table (intra-operative time). For the purpose of this

study, as in other studies, a surgical case was considered to have started with the positioning of the drapes and ended with their removal<sup>18</sup>.

- Clinical time: Operating, anaesthetic and immediate recovery time recorded to the nearest 10 seconds (preoperative, operative and immediate post operative period).

Data was entered into a specially designed format in an Excel spreadsheet and advanced analysis was done using Strata 10.0 (Stata Corp, Texas, USA).

## Results

A total of 38 hospitals were covered in the study, of which 42.1% were public sector institutions. Two-thirds of the hospitals were non teaching hospitals (Table 1). Of all the hospitals covered, 79% were from Delhi and the rest were from the neighbouring districts in the two adjoining States of Haryana and Uttar Pradesh. Of the 45 ophthalmologists observed, 42.2% were in the Government sector. A significant proportion of the observed ophthalmologists (64.4%) were working at non teaching institutions and 55.6% had more than 10 years surgical experience (Table 1).

Among the teaching hospitals, 53.8% were in the Government sector. 43.7% (7/16), 44.4% (4/9) and 15.4% (2/13) of hospitals in Government, NGO and private sector were teaching hospitals. It was also observed that 43.7% of all Government and 44.4% of all NGO hospitals had teaching programmes of postgraduate ophthalmology (MS/MD or for DNB in Ophthalmology).

A total of 156 cataract surgeries were observed in the six months. Only 18 (11.5%) were non Intra Ocular Lens (IOL) implant surgeries with 88.5% (138) operated individuals having received an IOL implant. A significant proportion of surgery (56.4%) was Phaco surgery while 29.5% were Manual Small Incision Cataract Surgeries (SICS).

The surgical time, case duration time and the clinical time were compared for different cataract surgical modalities. It was observed that the non-IOL cataract surgery took more time compared to any IOL surgery considering surgical time, clinical time as well as case duration time. Surgical time (in minutes) was 26.2(95% CI: 21.3-41.5) for non IOL surgery and 17.1 (95% CI: 15.2-19.4) for IOL surgery. Clinical time was

**Table 1: Basic characteristics of observed units for cataract surgery**

Characteristics	No.	Percent
Hospitals covered (N= 38)		
Government	16	42.1
NGO	9	23.7
Private	13	34.2
Teaching status		
Teaching	13	34.2
Non teaching	25	65.8
States covered (hospitals)		
Delhi	30	79.0
Haryana	4	10.5
Uttar Pradesh	4	10.5
Ophthalmologists observed (N= 45)		
Govt	19	42.2
NGO	13	28.9
Private	13	28.9
Work environment of ophthalmologists		
Teaching	16	35.6
Non teaching	29	64.4
Experience of ophthalmologists		
≤ 10 years	20	44.4
> 10 years	25	55.6

35.3 minutes (95% CI: 29.0-54.5) for non IOL surgery as against 23.2 minutes (95% CI: 21.2 – 27.2) for IOL surgery. Similarly for case duration time it was 57.2 minutes (95% CI: 34.1-72.1) for non IOL surgery compared to 41.0 (95% CI: 32.2- 44.3) for IOL surgery. In relation to actual surgical time and the case duration time, manual SICS took less time compared to phaco surgery. The case duration time was 2.2 times higher compared to the actual surgical time when all cataract surgeries were considered. Ten percent of surgeons could complete a cataract surgery with an IOL implant in 6.5 minutes (10<sup>th</sup> percentile) while 90% completed the surgery in 41.3 minutes (90<sup>th</sup> percentile). The 10<sup>th</sup> and 90<sup>th</sup> percentile for the case duration time was 15.5 minutes and 78.4 minutes respectively.

A comparison of the surgical time, case duration time and clinical time was carried out in relation to the different types of service providers (Table 2). The median surgical time was lowest for ophthalmologists working in the NGO sector (10 minutes) compared to

**Table 2: Median time for cataract surgery in different eye care provider units**

Characteristics	Sectors		
	Government (n= 75)	NGO (n= 48)	Private (n= 33)
Median surgical time	23.5	10.0	17.3
- Teaching hospitals	24.1	11.4	8.5
- Non teaching hospitals	23.4	8.1	18.1
Median clinical time	33.0	17.0	23.1
- Teaching hospitals	35.2	21.0	14.4
- Non teaching hospitals	32.3	14.1	24.3
Median case duration time	51.2	22.4	47.0
- Teaching hospitals	49.3	28.1	29.2
- Non teaching hospitals	53	16.2	47.4
Percentage of clinical time	67.5% (SD: 19.6)	71.6% (SD: 21.1)	68.3 % (SD: 23)
- Teaching hospitals	66.0% (SD:20.3)	64.6% (SD:20.5)	52.2% (SD:26.3)
- Non teaching hospitals	69.3% (SD:19.0)	81.6% (SD:18.1)	71.9% (SD:21.1)

Note: Time is expressed in minute.

both the government (23.5 minutes) and the private sector (17.3 minutes). In both the government and the NGO sectors, non teaching hospitals took less time compared to teaching hospitals though the opposite was observed in the private sector. The proportion of time spent on clinical time for cataract surgery was similar across the three sectors, ranging from 67.5% in the government sector to 71.6% in the NGO sector. The private sector included a wide range of services from a single practitioner to a corporate entity. When case duration time was considered, the non teaching hospitals took lesser time in the government and private facilities but not in the NGO set up (Table 2).

It was observed that cataract surgical time and clinical time were significantly less in the NGO sector compared to the other sectors (Table 3). More than half the NGO surgeons featured in the lowest quartile of time taken for surgery and clinical services as against the government sector where a third were in the 4<sup>th</sup> quartile both for surgical time and clinical time while it was

a quarter in respect of the private practitioners. There was wide variation with regard to the surgical time in the private sector. These differences were statistically significant both for surgical time ( $\chi^2= 42.33$ ;  $p < 0.001$ ) as well as the clinical time ( $\chi^2 = 41.77$ ;  $p < 0.001$ ).

Three attributes were thought to be important for the time taken for the clinical time in cataract surgery. These were the type of service provider where the ophthalmologist

was working (Government/private/NGO), the number of years of surgical experience ( $\leq 10$  years/ $\geq 11$  years) and whether the hospital was a teaching or non teaching institution (Table 4). It was observed that there were no significant differences in relation to the years of experience of a surgeon or the

**Table 3: Comparison of IOL implant cataract surgery performance across different service providers**

Parameters	Service Provider		
	Government (%)	NGO (%)	Private (%)
Cataract surgeries observed	61	44	33
Surgical time (minute)			
1 <sup>st</sup> quartile (Least time)	8.2 (5)	56.8 (25)	12.1 (4)
2 <sup>nd</sup> quartile	21.3(13)	22.7 (10)	36.4 (12)
3 <sup>rd</sup> quartile	36.1 (22)	11.4 (5)	24.2 (8)
4 <sup>th</sup> quartile (Max time)	34.4 (21)	9.1 (4)	27.3 (9)
	$\chi^2= 42.33$ ; $p < 0.001$		
Clinical time (minute)			
1 <sup>st</sup> quartile (Least time)	8.2 (5)	52.3 (23)	18.2 (6)
2 <sup>nd</sup> quartile	16.4 (10)	29.5 (13)	36.4 (12)
3 <sup>rd</sup> quartile	39.3 (24)	9.1 (4)	21.2 (7)
4 <sup>th</sup> quartile (Max time)	36.1 (22)	9.1 (4)	24.2 (8)
	$\chi^2 = 41.77$ ; $p < 0.001$		

**Table 4: Performance indicators for IOL implant surgeries**

Parameter	Adjusted OR	95% CI	$\chi^2$ ; p
Proportion of surgeries exceeding median clinical time for IOL surgery			
Teaching status			
Teaching hospital	1.0		
Non teaching hospital	1.02	0.45 - 2.3	$\chi^2 = 0.98$ ; p = 0.3
Type of hospital			
NGO	1.0		
Private	2.1	0.76 - 5.94	$\chi^2 = .2.15$ ; p = 0.14
Govt.	8.8	3.16 - 24.65	$\chi^2 = 25.2$ ; p < 0.001
			$\chi^2 = 28.23$ ; p < 0.001
Surgeon's years of experience			
≤ 10 years	1.0		
≥ 11 years	1.44	0.69 - 3.00	$\chi^2 = 0.98$ ; p = 0.32

teaching status of the hospital. A significant association was observed by the type of service provider with the ophthalmologists working in the government sector taking nearly 9 times more time for any cataract surgery compared to median clinical time taken by the ophthalmologists working in the NGO hospitals.

## Discussion

Studies have shown that the time-motion studies provide more accurate estimates on how clinicians use their time compared to the work sampling technique<sup>19</sup>. These techniques have been used most often in medical practices rather than surgical practices<sup>19, 20</sup>.

The use of available time in an operating room has been studied extensively in specialities like orthopaedics, general surgery and neurosurgery<sup>21-23</sup>. There is very little evidence on the use of theatre time in ophthalmology<sup>18, 24, 25</sup>. Even in these studies, the methods used were different. In the USA, a questionnaire was sent out to a random sample of members of the American Academy of Ophthalmology wherein they were asked to list time taken for preoperative, intra-operative and post operative follow up care for different surgical procedures including cataract surgery<sup>24</sup>. Another study in Nigeria looked at the start and end times of an OT in a day rather than observe individual surgeries<sup>25</sup>.

For planning for the number of ophthalmic surgeries that could be comfortably done by trained ophthalmologists, it is better to use case duration time

rather than the surgical time alone which reflects the speed and skill of the surgeon rather than the time for which the operation table is occupied. Our study showed that the median case duration time was 42.2 minutes for any cataract surgery as against 19.2 minutes for surgical time. This shows that a lot of time is being spent on anaesthesia and immediate post operative care, before the patient is allowed into the recovery room. It was also observed that the case duration time was 50% less (22.4 minutes) in NGO hospitals compared to government hospitals (51.2 minutes). Since almost all the cataract surgeries used a regional block given by an ophthalmologist personally, there is a potential to decrease the case duration time to improve the efficiency of the ophthalmic theatres in India.

The observation that SICS took less time than other IOL surgeries is of significant importance for the future as most surgeons in India are now switching over to SICS and therefore the surgical output has a potential to increase in the future.

A comment on the present study was that it was done only in the National Capital Region of India and neighbouring districts. It could be argued that this may not be representative of the country. However we feel that an intense observational study would not be logistically possible in a larger sample. At the same time, we feel that we have taken a sample of all types of institutions in the country and that there would not be significant differences in the OT set ups in different types of hospitals in most parts of the country.

Overall, the operation theatres were being used more efficiently in the NGO hospitals compared to the Government hospitals. Most NGO hospitals in India use a system of 2 tables in each OT where the second patient is prepared on one table while the surgeon is operating on another table, and auxiliary staff is trained to give anaesthesia and for the immediate post operative follow up. This system has been recognized to be more efficient in other surgical specialities also,

where 'overlapping' of cases improved efficiency<sup>26</sup>. In the Government and private hospitals, especially in the non teaching hospitals, all activities are undertaken by the operating surgeon and therefore the process takes longer.

In orthopaedic hospitals, only 49% of the available OT time was being used for surgery,<sup>22</sup> while in neurosurgery it amounted to 56% of the available time<sup>21</sup>. However ophthalmic theatre time is used more effectively as seen in Nigeria where 73.6% of the available time was used for surgery<sup>18</sup> and in the present study where more than 65% of the time in the OT was spent on clinical activities, irrespective of the type of hospital. This would be due to the lesser complexity of managing an ophthalmic OT and the fact that for cataract surgery, regional blocks are administered by the surgeons themselves or an auxiliary rather than being dependent on an anaesthetist for the same. It has been stated that a redesigning of the operative room processes would lead to a reduction in the 'non operative time' and help in increasing efficiency<sup>27</sup>.

In most countries a working shift consists of 8 hours a day<sup>17</sup>. The same is true in India. As shown by the results, if 70% of the working day is available for actual clinical work, then the OT would be available for 336 minutes a day for surgery. With a case duration time of 51.2 minutes in the government sector, 47 minutes in the private sector and 22.4 minutes in the NGO sector, then in the government and private sector 6-7 cataract surgeries can be completed in a working day, while 15 such surgeries can be done in the NGO sector. If the OT is available for cataract surgery only twice a week, then one can expect 12-14 surgeries per week in the Government and private sectors and 30 per week in NGO hospitals per OT table.

If ophthalmic OT is available for 48 weeks a year and surgeons operate for two days a week, then in a year, an NGO surgeon could perform 1440 cataract surgeries while a Government surgeon could perform 576 and a private surgeon could perform 672 cataract surgeries in a year.

A study in India showed that 46% of the surgeons were in the private sector, 22% in the NGO sector and 32% in the Government sector<sup>14</sup>. If the number of ophthalmic surgeons in India today was 11,000 based

on the 9500 reported in 2001, it is estimated that there would be 5060 surgeons in the private sector, 2420 in the NGO sector and 3520 in the Government sector. If all these surgeons were surgically active, there would be 3,400,320 cataract surgeries in the private sector, 3,484,800 in the NGO sector and 1,872,000 surgeries per year in the Government sector giving a cumulative figure of 8,757,120 potential cataract surgeries a year. However not all surgeries performed in the country are cataract surgeries and not all ophthalmic surgeons are surgically active. A study of ophthalmologists in India reported that among members of the All India Ophthalmology Society (AIOS), 93.4% (1959/2098) of the responding ophthalmologists were surgically active, of whom nearly 10% performed < 25 cataract surgeries in a year<sup>28</sup>. Since not all ophthalmologists in the country are members of AIOS, and the response rate was low, this may not be truly representative for India. Another study observed that the proportion of surgically active ophthalmologists was 62.5%<sup>29</sup>. Considering the evidence available, between 25-30% of the surgeons may not be performing surgery in the country.

The total cataract surgical output can be increased further in the country if measures to optimize OT functioning are in place, specifically in the government hospitals as with the support staff available at these institutions, this is imminently doable. In private clinics, efficiency can be increased by training auxiliary staff to manage routine procedures including pre operative and post operative care.

### Acknowledgement

The authors express their thanks to Mr. Manoj Tiwary and Ms. Pooja for assistance in collecting the data and Mr. Hira Pant for data entry and cleaning. The authors express their thanks to Vision 2020: India for providing a grant for the study.

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*Original article*

## Skill Building Programme in Population-based Research for Medical Undergraduates: Learners' Feedback

\*S. Chaturvedi<sup>1</sup>, Neelam<sup>2</sup>

### Abstract

**Objectives & Methods:** A training programme in population-based research was introduced for interns in 1993, in a Delhi medical school. Guided by the persistent feedback from learners, the timing of such training was advanced to MBBS para-clinical phase in 1999 – integrated with 10 months first slot of community medicine posting. Present article analyzes learners' feedback on this newly designed training programme from 16 consecutive batches from 2002-2006. **Results:** In 7 of the 9 units of learning, around 90% of the students rated their participatory involvement at  $\geq 3$  points on a 5 point rating scale. This rating was best in data collection (97.8%); and identification of research question (97.6%) – and least in presentation of report (48.7%); and report writing (61.8%). For 77.6% of the students, this was their first hands-on experience in population-based research. Over 55% of the students expressed their willingness to maintain their interest in population-based research after finishing the community medicine posting. On the other hand, 22.6% distinctly expressed their unwillingness in this regard. Main reasons cited by unwilling/not sure students were: 'low level of personal interest in population-based research' (39.7%); 'such activity was not contributory in getting admission to postgraduate courses' (33.2%); and 'Not so useful in likely job responsibilities' (21.2%). Almost half (48.9%) of the students chose para-clinical phase as most suitable period of MBBS for such learning exposure. Pre-clinical; clinical; and internship phases were preferred by 19.7%, 13.9%, and 10.7% respectively. **Conclusion:** Present feedback provides us a broad direction in opting for the para-clinical phase where exposure to population-based research can be effectively placed on a systematic basis, without extra resources.

**Key words:** Medical-undergraduates, population-based research, India.

### Introduction

Skill building in research methods is increasingly being seen as an integral component of medical education in South Asian medical schools, and reforms are being made to create room for such training.<sup>1-2</sup> On another front, a shift in the priorities of medical education is resulting into a gradual shift in the locus of learning.<sup>3-4</sup> Departments of community medicine are uniquely situated to provide an appropriate locus, while adding dimensions of population-based research to the training in research methods.

In India, after passing final professional

examination for Bachelor in Medicine and Surgery (MBBS), a student undergoes rotatory internship for one year. This is compulsory and only after satisfactory completion of internship, she/he acquires the degree. At University College of Medical Sciences, Delhi (department of Community Medicine) it was thought initially that the internship would be the right time for training in population-based research. A training programme in population-based research for the interns was introduced in 1993. When the feedback from learners was generated, some of the evidence prompted modifications in the programme. Unsuitable timing (54.2%) and short duration of exposure (24.5%)

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were identified as most important barriers that hampered learning<sup>5</sup>.

Informed by this study, it was planned to suitably advance the timing of such training programme. The programme for interns was discontinued in 1998, and since 1999 – a new programme has been integrated with 10 months' first slot of community medicine posting in para-clinical phase. Present article analyzes learners' feedback on this newly designed training programme, from 16 consecutive batches of undergraduates from 2002-2006.

### Material and Methods

In this medical school, 100 plus MBBS students join every year. During their first regular posting in Community Medicine lasting for 10 months in the 3<sup>rd</sup> and 4<sup>th</sup> semester of para-clinical phase (August through June), they are divided into 4 batches of approximately 25 students each. A training programme in population-based research was developed for these undergraduates. The programme was planned in a way that it could work: a). within the present system of undergraduate teaching-learning programme, and b). without asking for extra resources or logistical support. Programme was introduced in August, 1999 (for the year 1999-2000). In this, each of the 4 batches of 25 undergraduates, had to: identify a small research question on community health; evolve and conduct a study to address the question; and finally, interpret and present the findings of the study. Though they were facilitated by all the faculty members in the department, one teacher was made 'in-charge' of one batch to make it sure that the programme distinctly covered following units of learning: identification of research question; drafting the title and objectives; review of literature; design and methods; development of tools and pretesting; data collection; data analysis and interpretation; report writing; and presentation of report.

The educational aim of this programme was to provide the interns a hands-on experience in all the above areas of community health research. The facilitators of the programme, therefore, put maximum efforts to see that the involvement of the learner was active and participatory. In every project, the collective quantum of work pertaining to each unit of learning was subdivided into individual shares/learner's task. Barring the last 2 units of learning i.e. report writing and presentation, participation of each learner was ensured through the allocation of a series of individual tasks (shares) pertaining to different units of learning.

During the initial 3 years, the programme was piloted and improved. The active participation in the last 2 units of learning was limited to 8-10 learners, representing the whole group.

Feedback from the learners was generated on a pretested semi-structured tool. Each learner assessed her/his own participatory involvement, in each of the specific units of learning, on a five point rating scale. Learners were also asked to record their perception about some related items of enquiry. Their ratings and responses were kept anonymous, and the learners had prior information about the anonymity. Giving the feedback was not compulsory and the learners had the option to abstain.

### Results

In 7 of the 9 units of learning, around 90% of the students rated their participatory involvement at  $\geq 3$  points on a 5 point rating scale ( $\geq$  satisfactory). This rating was best in data collection (97.8%); and identification of research question (97.6%) – and least in presentation of report (48.7%); and report writing (61.8%).

Participatory involvement was 4 or 5 (good or maximal) for 70% or more students in: identification of research question; data collection; and data analysis and interpretation – for 60-69% in drafting the title and objectives; and design and methods – and for 58.4% in development of tools and pre-testing. However, a large proportion of students rated their participatory involvement as minimal or unsatisfactory in the last two units i.e. report writing (38.2%) and its presentation (51.3%) (Table 1).

For 77.6% of the students, this was distinctly the first hands-on experience in population-based research, and only 17.8% had a previous exposure. Over 55% of the students expressed their willingness to maintain their interest in population-based research after finishing the community medicine posting. On the other hand, 22.6% distinctly expressed their unwillingness in this regard. The main reason cited by majority (39.7%) of the unwilling/not sure students was the low level of personal interest in population-based research. This was closely followed by – 'such activity was not contributory in getting admission to postgraduate courses' (33.2%); and 'Not so useful in likely job responsibilities' (21.2%).

When the students were asked to identify the most important factor that hampered learning during the

**Table 1: Student's participatory involvement in each of the units of learning (n=411)**

Unit of Learning	Participatory involvement on a 5 point scale				
	1 Minimal	2 Unsatisfactory	3 Satisfactory	4 Good	5 Maximal
Identification of research question	2 (0.5)	8 (1.9)	99 (24.1)	209 (50.9)	93 (22.6)
Drafting the title and objectives	5 (1.2)	9 (2.2)	137 (33.3)	186 (45.3)	74 (18.0)
Review of literature	15 (3.6)	27 (6.6)	198 (48.2)	117 (28.5)	54 (13.1)
Design and methods	13 (3.2)	23 (5.6)	97 (23.6)	214 (52.1)	64 (15.6)
Development of tools & pre-testing	12 (2.9)	21 (5.1)	138 (33.6)	159 (38.7)	81 (19.7)
Data collection	2 (0.5)	7 (1.7)	79 (19.2)	137 (33.3)	186 (45.3)
Data analysis and interpretation	6 (1.5)	22 (5.4)	84 (20.4)	160 (38.9)	139 (33.8)
Report writing	63 (15.3)	94 (22.9)	51 (12.4)	91 (22.1)	112 (27.3)
Presentation of report	92 (22.4)	119 (29.0)	59 (14.4)	57 (13.9)	84 (20.4)

Figures in parentheses are percentages out of total students.

present exposure, 29.4% cited that it was not so rewarding in terms of scores. Over 25% expressed that the low level of personal interest was the most important impeding factor, and for 12.9% it was the 'inadequate preparedness of teachers' (a factor showing downward trend with time). When they were asked to suggest the most suitable period of MBBS programme for learning exposure in population-based research, almost half of them chose para-clinical phase (48.9%). Pre-clinical phase was preferred by a fifth of the learners (19.7%). Clinical phase was chosen by 13.9%, and only 10.7% preferred internship period for such training. A majority (52.1%) of students found that the skills acquired during present learning experience were as expected. For 29% of them it was more than expected, and for 9% - less than expected. However, 6.1% of the students thought that they didn't acquire any skill during the present experience (Table 2).

## Discussion

The timing of learning-exposure creates a big dilemma while developing an effective as well as suitable programme for such an educational intervention. When a similar programme was introduced for the interns in the same institution, 54.2% of the learners opined that the internship was an unsuitable period for such training<sup>5</sup>. This has been

supported by the present data as well when only 10.7% of the students thought that the internship would be the suitable period. In the present system, the evaluation/reward system and priorities change radically after passing final MBBS. Skills (psychomotor learning) don't help much in postgraduate entrance examinations - the immediate target for most of the interns. On the other hand, one may argue that educational inputs related to research and informatics should not be the skills to be learnt and forgotten after the first professional MBBS examination<sup>2</sup>. Moreover, the students in pre-clinical phase may not be prepared enough to take full advantage of exposure in population-based research. This is also reflected in present data where only 19.7% found pre-clinical phase as suitable time. Every second student in the present study opted for middle path and thought that the para-clinical phase was the most suitable period for such training. Some researchers feel the necessity to formulate a flexible syllabus rather than a rigid one<sup>2</sup>. However, a flexible syllabus is likely to throw more questions than answers - and may remain suboptimally or unsystematically covered.

In such a situation, present feedback provides us a broad direction in opting for the para-clinical phase where exposure to population-based research can be effectively placed. This study also illustrates that participatory involvement of MBBS students in

**Table 2: Student's feedback on some learning-related issues**

Previous hands-on experience in population-based research (n = 411)		
Yes	73	(17.8)
No	319	(77.6)
Can't say	19	(4.6)
Willingness to maintain the interest in population-based research after finishing the community medicine posting (n = 411)		
Willing	227	(55.2)
Unwilling	93	(22.6)
Not sure	91	(22.1)
Main reason, if unwilling / not sure (n = 184)		
Not contributory in getting admission to postgraduate courses	61	(33.2)
Not so useful in likely job responsibilities	39	(21.2)
Low level of personal interest	73	(39.7)
Other reasons	11	(6.0)
Most important factor that hampered learning (n = 411)		
None / Can't recall any	93	(22.6)
Low level of personal interest	104	(25.3)
Teachers' lack of interest	12	(2.9)
Inadequate preparedness of teachers	53	(12.9)
Not so rewarding in terms of scores	121	(29.4)
Other factors	28	(6.8)
Most suitable period for learning exposure in population-based research (n = 411)		
Pre-Clinical phase	81	(19.7)
Para-Clinical phase	201	(48.9)
Clinical phase	57	(13.9)
Internship	44	(10.7)
Can't say	28	(6.8)
Skills acquired during present learning experience (n = 411)		
More than expected	119	(29.0)
As expected	214	(52.1)
Less than expected	37	(9.0)
Didn't acquire any skill	25	(6.1)
Can't say	16	(3.9)

Figures in parentheses are percentages out of respective 'n'

population-based research can be accomplished during para-clinical phase. And this can be done on a systematic basis, without demanding for additional resources. However, the data from previous study<sup>5</sup> as well as the present one highlight a long standing need for an overall review of the present system of admission to postgraduate courses, which is impeding proper utilization of internship for psychomotor learning.

Though students' involvement in research has been used as a tool for teaching epidemiology in some medical schools in India<sup>6</sup>, it has largely remained on experimental basis depending on the motivation of individual departments and teachers. Nature and timing of such educational interventions keep varying from project to project, in the absence of consensus guidelines.

A sizeable number of students (12.9%) cited inadequate preparedness of teachers as the most important factor that hampered learning. This is totally preventable and needs to be kept at zero level. A large section of learners found their involvement in report writing and presentation as unsatisfactory or minimal. Interns also gave a similar feedback in the previous study<sup>5</sup>. The nature of these two activities is such that only a small group of learners can be intensively involved. In population-based settings where several students are involved in a single project, an equitable involvement in writing and presentation continues to pose an operational problem.

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*Original Article*

## Hepatitis E Epidemic with Bimodal Peak in a Town of North India

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### Abstract

**Introduction:** An epidemic of viral hepatitis occurred in Mandi Gobindgarh town of Punjab in northern India during year 2005-06. An attempt was made to study the outbreak clinically, serologically, and etiologically. **Methods:** Line listing and spot mapping of all cases of jaundice presented to civil hospital was done. An active search of cases was made through house-to-house visit with the help of 33 teams and 6 supervisors. Twenty two blood samples collected from acute cases were tested for anti-HAV IgM and anti-HEV IgM by ELISA. HEV specific PCR was also carried out. Sanitary survey was also done and water samples were tested for coliforms. **Results:** In house to house survey 3170 cases of jaundice were reported; of them 2171 (68.5%) were males. Mean age was 28.8 years. Overall attack rate was 5.2%. The epidemic continued for more than a year and bimodal peak was observed. Civil hospital campus which has separate water supply had no jaundice case. About 95% blood samples from icteric patients were found to be positive for IgM and IgG antibodies of HEV. Eighteen persons died during the epidemic, mostly in old age group. Case fatality ratio was 0.57%. No deaths occurred among 17 pregnant women who had developed hepatitis. **Conclusion:** The epidemic was caused by hepatitis E virus, which was transmitted due to faecal contamination of municipal water supply.

**Key words:** Epidemic, Hepatitis E Virus, Transmission, Waterborne.

### Introduction

Viral hepatitis is a major public health problem in the Indian subcontinent. Morbidity data of viral hepatitis is mainly from health institutions which grossly under report the magnitude of the problem<sup>1</sup>. Many studies have reported that the epidemics of viral hepatitis are mostly due to Hepatitis E virus (HEV) which is generally transmitted through faeco-oral route by contaminated water<sup>1-9</sup>. Hepatitis E virus is also responsible for a large proportion of sporadic cases of hepatitis<sup>10,11</sup>. Hepatitis E epidemic are generally short lived, single peak, and are due to contaminated drinking water supply<sup>1-5, 7-9</sup>. We report an epidemic of hepatitis E that continued for more than one year and had a bimodal peak.

### Materials and Methods

Mandi Gobindgarh, a small town with a population of 60677 and geographical area of 32.5

sq. km. (Census of India, 2001), belongs to Amloh tehsil of district Fatehgarh Sahib in Punjab state. From this town, 3 cases of viral hepatitis were admitted to Emergency Medical Ward of Nehru Hospital, Post Graduate Institute of Medical Education and Research (PGIMER) Chandigarh on 28 February 2006. A seven member team was constituted to investigate the reported epidemic from the Department of Community Medicine, Virology and Hepatology. The team visited the affected area on 1<sup>st</sup> March 2006 and reviewed the records of civil hospital. Line listing and spot mapping of all cases presented to civil hospital was done. Enquires were also made from the local medical practitioners about patients with jaundice. Blood and water samples were collected from areas from where cases were reported recently.

An active search of cases was done through house-to-house visit. A total of 33 teams with 6 supervisors carried out a house-to-house survey. An epidemiological investigation schedule was used to

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record information on age, sex, address, date of onset of symptoms/ signs, source of water supply for cases that had jaundice in previous one year. All deaths during this period were also recorded and verbal autopsy was conducted to explore the cause of death. A case was defined to be suspected if there was acute illness compatible with jaundice, fever preceding jaundice, epidemiological link or epidemic in the area of residence of case. Jaundice was defined as a yellow discoloration of conjunctiva or a typical prodrome followed by deep colouration of urine. Suspected case with laboratory test positive for IgM anti HEV antibody were considered to be confirmed case of hepatitis E.

A sanitary survey was also carried out to detect the sources of water contamination, if any, and to study methods of sewage disposal. The maps of the water supply pipelines were examined. Spatial distribution of the cases along with the distribution of water supply was mapped out. The town is supplied by the underground water through a network of 19 tube wells. All tube wells pour water within a grid (closed network of large size iron pipes), which finally distributes water to smaller pipes to houses in different wards. Water is supplied intermittently only three times in a day. Chlorination is done at the source with a device that mixes measured quantity of high test hypochlorite solution continuously in the drinking water. Wards located in the centre of the town mainly depend on the municipal water supply but water is also obtained through hand operated tube wells (hand pumps) in addition to the municipal water supply in the peripheral wards. Few areas like campus of civil hospital and colonies in the periphery of the town have their own water supply by separate tube wells. The field investigation team visited all the 19 tube wells and tested the chlorine content and pH of the water through chlorine comparator. Many sites were directly observed and in-depth interviews were conducted with health professionals, community leaders, and municipal councillors.

A total of 22 blood samples were collected from acute cases of jaundice. Serum was tested for anti-HAV IgM and anti-HEV IgM separately by ELISA technique according to the manufacturer's instruction (Smartest EIA, Belgium). Blood samples were subjected to HEV RNA extraction by Trizol (MRC, USA). cDNA was synthesized using the reverse transcription kit (MBI fermentas, Germany). HEV specific PCR was carried out amplifying ORF1 gene product with specific primer in a thermocycler (Techne, UK) according to the protocol mentioned by Jameel et al<sup>12</sup>.

Fourteen water samples were collected from the taps following standard guidelines<sup>13</sup>. Conventional method was used for testing coliform in water. Most Probable Number (MPN) was calculated for presumptive test for coliform. Residual chlorine was measured in drinking water using commercial colour-match comparators.

Epi-info 2000 software (Version 5 CDC and WHO) was used for data analysis. Chi square test was used to test statistical difference in the attack rates between wards.

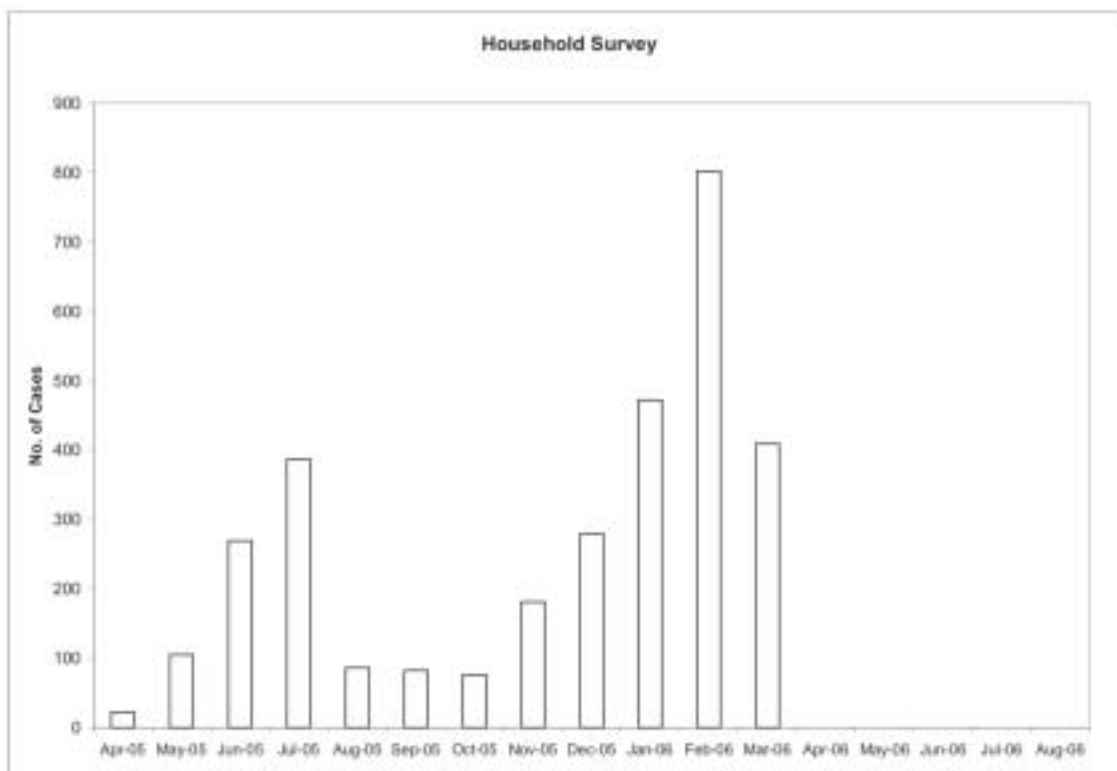
## Results

Record review revealed that large number of jaundice cases had presented to the civil hospital in the month of August 2005, however, the records of preceding months were not available. Therefore, house-to-house survey was undertaken in April 2006 which revealed that jaundice cases were occurring since April 2005. Epidemiological curve showed two peaks (Figure 1). First peak was seen in June to July 2005 and the second peak occurred during January to March 2006. Similar pattern was observed in the distribution of cases in outpatient and inpatient department of civil hospital. In year 2005 and 2006, 268 and 339 cases were reported in civil hospital whereas only 35, 10, 4 and 2 cases had been reported in year 2001, 2002, 2003, and 2004 respectively.

Out of the 3170 persons who reported to have suffered from jaundice in house to house survey, 2171 (68.5%) were males. Mean age (SD) of these cases was 28.8 (13.9) years. Attack rate peaked in 20 to 29 year age group (Table 1). Attack rate was higher in males (6.4%) compared to the females (3.7%).

Civil hospital records were incomplete regarding the address of jaundice patients. Therefore, cases found in house-to-house survey were utilized to prepare spot map of the cases. Overall the attack rate was 5.2%, which was highest in ward number eighteen (20.1%), and lowest in ward number 8 (0.5%) (Table 2). The campus of civil hospital, which was situated in ward number 17, had no case of jaundice although 120 doctors, nurses, technicians and other employees were residing in this campus.

Municipal repair and maintenance record revealed that there were many complaints of dirty water supply, therefore, leakages in water pipes were repaired from January 05 to April 05. Many repairs were done by private plumbers, and in that process several illegal water connections were made with the municipal water

**Figure 1: Time trend of Hepatitis E epidemic, Mandigobind Garh, 2006****Table 1: Attack rate of Hepatitis E by age, Mandigobindgarh, 2006**

Age-group (years)	Population	No. of cases	Attack rate (%)
0-9	11223	156	1.4
10-19	12133	670	5.5
20-29	11769	1013	8.6
30-39	9039	647	7.2
40-49	7341	375	5.1
50-59	4671	186	4.0
60-69	2791	87	3.1
70-79	1274	30	2.4
80 +	425	6	1.4
Total	60667	3170	5.2

supply. Additional repairs were done in December 05 and January 06 to correct the water contamination reported by media as well as due to public pressure. Complete clinical information was available from 798 cases reported in house-to-house survey. The commonest clinical finding was icterus, which was present in all cases, followed by malaise (99%), loss of appetite (97%), pain abdomen (86%), nausea or vomiting (92%), fever (63%) and itching (19%). The duration and nature of symptoms were similar in all age groups as well as in both sexes. House to house survey revealed that 18 persons died of jaundice from April 2005 to March 2006. Case fatality ratio was 0.57% (18/3170). These deaths were mostly in older persons. There were 17 pregnant mothers who were affected with viral hepatitis but no death was reported among them.

Out of total 22 blood sample tested for anti-HAV IgM and anti-HEV IgM, 2 (9%) were positive for anti-

**Table 2: Ward wise distribution of Hepatitis E cases, Mandi Gobindgarh, 2005-06**

Ward Number	Population (Census 2001)	No. of cases	Attack Rate (%)
One	1910	42	2.2
Two	2044	116	5.7
Three	2265	201	8.9
Four	2652	162	6.1
Five	3093	77	2.5
Six	3436	23	0.7
Seven	2573	297	11.5
Eight	3084	15	0.5
Nine	2275	127	5.6
Ten	2977	148	5.0
Eleven	3385	38	1.1
Twelve	4249	296	7.0
Thirteen	3486	172	5.0
Fourteen	2766	188	6.8
Fifteen	3396	77	2.3
Sixteen	3773	261	6.9
Seventeen	2638	241	9.1
Eighteen	2479	498	20.1
Nineteen	2922	22	0.8
Twenty	561	52	9.3
Twenty one	2791	41	1.5
Twenty two	1922	76	3.9
Total	60677	3170	5.2

HAV IgM, 21 (95.5%) were positive for anti-HEV IgM and two samples were positive for both. Four samples were positive for HEV RNA by RT-nPCR, using primer from the ORF1 region with an amplified HEV specific product of 343bp visualized in 2% agarose gel electrophoresis, thus confirming the HEV etiology. Bacteriologically, 60% (9/15) of the water samples, which were collected from the taps, were unsatisfactory for human consumption, i.e., showed coliform growth. Six samples showed MPN coliform count more than 180 and while 3 showed the count to be below 180.

## Discussion

Majority of the sporadic cases of viral hepatitis in the adult population and virtually all epidemics of viral hepatitis in India were due to HEV<sup>1-10</sup>. Epidemiological as well as laboratory investigation suggest that present epidemic was also due to HEV resulting from contamination of drinking water supply with sewage water, which is supported by following facts.

Mandi Gobindgarh is a very busy industrial area where daily hundreds of loaded trucks pass through different streets of the city. Due to superficial position, water pipes are damaged frequently. Inadequate maintenance of age-old pipes leads to leakage of water from the joints. Many residents of the city have illegal water connection. To avoid labour charges and visibility of water connection, they connect water pipes within the sewer main holes. As the water supply is intermittent, during no supply of water, negative pressure is created and there is mixing of drinking and sewerage water. Many a time people are not aware about the timing of water supply, so they connect *Tullu* (electric motor pump) to water pipes to suck water. This creates further negative pressure within the water pipes leading to damage of weak joints and ultimately contamination with sewer water.

This epidemic affected a significantly higher proportion of population who lived in older and overcrowded parts of the town than those living in newer and spacious areas of the town. Similar pattern was also reported by two studies from India<sup>6,8</sup>. The water supply source was separate in civil hospital and no case was reported from the civil hospital campus despite that no chlorination is done in their water supply although just out side the campus hundreds of cases were found who were taking water from municipal water supply system.

The age and sex distribution of cases was very much similar to that described in most previous epidemics of hepatitis E<sup>1,3, 5-9</sup>. In this study, children of less than 10 years were affected less often as has also been observed in previous epidemics. The relative infrequency of symptomatic HEV disease in children is perhaps due to relatively milder liver injury in this age group rather than the selective sparing of children from infection<sup>14</sup>. In the present study females were less commonly affected than males (M:F 2:1). The reason males are affected twice more often than the females is not clear. Male to female ratio observed in other studies vary from 1:1 to 3:1<sup>15</sup>. Perhaps male drink contaminated water more often because they spend more time outdoors than women<sup>14</sup>.

HEV infection is known to affect pregnant women more frequently than it does men and non-pregnant women. The reason for this predilection during pregnancy are however not clear<sup>14</sup>. Physiological and hormonal changes that occur during pregnancy might play role in severity of HEV in pregnancy<sup>15</sup>. High mortality during pregnancy (ranged from 11.4%-21.0%) has been reported by many studies due to

fulminant hepatic failure<sup>2,6,8,16</sup>. In our study no death has been seen among those pregnant women who were affected with hepatitis. The lack of nutrition and medical care could account for high maternal morbidity and mortality seen in hepatitis E<sup>15</sup>. People and medical practitioners of the town were aware about the disease and prompt treatment seeking may have also reduced mortality in pregnant women. Case fatality ratio for HEV infection during epidemic has been reported from 0.2% to 4%<sup>15,17</sup> but in this epidemic it was low (0.57%; 18/3170). Most of the deaths were among elderly; mainly due to delay in seeking medical care.

This epidemic is the third largest among the epidemics of HEV reported from India<sup>2,3,6-8</sup>. The time course of hepatitis E epidemics varies widely from single peaked, short lived outbreaks to prolonged multi peaked epidemics lasting for over a year<sup>6</sup>. As far as the duration of the epidemic is concerned, this is the longest epidemic ever reported in the history of hepatitis epidemics in Indian subcontinent. This epidemic has a bimodal peak similar to another study reported from India<sup>6</sup>. The first peak occurred probably due to initial faecal contamination of municipal water grid system by the sewerage, and the second by the contamination occurring due to the illegal connections installed by people during the repair of leakage pipes.

Natural immunity against HEV is short lived<sup>14</sup> and there is no vaccine which can protect population against this infection. So following prevention and control measures were recommended to prevent re-occurrence of the HEV epidemic: (a) The provision of adequate quantities of safe water by maintaining sufficient pressure in the distribution system, (b) identification of the leakage and immediate replacement of the leaking water pipes, and (c) separation of the water pipes from the sewerage system. These recommendations were implemented in the town during March 2006 and a declining trend of cases was observed in the local hospital and finally the epidemic ended in September 2006.

### Acknowledgements

We thank Dr. Harcharan Singh, Civil Surgeon and other health staff of district Fatehgarh Sahib and civil hospital Mandi Gobindgarh and Municipal Committee of Mandi Gobindgarh for providing financial support for purchasing of ELISA kits and field support in data collection. We are also thankful to Dr. S. Suraj Singh, Junior Resident in Department of Community Medicine PGIMER Chandigarh for his assistance in collecting water samples and providing assistance during visit at

Mandi Gobindgarh. We are grateful to the Head of Microbiology Department, PGIMER, Chandigarh for water quality tests.

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*Special Article*

## Public Health, Preventive & Social Medicine and Community Medicine- The Name Game

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The terms Public Health & Hygiene, "Social & Preventive Medicine", "Preventive & Social Medicine" and "Community Medicine" "Community Health", are being used interchangeably which creates confusion among the common man, bureaucrats as well as professionals. The confusion is creating a major problem in the growth of the discipline in India. If one studies the history of the discipline in India it will be observed that the discipline was first known as Hygiene and or State Medicine later it was designated as Public Health & Hygiene and then Preventive and Social Medicine/ Social & Preventive Medicine and only recently the discipline is named as Community Medicine or Community Health.

Though the name of the discipline changed but the curriculum and teachers remain the same for a long time. The growth of the discipline in India started with the establishment of All India Institute of Hygiene & Public Health at Kolkata in 1934. Earlier to that teachers/specialists were trained at London School of Tropical Medicine and Hygiene or obtained masters in Public Health from USA. When the Medical Council of India changed the name of the department as Social & Preventive Medicine/ Preventive & Social Medicine post graduate degree courses also started in some selected medical colleges. The best known course was at King George Medical College, Lucknow. Though the name of the discipline changed but the curriculum of the new post graduate course was mostly based on the existing DPH curriculum with some cosmetic change and the duration of the training was extended. Most of the teachers were erstwhile DPH from AIHH&PH. Even today if one scrutinizes the post graduate curriculum of Social & Preventive Medicine later known as Community Medicine one would not find any drastic basic changes. The core areas remaining the same viz. epidemiology, biostatistics, health service administration, health care delivery system, environmental sanitation, nutrition, communicable disease control, non communicable

disease control, MCH, occupational health, social determinants, national health programs. Emphasis to teach behavioral sciences, management and health economics was given. But similar changes were also introduced in the DPH course. In the skill development two new exercises were introduced, one was clinico-social case review the other was family health exercise. This was besides the simulation exercises in biostatistics, epidemiology. In the earlier courses exercises related to sanitation, food hygiene, metrology and entomology was included. Later except the clinico social case review, family exercises, biostatistical and epidemiological exercises were gradually removed. Clinico-social case review was introduced to develop the skill of drawing the natural history of a clinical case encompassing the social, behavioral, biological, environmental and host factor interaction causing the disease under study in that individual. The objective of introducing the family health exercise was to assess the health needs of the family. Once a student is accustomed and masters the skill it becomes easier for him to understand the epidemiology of different health problems and to apply the different levels of prevention in the basic unit of the community i.e. family. The understanding is basic to the application of his knowledge in improving the health of the community. But what was lacking was the experience in dealing any community health problems as well as improve the existing health services through intersectoral coordination & community participation. In few places it was introduced but not standardized. Even if we examine the existing Indian text books of Public Health, Preventive & Social Medicine and Community Medicine we hardly find any difference. As Public Health ceased to be a discipline in the undergraduate curriculum the only existing book was not revised. The oldest professional association was Indian Public Health Association which was affiliated with the World Federation of Public Health. It included public health professionals, academicians, practitioners and also subject specialists, like, nursing, sociologist,

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veterinarians, biostatisticians. The Association is the largest organ of the Public Health in the country consisting of more than 4500 active members. They have an indexed Journal of the same name. Later after the renaming of the department the teachers of the Preventive and Social Medicine formed an association known as Indian Association of Preventive & Social Medicine and it has also a journal named Indian Journal of Community Medicine. Senior members of the profession are having dual membership. Even the same professional may be the office bearer of both the organization concurrently. This has resulted in a complex problem for the health ministry & department to identify public health professionals for providing professional support in matters of public health. The government was forced to depend on individual's suggestions rather than a collective suggestion. So while formulating any policy the government is not getting the benefit of the collective wisdom of the available well qualified and experienced public health professionals. There is very little or no input from the public health professionals in the formulation of health policy or planning a health program. Some of the other professional with some public health orientation are ruling the roost by their personal endeavor and position in guiding the policy makers and planners. It is high time that we should redefine our role as public health professional whether we are trained as a specialist in Social & Preventive Medicine or Community Medicine. Let us remove from our mind the water tight compartment created by the mere change of name of the discipline. To do that we must be convinced that Public Health, Social & Preventive Medicine/Preventive & Social Medicine and Community Medicine are conceptually and structurally the same discipline fulfilling the C.E.A Winslows' (1920) time honored conceptual definition of Public Health "the science & arts of preventing disease, prolonging life and promoting health & efficiency through organized community effort"<sup>1</sup>. To prove the same a humble submission is made to the readers for their scrutiny and action. To remove any confusion and to define a scientific term the concept of "paradigm" is commonly used. A paradigm serves as a guide for all activity in a particular field. It determines what topics of inquiry are appropriate, what methods are most desirable, the way things ought to be done, and finally how support and recognition are awarded. So let me use a paradigm to illustrate our assertion. The paradigm used to understand the interrelationship of the above disciplines is based on the understanding of the conceptual linkage of the holistic concept of Health,

natural history of Disease & Levels of Prevention. The practice of modern medicine is also based on the above paradigm. To effectively diagnose a disease condition one has to have an in-depth knowledge of the Natural History of that disease including the determinants of health causing the imbalance. The objective of any medical intervention is also included in the levels of the prevention. The objective of any intervention by a practicing medicine man is to diagnose the disease condition as early as possible and treat effectively to avoid any further complication and restore to his normal status of health or rehabilitate him to a state of functional health if there is any permanent damage due from the disease condition. Preventive Medicine is the branch which is mostly concerned with the other two levels of prevention i.e. prevention of diseases by health promotion & specific protection. But in both the disciplines Medicine & Preventive Medicine the prime concern is that of the individual who seek care and is grouped as personal care service. On the other hand the public health practitioner's main job is to promote, protect, maintain and restore health among the public under his care. The public health practitioner like the medical practitioner must also be proficient in understanding all the possible effects & influences of the different determinants of health in the environment and its consequent effect on the individual and communities' health. Here the prime focus is on public/community and not individual. The role of a public health practitioner is to keep the public/community healthy. The action is pre-emptive before the disease strikes. On the other hand Community Medicine as defined by Royal College of Physician as 'a practice which focuses on the health needs as a whole (community diagnosis) and to judiciously plan, implement, evaluate the extent to which a suitable intervention may be any one or any combination of the levels of prevention effectively meets these needs through a community action'<sup>2</sup>. Corollary to the philosophical concept of public health the definition of community medicine seems to be the working definition of public health. The decision of the World Health Assembly of 1977 was a landmark date in the evolution of public health. For the first time the main social goal of the governments of the world & WHO was defined as "attainment by all the people of the world of a level of health that will permit them to lead a socially and economically productive life". A further landmark was the Alma-Ata Declaration (1978) calling on all governments to develop and implement primary health care strategy to attain the goal. India was a signatory to the same and pledged itself to provide

primary health care. Primary health care can be defined as “essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self determination.” In other words it can be said as “health by the people” and “placing people’s health in peoples’ hand” This approach integrates at the community level all the factors required for improving the health status of the population. Emergence of the primary health care strategy was the culmination of all existing ambiguity in the implementation of public health in a community<sup>3</sup>. Primary health care approach can be termed the functional definition of Public Health and ways of implementation.

From the above context one can appreciate that the three disciplines of Public Health, PSM, SPM and Community Medicine have a common generic origin and the objectives are also same. It is also fascinating to observe that Public Health & Medicine is usually seen as alternative approaches to address the problem of health & disease but in reality they are and historically have been mutually dependent and interactive. But unfortunately the distinction between these two areas of knowledge and practice was often highlighted precisely because so much is shared between them. “The division of responsibility, authority and power between public health and medicine has been a continuing source of concern & conflict. Although representative of both the fields have traditionally voiced strong commitments to health & social betterment , the relationship between public health & medicine has been characterized by clinical tensions, covert hostilities and at times open warfare. The last century has witnessed a series of attempts to precisely define the professional institutional and social boundaries between the inherently interrelated areas of knowledge and practice<sup>4</sup>.” After a thorough review of literature it was impossible to find out the reason for changing the name of the discipline in such a short period of two decades. One assumption may be that to keep public health teaching within the medical school the learned academicians probably thought it necessary to change it with more emphasis on amalgamating Public Health with clinical care. And this may be due to the apprehension based on American experience.

Where public health academicians could not tolerate the dominance of the Clinicians and brought Public Health teaching out from Medical Schools. The critical moment in the history of the institutional schism of public health and medicine in America was the “Welch – Rose Report of 1915” which was authored by William Welch the founding dean of John Hopkins School of Medicine and Wycliffe Rose of the Rockefeller Foundation. The fall out of Welch Report was the establishment of The John Hopkins School of Hygiene & Public Health in 1915 with Welch at the helm<sup>5</sup>. The reason for drifting apart of these disciplines in America is really disturbing. But in a country like India it needs immediate attention; it is still integrated and our national objective of Under Graduate Medical Education is to train a primary care physician capable of providing comprehensive health care with the primary health care approach. With the advent epidemiological, demographic and social transition, new public health problems are emerging or the older public health problem are reemerging with a newer dimension. Can the public health professionals of different hues introspect and try to remove the artificial barriers and become a united force. One alternative platform for academic upliftment of both the groups has been floated by the IPHA and that is Indian Academy of Public Health. Let us join hands and improve public health in India.

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*Short Communication*

## A Study on Human Risk Factors in Non-fatal Road Traffic Accidents at Nagpur

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### Summary

A cross sectional study was conducted among 423 victims of road traffic accidents reporting to Indira Gandhi Medical College, Nagpur for treatment during 1999-2000. Data was collected on pre-designed proforma by interview technique. Majority of the victims were male (85.8%) and of 18-37 years (74%); 64.5% of the subjects were consuming alcohol regularly and 5.9% were drug abusers; 43.7% and 10.2% had visual and hearing impairment respectively; 43.5% were not having any driving experience and 74.4% of the victims with two wheelers were not using any helmets at the time of accidents. Findings highlight the need for sustained health education and enforcement of traffic laws.

Road traffic injuries are a public health problem and a source of social concern throughout the world. It has been estimated that, on any given day, more than 3000 people die from a road traffic injury around the world. About 85% of these deaths and 95% of the annual disability- adjusted life years (DALYs) are lost because of road traffic injuries occurring in low and middle-income countries. It has also been projected that between 2000 and 2020, road traffic deaths will decline by about 30% in high-income countries but increase substantially in low and middle-income countries. In India, nearly 80,000 people were killed and 272,000 injured according to official figures<sup>1</sup>.

Each road traffic accident is a result of interplay of many factors, which can be broadly classified into human factors and environmental factors. Earlier studies have also shown that certain human factors such as alcohol use during driving are a major risk factor<sup>1</sup>. However, in India there is scarcity of data pertaining to accidents and particularly the role of human factors in non-fatal road traffic accidents. Thus, the present cross-sectional study was carried out to find out the role of different human factors in the occurrence of non-fatal road traffic accidents.

The present cross sectional study was conducted at Indira Gandhi Medical College, Nagpur. We included all 423 victims of non-fatal road traffic accidents reporting to Indira Gandhi Medical College,

Nagpur for treatment during 1999-2000. In the present study Road Traffic Accident was defined as the accidents occurring while driving vehicle on the road and non-fatal RTA implies those RTA cases where only injuries were afflicted. All non-fatal cases of RTA during the study period reporting to the study hospital were included. The demographic and injury characteristics were recorded on a pre-designed proforma by interviewing the study subjects. The human factors studied in the present study included socio-economic status, diminished visual acuity, diminished hearing acuity, overloading of vehicle, use of helmet, personal habits, past history of accidents and driving experience. Socio-economic status was classified according to modified Kuppaswamy's socio-economic scale<sup>2</sup>. For hearing and visual acuity, Rinnes test and Snellen's chart test was carried out by the investigators. Normal hearing acuity was defined as air conduction better than bone conduction at 512 Hz by Rinnes test<sup>3</sup> while normal visual acuity was defined as a distant vision of 6/6 on Snellen's chart<sup>4</sup> or history of not wearing any spectacles. The history of use of helmet was asked to only 129 motorized two wheeler drivers or riders. The statistical analysis was carried out using the software EpiInfo 3.3.2.

Out of total 423 subjects, 363 (85.8%) were male and only 60 (14.2%) were females. Thus a male: female ratio of 6:1 was observed. The majority of the

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victims were in the age group 18- 37 years constituting about three fourth of the study victims (74%) while 76 (18%) cases were aged more than 37 years and only 34 (8%) were below 18 years.

Higher proportion of most productive age group being victims may result in double loss – expenditure related to treatment and loss of productive man-days. Earlier studies have also reported a higher incidence of road traffic accidents in similar age groups<sup>5-7</sup>. This might be due to risk taking behaviour of youths. Frank has also observed higher male female ration in RTA<sup>8</sup>.

Table 1 depicts the personal characteristics and related risk factors.

Majority of the subjects belonged to upper lower and lower middle socio-economic strata. 64.5% of the subjects were consuming alcohol regularly and 5.9% were drug abusers. The consumption of alcohol or tobacco at the time of occurrence of accidents could not be ascertained because neither the subjects responded affirmatively nor the breath test was carried out to ascertain the consumption of alcohol. However the earlier studies have shown that both alcohol and tobacco, when taken affects the higher senses. This may be fatally dangerous when consumed at the time of driving<sup>9</sup>.

Visual and hearing impairment was observed in 185 (43.7%) and 43 (10.2%) study subjects respectively. Out of these 12.5% of visually impaired and 6.7% of hearing impaired subjects were unaware of this. No subject was detected having color blindness. The considerable proportion of newly detected subjects with impaired visual and hearing acuity may be attributed to the fact that these special senses are not examined while issuing a driving license by the licensing authority and thus they are left out. Such a group can be hazardous not only to themselves but also for the others or pedestrian making them predisposed to accident.

43.5% subjects were not having any driving experience. These subjects with no driving experience were basically trail drivers who were driving somebody else's vehicle. These trial drivers should be allowed once they get enough experience to drive safely thereby increasing their readiness of preventing accidents.

In the present study it was also found that majority of the victims were commuting on overloaded vehicles. This suggests that vehicles carrying passengers more than their specified capacity (overloading) are involved

**Table 1: Distribution of study subjects according to personal characteristics and risk factors (n= 423)**

Characteristics	Number (%)
<b>Socio-economic status</b>	
Upper	16 (3.8)
Upper Middle	53 (12.5)
Lower Middle	115 (27.2)
Upper Lower	211 (49.9)
Lower	28 (6.6)
<b>Personal habits*</b>	
None	34 (8.1)
Pan chewing	182 (43.0)
Tobacco chewing	205 (48.3)
Smoking	176 (41.7)
Alcohol consumption	273(64.5)
Drug abuse	25 (5.9)
Reduced Hearing acuity	43 (10.2)
Reduced Visual acuity	185 (43.7)
<b>Driving experience</b>	
< 10years	142 (33.6)
10 years and above	97 (22.9)
No experience	184 (43.5)
Overloaded vehicle	306(72.3)
Non-use of helmets**	96(74.4)

\* Multiple response, \*\*Included only 129 subjects

more in accidents. The congestion because of overloading and extra weight beyond the carrying capacity of the vehicle makes it difficult for the driver to control the vehicle resulting in accidents.

74.4% of the victims with two wheelers were reported to be without helmets at the time of accidents. Earlier studies have also reported a high risk of sustaining head injuries among those not using protective helmet<sup>10-12</sup>.

Findings of the present study once again highlighted some human factors related to road traffic accidents which might well be reduced/controlled by measures like health education, enforcement of road traffic laws, complete medical examination before issuing license etc.

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*Short Communication***An ICMR Task Force Study of Prevention of Parent to Child Transmission (PPTCT) Service Delivery in India****\*A. Sinha<sup>1</sup>, M. Roy<sup>2</sup>****Summary**

A retrospective survey was conducted during August to December 2007 in 19 medical colleges of India to examine the functioning of the PPTCT service delivery. Data was extracted from records of the PPTCT centers for the year 2005-2006. HIV prevalence was higher than 2005 NACO figures in 11 out of 19 (57.8%) centers. There was wide variation in the proportion of women counseled & tested for HIV in different centers. Antenatal prophylaxis was practiced in 7 out of 19 (36.8%) centers. Overall intra-natal ART was provided to 52.8% of HIV positive women. Early newborn testing was available at 3 out of 19 (15.7%) centers. Improved counseling services are required for better case detection.

United Nations General Assembly Special Session on HIV/AIDS (UNGASS) has set an ambitious goal for a 50% reduction in new pediatric infections by 2010. The WHO HIV and infant feeding technical consultation, has recommended increasing access to early infant diagnosis in the first months of life and to pediatric ARV treatment<sup>1</sup>. In India the Prevention of Parent to Child Transmission of HIV/AIDS (PPTCT) programme was started in the year 2002. Currently there are more than 4000 Integrated Counseling and Testing Centers (ICTCs) in the country<sup>2</sup>. The PPTCT programme includes many important elements<sup>3</sup>.

NACO hopes to achieve the UNGASS target with implementation of the PPTCT services that cover about 10% pregnancies in the country<sup>2</sup>. Further scale up of PPTCT services is planned up to the level of community health centre and primary health centre, and forming private-public partnership to be able to achieve the UNGASS goals.

The risk of mother to child transmission can be reduced to less than 2 per cent by intensive interventions in the antenatal, intra-natal and postnatal periods<sup>4</sup>. This has been achieved in western countries with effective measures like ARV therapy or ARV prophylaxis to the HIV infected mothers, elective caesarian section and avoidance of breast-feeding. However, these approaches are not always possible in

developing countries wherein 95 per cent of vertical transmission occurs. There are challenges of availability, affordability, duration and long term safety of optimal ARV agents in pregnant women and early neonatal life and the issue of transmission via breastfeeds in situation where alternatives to breastfeeding are not available.

We planned a survey in nineteen medical colleges of India to examine the functioning of the PPTCT services and to assess whether pediatric HIV cases were being detected early.

A retrospective survey was conducted during August to December 2007 in 19 Medical Colleges of India to examine the functioning of the PPTCT service delivery. Human Reproduction Research Centers (HRRCs), units of ICMR, existing in Obstetrics and Gynecology department of Medical Colleges across the country were chosen using convenience sampling to participate in the study. Data was collected from hospital records of the PPTCT centers for the year 2005-2006 on a pre-designed schedule on the selected parameters. The research officer of HRRCs also collected information regarding the number of districts in the State with functional PPTCT centers. This information was provided with the help of State AIDS Control Society. Filled forms were sent to the Central Coordinating unit at ICMR electronically. Data from

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the forms was abstracted and entered in Microsoft Excel for statistical calculations.

The table 1 summarizes few important indicators of PPTCT program from HRRC centers located in the North, West, South and East regions within the high, moderate and low HIV prevalence zones of the country.

The prevalence of HIV cases was highest at 5.9% in Pune in the high zone, 4.1% in Baroda in the moderate and 1.4% in Allahabad and 1.3% in Chandigarh in the low zone.

Pre-test counseling was provided to all antenatal care attendees under the PPTCT program (except in Jammu). The proportion of women tested for HIV ranged from 26% in Pune to 100% in Mumbai and Madurai in the high prevalence zone. In the Moderate prevalence zone it was 25% in Baroda and 54% in Puduchery. It ranged from 17% in Jaipur to 98% in Kolkata in the low prevalence zone.

The data shows that antenatal prophylaxis was practiced only in seven of the centers-Mumbai, Pune, Baroda, Puduchery, Chandigarh, Delhi, and

Allahabad. Overall 52.7% of the HIV positive women received ART at the time of delivery. ART was not provided in Jammu and Cuttack centers. For other centres, the proportion of women receiving ART ranged from 27% to 100% (Table 1).

Of all the institutions participating in the survey, newborn testing before 18 months had started only at AIIMS Delhi, JIPMER Puduchery, and KEM Pune. In all other facilities the testing started after 18 months of age. However, at AIIMS and KEM Pune where it started early at 6 weeks, no positive cases were detected during the year. Two positive cases were detected at JIPMER Puduchery in moderate prevalence zone, and prophylactic Nevirapine was provided to them. Prophylactic ART was provided to newborns of infected mothers in six centers. AIIMS Delhi reported availability of ART and PCP prophylaxis for infants. Early detection of infection in infancy has not yet started in the country, efforts in this direction need to be increased.

We compared the proportion of HIV detected in the present survey with the HIV prevalence in ANC population during 2005 as reported by NACO<sup>5</sup>. It was

**Table 1: Service delivery indicators in the PPTCT centers in 18 medical colleges of India**

HIV prevalence Zone	Region	Institutions	No. of Women Counseled	Women tested No. (%)	HIV + ve detected No. (%)	Started ART antenatally No. (%)	Started ART at delivery No. (%)
High	West	Mumbai	8206	9614 (> 100)*	153 (1.5)	2 (1.3)	68 (44)
		Pune	825	220 (26)	13 (5.9)	13 (100)	17 (> 100)*
	South	Chennai**	25475	25339 (99)	65 (0.25)	0 (0)	25 (96)
Moderate	West	Madurai	16422	16422 (100)	74 (0.45)	0(0)	50 (67)
		Baroda	677	169 (25)	7 (4.1)	5(71)	6 (85)
	South	Puduchery	7731	4250 (54)	17 (0.4)	1 (6)	16 (94)
Low	North	Jammu	Nil	1592	3 (0.18)	0 (0)	0 (0)
		Chandigarh	4131	3437 (83)	45 (1.3)	33 (73)	29 (64)
		Delhi	2160	669 (30)	5 (0.74)	5 (100)	5 (100)
	West	Jaipur	13675	2442 (17)	21 (0.85)	0 (0)	21(100)
		South	Trivandrum	5279	3831 (72)	8 (0.20)	0 (0)
	East	Cuttack	45445	27129 (59)	59 (0.21)	0 (0)	0 (0)
		Kolkata**	39848	38962 (98)	52(0.13)	0 (0)	13 (27)
		Guwahati	5951	4893 (82)	33 (0.67)	0 (0)	33 (100)
	Patna	2933	2617 (89.2)	22 (0.84)	0 (0)	12 (54.5)	
Allahabad	923	563 (60)	8 (1.4)	2 (25)	6 (75)		
Total		1,79,681	1,42,149 (79.1)	585 (0.41)	61 (10.4)	309 (52.8)	

\*Includes un-booked women. \*\* Data for 3 Chennai and 2 Kolkata centers.

found that the prevalence was higher than NACO figures in 11 out of 19 (57.8%) centers participating in the present survey. In three centers (Chennai, Madurai, Kolkata) the proportion of positive women was lower than the NACO 2005 figures. The NACO prevalence figures are based on the total number of ANC sites in the states during 2005 whereas we reported the prevalence detected in the PPTCT centers located in medical colleges during 2006. However, the increase in prevalence in the centers located in the low prevalence zone - in Allahabad (1.4%), and Chandigarh (1.3%) is alarming.

Proportion of women undergoing HIV testing after receiving pre-test counseling reflects the quality of counseling services. It was more than 50% at 13 out of 19 (68.4%) PPTCT centers surveyed. However, this proportion was only 17% at Jaipur, 30% at Delhi, 26% at Pune, and 25% at Baroda. This may be a result of inadequate counseling services at these centers. An independent evaluation of the NACP has earlier reported inadequate capacity (less amount of time spent with women needing counseling, presence of only one counselor etc) leading to inadequate services<sup>6</sup>.

Despite low proportion of women being tested, the HIV cases detected at Pune and Baroda was 5.9% and 4.1% respectively, indicating a very high transmission of HIV in these areas.

Currently, less than 10% of HIV-infected pregnant women in resource-poor countries receive antiretroviral prophylaxis services for prevention of mother-to-child transmission (PMTCT)<sup>7</sup>. Even if antiretroviral prophylaxis services were scaled up dramatically, HIV infection in children would continue to increase unless there were concurrent increases in services to prevent new HIV infections in women, improve access to family planning, and expand the availability of antiretroviral treatment for women who need it.

In the present survey 78% women took the test and 52.7% received ART prophylaxis during delivery as compared to 60% & 43.6% respectively in the NACO feasibility study<sup>8</sup>.

A negligible proportion of pregnancies in India actually avail of PMTCT services. Coverage and quality of the full range of interventions to prevent mother-to-child transmission of HIV, including those related to infant feeding counseling and support, is disturbingly low.<sup>1</sup>

The study findings highlights the need to improve the counseling services for better screening of ANC cases specially in high prevalence zones of the country. This is needed for better case detection. If India has to achieve the UNGASS goals efforts in early detection of infection in infancy need to be increased.

### Acknowledgement

We are thankful to the Officer-In-Charges (Professor & Head of the Departments of Obstetrics & Gynaecology) of the 19 participating H.R.R.C centers and their research staff for their help and cooperation in data collection.

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*Short Communication***Nutritional Status of Lodha Children in a Village of Paschim Medinipur District, West Bengal****S. Bisai<sup>1</sup>, \*K. Bose<sup>1</sup>, A. Ghosh<sup>1</sup>****Summary**

Undernutrition among tribal children is a major public health problem in India. Our study attempted to evaluate the prevalence of malnutrition among Lodha children of Paschim Medinipur, West Bengal. A cross sectional study was conducted among 165 children aged 1-14 years in a village of Paschim Medinipur district during January to March 2008. Children were considered underweight, stunting and wasting following the NCHS standards. Overall the prevalence of underweight, stunting and wasting was 33.9%, 26.1% and 19.4 %, respectively. Of these, 9.1%, 9.7% and 3.6% children were found to be severely underweight, stunted and wasted. Moreover, the prevalence of underweight and stunting was significantly higher in pre-school children compared to school going children. There is an urgent need for appropriate steps to be taken to improve nutritional status of children in this ethnic group.

Near about fifty percent of the children under the age of five years in India are moderately or severely malnourished. These rates are higher in underprivileged communities. The tribal populations of India are recognized as socially and economically underprivileged<sup>1</sup>. The vast majority of the tribal populations reside in rural areas of the country. Lodha is one such primitive tribe resident in Paschim Medinipur District of West Bengal. Their mother tongue is Lodha, which is close to Savara, an Austro-Asiatic language. Traditionally, they were forest dwellers, but now they have started cultivation either as owner or as agricultural laborer and are also engaged in hunting and fishing. They belonged to the low socio-economic class.

Undernutrition among children is an important health problem in India including West Bengal. There is little information on health profile and nutritional status among various tribal populations of West Bengal<sup>2-5</sup>. Moreover, there is no information on nutritional status, as assessed by WHO<sup>6</sup> recommended Z-score method, among Lodha children. In view of this, present investigation reports the prevalence of

underweight, stunting and wasting among Lodha children in Paschim Medinipur district of West Bengal.

A community based cross sectional study was conducted in a village of Paschim Medinipur district – which is situated between Midnapore and Kharagpur town, and 125km from Kolkata city, the provincial capital of West Bengal. This study was carried out from January to March 2008. A total of 165 children aged 1-14 years were measured in the present study to assess the nutritional status. The gender specific sample size was calculated using standard formula as documented by earlier study<sup>7</sup>. The estimated sample size for boys and girls were 67 and 88, respectively, based on the prevalence of wasting among Santal<sup>5</sup> boys (22.7%) and girls (35.8%) with a relative precision of 10%. Institutional ethical approval was obtained to conduct this study. Data on age, gender, weight and height was collected on a pre-tested questionnaire by house to house visit following interview and examination using the simple random sampling method. Height and weight measurements were made by a trained investigator following the standard technique<sup>8</sup> using weighing scale and anthropometer rod to the precision

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of 0.5 kg and 0.1cm respectively. Children were considered underweight, stunted and wasted if their weight-for-age, height-for-age and weight-for-height Z - scores below -2.0 SD of the NCHS reference population<sup>9</sup> as calculated using EPI6 software. Severe, and moderate undernutrition was assessed as Z-score below -3.0, and -3.0 - < -2.0, respectively. We followed the WHO<sup>6</sup> classification for assessing severity of malnutrition by percentage prevalence ranges of these three indicators among children. Student's t-test were undertaken to test for sex differences in height and weight. Proportion test were performed to test for differences in prevalence. Odds ratio (OR) was also calculated. Standard statistical analyses were performed using the SPSS package and EPI6. A  $p < 0.05$  considered for statistical significance.

A total of 165 children, 68 (41.2 %) boys and 97 (58.8 %) girls were studied. The overall (age and sex combined) means of weight and heights were 17.8 kg (SD 6.8) and 110.1 cm (SD 20.9), respectively. There were no significant sex differences in mean weight and height.

Overall the prevalence of underweight (severe + moderate), stunting and wasting was 33.9%, 26.1% and 19.4%, respectively. Of these, 9.1%, 9.7% and 3.6% children were found to be severely underweight, stunted and wasted, respectively (Table 1).

It is important to note that the rate of severe under nutrition was higher in boys and preschool children (< 60 months) compared with girls and school going children ( $\geq 60$  months). Similarly, prevalence of underweight, stunting and wasting was slightly higher in boys (35.3%, 26.5%, 26.5%) than their girl (33.0%, 25.8%, 14.5%) counterparts. However, data showed no significant sex difference in the three nutritional indicators. Moreover, the prevalence of underweight, stunting and wasting was significantly higher in pre-school children compared to school going children. Similarly, the rates of severe underweight (pre-school vs school going: 20.0% vs 4.3 %) and stunting (24.0% vs 3.5%) were significantly higher in this group. They had 2.71 (CI: 1.28 - 5.74,  $p < 0.01$ ) and 2.32 (CI: 1.06 - 5.12,  $p < 0.05$ ) and times greater chance to be underweight and stunted, respectively, than school going children.

Based on the WHO<sup>6</sup> classification of severity of malnutrition, the overall prevalence of underweight and

wasting were very high ( $\geq 30\%$  and  $\geq 15\%$ ). However, the prevalence of stunting was moderate (20-29%). It is noteworthy that, among pre-school children, the prevalence of stunting (38.0%), underweight (50.0%) and wasting (24.0 %) was high to very high.

Several recent studies have been done in different parts of India on health and nutritional status among tribal children and adolescents<sup>10, 11</sup>. However, evaluation of nutritional status among the tribal children in West Bengal has not been investigated sufficiently<sup>5</sup>.

Our study found the prevalence of underweight, stunting and wasting to be 50.0%, 38.0% and 24.0 %, respectively. The prevalence of severe underweight, stunting and wasting were 20%, 24% and 8%, respectively. A study<sup>10</sup> from Madhya Pradesh has also documented similar high prevalence among Gond pre-school children. An earlier study<sup>12</sup> among Kodaku tribal pre-school children of Central India also found high prevalence of undernutrition. Thus, these studies clearly indicated that tribal pre-school children were experiencing severe nutritional deficit. Moreover, since growth related dietary requirements are highest during this period, the impact of this dietary deficit is maximum, particularly among boys, during this phase. The higher prevalence of undernutrition among boys is in concordance with an earlier report<sup>13</sup>. This higher prevalence could be the result of increased nutritional needs of boys compared to girls.

In our study, the overall prevalence of underweight, stunting and wasting were 33.9%, 26.1% and 19.4 %, respectively. A recent study from West Bengal<sup>5</sup> had reported a similar prevalence (33.7%) of underweight. However, their reported prevalence of wasting (29.4%) was higher than the present study. In contrast, the prevalence of stunting was higher in present study (28.5%) than that reported (17.9%) by Chowdhury et al<sup>5</sup>. In the present study 9.1 %, 9.7% and 3.6% children were found to be severely underweight, stunted and wasted, respectively. Chowdhury et al<sup>5</sup> had reported rates of severe underweight, stunting and wasting as 7.92%, 4.98%, and 9.51%, respectively. These results clearly indicated that the prevalence of stunting was higher among the Lodhas. Stunting is an indicator of chronic or long-term nutritional deficiency<sup>14</sup>. Thus the children in the present study have been experiencing prolonged nutritional stress.

**Table I. Nutritional status of Lodha children by age and sex**

Nutritional Indicators	Severe ( $< -3$ Z score)	Moderate ( $-3$ to $< -2$ Z score)	undernutrition ( $< -2$ Z score)	Normal ( $\geq -2$ Z score)
<b>Gender:</b>				
<b>Boys (n= 68)</b>				
Underweight	10 (14.7)**	14 (20.6)	24 (35.3)	44 (64.7)
Stunting	7 (10.3)	11 (16.2)	18 (26.5)	50 (73.5)
Wasting	4 (5.9)	14 (20.6)	18 (26.5)	50 (73.5)
<b>Girls (n= 97)</b>				
Underweight	5 (5.2)**	27 (27.8)	32 (33.0)	65 (67.0)
Stunting	9 (9.3)	16 (16.5)	25 (25.8)	72 (74.2)
Wasting	2 (2.1)	12 (12.4)	14 (14.5)	83 (85.5)
<b>Age group:</b>				
<b>&lt; 60 months (n= 50)</b>				
Underweight	10 (20.0)*	15 (30.0)	25 (50.0)*	25 (50.0)
Stunting	12 (24.0)*	7 (14.0)	19 (38.0)**	31 (62.0)
Wasting	4 (8.0)	8 (16.0)	12 (24.0)	38 (76.0)
<b><math>\geq 60</math> months (n= 115)</b>				
Underweight	5 (4.3)*	26 (22.6)	31 (26.9)*	84 (73.1)
Stunting	4 (3.5)*	20 (17.4)	24 (20.9)**	91 (79.1)
Wasting	2 (1.7)	18 (15.7)	20 (17.4)	95 (82.6)
<b>Overall (n= 165)</b>				
Underweight	15 (9.1)	41 (24.8)	56 (33.9)	109 (66.1)
Stunting	16 (9.7)	27 (16.4)	43 (26.1)	122 (73.9)
Wasting	6 (3.6)	26 (15.8)	32 (19.4)	133 (80.6)

Figures in parenthesis are percentages, \* significant difference;  $p < 0.01$ , \*\* significant difference;  $p < 0.05$ .

In conclusion, the nutritional status of the Lodha children, especially among lower age group, of this region is critical. There is an urgent need for appropriate steps to be taken to improve nutritional status of this ethnic group. Lastly, it must be mentioned here that similar studies should be undertaken among children of other tribal populations of not only West Bengal but also in other parts of India.

### Acknowledgement

Financial assistance from Indian Council of Medical Research (ICMR) is gratefully acknowledged. The authors express their thanks to the parents for their help and cooperation.

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## **Indian Public Health Association**

**Headquarter Secretariate**

**110, Chittaranjan Avenue, Kolkata-700073**

**Registration under Society Act No. S/2809 of 1957-58**

### **Notice for 53rd Annual General Body Meeting**

The 53rd Annual General Body Meeting of the IPHA will be held on 9th January, 2009 at 6 PM at Kuvempu Kalakshetra Auditorium, KIMS Hospital Campus, K.R.Road, V.Puram, Bangalore - 560 004. (Please reconfirm the exact venue and time from the organizers of the conference).

**Sd/-**  
**Dr. Madhumita Dobe**  
Secretary General, IPHA

*Short Communication*

## Prevalence and Pattern of Childhood Morbidity in a Tribal Area of Maharashtra

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### Summary

Previous studies have demonstrated that tribal children suffer from a higher rate of morbidity. Gender discrimination in the form of dietary neglect of the female children has also been noted. The community based cross-sectional study was carried out in tribal PHC Salona of Chikhaldara Block, Amaravati District, Maharashtra to study the prevalence and pattern of morbidities in children. 2603 study children between 0-72 months of age were covered in a house to house survey by the investigator. Parents of eligible children were interviewed using a pre-tested questionnaire for socio-demographic details, personal habits, past and current medical history. The prevalence of overall morbidities was 34.7% and it was higher in female as compared to male children (34.8% vs. 29.7%;  $\chi^2 = 9.3$ ,  $p < 0.005$ ). Among individual morbidities, the prevalence of acute respiratory infections was the highest (25.5%) followed by acute diarrhoeal diseases (5.8%), conjunctivitis (1.5%), and skin infections (1.2%).

Children constitute the most vulnerable section of the community. The health status of the children serves as a sensitive indicator of the overall health of the entire community. Several factors are known to be responsible for causing higher rates of morbidity in children. While many of the factors are related to health care services and their uptake by the population, several other factors are entwined in the socio cultural fabric of the society. While nutritional status is known to be an important variable in the causation of morbidity in children, the data on the nutritional status of under-five children from tribal communities is lacking<sup>1</sup>. However, the data from rural India demonstrates a much higher morbidity in rural areas than in urban areas, and it is particularly high among children from disadvantaged socio-economic groups. The tribal children have higher rates of morbidity, and female children are known to receive less than desired nutritional intake<sup>2</sup>. The current study was undertaken to ascertain the prevalence and pattern of morbidity among children (0-72 months) in a tribal area.

The present community-based cross-sectional study was undertaken in the tribal areas of Salona

Primary Health Centre (PHC) of Chikhaldara Block in Amaravati District of Maharashtra during July 2005 and June 2006. The Salona PHC was selected from the five PHCs under Chikhaldara block by simple random sampling. This PHC consisted of 8 sub-centers serving 42 villages and was specifically selected since it has a large tribal population. The inhabitants of this area were predominantly tribal viz. Korku and Gavli. Other castes constituted a very small percentage of the population.

The necessary permission for the study was procured from the district health officer and the institutional ethics committee of Government Medical College Nagpur. The purpose of the study was also explained to the local leaders, Sarpanch, Gramsevak and Talathi to ensure cooperation.

The total population of the selected area was 20,571. We intended to include all children of 0-72 months in the study area as our study subjects.

Data was collected by house to house visit using pre-designed schedule for family details and characteristics of the study subjects. If the house was

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**Table 1: Prevalence of morbidity among children (0-72 months) by age and sex**

Age in months	Male		Female		Total	
	No. of children	Morbidity No (%)	No. of children	Morbidity No (%)	No. of children	Morbidity No (%)
0-12	183	59(32.2)	222	70(31.5)	405	129(31.8)
13-24	209	71(33.9)	215	72(33.5)	424	143(33.7)
25-36	222	72(32.4)	203	75(36.4)	425	147(34.5)
37-48	202	66(32.7)	209	77(36.8)	411	143(34.8)
49-60	209	99(47.3)	241	85(35.3)	450	154(34.2)
61-72	275	68(24.7)	213	81(38.0)	488	169(34.6)
Total	1300	386(29.7)	1303	460(35.0)	2603	905(34.7)

locked during the survey, a second visit was made within a week's time. If the house was still locked during the second visit then such families were excluded from the study. We could cover a total of 2603 children (response rate being 91.3%).

The parents of the study subjects were interviewed for socio-demographic details, personal habits, past and current medical history. History of present illness and also within last 15 days of the children were recorded. Study subjects were also clinically examined and assessed by anthropometry (if applicable). The study subjects with an identified morbidity were referred to the nearest sub-center for treatment.

The data was entered in a Microsoft excel worksheet and bi-variate analysis including chi square test was used whenever required.

Total population of the PHC area was 20571, 10759 (52.9%) males and 9554 (47.1%) females. Out of total 3449 families, maximum (92.1%) belonged to Hindu religion followed by Christian (2.9), Buddhist (2.5%) and Islam (2.2%). Out of total 2603 children surveyed, 1300 (49.9%) were male and 1303 (50.1%) females. 18.7% of children were in the age group 61-72 months.

Prevalence of overall morbidity was found to be

34.7%, being statistically higher among girls than boys (35% vs. 29.7%;  $\chi^2 = 9.3$ ,  $p < 0.005$ ). Overall prevalence of morbidity was highest (34.8%) in the age group 37-48 months and was lowest (31.8%) in the age group 0-12 months. Highest prevalence (47.3%) among boys was observed in the

age group 49 – 60 months (Table 1).

Table 2 shows that the prevalence of acute respiratory infections was the highest (25.5%) followed by acute diarrhoeal diseases (5.8%), conjunctivitis (1.5%) and skin infections (1.2%). Highest prevalence of ARI was found in the age group 37-48 months (27.7%) and for acute diarrhoeal diseases it was found in the age group 61-72 months (8.8%).

Further analysis showed prevalence of ARI among boys (24.8%) and girls (26.8%) were not different. Among male children, 0-12 month's age group suffered most (26.8%) from ARI compared to other age groups; among female children it was in the age group 37-48 months (29.7%). Prevalence of acute diarrhoeal diseases among male (5.2%) and female (5.9%) children was also found to be not significantly different. Among male and female children, acute diarrhoeal

**Table 2: Pattern of communicable diseases\* among children of 0-72 months (n=2603)**

Age in months	No of children	Children with communicable diseases			
		ARI	ADD	Conjunctivitis	Skin infections
0-12	405	102(25.1)	09(2.2)	04(0.9)	04(0.9)
13-24	424	112(26.4)	18(4.2)	04(0.9)	01(0.2)
25-36	425	103(24.2)	32(7.5)	08(1.8)	04(0.2)
37-48	411	114(27.7)	19(4.6)	05(1.2)	02(0.4)
49-60	450	112(24.8)	29(6.4)	06(1.3)	06(1.3)
61-72	488	123(25.2)	43(8.8)	02(0.4)	01(0.2)
Total	2603	664(25.5)	150(5.8)	39(1.4)	32(1.2)

\* 4 select causes displayed

diseases were more prevalent in the age group of 61-72 months (8.8%) and 25-36 months (9.3%) respectively.

Tribal communities in India still are a deprived group. The present study revealed that the prevalence of communicable diseases was 34.2% among the study subjects. ARI constituted a leading cause of morbidity among the study subjects. The prevalence of ARI was recorded as 25.5%, which is the highest amongst various studies conducted in tribal areas<sup>3</sup>. Although the study was not primarily designed to measure sex-differentials in morbidity, the present study demonstrates that the ARI morbidity was slightly higher in females as compared to males but the difference was not statistically significant. Kaushik PV et al<sup>4</sup> found that 42.25% children had ARI within a period of preceding 15 days. Deb SK<sup>5</sup> in rural area of Tripura found that the monthly incidence of ARI was 20.0%, which correlates with the present study. Nagraj et al<sup>6</sup> observed that the prevalence of ARI was 9%. Rao VK<sup>2</sup> carried community based cross sectional study and found that the prevalence of ARI was 12.4%. Bansal R<sup>7</sup> found that the highest prevalence of ARI i.e. 41.3% in migrant tribal children; this might be due to migratory conditions and lack of health care utilization. Firewood is most commonly used fuel in tribal area which could be contributing factor for higher prevalence of ARI<sup>8</sup>. However, detailed epidemiologic studies would be needed to establish this relationship.

In present study the prevalence of ADD is 5.8%. Similar findings were observed by various authors. Sudarshan MK<sup>9</sup> et al observed that 7% children experienced ADD and Nagraj N et al<sup>6</sup> showed that the prevalence of ADD was 8.7%. However, a study carried out in the Nicobar Islands yielded a low rate of 0.2 episodes per child in a month<sup>10</sup>. This could be due to a low rate of diarrhea in the season of the conduction of the survey. Above mentioned studies showed higher prevalence of ADD and could have many contributing factors. The most common reason could be access to safe potable water, which is poor in tribal area. Moreover, tribal people have poor knowledge about methods of purification<sup>10</sup>.

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*Short Communication*

## A Clinico Epidemiological Study of Tetanus Cases Admitted to Epidemic Disease Hospital, Bangalore

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### Summary

A descriptive study was conducted among tetanus cases admitted to epidemic disease hospital (EDH), Bangalore from October 2006 to March 2007 to describe the socio demographic characteristics of tetanus cases, the clinical presentation and the treatment given to tetanus cases. A total of 80 cases were admitted during this period. Out of the 80 tetanus cases, 71% were from rural area, 55% unimmunized, 47.5% were agricultural workers. A total of 25(31.25%) deaths were observed during the study period. No case was administered anti tetanus serum outside the epidemic disease hospital.

Tetanus continues to be a health problem even 20 years after the launch of Universal Immunization Programme in India. Over 70,000 cases of neo natal tetanus was reported in 1994<sup>1</sup>. Very little information is available about tetanus in adults in recent times. In this background the current study was taken up at epidemic disease hospital, Bangalore. Objectives of the study were to describe the socio demographic characteristics, clinico-therapeutic characteristics of tetanus cases and the mortality associated with tetanus cases.

This was a descriptive study conducted at epidemic disease hospital (EDH), Old Madras road, Bangalore, Karnataka by the department of Community Medicine, KIMS, Bangalore for a period of 6 months from October 2006 to March 2007. All 84 tetanus cases admitted to EDH during this period were the study subjects. Only those cases fulfilling the clinical diagnosis of tetanus i.e. probable/confirm tetanus were included<sup>2</sup>. 4 out of the 84 tetanus cases got discharged against medical advice. Thus we could analyse only 80 cases. The data was collected in a pre designed schedule from hospital records and personal interview of the patients or a responsible attendee in case of death of the patient or unable to answer. Socio economic status classification of the tetanus cases was done by using the Standard of Living Index (SLI)<sup>3</sup> scale.

Of 80 cases, 65(81.3%) were males and 15 (18.7%) were females. The youngest case was 3 months old and the oldest case was of 80 years. It was observed that majority 45 (48.75%) cases were between the age group of 31-60 years. There was no case of neonatal tetanus. Among the 80 cases admitted, 25 died. Of these, 21(84%) were males and 4(16%) females. The case fatality rate was 31.25%. Highest mortality (76%) was observed in the age group of 21-60 years. Among the 80 tetanus cases, 73(91%) were Hindus and 53(66%) belonged to low SLI. Similarly 57(71%) cases came from rural areas, 16(20%) cases from urban slum and only 7(9%) from urban non slum.

Considering the region from which tetanus cases came, we observed that Kolar district contributed to the highest 24(30%) cases followed by 16(20%) cases from Bangalore rural and urban district each. The maximum distance traveled by the tetanus case to reach EDH was 120 kilometers, the minimum distance was 5 kilometer and the average distance being 61 kilometers.

Considering occupation of the tetanus cases, 38(47.5%) were farmers, 18(22.5%) were coolie workers. Out of 25 deaths observed 16(64%) were farmers and 4(16%) were coolie workers by occupation. Regarding type of injury and tetanus cases, it was observed that 60(75%) cases had traumatic injury/history of which 24(29%) had agricultural trauma. 14(17%) case had idiopathic origin and 6(8%) had otogenic history.

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Regarding wound care out of the 60 cases with traumatic injury/history, only 17 washed the wound with water & soap. It was observed that only 3(18%) cases who washed the wound died as against 14(32.5%) who did not wash the wound with water. There was a high case fatality rate of 5(50%) among those who applied irritants over the wound indicating the importance of proper wound care in prevention of tetanus.

Among the 80 tetanus cases, we observed that, 44(55%) cases were unimmunized with tetanus vaccine, 2 (2.5%) children between the ages of 1-10 years were partially immunized and 34(42.5%) cases did not know their immunization status.

Regarding presenting symptom, 61 (77%) cases had lock jaw, 44(55.7%) cases had neck stiffness. 9(11.3%) cases had spasms at presentation of whom 7(77.7%) died. It was observed that 70 (87.5%) cases sought medical help within 3 days of occurrence of first symptom. 34 (42.5%) tetanus cases occurred within 10 days following injury. Out of the 25 deaths observed 14 (56%) died within 5 days, 7 (28%) within 10 days, 3 (12%) within 15 days and 1 (4%) within 20 days of occurrence of first symptom.

No case was administered anti tetanus serum outside the EDH. It was observed that tetanus inpatients who survived for a critical period of 10 days had high chances of survival i.e. only 2 (2.5%) deaths out of 38. At the time of discharge tetanus toxoid injection was administered to all tetanus cases who had survived.

Based on the hospital record analysis, tetanus cases have shown declining trend in the last 20 years from a maximum of 470 cases and 180 deaths in 1985 to 160 cases and 40 deaths in 2006 . There seems to be no seasonal trend in the occurrence of tetanus cases.

In the present study, out of the 80 tetanus cases majority were males, from rural background, agricultural workers, had history of trauma and in the productive years of their life i.e 20-50 years. Anuradha

S<sup>4</sup> had observed similar findings in their study. 42.5% of the tetanus cases occurred within 10 days following injury similar to observations made by Patel J C et al<sup>5</sup>.

The factors associated with poor prognosis in our study were unimmunized status, poor wound management; spasms at presentation, delay in diagnosis and treatment, and these observations are similar to studies done by Patel J C et al<sup>5</sup>. Access to early and proper health interventions are the need of the hour for good prognosis. Similarly with the support of mass media, health education messages for the general public regarding early and proper tetanus wound management needs to be strengthened.

### Acknowledgement

The authors would like to thank the of cooperation of the staff of epidemic disease hospital, Bangalore , the patients and their families and lastly Dr Avi Nahar and Dr Benjamin for their help in conducting the study.

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*Short Communication*

## Study of Parental Handling Patterns in a Primary School of Kolkata

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### Summary

The intricate pattern of parenting in our socio-cultural context needs evaluation hence this study was done with the objective to reveal the parenting styles of school going children. 141 school children belonging to the age group 6-10 years were included in the study. The Parental Handling Questionnaire a 14-item scale consisting of 10 items of care and 4-items of control was administered to the mothers accompanying the children. Rating was done on a 3-point. The scale showed moderate internal consistency. 5 independent factors with overlapping items of care and control were deduced on factor analysis indicating multidimensional aspects of parenting in our society.

Parenting is an intricate art involving the child's style and the parent's approach and responses. Most of the parents rely on the fact that parenting deals with child rearing practices, acting like guardians in guiding and steering them on to become young mature adults. More so, people across the decades have realized that parent-child relationship is perhaps the more sensitive, valuable and complicated interpersonal manipulation when compared to the husband-wife relationship. The child affects the parents and vice-versa but the quality of relationship between the parents changes the way they interact with the child.

A mutually responsive parent-child relationship better termed as Mutuality has been the base of dyadic interaction that helps in shaping a child's emotional, behavioral and cognitive aspects<sup>1</sup>. The enduring child-parent relationship is dependent upon few of the theories like socialization, relationship and family, ecological and transactional<sup>2</sup>. The mutuality model<sup>3</sup> is extremely important so far as a child's self-regulation is concerned. Mutuality is influenced by a couple of factors like socio-economic status, maternal personality and social cognition<sup>4</sup>. Father's mood is responsible for modifying an infant's temperament not only during childhood but also thereafter<sup>5</sup>. A difficult infant temperament is a risk factor for behavioral and emotional problems later in childhood<sup>6</sup>. The mothers act as guiding factors regarding their partner's involvement with their children<sup>7</sup> and a better inter-parental relationship is likely to be established by the

active participation of the mother. The result of positive and negative parent-child interaction do affect a child's temperamental processing and behavioral distortions in adolescence<sup>8</sup>. Harsh and strict parenting patterns have resulted in a child's aggression while withdrawn or intrusive negative parental behavior is related to a child's depression and anxiety<sup>9</sup>. The best predictor of mothers' discipline style is behavioral self-efficacy<sup>10</sup>. Mothers' depressive symptoms are related to children's internalizing behaviors like feelings of inferiority, depression, or worthlessness while temper tantrums, threats, impulsive acts are related to the externalizing behaviors. These maternal trends definitely have an impact on later childhood development<sup>11</sup>.

There are different types of parents –Artisans, Guardians, Idealists & Rational –each have variable views of raising their children, reflecting their own personality and some aspects that is practically unexplored<sup>12</sup>. The numerous parenting styles are Authoritarian (restrictive/ punitive/ legalistic), Authoritative (guiding/interactive), Permissive (indulgent/ responsive/not demanding) and Neglectful (uninvolved/ no discipline). Authoritative parenting style is mostly accepted as the children have high levels of social competence and self-esteem. Peer group popularity is widely prevalent amongst them and they can set their own standards.

Keeping this in view, the present study was conducted with the objective to delineate the various parenting patterns amongst the school children.

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The study was conducted in a primary urban school of Kolkata during the time period between May and August 2005. The school was selected purposively and we intended to include all children of class I – IV. There were a total of 200 school children. Parents (mother/father) were the study respondents. Parents of school children were intimated 2-4 weeks prior to the scheduled program through a common school notice. Each class (I-IV) had two sections and children of each section were informed by the school authorities, a day before to report school with their parents on the day of the interview. In each visit, parents of 15-20 students attended the interview schedule. Out of the total 200 school children, only 141 students could be covered based upon their willingness to participate in the programme.

Of the 141 children; 57 were boys and 84 were girls belonging to the age group 6-10 years. The Parental Handling Questionnaire (PHQ) was administered to the mothers or fathers accompanying the children to the school and the verbatim responses of the parents were rated on the 3-point scale of PHQ.

The Parental Handling Questionnaire developed by Savita Malhotra<sup>13</sup> on the basis of the Parental Bonding Instrument described by Parker et al.<sup>14</sup> was used in this particular study. This 14-item questionnaire measured two parental handling variables viz. *Care* consisting of 10 items (1-10) and *Control* consisting of 4 items (11-14). Scoring was done on a 3-point basis as 0, 1 and 2 with '0' for a 'no' response, '1' for sometimes and '2' for a 'yes' answer.

Statistical analysis was done using Chi-square, Pearson's correlation co-efficient, variance among the items, internal consistency of the scale using Cronbach's alpha, and Principal Component Analysis. SPSS version-9 was used for data analysis.

**Table 1: Genderwise distribution of parental handling scale score (n-141)**

Variables	Male (n= 57)	Female (n= 84)
<i>Care</i> *	13.72 ± 2.76	13.62 ± 2.44
<i>Control</i> **	4.60 ± 1.96	3.92 ± 3.92

\*p= 0.614, \*\*p=0.053 (Kruskal Wallis Test)

Table 1 shows the gender wise distribution of Parental Handling scale score. The mean score on the *Care* items was comparable to one reported by scale authors (13.06 ± 2.8). The mean score on *control* items

was low compared to scores reported by scale authors (4.58 ± 1.41).

1 child had *care* score above 2SD of mean *care* score, while 4 children had *care* score below 2 SD of mean *care* score. All children had *control* score within ± 2SD of mean *control* score.

The Principal Component Analysis (PCA) indicated a pattern of variance among the 14 items of *care* and *control* respectively. Factor 1 showed highest variance (21.462%; initial Eigen value= 3.005), subsequent factors have decreasing values of variance. On inspection of the individual factors, we did not get a 2-factor solution, care and control as derived by the scale authors; instead a 5-factor solution is obtained from PCA, the composition of which is as follows:

Component 1 includes items 10(*care*) and 11, 13,14 (*control*). We named this Component as *Control-Reprimand*.

Component 2 includes items 3,4,5 (*care*). We named this Component as *Care and Company*.

Component 3 includes items 8,9 (*care*). We named this Component as *Control Decision*.

Component 4 includes items 2,7 (*care*) and 12(*control*). We named this Component as *Give Positive Support*.

Component 5 has -ve correlation with item 1(-0.585) and +ve correlation with item 6 (0.765). We named this Component as *Trust*.

In our socio cultural context the mothers are unable to express their affection and child's deeds by smiling; instead they might be adopting a different measure to convey their feelings towards the children. This can be a plausible explanation of the peculiar finding of the factor 5.

Parental handling is a largely unexplored topic in our socio-cultural context; keeping this in view we tried to decipher few of the aspects of parenting patterns among school going children.

The study was performed based on the Parental Handling Questionnaire where the *care* items were comparable to that reported by the authors; however the *control* items showed lower scores raising the question of applicability/validity of the instrument in our socio-cultural context. Subsequently, it was revealed that unlike 2 distinct factors - *Care* and *Control*; our study analysis derived 5 independent factors namely- *Control-Reprimand*, *Care and Company*, *Control Decision*, *Give Positive Support* and *Trust*. These factors indicate that there have been

overlapping of the *care* and *control* items giving rise to such mixed patterns of parenting styles. High care and nurturance with low control makes a child remain healthy while the combinations produced in our study reveals a conglomeration of care and control factors that raises the question of level of parental bonding with their children. This peculiar finding can be explained by the cultural, environmental and genetic factors possibly modifying the parenting styles requiring further research. Another interesting finding is that the method of handling a child by his/her mother varies so far as *care* factor is concerned (as revealed by the -ve correlation of item 1 and +ve correlation of item 6 of the questionnaire). Parents display care in a different way possibly suppressing emotional responses while being overprotective when the child is in distress. This composite result has depicted a deviant parenting style in nurturing their off- springs. Here lies the significance of child-parent bonding; impairment of which leads to future emotional disorders in the children. In today's scenario, the dreaded outcomes of poor parent-child attachment namely substance abuse and HIV needs special emphasis.

The moderate internal consistency (Cronbach's alpha = 0.513) observed in the present study might possibly point to certain modifications in the existing scale. Analysis has produced an absolutely different factor structure from the one reported by the scale authors. The study shows that in our socio-cultural context, the concept of *care* is much too complicated; instead of a discrete *Care* factor there is a multidimensional idea embracing other factors as already mentioned above. However, small sample size and absence of follow-up inadvertently affected a definite conclusion. The proposed factors need to be studied in larger samples using techniques of confirmatory factor analysis (CFA).

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*Short Communication***Physical Wife Abuse in an Urban Slum of Pune, Maharashtra**\*Manisha M. Ruikar<sup>1</sup>, Asha K. Pratinidhi<sup>2</sup>**Summary**

The present cross-sectional study was undertaken during August- September 2004 in an urban slum area of Pune to find out prevalence & characteristics of physical wife abuse/wife beating & to ascertain women's views & behavior towards it in a social context. The prevalence of physical wife abuse/wife beating was reported to be 61.5%. The most commonly reported husband's behavior included slapping (98.8%) followed by pushing (39.8%) & kicking wives (33.7%). 17.8% women justified physical abuse by husband. The most commonly reported behavior of women included crying (85.2%) & silently bearing the physical abuse (59%).

Physical wife abuse (wife beating) evolves in part from women's subordinate status in society. Justifications for wife beating frequently evolve from gender norms – that is, social norms about the proper roles & responsibilities of men & women. Many cultures hold that men have the right to control their wives behavior<sup>1</sup>. In order to understand problem of wife beating, one needs to study the 'social context' in which it occurs, including the status of women, gender norm, socio-economic status & relationship dynamics<sup>2, 3</sup>.

This community based cross-sectional study was undertaken during August - September 2004 in Mangalwarpath – an urban slum area under Urban Health Centre of BJ Medical College, Pune to find out prevalence & characteristics of physical wife abuse / wife beating and to ascertain women's views & behavior during wife beating in a social context. Married women in 15-45 years age group were the study subjects. Households with married women of 15-45 years were enlisted and 10% of these were selected by systematic random sampling. From these selected households, one study subject from each household were included. Thus we could include a total of 135 study subjects and all of them were interviewed with pre-tested structured pro-forma. The questions in the proforma were phrased in a supportive & non-judgmental manner. We tried to establish good

rapport with the respondent before asking the sensitive aspects related to physical abuse.

Physical abuse was assessed by asking woman if she was ever slapped, pushed kicked, pulled by hairs, hurt with weapon or object, punched, burned. Any woman who reported being physically abused in this manner was asked about the frequency of abusive episodes, reasons for abusing, whether she justifies wife beating, her behavior during abusive episodes, reasons for tolerating if so, whether she was pregnant during any episode & whether she received medical treatment for injuries sustained as a result of this abuse.

Out of 135 women, 83 (61.5%) reported physical abuse. Out of these 83 women, 85.5% reported repeated physical abusive episodes. The most commonly reported types of husband's abusive behavior included slapping (98.8%) followed by pushing (39.8%) & kicking wives (33.7%). Less frequently reported behavior included pulling by hairs (24.1%) & using a weapon/object against wives (24.1%). Beating during pregnancy & life threatening abuse were reported by 18% & 12% respectively.

The prevalence of physical wife abuse found in this study is consistent with the findings of previous community based studies in India<sup>4, 5</sup> & abroad. In 48 population based surveys from around the world, 10%

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**Table 1: Women's views towards wife beating /physical wife abuse (n= 135)**

Wife's views	Experienced physical abuse	Not experienced physical abuse	Total No. (%)
	No. (%)	No. (%)	
Justified	22 (26.5)	2 (03.8)	24 (17.8)
Unjustified	61 (73.5)	50 (96.2)	111 (82.2)
Total	83 (100)	52 (100)	135 (100)

to 69% of women reported being physically assaulted by an intimate partner at some point in their lives<sup>6</sup>. In WHO multi-country study on women's health & domestic violence against women; for ever-partnered women, the range of life time prevalence of physical violence by an intimate partner was between 13% & 61% with most sites falling between 23% & 49%<sup>7</sup>. In WHO multi-country study, the vast majority of women physically abused by partners experienced acts of violence more than once. In the same study, the proportion of ever-pregnant women physically abused during at least one pregnancy exceeds 5% in 11 of the 15 settings<sup>7</sup>.

**Table 2: Women's behavior according to their views towards wife beating/physical wife abuse (n= 135)**

Wife's behavior	Views		Total No. (%)
	Justified No. (%)	Unjustified No. (%)	
Passive	10 (45.5)	28 (45.9)	38 (45.8)
Active	12 (54.5)	33 (54.1)	45 (54.2)
Total	22 (100)	61 (100)	83 (100)

17.8% women justified beating by husband. Domestic violence continues to be frighteningly common & to be accepted as 'normal' within too many societies<sup>7</sup>. Data from NFHS II shows that 56% women justified beating by husbands<sup>8</sup>. In WHO multi-country study there was wide variation in women's acceptance of different reasons, and indeed of the idea that violence was ever justified. While over three quarters of women in the city of Brazil, Japan, Namibia, and Serbia & Montenegro said no reason justified violence; less than one quarter thought so in the provincial settings of Bangladesh, Ethiopia & Peru<sup>7</sup>.

It was indeed interesting to study behavior during beating of those 61 (73.5% of abused) women who think wife beating is unjustified. The most commonly reported wife's behavior included crying (85.2%) & silently bearing the physical abuse (59%). Less frequently reported behavior included shouting at husband (23.0%), holding husband's hand (18%) & running away from house (16.4%). The rarest behavior was slapping the husband (3.3%). Only crying, only silently bearing - these two responses together were reported by 28 out of 61 (46%) abused women.

61 women consistently reported similar reasons for tolerating wife beating & remaining in abusive relationships. The most commonly reported reasons were social stigma (36.1%) & concern for children (32.8%) followed by economic dependence (24.6%), lack of family/friend support (23.0%) & inhibitions of upbringing (23.0%). None of the women ever reported to formal services like police, legal advisors, women's NGOs.

In all countries of WHO multi-country study, the interviewer was the first person to whom many abused women had ever talked about their partner's physical violence. Over half of physically abused women (between 55% & 95%) reported that they had never sought help from formal services<sup>7</sup>. Low use of formal services reflects in part their limited availability. However, even in countries relatively well supplied with resources for abused women, barriers such as fear, stigma & the threat of losing children stopped many from seeking help<sup>7</sup>.

Changing women's views towards wife beating is probably not sufficient for changing their behavior during wife beating. A woman's behavior is often limited by the options available to her. Thus what may seem to an observer as passive behavior during beating may in fact be strategic assessment of what it takes for the woman to survive in the marriage and to protect herself and her children. Perhaps women's behavior during wife beating will change if in addition to changing women's attitude towards wife beating they are empowered and supported by other family members, friends or women's support group firstly to prevent abusive episode per se & secondly to present with alternatives to living with an abusive spouse whenever needed. Otherwise wife beating will continue to put women at increased risk of depression, suicide

attempts, chronic pain syndromes, psychosomatic disorders, physical injury, gastrointestinal disorders irritable bowel syndrome & a variety of reproductive health consequences.

The first recommendation drawn from findings of WHO multi-country study is to promote gender equality & women's human rights<sup>7</sup>.

### Acknowledgement

We acknowledge entire staff at Urban Health Centre of Department of Preventive & Social Medicine in BJ Medical College, Pune.

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## Indian Public Health Association

### Headquarter Secretariate

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### Notice for 53rd Annual Central Council Meeting

The 53rd Annual Central Council Meeting of the IPHA will be held on 8th January, 2009 at 6 PM at Meeting Hall of Kempegowda Institute of Medical Sciences (New Campus), Banashankari 2nd stage, Bangalore -560 070. (Please reconfirm the exact venue and time from the organizers of the conference)

Sd/-  
**Dr. Madhumita Dobe**  
Secretary General, IPHA

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*Short Communication*

## **Gender Inequality in Nutritional Status among under Five Children in a Village in Hooghly District, West Bengal**

**\*I. Dey<sup>1</sup>, R.N. Chaudhuri<sup>2</sup>**

### **Summary**

A community based, cross-sectional study was conducted in the Mollasimla village of Hooghly district of West Bengal, to examine the differences in nutritional status of under-five males and females and to determine the different bio-social factors associated with such differences. It was found that 55.9%, 51.4% and 42.3% of the girls were underweight, stunted and wasted respectively compared to 46.6%, 40.5% and 35.3% of the boys and a significantly higher proportion of malnutrition was found to be present among female children of higher birth order and those belonging to families with lower per capita income compared to the males.

Girls of today are the women of tomorrow. The skills, ideas and energy of girls are vital for full attainment of the goals of equality, development and peace. For a girl to develop to her full potential, she needs to be nurtured in an enabling environment where her needs for survival and development are met. Exploration of the problems of the girl child in South East Asian Region has raised several important issues. The most alarming aspect in the 2001 census report of India, is the sharp fall in the sex ratio specially of children (0 – 6 years)<sup>1</sup>.

From conception to death, the girl child is exposed to all sorts of discrimination, abuse, and exploitation. There exists worldwide evidence of discrimination and violence against girls that begins even before they are born and continues unabated throughout their lives. They often have less access to nutrition, physical and mental health care, and education and enjoy fewer rights, fewer opportunities and fewer benefits of childhood and adolescence than do boys. Discriminatory attitudes against females vary from being implicit to those that are quite explicit. So this study was undertaken to examine the differences in nutritional status of under-five males and females and to determine the different bio-social factors associated with such differences.

It was a community based cross – sectional study carried out from June 2003 to May 2004, in the Mollasimla village of Hooghly district of West Bengal, which is the rural field practice area of All India Institute of Hygiene and Public Health, Kolkata. The village Mollasimla had a population of 3176.

All the children, 0 – 59 months of age belonging to the study area were included as study subjects. The mothers of the children were the respondents. Care was taken to ensure that the family of the particular under five was a permanent resident of the area and not a frequent migrant. By complete enumeration of the eligible under five children in the village of Mollasimla, 116 males and 111 females were registered for the study with the help of the health workers.

A pre-designed and pre-tested semi structured interview schedule was used to collect the data. Data was collected on religion, type of family, number of family members and occupation and literacy status of the parents and per capita monthly income of the family. For every under-five boys and girls, age and birth order were considered along with assessment of nutritional status by anthropometric methods. Salter's spring balance was used for measuring the weight of the children with minimum clothing and reading was taken to the nearest 100gm. Height was measured

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**Table 1: Distribution of male and female children according to their nutritional status**

Nutritional status	Male (n= 116) No.(%)	Female (n= 111) No.(%)	Total (n= 227) No.(%)
<b>Weight for age (Z-score of NCHS Std)</b>			
Normal	62(53.4)	49(44.1)	111(48.9)
< 2SD - > 3SD	30(25.9)	43(38.8)	73(32.2)
< 3SD	24(20.7)	19(17.1)	43(18.9)
<b>Height for age (Z-score of NCHS Std)</b>			
Normal	69(59.5)	54(48.6)	123(54.2)
< 2SD- > 3SD	45(38.8)	53(47.8)	98(43.2)
< 3SD	2(1.7)	4(3.6)	6(2.6)
<b>Weight for height (Z-score of NCHS Std)</b>			
Normal	75(64.7)	64(57.7)	139(61.2)
< 2SD-> 3SD	38(32.7)	43(38.7)	81(35.7)
< 3SD	3(2.6)	4(3.6)	7(3.1)

using standard measuring rod by making the child stand erect against the wall and reading was taken to the nearest 0.5 cm. For children less than two years of age, recumbent length was measured with an infantometer. For reporting weight for age, height for age and weight for height relative to NCHS reference, Z-scores had been used. Verification of records was done as and when necessary. Proportions and tests of significance were used for statistical analysis.

The study population comprised of 227 under five children of which 116 were males and 111 females. 64.7% of males and 62.2% of females were Muslims and the rest were Hindus. The distribution of male and female children in different age groups was almost equal. Almost 75% of the children were from the families of size one and two. Majority of the children were of first or second birth order but 6.6% of children belonged to birth order greater than or equal to five.

Table 1 depicts the nutritional status of under five children by gender. According to weight-for-age, a higher percentage of females (55.9%) were undernourished compared to the males (46.6%). 18.5 % of the children were severely

undernourished (< 3SD). According to height-for-age, 51.4% and 40.5% of girls and boys were found to be stunted (below - 2 SD). It was also found that 3.6 % of the females as compared to 1.7% of the males were below - 3 SD from the NCHS standard. Considering weight-for-height, 42.3 % of females were found to be wasted (less than - 2 SD) compared to 35.3% of males.

20.9% of the children in 12 - 59 months of age group had their mid upper arm circumference less than 12.5 cm.

To assess the different bio-social factors associated with gender differences in nutritional status,

weight-for-age was used (Table-2). It was found that females had a higher proportion of malnutrition in both the religions. Among Hindu community, 52.4% of females compared to 39.1% of the males and among

**Table 2: Bio-social factors related to gender inequality in malnutrition**

Bio-social factors	Males (n= 116)		Females (n = 111)	
	Total	underweight	Total	underweight
<b>Religion</b>				
Hindu	41	16(39.1)	42	22(52.4)
Muslim	75	38(50.6)	69	40(58)
<b>Birth order</b>				
First	55	24(43.6)	52	14(26.9)
Second/more*	61	30(49.2)	59	48(81.4)
<b>Literacy status of father</b>				
Illiterates	54	28(51.9)	55	34(61.8)
Literates	62	26(42)	56	28(50)
<b>Literacy status of mother</b>				
Illiterates	54	29(53.8)	67	40(59.7)
Literates	62	25(40.3)	44	22(50)
<b>Per-capita monthly income of the family</b>				
< Rs. 400**	81	34(42)	77	48(62.3)
≥ Rs. 400	35	20(57)	34	14(41.1)

Figures in parenthesis are percentages  
\* $\chi^2= 13.5$ ,  $p < 0.05$  \*\* $\chi^2= 6.58$ ,  $p < 0.05$

the Muslims, 58% of the females compared to 50.6% of males had malnutrition. The present study revealed that among the first birth order children 26.9% of the girls were malnourished compared to 43.6% the males but the difference was not significant statistically. A higher proportion of females (81.4%) of second and subsequent birth order were malnourished compared to the males of same birth order. Female children of both literate and illiterate parents were more undernourished compared to their male counterparts. However, the differences were not statistically significant.

Taking the current cost inflation index, the poverty line per capita income comes at Rs 362.23 per month. So children falling in per capita income group below Rs 400 per month were taken into consideration as low income group. Among children belonging to families with per capita income less than Rs 400 a higher proportion of females (62.3%) were malnourished compared to males (42%).

Nutritional status is a major determinant of health and well being of children. We found, 55.9% of girls were malnourished compared to 46.6% of boys. NFHS 2 also reported a higher percentage of undernourished females (48.9%) than males (45.3%) among under three years' children. Similar to our findings, other studies in various parts of India<sup>3-6</sup> also reported higher proportion of malnutrition among female under five children than males. In the villages of Maltab Thana in Bangladesh, Chen et al (1987)<sup>7</sup> showed 14% of females to be severely malnourished compared to 5% of males. Chen et al<sup>7</sup> also detected higher proportion of stunting among females in Bangladesh. Wasting was also higher among girls. So, gender inequality is evident in almost every part of the country and abroad.

The present study shows that 81.4% of the females of second and subsequent birth order were malnourished compared to 49.2% of males of same birth order. It might be viewed that the first child, whether a son or a daughter, is always cared for and discrimination starts when there is already a son in the family or when the expectation of having a son is not met. However, this needs to be substantiated by appropriately designed study.

This study revealed a difference in the nutritional status of male and female under five children. Birth order of the child and family income seem to be

important determinant of discrimination. So mothers should be made aware of the nutritional need of the girl child inspite of limited resources. Community support is also necessary to negate such inequalities.

#### Acknowledgement:

The authors gratefully acknowledge the support and cooperation of Deptt. of Community Medicine and Deptt. of Maternal & Child Health, AIHH&PH, Kolkata as well as Rural Health Unit & Training Centre, Singur, West Bengal.

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*Short communication:*

## **Under Nutrition and Measles Related Complications in an Outbreak of Measles**

**A. Mishra<sup>1</sup>, S. Mishra<sup>2</sup>, \*C. Lahariya<sup>3</sup>**

### **Summary**

An outbreak of measles was reported from Shivpuri district of Madhya Pradesh, India. The authors investigated this outbreak with an objective to describe the under nutrition and measles related complications. A total of 723 children aged 12-59 months were included in this study. Their caregiver was interviewed for necessary information and Mid Upper Arm Circumference measurement of the affected child was done for the assessment of nutritional status. 171 (22.3%) of these had reported to have suffered from one or more measles related complication. 556 (76%) of the measles cases in this study were undernourished. Measles related complications was more among measles affected children who were severely undernourished (38%) in comparison to other groups ( $\chi^2 = 97.80$ ; d.f. =1;  $p < 0.0001$ ).

Outbreaks of measles, a leading cause of childhood morbidity and mortality, is still common in countries like India<sup>1, 2</sup>. The low measles vaccine coverage, high childhood undernutrition, poverty, Vitamin A deficiency, and low immunity are often described as contributory factors for the occurrence of these measles outbreaks<sup>3</sup>. The studies have reported that both infections and the complications are more frequent amongst undernourished children<sup>4, 5</sup>.

Measles is commonly occurring disease in children in India and amongst the leading cause of childhood morbidity and mortality<sup>1</sup>. Although reports suggest a decline in measles incidences worldwide<sup>2</sup>, the outbreaks are common in countries like India<sup>3, 4</sup>. It is associated with high rate of complications<sup>5</sup> and contributes to a major proportion of childhood mortality<sup>6</sup>. The low measles vaccine coverage, high childhood undernutrition, poverty, Vitamin A deficiency, and low immunity are often described as contributory factors for the occurrence of these measles outbreaks<sup>7</sup>. The studies have reported that both infections and the complications are more frequent amongst undernourished children<sup>8, 9</sup>.

An investigation of a confirmed measles outbreak

in Shivpuri district of Madhya Pradesh, India was conducted with the objective to understand the possible effect of undernutrition on measles and related complications.

A reported outbreak of measles was investigated by the teams from a medical college. The outbreak had occurred in Shivpuri district of Madhya Pradesh in April - May 2004. A cross sectional survey was carried out from May 12-19, 2004 by the study teams comprised of faculty members, post graduate students, interns from medical college and paramedical staff from chief health and medical officer, Shivpuri District.

The sub centre was chosen as study cluster for this study. Shivpuri rural area has 199 sub-centers and 30 sub-centres were included in this study by thirty cluster sampling technique<sup>6</sup>. A total of 206 villages in these 30 subcentres were surveyed by investigating teams. The standard case definition was used as diagnostic of measles. A combination of major and minor criteria was used to clinically identify the measles cases; a study subject was considered to have measles, if the case presented with one of the major criteria and any of the three minor criteria<sup>7</sup>. Only the clinical definition of measles case was considered, as the index

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case was already evaluated by experts. The mothers or any other caregivers of any case of measles or related complication in last 3 months (to avoid recall bias) were enquired for relevant information using a WHO standard questionnaire modified to suit local needs. The details of the methodology have been published elsewhere <sup>8</sup>.

If a child affected from measles was aged between 12-59 months; the Mid Upper Arm Circumference (MUAC) was also taken. The non dominant upper arm was chosen for the measurement and the circumference of location in between the tip of the shoulder and the tip of the elbow (olecranon process and the acromian process) was considered as MUAC <sup>9</sup>. The study teams were trained in taking MUAC to minimize the inter observer variations.

Any episode of diarrhea, pneumonia or ear infection (dummy for Otitis media) or any other identified complication, which led to the hospitalization, was considered complicated case for this study. MUAC of < 12.5 cm was considered as severe undernutrition; while MUAC in the range of 12.5-13.4 cm was termed as under nutrition only. All the children who had MUAC  $\geq$ 13.5 cm were considered as normal in this study. The data so collected was analyzed using Epi-Info (version 6) software.

A total of 729 children aged 12-59 months with 171 cases with one or more complications were found and included in this study. However, the MUAC could be taken for 723 children and final analysis was done with these children only.

The children were almost equally distributed in all age sub-groups with highest proportion (30.4%) in 24-35 months age group (Table 1). The proportion of severely undernourished children was highest in 12-23 month old measles affected children and this proportion declined for subsequent age subgroups. The proportion of children with MUAC of 12.5-13.4 cm was almost equal in all 4 sub groups. It was noticed that overall 76% of our study children were undernourished (Table 1).

Almost one fifth (22.3%) children in our study group had developed any measles related complication. Measles related complications was more

**Table 1: Distribution of MUAC according to age of the study subjects**

Age group (Months)	MAUC			Total No (%)
	< 12.5 cm No (%)	12.5-3.4 cm No (%)	$\geq$ 13.5 cm No (%)	
12-23	101 (63)	41 (27)	16 (10)	158 (21.8)
24-35	121 (55)	64 (29)	35 (16)	220 (30.4)
36-47	81 (44)	59 (32)	45 (24)	185 (25.6)
48-59	46 (29)	43 (27)	71 (44)	160 (22.1)
Total	349 (48)	207 (28)	167 (24)	723 (100)

among measles affected children who were severely undernourished (38%) in comparison to other groups ( $\chi^2 = 97.80$ ;  $df= 1$ ;  $p< 0001$ ; Table 2)

It comes out that more than 3/4<sup>th</sup> of the children, who had suffered an episode of measles in this outbreak, were undernourished. The other researchers have also reported the similar findings for measles case<sup>10</sup>. The reported prevalence of undernourishment in this state was 53% during the same time, reported by a national survey <sup>11</sup>. It may be suggested that the chances of measles during an outbreak are highest

**Table 2: The MUAC and the occurrence of measles related complications**

Complications	MAUC			Total No (%)
	< 12.5 cm No (%)	12.5-3.4 cm No (%)	$\geq$ 13.5 cm No (%)	
Yes	133 (38)	021 (10)	007 (04)	171 (22)
No	216 (62)	186 (90)	160 (96)	562 (78)
Total	349 (48)	207 (28)	167 (24)	723 (100)

$\chi^2 = 97.80$ ;  $d.f. = 1$ ;  $p < 0.0001$ .  $\chi^2$  test was done for MUAC less than 12.5 cm and the rest.

amongst undernourished children. However, this should be substantiated by appropriate study.

The undernourished children are most likely to develop measles related complications. This risk may be more among severely undernourished children. Studies by researchers in India and abroad have reported similar findings <sup>10, 11</sup>. However, under nutrition may also be the effect of measles and/or

measles related complications; this should also be duly considered. Higher proportion of under nutrition among measles affected children in the present study is also a matter of concern. Proportion of measles cases with complications was observed to be more among measles cases with severe under nutrition than others. Thus, special attention should be given to undernourished children during a measles outbreak.

### Acknowledgement:

The authors would like to thank Dr (Mrs.) Shaila Sapre, The Dean, GR Medical College, Gwalior, India for her support and encouragement during the study. We also thank the health commissioner, MP State and the district administration, Shivpuri for cooperation during the study. The technical support provided by the team of UNICEF, Bhopal office was contributory in completing this study in time. The members of survey team also deserve the special mention.

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*Review Article***Public Health Strategies to Stem the Tide of Chronic Kidney Disease in India****\*D. Bhowmik<sup>1</sup>, C.S.Pandav<sup>2</sup>, S.C. Tiwari<sup>1</sup>****Summary**

It is estimated that 10-15% of the population has chronic kidney disease (CKD), resulting in significant health expenditure, which is largely met by out-of-pocket by the patient in India. However, the seriousness of this public health problem has remained largely under-recognized so far. Luckily the preventive measures are simple and not difficult to implement. Public health strategies are essential to control the burgeoning problem. Lifestyle modifications can reduce the incidence of obesity, hypertension and diabetes. These diseases account for a significant proportion of CKD cases. Active involvement of the primary care physicians is vital for early detection of CKD with retardation of its progress, since nephrologists do not see the patients in the early stages. The role of community health specialists is essential to organize health education programs and screening camps, form active patient support groups; and incorporate the prevention program in the various tiers of the health-care system. Availability of optimal nephrology services in peripheral hospitals can rehabilitate most cases of end-stage renal disease, and also prevent the illegal organ trade, which keeps rearing its ugly head at regular intervals in India.

**Key Words:** chronic kidney disease, public health strategies, prevention.

**Introduction**

In the last century there has been a quantum leap in the delivery of health care to the public especially in developed countries, resulting in a significant reduction in infectious diseases and overall improvement in the health indices. Diseases like pneumonia, influenza, tuberculosis and diarrhoea which were the leading causes of mortality in the beginning of the twentieth century in the advanced countries have now been replaced by cardiovascular diseases, cancer and chronic obstructive airway disease at the top of the list<sup>1</sup>. India too is witnessing a gradual demographic, nutritional and epidemiological transition. The life expectancy has increased, resulting in an increase in the elderly population. The prevalence of obesity has increased especially in the urban areas, with its attendant problems. According to the National Health Profile 2007 published by the Central Bureau of Health Intelligence under the auspices of the Directorate

General of Health Services non-communicable diseases like cardiovascular diseases, stroke, diabetes, cancer and accidents are now responsible for significant morbidity and mortality. In fact currently they account for almost two-thirds of all deaths (as compared to less than half of all deaths 30 years back). However, renal diseases do not find a separate mention in public health statistics<sup>2</sup>.

The burden of CKD in the community has so far been under-recognized. In order to correct this anomaly and appropriately convey the course of the disease since its onset, the National Kidney Foundation USA introduced the term Chronic Kidney Disease (CKD) in 2002 (replacing the earlier commonly used term chronic renal failure)<sup>3</sup>. Chronic kidney disease has been graded into 5 stages according to the severity of the disease (Table 1). It may seem surprising that a disease, which is not an accepted public-health problem, actually afflicts approximately 11% of the

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**Table 1: Stages of Chronic Kidney Disease<sup>3</sup>**

Stage	Description
Stage 1	Evidence of kidney damage (sustained proteinuria or renal scarring on imaging) with normal kidney function (GFR > 90 ml/min)
Stage 2	Kidney damage with mildly decreased kidney function (GFR 60-89 ml/min)
Stage 3	Moderately decreased kidney function (GFR 30-59 ml/min) with or without evidence of kidney damage
Stage 4	Severely decreased kidney function (GFR 15-29 ml/min)
Stage 5	Kidney failure or end-stage renal disease necessitating renal replacement therapy (GFR < 15 ml/min)

USA population, while another 11% are at increased risk of developing the disease<sup>3</sup>. The figures are likely to be similar in India. Stage 5 CKD requiring dialysis or end-stage kidney disease (ESRD), which catches the attention of the public and health administrators is only the tip of an ice-berg; while the vast majority of CKD patients remain submerged in the sea of ignorance. The reasons for this are many. CKD up to stage 3 is usually asymptomatic and awareness of the disease in the lay population is abysmal. Due to lack of awareness amongst health care professionals, urine and blood tests to detect CKD are not routinely done in those susceptible to develop the disease e.g. diabetes, hypertension, etc<sup>3,4</sup>. Besides the diagnosis of chronic kidney disease is often missed since the commonly used marker of renal function-serum creatinine is in fact not sensitive enough to detect renal impairment until the glomerular filtration rate has reduced to almost 60 ml/min (normal 80-120 ml/min). Another very important reason is that the correct statistics of CKD is in fact not generated, since this entity is not yet listed in the International Classification of Diseases by the WHO. Surprisingly hypertensive nephrosclerosis, which accounts for a quarter of all dialysis patients is also not mentioned under renal diseases<sup>5</sup>. This probably explains why CKD is not even mentioned in a recent report enumerating the

principle non-communicable diseases leading to death in India<sup>6</sup>.

CKD (Stage 3 and above) is incurable and relentlessly progressive leading ultimately to ESRD. (However a large number of patients die of cardiovascular diseases before reaching ESRD, since CKD patients have a 20 fold higher cardiovascular risk as compared to the general population). Dialysis has been made freely available at government expense to patients with ESRD in most developed nations. The US Renal Data System shows that 1526/per million of the US population are currently receiving maintenance dialysis, while in Taiwan the figure is 1830/per million<sup>7</sup>. Japan and Singapore are not far behind. The number of patients needing dialysis in India is actually likely to be similar. It is only recently that the prevalence of renal disease in the Indian population has been studied<sup>8,9</sup>. Further studies are in progress, along with compilation of registry data. It is likely that between 10 to 15% of the general population has CKD. This is not surprising given that the prevalence of hypertension and obesity is increasing rapidly and India is the diabetic capital of the world. But the stark reality is that 90% of CKD patients in India do not even get to see a nephrologist<sup>10</sup>. Most of the patients who receive nephrology opinion cannot afford renal replacement therapy and die. In fact the cost of maintaining stage 5 CKD patients has burnt a deep hole in the health-care budget of even affluent nations, who are finding it hard to cope with it. The overall impact of this condition on society is enormous; and in the absence of government or insurance benefits, for the individual and his family it is often devastating. In the private sector the cost of maintenance hemodialysis is about Rs.12 000 per month, while the cost of chronic ambulatory peritoneal dialysis is Rs.18000 per month. This translates into an enormous cumulative expense, as it is required as long as the patient lives. As of now maintenance dialysis in government hospitals is almost non-existent. Hence the attention has turned to finding effective means of preventing the initiation and the progression of CKD<sup>3</sup>.

Luckily the prevention of CKD is not too difficult and it does not need high-end technology. But it cannot be achieved by nephrologists alone. What it needs is concerted action at every level of health care including general practitioners, internists, orthopaedicians, gynecologists, community medicine, various

professional associations, and also very importantly the policy-makers. The role of family support groups of CKD patients and citizens organizations is equally important in generating awareness. It is now accepted that preventing CKD has the potential to improve the quality of life of many individuals, and save health care costs by avoiding the need for dialysis and transplantation<sup>11</sup>. Public health policy to control CKD is now being implemented by several countries including USA<sup>12</sup> and Cuba<sup>13</sup>.

### Preventive measures for chronic kidney disease

Like any other disease prevention of CKD can also be considered under the following heads:

#### Primordial Prevention

Primordial prevention i.e. the prevention of the emergence or development of risk factors in the population plays a vital role in the prevention of CKD. These may be classified as:

- Prevention of intrauterine growth retardation

Many epidemiological studies have found an inverse association between birth weight (when low) and hypertension in adulthood<sup>14, 15</sup>. Nephrogenesis is complete by the 36<sup>th</sup> week. Maternal malnutrition between the 9<sup>th</sup> and 36<sup>th</sup> gestational week, and consequent intra-uterine growth retardation leads to a low nephron number as a result of reprogramming of nephrogenesis. In the presence of limited resources, the development of the brain and the heart get preference over other organs. This leads to intra-glomerular hypertension, hyperfiltration, proteinuria and a propensity to CKD in later life<sup>16</sup>. Hence steps to prevent CKD should start in the womb. Adequate nourishment during pregnancy is essential for optimal renal development.

- Healthy environment

A wide variety of bacterial, viral and parasitic infections can lead to post-infective glomerulonephritis (PIGN)<sup>17</sup>. The incidence of PIGN in the industrialized countries has reduced drastically as a result of improved living standards and reduction in infectious diseases. However PIGN is still common in the poorer nations. Although most cases of PIGN recover completely, it is now known that a small but significant percentage of patients (especially when PIGN occurs in adults)

develop persistent proteinuria, hypertension and even CKD several years later<sup>17</sup>. Similarly, epidemiologic studies have suggested that low level exposure to lead over prolonged periods may be associated with CKD and or hypertension<sup>18</sup>. Introduction of lead-free petrol in India has substantially reduced the environmental exposure to lead. Hence a clean pollution free environment contributes to reduction in CKD.

- Health Promotion

Although kidney diseases have high prevalence in the community with serious implications, currently awareness is very poor. A healthy life-style can prevent obesity, hypertension and type 2 diabetes. In addition kidney diseases increase the risk for cardiovascular diseases, and cardiovascular diseases increase the risk for CKD. Public awareness programs are vital for health promotion. The harmful renal effects of the indiscriminate use of painkillers available over the counter are not well known to the lay public. Kidney disease awareness programs should start from the high school level. Childhood and teenage obesity is rampant and this is the best age to create an impact. Specific kidney awareness programs for patients suffering from diabetes, hypertension, cardiovascular disease and malignancy can also be very helpful. Active role by the media and social organizations is necessary for spreading the message.

#### Primary Prevention

- Screening programs

The key features of a screening program for renal disease include detection of hypertension and diabetes and urine examination for proteinuria & hematuria<sup>19</sup>. Many countries have screening programs starting in childhood to diagnose kidney disease<sup>20-22</sup>. The cost-benefit ratio of such programs is still to be evaluated<sup>22</sup>. One outstanding example of community screening is the program of community screening Dr Mani, who has reached out to the rural population near Chennai, India for diagnosing and treating hypertension by creating a network of doctors and unskilled individuals at the grassroots. He has been able to diagnose and prevent CKD at a very minimal expense<sup>10</sup>. Similar programs can make a real dent in the retarding CKD.

- Integration of preventive nephrology at the grassroots

Patients with diabetes mellitus, hypertension and other systemic diseases are at a high risk of developing CKD. Currently 30 million persons are diabetics and 118 million are hypertensives. Appropriate management of these conditions helps in preventing the initiation of CKD. A recent long term study has shown that intensified multifactorial intervention in type 2 diabetes prevents the development of diabetic nephropathy besides reduction in cardio-vascular mortality<sup>23</sup>. Obesity is fast reaching endemic proportions in the urban areas of the country, affecting 20-35% of individuals. The concept of Metabolic Syndrome consisting of constellation of visceral obesity, insulin resistance, hypertension and dyslipidemia has now crystallised<sup>24</sup>. These patients are at an increased risk of developing type 2 diabetes mellitus and cardiovascular disease. Now it has been realized that they also have increased chances of developing CKD<sup>25, 26</sup>. Treatment consists of lifestyle modifications to achieve ideal body-weight; along with good control of blood pressure, blood sugar and dyslipidemia. Smoking is a well known health hazard, with more than 9 million tobacco related deaths in the country. Now the harmful effects of smoking on the kidney are established. Smoking increases the risk of proteinuria and CKD<sup>27</sup>. Hence smoking cessation would help in the prevention of kidney disease as well. Primary prevention of CKD is possible only if the primary care physicians are sensitized to preventive nephrology through regular CME programs. Urine examination for proteinuria, and measurement of estimated GFR by the Modification of Diet in Renal Disease (MDRD) or Cockcroft-Gault formula at regular intervals in patients at risk can diagnose CKD early<sup>3</sup>.

- Augmentation of maternal health care

It is unfortunate that sepsis mediated obstetric acute renal failure still accounts for about a fifth of all cases of acute renal failure (now called acute kidney injury or AKI) in the third world. Besides being associated with a high mortality, a significant proportion of survivors develop progressive CKD. Good maternal health care can eliminate this entity.

### Secondary and Tertiary Prevention

Currently diabetes and primary hypertension account for about two-thirds of all cases of ESRD<sup>7</sup>. Early diagnosis of renal disease in these cases and

appropriate measures can help retard the otherwise relentless progression of the CKD to ESRD. It is now proven that good blood sugar control (HbA1C < 6.5%), inhibition of the renin-angiotensin system with angiotensin converting enzyme inhibitors / angiotensin receptor blockers and BP < 140/90 mmHg helps in the retardation of progression of diabetic nephropathy<sup>28</sup>. The degree of proteinuria is both a marker of nephropathy and a modifiable factor. Hence yearly urine examination and GFR estimation in all diabetics with nephropathy is essential to control the surge in cases of diabetic ESRD. Similarly hypertensives need optimal blood pressure control and monitoring of proteinuria and GFR. Internists who see the bulk of these cases need to be trained and sensitized for secondary prevention of CKD.

The timing of referral of CKD patients to the nephrologist remains controversial. Ideally patients diagnosed with CKD (initial stages) should be referred to the nephrologist early, in order to establish the exact diagnosis, and for initiating a comprehensive management program. Subsequently these patients can be followed up by the internist until the pre-dialysis stage. Currently the quality of pre-tertiary care of CKD patients in India leaves a lot to be desired<sup>29</sup>. Obviously this needs an integrated approach involving the general practitioner, internist and nephrologist.

- Dissemination of nephrology services

Currently nephrology services are available in few select tertiary care centers only. Qualified nephrologists with dialysis facilities are essential at all district hospitals so that CKD patients receive comprehensive care and are referred to a tertiary centre well in time. Also patients with AKI will benefit from optimal treatment so that not only is the mortality reduced but the survivors do not progress to CKD.

- Encouraging cadaver kidney donation

There is no doubt that renal transplantation is the best modality of treating end-stage renal failure. However there is an enormous shortage of available organs. This shortfall in the demand-supply ratio results in kidney organ trade and organized rackets in the developing nations. Currently in most of these countries cadaver transplant program has still to take

off. Establishing a successful cadaver transplant program would go a long way in solving this problem.

### Conclusions and Recommendations

Public health measures to contain the epidemic of chronic kidney disease are long overdue. Reducing obesity, hypertension, diabetes and indiscriminate use of non-steroidal anti-inflammatory drugs will strike at the root cause of CKD. A proactive role at the level of primary health care will result in early detection of CKD. Providing adequate nephrology services to the afflicted population is also essential, along with taking measures to achieve a quantum leap in cadaver kidney donation. Only such a multi-pronged approach can successfully reduce the burden of CKD on the community. This will reduce the morbidity and mortality of patients, and the health care budget of the state. The message of the World Kidney Day 2008 was 'Kidney disease is common, harmful and treatable'. To this we may justifiably add 'preventable' as well.

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*Letter to the Editor***Patient's Awareness and some Behavioural Issues  
Related to TB and DOTS**

Dear Editor,

It has been established that knowledge and viewpoint of the beneficiaries are high priority areas to be boosted for the enhanced effectiveness of any control programme. In this regards, we performed a rapid assessment on the patients' awareness and attitude on TB and DOTS, at DOTS centres in Ranchi, with the objectives of studying the awareness, attitude, knowledge of TB and DOTS and also identifying the barriers for effective implementation. The cross-sectional study was carried out during January 2008 in two DOTS centres selected randomly in Ranchi. Thereafter one DOTS day was chosen randomly and all the patients undergoing treatment for at least one month and reporting to the DOTS centre on that DOTS day were selected as the study subjects. A pre-tested, semi-structured questionnaire consisting 36 items was used as data collection tool. Broadly the variables studied were: socio-demographic characteristics of the patients, their perception about TB, role of DOTS, source of information, and acceptance of the treatment. Data was collected by interviewing the patients in an individual basis.

Overall 58 study subjects were included from DOTS Centres at RIMS (n= 27) & Ormanjhi (n= 31). 37(63.8%) were males and 21(36.2%) females with a mean age of 34 years. Of them, 17 (29.3%) were tribal. The average duration of illness was 7 months. The patients thought that they had delayed the treatment for a mean of 2 months ranging from 1 month to 5 months. While 90% of the patients mentioned TB as a common disease in their neighbourhood, 10% patients still thought it to be uncommon and 86% of the patients mentioned cough as the most common symptom of TB. 72.4% correctly stated that TB spreads by coughing, 12 i.e. almost 21% had no idea about the modes of spread of TB. 56% patients in our study covered their mouth while coughing to prevent spread to others. But a substantial number of patients (38%) took no precautions whatsoever and 1 patient had no idea about it. 39 patients (67%) knew the consequences

of non-compliance to proper medication, 5% had no idea what would happen if they stopped treatment in between.

72.4% patients were isolated in rooms due to their disease and also observed isolation of utensils in an effort to prevent the spread. But 16 patients (28%) were not isolated and their utensils were shared in the family. 80% of the study subjects were allowed to attend the social functions by their relatives, while the remaining patients were barred from social functions.

It was found that the major source of information about TB and DOTS was radio for 62% of the patients. Health staff comprised the second major source of information (22%) followed by TV and posters. While enquired about the major cause of delay in seeking treatment, majority (91%) pointed it to be due to social stigmatization associated with being diagnosed as a patient of TB. All patients knew about the DOTS centre and reported that therapy they received was absolutely free of cost. All the respondents had Govt health facility in their place of residence or work and preferred allopathic system of medicine. All patients were satisfied with the treatment they received at the DOTS centre and all were happy with the functioning of DOTS centre. All the patients stated that they would advise others to visit DOTS centre if they had symptoms suggestive of TB.

It is a welcome sign that people of all age groups are coming to the DOTS centre for diagnosis and treatment of TB. There seems to be a wide range (1 to 3 months) of time lag between the onset of symptom suggestive of TB and start of DOTS therapy. Further, as stated earlier, the time delay is heavily dependent upon the individual concern for the disease. Hence, this is a priority area where the control programme should focus, thereby reducing the delay in seeking treatment. Consequent early therapy to a sputum positive case can limit the spread of the disease. Since a proportion of patients are still unaware about the most common presentations, and the modes of spread

of TB, it reflects the lack of the knowledge about the disease in the community. Majority of patients covering their mouths while coughing is a favourable finding of the present study. However, the programme still has to cover few patients which have not yet been properly informed about the basic facts about TB. Most of the patients were allowed to attend the social functions. This means, the diagnosis was probably not revealed to the society and this can be attributed to the social stigma associated with the disease. Social stigmatisation was also the major reason for delaying the initiation of therapy. All patients knew about DOTS centre and it is very satisfying to know that patients knew that DOTS was free, and none paid for the services. This might be due to the proper and effective mass communication, including radio, TV, and also through the health staffs. Further patients had health

facilities near their homes or near work and all preferred allopathic medicine. It is due to the proper functioning of DOTS, that the patients were satisfied with the treatment they were receiving and they would advise others to visit DOTS centre if they had features suggestive of TB.

The findings of the present study highlight the need to further increase the knowledge levels of the patients and the community. Finally, the study being a rapid assessment in a small scale, further studies needs to be conducted.

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## *Book Review*

### **Nabojato Sahayika**

**Amitava Sen, Parul Dutta**

'Nabojato Sahayika' is a good book written in Bengali. The content of the book is selected rightly to cover most aspects of newborn care. The description of different neonatal instruments, how and when to use them and maintenance of these equipments are very useful components. The increasing use of gadgets and technology in newborn health care is making it a necessity for the service providers to know the day to day cleaning and maintenance of commonly used items in the newborn care unit. This improves the life of the instrument and decreases the 'out of order' days per year of the instrument.

There are ample photographs and illustrations at every step of this book. The approach is always on practical components that will help the health care providers to improve their capacity to serve. The efforts of the authors are commendable. Many issues that are not common highlighted in standard textbooks but matters in newborn morbidity and mortality in Indian context are rightly stressed upon.

Comming to the beneficiaries of this book and the course for which it is prepared, I want to express my concern. It is true that Purulia model of sick

newborn care is successful in reducing mortality in neonates and now are in a scaling up mode of this activity at various levels. The Purulia model was in project / experimental setting with strict and dedicated supervision. When we intend to use this encouraging result in wide population it needs to take into account the diluting effect of general health system setting. It is important to remember that we are adding a new group of health care provides in the area of neonatal nursing, which is considered a superior skilled component. Considering the high neonatal mortality and large number of low birth weight newborn and few skilled nursing personnel available, this experimental new tier of newborn care provider and this course is a need. The course needs to be accredited by Universities / councils or institutions to ensure standards in this human resourse development. The real benefits of Purulia model and the Nabojato Sahayika will then reach to the newborns of the country.

**Sukanta Chatterjee**

Prof. & Head, Department of Pediatrics  
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