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Editorial

Tuberculosis (TB) is a highly contagious lung infection that kills about 1.5 million people each year worldwide (WHO). It is one of the oldest diseases known to mankind and has been present in the human population since antiquity – fragments of the spinal column from Egyptian mummies from 2400 B.C. show definite pathological signs of tubercular decay. It has taken a heavy toll on mankind both in terms of lives and development. With the advent of chemotherapy with anti-TB drugs, drug resistance was reported very early. After the discovery of streptomycin, it was noted that case fatality from TB was significantly reduced. But at the same time it was observed that patients improved over the first few months and subsequently their condition deteriorated, in many cases it was due to drug resistance. Single drug resistance is found in almost all the countries treating tuberculosis with anti-TB drugs. However, multi/poly drug resistance (resistance to more than one drug) is the cause for concern. MDR-TB is defined as resistance to Isoniazid and Rifampicin, with or without resistance to other first-line drugs (FLD). MDR-TB is being increasingly reported these days. WHO estimated, there were about 650 000 cases of MDR-TB occurring world-wide in 2010.

In 2006, the first reports of extensively drug-resistant tuberculosis (XDR-TB), an even more severe form of drug resistant TB than multidrug-resistant TB (MDR-TB), began to appear. XDR-TB is defined as resistance to at least Isoniazid and Rifampicin, to any of the fluoroquinolones and to any of the three second-line injectables (Amikacin, Capreomycin, and Kanamycin). Within a year of the first reports of XDR-TB, isolated cases were reported in Europe that had resistance to all first-line anti-TB drugs (FLD) and second-line anti-TB drugs that were tested. In 2009, a cohort of 15 patients in Iran was reported which were resistant to all anti-TB drugs tested. The terms “extremely drug resistant” (“XXDR-TB”) and “totally drug-resistant TB” (“TDR-TB”) were given by the respective authors reporting this group of patients. Recently, a further four patients from India with “totally drug resistant” tuberculosis (“TDR-TB”) were described, with subsequent media reports of a further eight cases. The term “totally drug resistant” has not been clearly defined for tuberculosis, while the concept of “total drug resistance” is easily understood in general terms. The prognostic relevance of in vitro resistance to drugs without an internationally accepted and standardized drug susceptibility test therefore, remains unclear and current WHO recommendations advise against the use of these results to guide treatment. Lastly, new drugs are under development, and their effectiveness against these “totally drug resistant” strains has not yet been reported. For these reasons, the term “totally drug resistant” tuberculosis is not yet recognized by the WHO. For now these cases are defined as extensively drug resistant tuberculosis (XDR-TB), according to WHO definitions.

The discovery of patients with MDR or XDR-TB emphasizes the importance of ensuring that all care for tuberculosis, whether in the public or private sector, must conform to international standards in order to prevent the emergence of drug resistance. Almost all countries must, in addition, ensure appropriate diagnosis and treatment of cases of MDR-TB. National regulations for the quality and dispensing of anti-TB drugs, particularly of the second-line drugs, need to be strictly enforced.

ADHERENCE OF THE NTP TO DOTS RECOMMENDED DEFAULTERS TRACING MECHANISM IN KHYBER PAKHTUNKHWA, PAKISTAN

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ABSTRACT

Introduction: Tuberculosis is still a major public health problem worldwide. Pakistan is one of the few countries with extremely high tuberculosis (TB) incidence and ranks sixth among the 22 high TB burden countries. World Health Organization (WHO) and International Union Against Tuberculosis and Lung Diseases (IUATLD) advocate the use of DOTS strategy to control tuberculosis. The study aimed to determine the adherence of DOTS facilitators and treatment supporters to the defaulter tracing mechanisms in Khyber Pakhtunkhwa.

Methodology: A Cross Sectional study was conducted in five districts Khyber Pakhtunkhwa. A total of 200 participants were included in the study of which 150 were DOTS facilitators and 50 were treatment supporters. A pre-tested structured questionnaire was administered to the participants. Five randomly districts of Khyber Pakhtunkhwa were selected out of the total of 24 districts and from each district 10 health facilities were then chosen. The DOTS facilitator and treatment supporters attached to these health facilities were interviewed. Two Focus Group Discussions were also held from a group of defaulted patients.

Results: The study showed that 90% of the health facilities did not have desk guides and 82% of the treatment supporters did not receive training in DOTS strategy. The reasons of defaulting mentioned by DOTS defaulters in the Focus Group Discussion were lack of defaulter tracing mechanism that approach them and health education regarding the hazards of treatment interruption.

Conclusion: The study is very significant as it highlights the deficiencies in implementation of DOTS tracing mechanism. The findings of the study could be of help to national as well as provincial tuberculosis programme. The main recommendation is to provide training to treatment supporters in DOTS strategy and to update guidelines for defaulter tracing.

Key words: Tuberculosis, Pakistan, Cross-sectional study, World Health Organization.

INTRODUCTION

World Health Organization (WHO) and International Union Against Tuberculosis and Lung Diseases (IUATLD) advocate the use of DOTS strategy to control tuberculosis.[1,2] DOTS strategy is made up of five operational components: political commitment, diagnosis and follow up through sputum microscopy, regular un-interrupted supply of drugs, accurate cohort recording and analysis, and use of standardized short course drug regimen including direct observation of treatment by people responsible to the health services. The direct observation of treatment component is intended to address patient's non-compliance. DOTS is one of the simplest strategies to help cure the tuberculosis patients.[3]

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Pakistan is one of the few countries with extremely high tuberculosis (TB) incidence and ranks sixth among the 22 high TB burden countries[4] and contributes 43% of the TB cases in the Eastern Mediterranean Region. Although national TB programme in Pakistan has made noticeable progress during the last few years the treatment success and case detection rates are far below the global targets of 85% treatment success and 70% case detection rates.[5] A defaulter rate of approximately 12% is a challenge for the national programme interventions.[6] The Khyber Pakthunkhwa Province of Pakistan with an estimated population of 20 million lies in the northwestern part of Pakistan bordering Afghanistan. The estimated number of all forms tuberculosis was 329 per 100,000 population in the year 2004 and the estimated incidence of sputum smear positive is 81/ 100,000 population. [7]

National Tuberculosis Control Programme has developed guidelines for retrieval of absent/ defaulted patient; i.e., if patient (or his supporter/ family menber) fails to turn up within seven days or more of his/her scheduled visit to collect medicine. DOTS Facilitator must identify (in time) the delay, and arrange for retrieval of the absentee (patient) through one or more of the ways: 1. Coordinating with the community health worker in the area. 2. Home visiting by a staff member of treatment center, where feasible. 3. Writing letter to patient, where deemed suitable and found feasible. 4. Other feasible way, as deemed suitable under local circumstances.[8] Many studies were conducted that determined the causes of default from defaulters end while there is dearth of studies from care providers end so it became essential to conduct a study regarding adherence of care providers to DOTS defaulter strategy.

The study was designed to determine the extent of adherence of DOTS facilitators and treatment supporters to the defaulter tracing mechanisms in Khyber Pakhtunkhwa and to give recommendations. The study would help the provincial TB control programme in framing their policies and practices with regard to DOTS defaulting mechanism, which in turn would reduce the defaulter rates.

METHODOLOGY

A cross sectional study was carried out from March to July 2005 in five randomly selected districts Khyber Pakhtunkhwa out of the total 24 districts namely, Peshawar, Mardan, Nowshera, Bannu and Mansehra. The total population of these five districts was 6182097. In each of these districts 10 health facilities were randomly selected (total n=50 facilities). Assuming that the frequency of non-adherence of DOTS facilitators & treatment supporters to the retrieval mechanism was 2% and the maximum allowed error of 0.1%. Therefore the least reliable sample size was 200. The sample size calculated for was 200 participants. The study subjects consisted of 50 DOTS Facilitators and 150 treatment supporters who were attached to TB patients under DOTS (Total n=200 subjects). DOTS facilitators were medical officers, dispensers, medical technicians, lady health visitors while treatment supporters were lady health workers, volunteers and staff working in health facilities. DOTS facilitator usually keeps the TB registers updated while the treatment supporters have treatment support cards of the patient under treatment/supervision.

Within each health center one DOTS facilitator and three to four treatment supporters were interviewed. In case a health center was closed or the concerned staff was not present then the next health center in the list was visited and this health center was again visited. If this health center was again found to be closed then a new health center was selected randomly from the remaining health centers. Informed consent was taken from each of the participants before conducting the interview.

A pre-coded questionnaire was developed in English to obtain information regarding the adherence of NTP to DOTS defaulters tracing mechanism in Khyber Pakhtunkhwa. The questionnaire was translated into Urdu, and then back into English. The study was pre-tested in five health centers of district Peshawar.

The questionnaire included the following variables related to DOTS Facilitator: gender, education level, his/her designation, duration of service, training in DOTS strategy, duration of working as DOTS facilitator, availability of desk guide in Urdu, and their knowledge, practices and recommendations regarding DOTS defaulter tracing mechanism.

The variables related to treatment supporter were: his/her designation, education level, duration of

service, duration of working as treatment supporter, training in DOTS strategy, and their knowledge, practices and recommendations regarding DOTS defaulter tracing mechanism. Before conducting the interviews informed consent was sought from the participants. Two focus group discussions were also held with the traced defaulters in order to elucidate the reasons of defaulting. Each of the FGD held consisted of eight participants. The groups members participated were homogenous. Only those participants were included who were adults and defaulted for more than two months.

Data Analysis

To minimize the chances of error data were double entered using EPIINFO 6.04d[9] computer software package. Data were analyzed using software package SPSS[10] (Statistical Package for Social Sciences version 10.0). Simple descriptive statistics were applied. Distributions of categorical variables were investigated and percentages and frequencies were calculated. Data collected from the FGDs were also analyzed. Questions regarding default were formulated before the FGD were held. Questions were open-ended, simple, unbiased and nonthreatening. The participants were recruited with the help of district TB officer. The FGD was recorded in a tape recorder while at same time a person was hired who took notes of the discussion. A mediator was also recruited who initiated the FGD and guided the discussion focused on default. The mediator was neutral in FGD and did not appreciate or showed displeasure over the responses. Each FGD session lasted for about an hour. The issues that were discussed were why they defaulted, any one from health facility tried to retrieve them, duration of their treatment, follow up visits, supervision by treatment supporters, side effects of anti-TB medicines, financial charges involved in TB treatment, health education regarding anti-TB treatment, benefits involved in completing the treatment and hazards involved in stopping the treatment and travel to health facility.

RESULTS

A total of 200 participants were interviewed, 50 DOTS facilitators and 150 treatment supporters in 50 health centers of 5 randomly selected districts of Khyber Pakhtunkhwa. Eighty four percent DOTS facilitators were males while 88% of treatment supporters were females. Among DOTS facilitators, 44% were male medical technicians followed by medical officers (24%), while majority of the treatment supporters (83%) were lady health workers. Eighty two percent of the treatment supporters did not receive training in DOTS strategy while 84% of the DOTS facilitators had received training in DOTS (Table 1).

Table 1. Characteristics of DOTS facilitators and treatment supporters in Khyber Pakhtunkhwa

Characteristics	DOTS Facilitators (n = 50) n (%)	Treatment supporters (n = 150) n (%)	Total (n = 200) n (%)
Gender			
Male	42 (84)	18 (12)	60 (30)
Female	08 (16)	132 (88)	140 (70)
Educational level			
Primary	00 (00)	19 (12.7)	19 (9.5)
Matriculation	10 (20)	84 (56)	94 (47)
Intermediate	14 (28)	28 (18.7)	42 (21)
Graduate	18 (36)	07 (4.7)	25 (12.5)
Post-graduate	08 (16)	04 (2.7)	12 (06)
Other (religious)	00 (00)	08 (5.4)	08 (04)
Designation			
Medical officer	12 (24)	00 (00)	12(06)
Medical technician (male)	22 (44)	00 (00)	22(11)
Medical technician (female)	04 (08)	04 (2.7)	08(04)
Lady health visitor	03 (06)	02 (1.3)	05(2.5)
Lady health worker	00 (00)	125 (83.3)	125(62.5)
Dispenser	09 (18)	00 (00)	09(4.5)
Ward orderly	00 (00)	02 (1.3)	02(01)
Community volunteer	00 (00)	13 (8.7)	13(6.5)
Other (shopkeeper)	00 (00)	04 (2.7)	04(02)
Received DOTS training			
Yes	42 (84)	27 (18)	69 (34.5)
No	08 (16)	123 (82)	131 (65.5)
Working in the health facility (years)			
< 1 year	15 (30)	02 (01)	17 (09)
1 – 10 years	32 (64)	127 (94)	159 (86)
> 10 years	03(06)	06 (04)	09 (05)

As shown in Table 2, fifty percent of the DOTS facilitators responded that treatment supporters gave them information regarding DOTS defaulters, while 99% of the treatment supporters said they gave information on DOTS defaulters to DOTS facilitators. The difficulties that were pointed out by DOTS facilitators in obtaining anti-tuberculosis medicines were mainly transport problem (33%) and those by treatment supporters was absence of concerned staff (35%).

Table 2. Adherence to the defaulter tracing mechanism by DOTS facilitators and treatment supporters

Variables	DOTS Facilitators n (%)	Treatment supporters n (%)	Total n (%)
Information given to facilitators regarding DOTS defaulters by treatment supporters			
Yes	25 (50)	148 (99)	173 (86.5)
No	25 (50)	02 (01)	27 (13.5)
Meeting between DOTS facilitator & Treatment supporter			
Less than 4 weeks	14 (28)	113 (75)	127 (63.5)
After 4 weeks	24 (48)	23 (15)	47 (23.5)
After more than 4 weeks	12 (24)	14 (10)	26 (13)
Retrieving an absent patient during initial phase of treatment (in days)			
≤ 7 days	42 (84)	145 (97)	187 (93.5)
> 7 days	08 (16)	05 (03)	13 (6.5)
Retrieving an absent patient during continuation phase of treatment (in days)			
≤ 7 days	23 (46)	142 (95)	165 (82.5)
> 7 days	27 (54)	08 (05)	35 (17.5)
Difficulties in obtaining anti-tuberculosis medicines			
Yes	12 (24)	20 (13)	32 (16)
No	38 (76)	130 (87)	168 (84)
Difficulties in obtaining anti-tuberculosis medicine			
Shortage of medicine	03 (25)	04 (20)	07 (22)
Concerned staff absent	02 (17)	07 (35)	09 (28)
Transport problem	04 (33)	01 (05)	05 (16)
Packaging of medicine	01 (08)	01 (05)	02 (06)
Unsatisfactory behavior	00 (00)	02 (10)	02 (06)
No response	02 (17)	05 (25)	07 (22)

Table 3 depicted that 74% of the treatment supporters responded that they were working/ attached to the health facility for a period of 1 – 5 years. Regarding a knowledge question that who kept the treatment support card, 53% responded that it was with the patient while 38% responded that treatment supporter kept it. Sixty-nine percent of the treatment supporters responded that they themselves filled treatment support card while it was observed that 79% of the treatment support cards were not properly filled.

Table 3. Performance of treatment supporters regarding the defaulter tracing mechanism

Variables	**n**	**(%)**
Working as treatment supporter		
< 1 year	34	23
1 – 5 years	109	74
> 5 years	04	03
Treatment supporter visit to patient home for giving anti-TB medicine		
Yes	132	88
No	18	12
Keeping of treatment support card		
With treatment supporter	57	38
With patient	80	53
Inside health facility	07	05
Don't know	05	03
No response	01	01
Do you fill treatment support card		
Yes	104	69
No	46	31
Treatment support card properly filled		
Yes	31	21
No	119	79
Cooperation of under treatment TB patients		
Yes	149	99
No	01	01
Cooperation of health facility staff		
Yes	147	98
No	03	02

Table 4 showed that 98% the facilitators and 99% of treatment supporters responded that they were not given any incentive to trace DOTS defaulters. Regarding measures that would be adopted to trace DOTS defaulters 56% of the facilitators and 98% of treatment supporters responded by visiting the patient home while among DOTS facilitators 24% didn't know any measure. The recommendations given by DOTS facilitators and treatment supporters

for tracing DOTS defaulters were mainly to visit the defaulter patient home (14% and 29% of facilitators and treatment supporters, respectively), and to provide/strengthen health education (04% and 33% of the facilitators and treatment supporters, respectively). 4% of the DOTS facilitators and less than 1% of the treatment supporters were of the opinion that they would write a letter to the patients who interrupted.

Table 4. Defaulter tracing mechanism practiced by DOTS facilitators and treatment supporters and their recommendations to improve it

Variables	DOTS Facilitators n (%)	Treatment supporters n (%)	Total n (%)
Incentives given to trace DOTS defaulters			
Yes	01 (02)	02 (01)	03 (1.5)
No	49 (98)	148 (99)	197 (98.5)
Measures that would be adopted to trace a defaulter patient given by NTP			
Visit patient home	28 (56)	147 (98)	175 (87.5)
Trough locality elders	02 (04)	01 (0.7)	03 (1.5)
Through LHW	04 (08)	01 (0.7)	05(2.5)
Through writing letter	02 (04)	01 (0.7)	03 (1.5)
Through health facility staff	02 (04)	00 (00)	02 (01)
Don't know	12 (24)	00 (00)	12 (06)
Recommendations given for tracing DOTS defaulters			
Visiting patient home	07 (14)	43 (29)	50 (25)
Inquiry from neighbors	01 (02)	04 (03)	05 (03)
Involving LHW	07 (14)	08 (05)	15 (08)
Patient must be of catchment area	01 (02)	00 (00)	01 (01)
Patient NIC	06 (12)	01 (01)	07 (04)
Through locality elders	05 (10)	04 (03)	09 (05)
Health education	02 (04)	50 (33)	52 (26)
Special staff to trace defaulters	05 (10)	04 (03)	09 (05)
Behavior/personal involvement of staff	05 (10)	10 (07)	15 (08)
Free test/ free medicine	03 (06)	05 (03)	08 (04)
Involving other health staff of facility	02 (04)	05 (04)	07 (04)
Responsible household member	01 (02)	01 (01)	02 (01)
Provision of transport	02 (04)	05 (03)	07 (04)
Incentives/credit to staff	02 (04)	01 (01)	03 (02)
Don't know	01 (02)	03 (02)	04 (02)
No response	00 (00)	06 (04)	06 (03)

A great majority of health centers i.e., 90% didn't have desk guide booklets present in health centers. About 34% of the facilitators responded that they were running OPD and maintaining medicine store along side DOTS work which pointed towards workload. Ninety-six percent of the DOTS facilitators responded that they themselves checked TB 01 cards and the same percentage of cards were properly filled. Twenty-six percent of the facilitators responded that they would declare a patient defaulter after he interrupted the treatment for more than two months.

Two focus group discussions were held one in Peshawar and the other in Mardan.

The main reasons for defaulting were that anti-tuberculosis medicines were stopped because of their side effects. No body from health facility approached them after they defaulted on treatment and there was lack of health education regarding the hazards of treatment interruption, the other reasons being financial constraints and lack of knowledge regarding tuberculosis treatment.

DISCUSSION

The study reported the sub-optimal adherence of heath staff in various health facilities of Khyber Pakhtunkhwa to DOTS defaulter tracing mechanism developed by National Tuberculosis Control Programme (NTP). Although National Tuberculosis Control Programme has developed guidelines for retrieval of absent patient and these guidelines are not elaborative, and needs updating and revision. Apart from developing comprehensive plan/guidelines how to trace DOTS defaulters other issues related to DOTS must be addressed. And these are training of all those involved in DOTS strategy. Refresher training for those who had already received DOTS training. Our study shows that a large number of treatment supporters (82%) did not receive training in DOTS strategy. This lack of training affects the performance of treatment supporters regarding supervision of treatment of TB patients and tracing of DOTS defaulters. It was evident from the comments of the defaulted patients in the Focus Group Discussion that nobody from the health facility contacted them

when they defaulted. So here lack of proper training can compromise the performance and that resulted in a poor relation between patients and health care facility staff.[11] Training in DOTS strategy should not be limited to those working in public sector but it should also include those working in private sector and treating TB patients. A study conducted in Pakistan showed that almost 98% of the private practitioners didn't take any action if a patient on anti-tuberculosis treatment didn't turn up i.e., defaulted on treatment.[12]

Knowledge of DOTS facilitators and treatment supporters was adequate regarding retrieving absent patient who was on anti-TB treatment and their responses were in conformity to NTP guidelines.

In our study, the results showed that more than 80% of the treatment supporters went to the patient home to give them anti-tuberculosis medicines and a study conducted in Iraq also showed that home visits by trained personnel improves patient compliance regarding DOTS.[13]

One of the significant recommendations given was that health education be imparted to TB patients to minimize their default. And studies conducted have shown that health education imparted to patients[14] and mothers have improved compliance with treatment among tuberculosis patients and children positive for tuberculin.[15] The second important recommendation given was visiting patient home who defaulted on treatment. The measures, which they would adopt to trace a defaulted patient were also of significance majority of the DOTS facilitators and treatment supporter would opt for visiting a defaulted patient home and simple measures such as reminder letters sent to patients who defaulted on treatment were efficacious, even among illiterate patients.[16]

If a comparison is made between DOTS Facilitators and treatment supporter regarding proper filling of TB cards it was observed that 96% of DOTS Facilitators properly filled TB 01 cards while 79% of treatment supporters failed to fill treatment supporter cards properly and this again pointed out that to the dire need of DOTS training to treatment supporters. And again it became evident that absence of training in DOTS strategy to Lady Health Workers (LHWs) resulted in lack of their skill and capacity development.

This is again emphasized that role of LHW is not only significant in tracing DOTS defaulters but also in their treatment, as a study conducted in Pakistan found that cure rate was high in that group of patients which were under the supervision of LHW versus those under supervision of health facility or under no ones supervision.[17]

It was of interest to note that a great majority of the health facilities did not have desk guide. The desk guide has guidelines on how to trace a defaulted patient although not in detail. And not having the desk guide showed poor adherence to DOTS strategy.

The comments that emerged from focus group discussion were that no body from health facility staff approached them when the patients defaulted, lack of health education from the health care provider side, financial constraints and not having the knowledge regarding benefits of treatment and on side effects of antituberculosis medicines These views were also expressed by defaulters from other tudies.[11,8,19,20] This emphasized that there was lack of coordination in DOTS defaulter tracing mechanism. There is no proper monitoring of patients under DOTS by treatment supporters.

The main recommendations that came out of the study were review and development of comprehensive guidelines for tracing the defaulted patients, training of LHWs in DOTS strategy, provision of desk guide to health facilities and health education to patients under DOTS. Proper coordination between LHWs and other health facility staff is essential.

One of the significant recommendations that were derived from the findings of this study LHWs are in dire need of training in DOTS strategy.

CONCLUSION

This study concludes that DOTS defaulter tracing mechanism implementation is sub optimal. Further technical support is needed in this area. The treatment supporters specially LHWs need training in DOTS strategy.

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REFERENCES

1. Maher D, Chaulet P, Spinaci S, Harries A. Treatment of Tuberculosis: Guidelines for the national programme, 2nd edition, Geneva WHO/ TB/97.220,1997.
2. Enarson DA, Rieder HL, Arnadottir T, Trebucq A. Management of Tuberculosis: A guide for low income countries, 5th Edition, Paris IUATLD, 2000.
3. Kumaresan JA, Ahsan Ali A-KM, Pakkali LM. Tuberculosis control in Bangladesh: success of the DOTS strategy. Int J Tuberc Lung Dis 1998;2:992-98.
4. USAID Infectious diseases Available from: URL: http: // www.usaid.gov/our_work/global_health / id / tuberculosis / countries / ane/pakistan_profile.html
5. Global TB Report, World Health Organization Geneva, 2003.
6. Country Data Pakistan Available from: URL://www.ntp.gov.pk/data/Country%20Data.pdf
7. Country Profile Pakistan. Available from: URL: www.stoptb.org/countries/Global Report 2006/pak.pdf
8. Retrieving Tuberculosis Patient, page 12, DeskGuide for Doctors, National Tuberculosis Control Programme Pakistan.
9. Epi Info 6.04d [computer program]. Centers for Disease Control and Prevention Atlanta, Georgia, USA. Available from: URL: http://www.cdc.gov/epiinfo/Epi6
10. SPSS. Statistical Package for Social Sciences [computer program]. SPSS Inc. Headquarters, 233 S. Wacker Drive, 11th floor, Chicago Illinois, USA 60606.
11. Jaiswal A, Singh V, Oqden JA, Porter JD, Sharma PP, Sarin R et al. Adherence to tuberculosis treatment: lessons from the urban setting of Delhi, India. Trop Med Int Health 2003;8:625-33
12. Shah SK, Sadiq H, Khalil M et al. Do private doctors follow national guidelines for managing pulmonary tuberculosis in Pakistan? Eastern Mediterranean Health Journal 2003;776-788.
13. Mohan A, Nassir H, Niazi A. Does routine home visiting improve the return rate and outcome of DOTS patients who delay treatment? Eastern Mediterranean Health Journal 2003;702-708.
14 Morisky DE, Malotte CK, Choi P et al. A patient education program to improve adherence rates with antituberculosis drug regimens. Health Educ Q 1990;17:253-67.
15. Sanmarti L, Megias JA, Gomez MN et al. Evaluation of the efficacy of health education on the compliance with antituberculosis chemoprophylaxis in school children. A randomized clinical trial. Tubercle Lung Dis 1993;74:28-31.
16. Paramasivan R, Parthasarathy RT, Rajasekaran S. Short course chemotherapy. A controlled study of indirect defaulter retrieval method. Indian J Tuberc 1993; 40:185-90.
17. Khan MA, Walley JD, Witter SN, Imran A, Safdar N. Costs and cost-effectiveness of different DOT strategies for the treatment of tuberculosis in Pakistan. Health Policy and Planning 2002;178-86
18. Tekle B, Mariam DH, Ali A. Defaulting from DOTS and its determinants in three districts of Arsi Zone in Ethiopia. Int J Tuberc Lung Dis 2002;573-9.
19 Mirasha P, Hansen EH, Sabroe S and Kafle KK. Adherence is associated with the quality of professional-patient interaction in Directly Observed Treatment Short-course, DOTS. Patient Educ Couns. 2005 Oct 17.
20. Bam TS, Gunneberg C, Chamroonsawasdi K, Bam DS, Aalberg O, Kasland O et al. Factors affecting patient adherence to DOTS in urban Kathmandu, Nepal. Int J Tuberc Lung Dis 2006;270-6.

BPKIHS TB MODULE: AN INNOVATIVE WAY TO TEACH TUBERCULOSIS TO MEDICAL UNDERGRADUATES

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ABSTRACT

Introduction: Tuberculosis is a major public health problem in Nepal. Medical schools need to practice evidence-based medicine for national TB control programmes. The objective of the study is to know the feedback about TB module from medical undergraduates.

Methodology: This is descriptive study designed to know the feedback regarding content and usefulness of TB teaching module from medical undergraduates of BP Koirala Institute of Health Sciences. The total duration of the study was from March 2004 to May 2008.

Results: The feedback about the TB teaching module was taken from 471 students. Out of them 64.7% (305) were males and 35.3% (166) females. Almost all students replied that objective of the module was clear and relevant. "TB teaching module is very useful" was the overall comments of the respondents particularly in respect of structured interactive session (SIS), Lecture, and Field visit to Primary Health Care Center, Britain Nepal Medical Trust, Nepal Anti Tuberculosis Association (NATA). Regarding the relevancy of the module, around 98% students' response was "relevant" and regarding the contents, 11% students' response was "content is too much".

Conclusion: It is recommended that this innovative BPKIHS TB module may be implemented in other medical schools of SAARC countries after necessary modifications in their own context.

Key words: Tuberculosis, Teaching module, Medical schools, Nepal

INTRODUCTION

Tuberculosis (TB) is a major public health problem in Nepal. Every year about 40,000 people develop tuberculosis; nearly half of them have infectious sputum positive tuberculosis and are capable of spreading the disease to others.[1] It is estimated that around 45% of the country's population infected with TB. Introduction of Directly Observed Treatment Short Course (DOTS) has already reduced the number of deaths. However, 6,000 to 7,000 people still die every year from this disease.[1,2] DOTS, has been implemented throughout the country since April 2001. A key feature of DOTS in Nepal is the National TB Programme (NTP) partnership with organizations at the national, regional and local levels.[2,3] Successfully implementing the DOTS strategy requires that doctors to be trained to manage TB properly. Obviously, the active participation of doctors in tuberculosis control will lead to a change in the attitude of other health care providers and their involvement will be achieved more easily.[4,5]

Revised National TB Control Program (RNTCP) is implemented in India through the primary health

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care system; under the guidance of a MBBS passed medical officer (MO).[6] Medical schools must adopt and use their potential to contribute proactively in shaping the future of the health system. By introducing changes in medical education, research and delivery of care for TB control, medical schools have the unique opportunity to demonstrate social accountability. Medical schools should provide every medical graduate with the knowledge, skills and attitudes essential to the management of TB in the patient and in the community as a whole. They should have an effective educational strategy to provide such ability to their students.[4] Medical schools need to practice evidence-based medicine and thus contribute towards developing future guidelines for national control programmes. In order to improve their relevance, teaching medical institutions should redefine their mission statements and make essential modifications to unify teaching and practice.[5]

The BP Koirala Institute of Health Sciences at Dharan was the first institute in Nepal to set up a DOTS teaching centre. Concerted efforts have been made to orient training to the perceived needs of the community and to the principles of the national control programme.[7] A major step to control tuberculosis is by providing assistance to the national programme in three main areas: Teaching, Service and Research.

Teaching Practices of BPKIHS: The MBBS curriculum of BPKIHS is thoroughly integrated and community oriented and partially problem-based, incorporating a need-based approach. During the first two years, emphasis is laid on the pre and para clinical sciences along with community medicine and professional skills; and in the next two and half years, the emphasis is on clinical sciences with a high degree of integration between clinical disciplines and community medicine; while the foundation of pre and Para clinical sciences continues to be strengthened. The curriculum incorporates early patient contact and emphasizes the importance of the study of community medicine and behavioral sciences from the beginning. Teaching through lectures has been restricted to a bare minimum while problem-based and hands-on learning experiences are encouraged. During the clinical posting, the students are regularly taken once a week to the District Health Office to orient them to the major local health problems and the various national health programs. In view of the seriousness of the problem of tuberculosis in Nepal, the Institute has developed a module on tuberculosis for teaching undergraduate students of medicine.

BPKIHS, Teaching Module of Tuberculosis: The module respects the need for imparting teaching in class, laboratory and field involving various teaching departments. The aim is to provide students with a broad and comprehensive knowledge of tuberculosis and especially to develop skills in diagnosis and management of the disease, in compliance with the National TB Control Program of Nepal.

Table 1. BPKIHS, TB teaching module for medical undergraduates

Topics of Structured Interactive Session (SIS)	Department	Duration
Magnitude of TB problem and national tuberculosis program.	Community Medicine	1 hour
Laboratory diagnosis of tuberculosis	Microbiology	1 hour
Pulmonary tuberculosis (Pathogenesis, clinical features, complications)	Medicine	1 hour
Extra pulmonary tuberculosis (TB meningitis, Lymph node involvement, pleural effusion)	Medicine	1 hour
Genital tract TB in females	Gynae/Obstetrics	1 hour
Management of childhood tuberculosis and neonates born to mothers suffering from TB	Paediatric	1 hour
Treatment of tuberculosis including in special situations e.g. pregnancy, renal failure, elderly, liver disease, etc.	Medicine	1 hour
Intestinal tuberculosis; abdominal tubercular lymphadenitis	Surgery	1 hour
Bone and joint TB including hip and knee joint TB	Orthopaedics	1 hour
Spinal tuberculosis including cold abscess	Orthopaedics	1 hour
Urogenital tuberculosis in males	Surgery	1 hour
TB with HIV & emergencies in tuberculosis	Medicine	1 hour
Skin manifestations of TB	Dermatology	1 hour

Table 2. Teaching methods, duration and involving different departments in the TB Module for medical undergraduates

Student's Seminar (SEM)	Department	Duration
Tuberculosis with special reference to Nepal		
Epidemiology National tuberculosis control programme Multi-drug resistance tuberculosis New advance in the diagnosis and management Prevention of tuberculosis	Community Medicine, Medicine, Surgery, Paediatrics, Gyne/Obs, Pharmacology	2 hours
Small Group Discussion (SGD)		
X-ray	Radiology(batch wise)	2 hours for each batch
LABEX		
ZN staining and Mantoux-testing	Microbiology(batch wise)	2 hours for each batch
Slide Session		
Gross and microscopic lesions in tuberculosis of various organs	Pathology	2 hours for each batch
Case Based Learning in Field (CBLF)		
Visit to NGO (Britain Nepal Medical Trust, Nepal Anti Tuberculosis Association) Visit to Madhuban/Ithari – DOTS clinic	Community Medicine Community Medicine	1 day 1 day
Case Based Learning (CBL)		
Hospital Indoor (Wards)	Medicine, Paediatrics, Surgery (batch wise)	2 hours for each batch

During Phase I (first two years of MBBS course); TB is taught as Problem Based Learning (PBL) duration of one Week and major departments involved in this program are Community Medicine, Medicine, Microbiology, Pathology, and Pharmacology. In phase II (next two and half years), over 13 hours of structured interactive sessions, are conducted by various departments (Table 1 & Table 2) in addition to those, seminars and small group teachings activities were in third year of MBBS course. The Case Based Learning in Field (CBLF), visit to NGO (Britain Nepal Medical Trust, Nepal Anti Tuberculosis Association), Primary Health centre DOTS program was conducted by the department of Community Medicine. Case Based Learning (CBL) in hospital Wards of Medicine, Pediatrics' & Surgery departments were also done in different batches. To know the feedback about BPKIHS TB Module from 3rd year medical undergraduates.

METHODOLOGY

A descriptive study was applied for the study over period from March 2004 to May 2008. The study was conducted by the department of Community Medicine, BP Koirala Institute of health sciences. Feedbacks were taken from 3rd year MBBS students of the batches from 2004 to 2008, who had gone through teaching method of TB Module. Semi structured questionnaire was used to perform interview applying convenience sampling technique. The key data information included different characteristics of TB module like content, relevancy, objective, student participation, time adequacy and some suggestion to improvement.

The collected data were entered into computer using excel data sheet. The qualitative data were summarized and expressed as frequency, percentage and presented in tables, bar diagram and pie chart.

RESULTS

A total of 471 students participated in the study (Table 3). The distribution of student's number was different from 2004 to 2008. Male students were found more than females.

Table 3. Yearly batch wise students participated in the study

Year	Male (row %)	Female (row %)	Total
2004	47 (62.7%)	28 (37.3)	75
2005	66 (66.0%)	34 (34.0%)	100
2006	65(67.7%)	31 (32.3%)	96
2007	62 (62.0%)	38 (38.0%)	100
2008	65 (65.0%)	35 (35.0%)	100
Total	305 (64.7%)	166 (35.3%)	471(100%)

In the present study 87.2% students told that contents of TB was adequate (Table 4). Most (82.7%) of the students said that student's participation during teaching TB module was enough. Majority (89.2%) of them replied that time allotted for teaching module was adequate.

Table 4. Different characteristics of BPKIHS TB Module

Characteristics	Adequate	Too much	Inadequate	Total
Content of the Module	87.2%	11.4%	1.4%	100%
Students participation	82.7%	0%	17.3%	100%
Time allotted	89.2 %	9.1 %	1.7 %	100 %

Regarding objective of the module, almost all students replied that that objective of the TB module was clear,

A significant positive response was found among the students (97.5%) related to relevancy of the contents of the TB module (Figure 1).

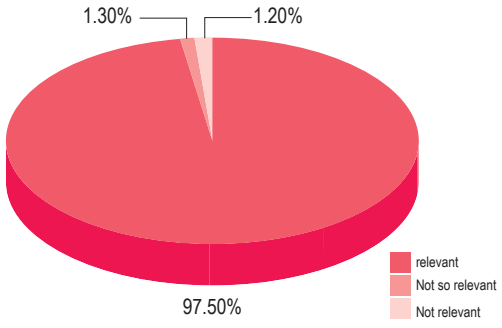

Figure 1. Relevancy of the contents of TB module

Majority of the students (97-98%) appreciated the field visits to PHC DOTS program and NGO/ INGO supported DOTS clinics (BNMT, NATA). They found these field visits very useful & informative. Similarly 98.4% students reported that the methodologies used for different activities and sessions in TB modules were. (Structured, interactive sessions, Lectures, Seminar) appropriate and very useful for them (Figure 2)

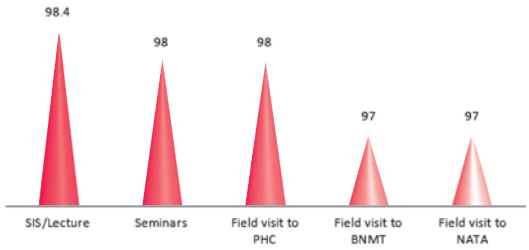

Figure 2. Responses of different teaching methods used in TB module

DISCUSSION

The BPKIHS TB module, is thoroughly integrated, community oriented, field based and case-based, incorporating a need -based approach. The module was well received by medical undergraduates. Almost all reported that the objective of TB module was clear. Regarding content and relevant of the module around 98% replied that it was relevant where as 11% said "its contents are too much". Nearly Ninety eight percent (97.5%) replied that TB module was relevant with TB diagnosis and treatment. Duration of the TB module was reported to be adequate by majority (89.2%) students where as few (1.7%) opined as inadequate.

Student's knowledge, based on assessments, increased to satisfactory levels. A study by N Selvakumar et al, Proficiency to read sputum AFB smears by senior tuberculosis laboratory supervisors under training at reference laboratory, the sensitivity to read sputum AFB smear by fresh trainee with little or no experiences increased from 75% to 94% during the carefully planned training programme; the specificity increased from 88% to 99%.[8]

Almost all (98%) students felt that field visits were very useful & informative; health workers in NATA and primary health center (PHC) were helpful and gave opportunity to learn in friendly environment. Such field visits help to understand the real scenario of care providers and problems faced by them during diagnosis & treatment.

Regarding methodology for the module, they replied that it was appropriate and useful (98.4%). The novel aspects of teaching included reading chapters in classroom followed by Problem Based Learning (PBL) & seminar, modular assessments were highly rated.

Similar result was found in the study done by Harries AD et al, the Malawi experience, teaching tuberculosis control to medical undergraduates by using the teaching module from 2000 - 2002.[9]

Suggestions provided by students: The student's suggestions were that the module should include management of MDR and XDR TB, as well as BCG vaccination. Interaction with TB patients should be encouraged during the field visits. Student's participation should be increased as much as possible. The module should have more practical aspects. Similar type of teaching module should be developed for other disease like Malaria, Kalaazar and HIV/AIDS.

CONCLUSION

The module was well received and appreciated by the undergraduate medical students. It is recommended that this innovative BPKHIS TB module may be implemented in other medical school of SAARC countries after necessary modifications in their own context.

REFERENCES

1. National Tuberculosis Program of Nepal, a clinical manual, NTC third edition 2009.
2. Department of Health Services, MOH, Nepal, Annual report, 2005/2006.
3. WHO publication 2005, Regional Office for South-East Asia New Delhi, Tuberculosis control in the South East Asia region, The Regional Report, November 2005, WHO project no. ICP TUB 001: 1-2.
4. JP Narain and LM Nath. The Role of Medical Schools in Tuberculosis Control in SK Sharma and A Mohan edt Tuberculosis. Jaypee Brothers Medical Publication (P) LTD. New Delhi. First Edition 2001;597-600.
5. WHO, Regional Office for South-East Asia, New Delhi. Enhancing the role of medical school in STD/HIV and TB control 2000:1.
6. Central TB Division (CTD), Directorate General of Health Services, Ministry of health and Family Welfare, Gov of India. Revised National TB Control Program. Technical guidelines for TB Control. New Delhi: CTD, 1997.
7. Jha N, Rijal S, Koirala S. Role of Medical school in TB control; An Experience from Nepal: Regional Health forum, WHO South East-Asia 2003;7
8. Selvakumar N, Kumar V, PG Gopi et al. Proficiency to read sputum AFB smears by senior tuberculosis laboratory supervisors under training at a reference laboratoty in India: Indian J Tuberc 2005;52:11.
9. Harries AD, Kumwenda J, Zijlstra EE et al. Teaching tuberculosis control to medical undergraduates: the Malawi experience. Int. J. Tuberc Lung Dis. 2003;7:842

SIMPLE AND RAPID LIQUID CHROMATOGRAPHY METHOD FOR SIMULTANEOUS DETERMINATION OF ISONIAZID AND PYRAZINAMIDE IN PLASMA

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ABSTRACT

Introduction: Treatment of tuberculosis (TB) requires a combination of drugs. Isoniazid (INH) and pyrazinamide (PZA) are key components of the first-line regimen used in the treatment of TB and monitoring these drug levels in plasma would help in better patient care. The objective of the study is to develop and validate a simple and rapid high performance liquid chromatographic method for simultaneous determination of INH and PZA in human plasma.

Methodology: The method involved deproteinisation of plasma with para hydroxy benzaldehyde and trifluoroacetic acid and analysis using a reversed-phase C^8 column and UV detection at 267nm. The flow rate was set at 1.5 ml/min at ambient temperature. The accuracy, linearity, precision, specificity, stability and recovery of the method were evaluated. The method was applied to estimate plasma INH and PZA collected from six children with TB.

Results: Well resolved peaks of PZA and INH at retention times of 3.2 and 6.1 minutes respectively were obtained. The assay was linear from 0.25 - 10.0 µg/ml for INH and 1.25 – 50.0 µg/ml for PZA. The within-day and between-day relative standard deviation for standards were below 10%. The average recoveries of INH and PZA from plasma were 104 and 102% respectively.

Conclusions: A rapid and accurate method for simultaneous determination of INH and PZA in plasma was validated. The assay spans the concentration range of clinical interest. The easy sample preparation and small sample size makes this assay highly suitable for pharmacokinetic studies of INH and PZA in TB patients.

Key words: Isoniazid, Pyrazinamide, Plasma, HPLC

INTRODUCTION

Treatment of pulmonary and extra pulmonary tuberculosis (TB) consists of a 6-month short course chemotherapy regimen with isoniazid (INH), rifampicin (RMP), pyrazinamide (PZA) and ethambutol (EMB) for two months followed by INH and RMP for the next four months. It has been suggested that drug concentration measurements in TB patients with sub-optimal response to directly observed therapy may be necessary.[1,2] Um et al have reported that low concentrations of anti-TB drugs are common, and therapeutic drug monitoring would be useful to optimise drug dosages, especially in patients with an inadequate clinical response to anti-TB treatment.[3] Substantial inter-patient variability of anti-TB drug concentrations has been reported.[4] Several factors are known to influence drug levels .[4,5] INH and PZA are key components of the first-line regimen used in the treatment of TB and monitoring these drug

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levels in plasma would help in better patient care.

Several methods to estimate INH and PZA by high performance liquid chromatography (HPLC) individually and in combination have been described.[6–13] Song et al have described a method for simultaneous determination of RMP, INH, PZA and EMB by LC-MS-MS.[14] There are also methods reported for simultaneous determination of RMP, INH and PZA by HPLC, which employ cumbersome solid phase extraction procedures[12] or derivatisation prior to separation.[13] The aim of this study was to develop and validate a simple and rapid assay for simultaneous estimation of INH and PZA in plasma by HPLC.

METHODOLOGY

Chemicals

Pure INH and PZA powder were obtained from Sigma Chemical Company, St.Louis, MO, USA. Methanol (HPLC grade), perchloric acid, tetrabutyl n-ammonium hydroxide, para hydroxy benzaldehyde and trifluoro acetic acid were purchased from Qualigens (India). Deionized water was processed through a Milli-Q water purification system (Millipore, USA). Pooled human plasma was obtained from a Blood Bank, Chennai, India.

Chromatographic System

The HPLC system (Shimadzu Corporation, Kyoto, Japan) consisted of two pumps (LC-10ATvp), diode array detector (SPD-M10Avp) and auto sampler (SIL-HTA) with built in system controller (SCL-10Avp). ClassVP-LC workstation was used for data collection and acquisition. The analytical column was a C_8, 250 x 4.6mm ID, 5m particle size protected by a compatible guard column (Lichrospher 100 RP-8e, Merck, Germany).

The mobile phase consisted of water: methanol (80:20 v/v) containing 0.05% perchloric acid and 0.1% tetrabutyl n-ammonium hydroxide. Prior to preparation of the mobile phase, the solvents were degassed separately using a Millipore vacuum pump. The UV detector was set at 267 nm. The chromatogram was run for 8 minutes at a flow rate of 1.5 ml/min at ambient temperature. Unknown concentrations were derived from linear regression analysis of the peak height of analyte vs. concentration curve. The linearity was verified using estimates of correlation coefficient (r).

Preparation of standard solution

Stock standards (1 mg/ml) of INH and PZA were prepared separately by dissolving the drugs in deionised water. The working standards of INH (0.25 to 10.0µg/ml) and PZA (1.25 to 50.0µg/ml) in combination were prepared in human plasma that was obtained from a Blood bank. Working standard solutions in human plasma containing INH and PZA respectively in the following concentrations were prepared: 0.25 & 1.25 µg/ml, 0.5 & 2.5µg/ml, 1.0 & 5.0µg/ml, 2.5 & 12.5µg/ml; 5.0 & 25.0µg/ml; 10.0 & 50.0µg/ml.

Sample preparation

To 100µl each of calibration standards and test samples, 50µl of para hydroxy benzaldehyde and 100µl of trifluoro acetic acid were added for deproteinisation and extraction of analytes. The contents were vortexed and centrifuged, and 100µl of the clear supernatant was injected into the HPLC column.

Accuracy and Linearity

The accuracy and linearity of INH and PZA standards were evaluated by analysing a set of standards ranging from 0.25 to 10.0µg/ml for INH and 1.25 to 50.0µg/ml for PZA. The within day and between day variations were determined by processing each standard concentration in duplicate for six consecutive days.

Precision

In order to evaluate the precision of the method, three different plasma samples from patients containing INH and PZA were processed and analysed in duplicate on three consecutive days.

Recovery

For the recovery experiment, plasma samples from two patients containing INH and PZA were spiked with 2.5 and 5.0µg/ml of INH and 5.0 and 10.0µg/

ml of PZA and assayed. The percentage of recovery was calculated by dividing sample differences with the added concentrations. Recovery experiments were carried out on three different occasions.

Specificity

Interference from endogenous compounds was investigated by analysing blank plasma samples obtained from six each of male and female subjects. Interference from certain anti-TB drugs, namely, RMP and EMB at a high concentration of 50µg/ml was evaluated.

Samples

Six children with TB (3 males and 3 females) aged 4 to 11 years and body weight ranging from 13 to 38 kg, who were attending the out-patient clinic of the centre, took part in the study. They were on regular anti-TB treatment consisting of INH, RMP, PZA and EMB thrice weekly for a period of 15 days to 2 months. On the study day, the patients were instructed to report to the clinic in a fasting condition. Blood samples (2 ml) were drawn in heparinized vacutainer tubes before dosing and at 2, 4, 6 and 8 hours after dosing. All the blood samples were centrifuged immediately and plasma was separated and stored at -20^{o}C until assay. Estimations of plasma INH and PZA in all the samples were undertaken within 24 to 48 hours of blood collection. Informed written consent was obtained from all the parent/guardian of the children before blood draws were made.

Stability

The stability of INH and PZA in human plasma when stored at -20^{o}C was evaluated by assaying five plasma samples containing INH and PZA on days 1 and 30.

RESULTS AND DISCUSSION

Treatment of TB usually involves a combination of drugs; hence a simple and accurate method for simultaneous estimation of some of the anti-TB drugs is described. In this study, we have attempted to develop and validate a simple method, which requires a simple one-step deproteinisation method and analysis using a C8 column and an isocratic mobile phase. The present method has the advantages of being rapid (run time is only 8 minutes) and using a small sample volume (100 microlitres), without any loss of analytes.

Under the chromatographic conditions described above, INH and PZA were well separated as seen in the representative chromatograms (Figures 1a, b). The retention times of PZA and INH were 3.2 and 6.1 minutes respectively. Blank plasma samples did not give any peak at the retention times of INH and PZA (Figure 1c). The lowest concentrations of INH and PZA gave discrete peaks at the respective retention times (Figure 1a).

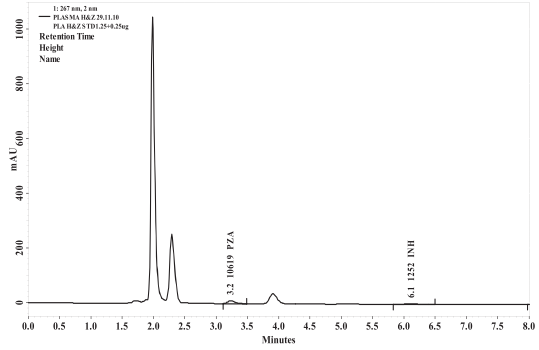

Figure 1a. Chromatogram of extracted isoniazid (0.25 µg/ml) and pyrazinamide (1.25 µg/ml) plasma standards

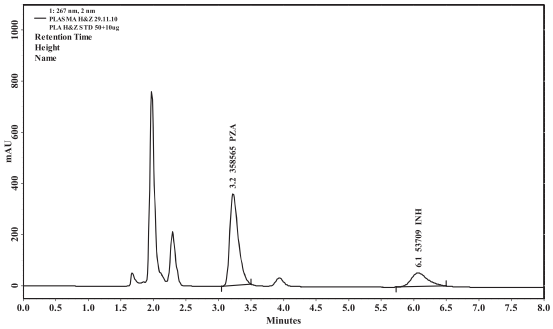

Figure 1b. Chromatogram of extracted isoniazid (10.0 µg/ml) and pyrazinamide (50.0 µg/ml) plasma standards

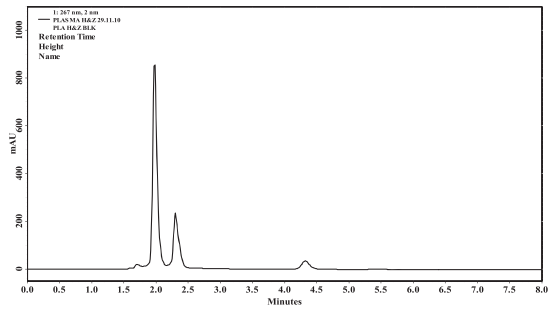

Figure 1c. Chromatogram of extracted blank plasma

INH and PZA are used in the treatment of TB along with other first-line anti-TB drugs. Since not much is known about the interference of other drugs in the assay, it becomes necessary to rule out interference of anti-TB drugs in the assay of INH and PZA and establish the specificity of the method. No endogenous substances or first-line anti-TB drugs such as RMP and EMB interfered with the INH and PZA chromatograms.

INH and PZA concentrations ranging from 0.25 - 10.0 µg/ml and 1.25 – 50.0 µg/ml respectively were checked for linearity These concentrations span the range of clinical interest, which are reported to be present in plasma following treatment with INH and PZA. The calibration curve parameters of INH and PZA from six individual experiments for standard concentrations showed a linear relationship between peak height and concentrations, as evidenced by mean (± SD) correlation coefficient values of 0.9995 ± 0.0006 and 0.9968 ± 0.0014 for INH and PZA respectively. The linearity and reproducibility of the various standards used for constructing calibration graphs for plasma INH and PZA are given in Table 1. The within-day and between-day relative standard deviation (RSD) for standards containing 0.25 to 10.0µg/ml for INH ranged from 3.1 to 8.7% and 4.5 to 9.2% respectively, while the corresponding values for PZA standards containing 1.25 to 50.0µg/ml ranged from 1.1 to 2.9% and 2.1 and 7.0% respectively.

The reproducibility of the method was further evaluated by analysing three plasma samples containing different concentrations of INH and PZA. The RSD for these samples ranged from 0.7 to 3.2% for INH and 6.2 to 7.6% for PZA. The % variations from the actual concentrations ranged from 96 to 101% for INH and 98 to 102% for PZA. For the concentration to be accepted as the lower limit of quantitation (LOQ), the RSD has to be less than 20%.[15]

Table 1. Linearity & reproducibility of plasma isoniazid & pyrazinamide standards

Conc (µg/ml)	Mean peak ± SD in mAU (RSD%)		Conc (µg/ml)		
	Isoniazid			Pyrazinamide	
	Within day (n= 6)	Between day (n = 6)		Within day (n = 6)	Within day (n = 6)
0.25	1080± 90 (8.4)	1139± 104 (9.2)	1.25	9071± 110 (1.2)	9308± 650 (7.0)
0.5	2639± 230 (8.7)	2456± 213 (8.7)	2.5	17109± 195 (1.1)	17486± 684 (3.9)
1.0	5927± 184 (3.1)	5327± 310 (5.8)	5	36412± 931 (2.6)	35856± 1329 (3.7)
2.5	3070± 1021 (7.8)	12920± 742 (5.7)	12.5	71908± 1020 (1.4)	71023± 1461 (2.1)
5.0	27631± 1678 (6.1)	25937± 1236 (4.8)	25	166203± 4184 (2.5)	154169± 4982 (3.2)
10.0	56044± 2669 (4.8)	54639± 2466 (4.5)	50	378768± 11147 (2.9)	366051± 10279 (2.8)

mAU – milli Armstrong unit

In the present method, the lowest concentrations of INH and PZA in the calibration curve were 0.25µg/ml and 1.25µg/ml for INH and PZA respectively. The method reliably eliminated interfering material from plasma, yielding a recovery for INH and PZA that ranged from 100 to 106% and 99 to 105% respectively (Table 2).

Table 2. Recovery of isoniazid & pyrazinamide in plasma

Added (µg /ml)		Estimated (µg /ml) (Mean ± SD)		Recovery (%)	
INH	PZA	INH	PZA	INH	PZA
Baseline		4.79± 0.08	44.11± 0.90		
2.5	5	7.43± 0.03	49.21± 1.19	106	102
5	10	10.01± 0.05	54.35± 1.25	104	102
Baseline		1.72± 0.06	21.42± 0.75		
2.5	5	4.22± 0.04	26.38± 0.67	100	99
5	10	7.02± 0.04	31.91± 0.75	106	105

The method described was applied for the determination of INH and PZA concentrations in plasma from six children receiving treatment with RMP, INH, PZA and EMB. These children received doses based on their body weight. The dose of INH ranged from 150 to 300mg, while that of PZA ranged from 500 to 1000mg. Figures 2 and 3 respectively present the mean plasma INH and PZA concentrations obtained in children at various time points after drug administration. The plasma concentrations of INH and PZA increased steadily and attained a peak level at about two hours. The mean plasma peak concentrations of 7.7µg/ml and 44.1µg/ml for INH and PZA respectively were obtained at two hours; thereafter the drug levels declined steadily. Thus the plasma concentrations of INH and PZA followed a typical pharmacokinetic pattern.

The mean plasma INH concentrations measured on days 1 and 30 in five plasma samples stored at -20°C were 6.03 and 5.67µg/ml respectively; the corresponding values for PZA were 32.45 and 31.35 µg/ml respectively. No degradation of INH and PZA in plasma occurred up to 30 days when stored at -20°C.

In conclusion, a sensitive, specific and validated method for quantitative simultaneous determination of INH and PZA in plasma is described. This rapid, accurate and reproducible method utilises a single step extraction. The chromatograms yield well-resolved peaks for INH and PZA with good intra- and inter-day precision. The easy sample preparation and small sample size makes this assay highly suitable for estimation of plasma concentrations of INH and PZA as part of pharmacokinetic studies or therapeutic drug monitoring in TB patients.

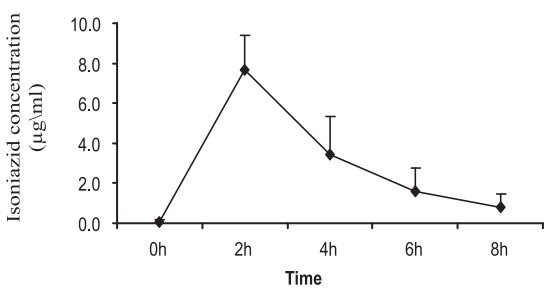

Figure 2. Mean plasma isoniazid concentrations in six children with tuberculosis Vertical bars represent standard deviation

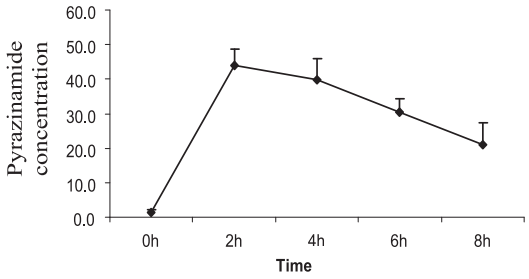

Figure 3. Mean plasma pyrazinamide concentrations in six children with tuberculosis

REFERENCES

1. Burman WJ, Gallicano K, Peloquin CA. Comparative pharmacokinetics and pharmacodynamics of the rifamycin antibacterials. Clin Pharmacokinet 2001;40:327-41.

2. Kimerling M, Phillips P, Patterson P, Hall M, Robinson CA, Dunlap NE. Low serum antimycobacterial drug levels in non-HIV-infected tuberculosis patients. Chest 1998;113:1178-83.

3. Um SW, Lee SW, Kwon SY et al. Low serum concentrations of anti-tuberculosis drugs and determinants of their serum levels. Int J Tuberc Lung Dis 2007;11:972-8.

4. Mcllleron H, Wash P, Burger A, Norman J, Folb PI, Smith P. Determinants of rifampicin, isoniazid, pyraznamide and ethambutol pharmacokinetics in a cohort of tuberculosis patients. Antimicrob Agents Chemother 2006;50:1170-7.

5. Tappero JW, Bradford WZ, Agerton TB et al. Serum concentrations of antimycobacterial drugs in patients with pulmonary tuberculosis in Botswana. Clin Infect Dis 2005;41:461-9.

6. Moussa LA, Khassouani CE, Soulaymani R et al. Therapeutic isoniazid monitoring using a simple high performance liquid chromatographic method with ultraviolet detection. J Chromatogr B Analyt Techonol Biomed Life Sci 2002;766: 181-7.

7. Revankar SN, Desai ND, Vaidya AB, Bhatt AD, Anjaneyulu B. Determination of pyrazinamide in human by high performance liquid chromatography. J Postgrad Med 1994;40:7-9.

8. Chan K, Wong CL, Lok S. High-performance liquid chromatographic determination of pyrazinamide in cerebrospinal fluid and plasma in the rabbit. J Chromatogr 1986;380:367-73.

9. Mehmedagic A, Verite P, Menager S et al. Determination of pyrazinamide and its main metabolites in rat urine by high-performance liquid chromatography. J Chromatogr B Biomed Sci Appl 1997;695:365-72.

10. Kraemer HJ, Feltkamp U, Beithaupt HB. Quantification of pyrazinamide and its metabolites in plasma by ionic-pair high-performance liquid chromatography. Implications for the separation mechanism. J Chromatogr B Biomed Sci Appl 1998;706:319-28.

11. Conte JE Jr, Lin E, Zurlinden E. High-performance liquid chromatographic determination of pyrazinamide in human plasma, brochoalveolar lavage fluid, and alveolar cells. J Chromatogr Sci 2000;38:33-7.

12. Khuhawar MY, Rind FM. Liquid chromatographic determination of isoniazid, pyrazinamide and rifampicin from pharmaceutical preparations and blood. J Chromatogr B Analyt Techonol Biomed Life Sci 2002;766:357-63.

13. Simth PJ, van Dyk J, Fredericks A. Determination of rifampicin, isoniazid and pyrazinamide by high performance liquid chromatography after their simultaneous extraction from plasma. Int J Tuberc Lung Dis 1999;3:S351-2.

14. Song SH, Jun SH, Park KU et al. Simultaneous determination of first-line anti-tuberculosis drugs and their major metabolic ratios by liquid chromatography/tandem mass spectrometry. Rapid Commun Mass Spectrom 2007;21:1331-8.

15. Aymard G, Legrand M, Trichereau N, Diquet B. Determination of tweleve antiretroviral agents in human plasma sample using reversed-phase high performance liquid chromatography. J Chromatogr B 2000;744:227-40.

ASTHMA IN YOUNG AND ELDERLY: THE DIFFERENCES

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ABSTRACT

Introduction: Asthma is considered as disease of childhood but may continue in elderly or elderly may be diagnosed as asthmatic for the first time. Asthma in elderly may differ from young with respect to diagnosis and management on account of psychosocial and economic differences and age related changes which may further be enhanced because of comorbidities and interactions between the drugs used for comorbidities.

Methodology: Young and elderly asthmatics were compared with regards to Symptoms, Severity (Global Initiative for Asthma: GINA guidelines), Accessibility to treatment, Co-morbidities, Inhalational techniques, Compliance and factors affecting compliance and; Outcome measures. These patients were followed up periodically for above said parameters.

Results: Salient differences noted in elderly vs young were: higher GINA scoring (Moderate Persistent: 30% vs 10%), baseline non-compliance (60% vs 30%), non-compliance due to cost and memory (80% vs 26.7%), incorrect technique of inhalation (69.6% vs 42.4%), comorbidities (98% vs 38%) and concomitant drug usage (68% vs 40%). There were differences in symptoms and quality of life indicators. There was significant improvement in various parameters in both groups, especially the young if counseled properly.

Conclusion: Significant differences exist between elderly and young asthmatics.

Key words: Asthma, Young, Elderly

INTRODUCTION

Asthma is considered as a disease of childhood, but it may be first diagnosed in elderly. Although most elderly patients have long-standing asthma, some may have (late-onset disease). Late-onset asthma patients usually present with moderate to severe symptoms.[1] Some studies have shown that 40% elderly have their first asthmatic attack after 40 years.[2]

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Asthma in elderly has a major impact on patient's quality of life. It is under diagnosed and under treated.

Asthma may differ in young and elderly from beginning to final outcomes. The study was conducted to make comparisons of the following parameters in asthma in elderly (≥ 65yrs) and younger (<40yrs) patients.

1. Symptoms.
2. Severity (GINA guidelines).
3. Accessibility to treatment.
4. Co-morbidities.
5. Treatment methods especially inhalational techniques.
6. Treatment compliance and factors affecting compliance.
7. Outcome measures like quality of life, asthma exacerbations etc.

METHODOLOGY

Study Design: The study was a prospective study conducted on patients of bronchial asthma presenting to the Department of Tuberculosis and Chest Diseases, Government Medical College, Patiala, India and fulfilling the following diagnostic criteria:

History suggestive of asthma like attacks of cough, wheezing, or exercise induced dyspnoea or nocturnal cough or wheezing and evidence of bronchial reversibility on spirometery.

Sample size: 100 patients of bronchial asthma were studied and were divided into:-

Group A: 50 patients ≥65 yrs.
Group B: 50 patients <40 yrs.

Detailed personal history of the patient including age, sex, detailed clinical history including history of cough, wheezing, history of past illness including history of atopy, history of emergency admissions/ hospitalizations, type of medications used, routes of administration and inhalational technique was taken. The details of treating physicians, compliance and causes for non compliance, adverse effects of asthma medications, any concomitant drug usage, presence of any confidante and frequency of contact with him/her, associated co-morbid conditions and quality of life indicators were also studied. Patients were followed up at 15th day, 1st, 2nd and 3rd month. At each follow up, questionnaire based symptomatic improvements or deteriorations, type of medications, routes of drug delivery, inhalational techniques and compliance were noted. PEFR (Peak Expiratory Flow Rate) testing was also done at each visit. The data so obtained was tabulated and statistically analyzed using the Chi-Square or the Fisher's Exact Test.

Patients between 40-65 year age group were not included so as to avoid confounding and to represent a purely young and purely elderly population so that the differences, if any, can be found.

Informed consent was obtained from all the patients.

Ethical clearance was obtained from the medical college and the state medical university.

RESULTS

Both groups were comparable with regards to gender, rural urban background and marital status, except that death of spouse was significantly higher in elderly. Symptoms were significantly more predominant in elderly and history of atopy was significantly more in young.

Table 1. Demographic and Symptomatic Profile

	Elderly (n=50)	Young (n=50)	P value
Sex			
Males	26	34	0.102
Females	24	16	0.102
Background			
Rural	24	31	0.159
Urban	26	19	0.159
Marital status			
Married	32	38	0.191
Unmarried	0	11	<0.001
Spouse dead	18	1	<0.001
Symptoms			
Daily cough	19	7	0.006
Wheezing	18	5	0.002
History of atopy	29	42	0.004
Age at onset			
<40years	8	50	<0.001
>40years	42	0	<0.001

As per GINA guidelines, moderate persistent and both moderate and severe persistent asthma was significantly higher in elderly. Significantly more young received care from pulmonologist and were prescribed inhalational therapy.

(DPI: Dry Powder Inhaler, MDI: Metered Dose Inhaler, MDIS: Metered Dose Inhaler with Spacer)

Table 2. GINA Classification and Prescription of Inhalational Therapy

	Elderly	Young
GINA Guidelines		
Intermittent	16(32%)	23(46%)
Mild Persistent	15(30%)	20(40%)
Moderate Persistent	15(30%)	5(10%)
Intermitenet Persistent	4(8%)	2(4%)
Treating Physician		
Pulmonologist	16(32%)	27(54%)
General Physician	21(42%)	15(30%)
Alternate System of Medication	4(8%)	3(6%)
Quack	9(18%)	5(10%)
Inhalational Therapy		
Pulmonologist	16(32%)	27(54%)
General Physician	7(14%)	6(36%)
Alternate System of Medication	0	0
Quack	0	0
Type of Device		
DPI	17(73.9%)	26(78.8%)
MDI	2(8.7%)	2(6.1%)
MDIS	4(17.4%)	5(15.1%)

Baseline compliance and confident and correct usage of inhalational devices was significantly higher in young. Statistically significant higher non compliance was present in elderly which was due to cost and poor memory.

Elderly had significantly higher number of comorbidities, especially hypertension, visual impairment, depressive symptoms and osteoarthiritis resulting in significantly higher number of concomitant drug usage. Elderly also had poorer contact with the confidante and impaired quality of life, fatigue and impaired social functioning.

Table 4. Comorbidities, Concomitant other drug usage and Quality of Life parameters

	Elderly	Young	P value
Number of comorbidities			
0	1(2%)	31(62%)	<0.001
1	12(24%)	11(22%)	0.806
2	9(18%)	5(10%)	0.249
3	11(22%)		

Table 3. Baseline Compliance and Usage of Inhalational Therapy

	Elderly	Young	P value
Baseline Compliance	20(40%)	35(70%)	<0.001
Reasons for non compliance			
Cost	6(20%)	4(26.7%)	0.709
Cost & Poor Memory	7(23.3%)	0	0.001
Poor Memory	11(36.7%)	0	0.001
Relief of Symptoms	6(20%)	11(73.3%)	0.709
Baseline use of Inhalational therapy	23(46%)	33(66%)	0.044
Technique of Inhalation			
Confident and Demonstrate Correctly	7(30.4%)	19(57.6%)	0.045
Confident but does not Demonstrate Correctly	14(60.9%)	12(36.4%)	0.070
Neither Confident Nor Demonstrate Correctly	2(8.7%)	2(6%)	1.000

DISCUSSION

Elderly had more symptoms which may be because of higher comorbidities and poor control of asthma due to memory and cost constraints.[3,4,5,6]

Although atopy was significantly higher in younger asthmatics, but potential allergens should be avoided in both elderly and young asthmatics.[2,3]

Although asthma in elderly may be a continuum of young age,[7,8] but in present study 84% patients had onset after age of 40 years. So diagnosis of asthma in elderly without history of asthma in early childhood should be kept in mind.

Elderly patients had more severe disease than young, this is similar to study by Barr[8]. Elderly patients had higher GINA gradation (moderate persistent asthma and both moderate and severe persistent asthma taken together (p=0.025)). This

can be explained with delay in diagnosis, delay in starting treatment and inadequate medications, poor inhalational technique, poor compliance because of cost and memory and absence of confidante because of death of spouse in elderly. Despite of having higher symptoms, elderly attributed them to comorbidities rather than asthma. Moreover, elderly may be placed in higher GINA gradation because of low base line lung functions due to natural decline with age. Even young asthmatics who carry their asthma to old age may have higher grading because of poor control for several years causing airway remodeling.

The severity of asthma in these patients may reflect poor family support and loneliness of the patients especially in elderly whose spouse is not alive. Psycho social and financial factors also gain more importance, especially in case of widowed females in Indian setting who are mostly financially dependent.

Elderly had poorer lung function values which were similar to findings of Quadrelli[6].

Similar to study by Diette[3], significantly more young received care from pulmonologist. In India, there is unequal distribution of health care providers with pulmonologists being stationed in specialized centers which were easily accessible to young, but elderly were constrained to get treatment from locally available general physicians, alternate system of medication or quacks because of psychosocial and economic problems. Pulmonologists are more likely to prescribe inhalational medications and educate about disease and treatment.

Receipt of inhalation therapy through care by pulmonologist than by Quack, general physician or alternate system of medication was found to be statistically significant in elderly ($p = 0.001$) and young, similar to study by Sin[9]. However, young received statistically significant higher inhalational therapy ($p=0.04$).

Lack of familiarity of evidenced based medicine about asthma in general physicians, alternate system of medication and quacks, who are not keeping themselves updated regarding latest trends in medical care may partly explain this disparity .Although various asthma consensus guidelines have been promulgated, there remains a substantial gap between recommended and actual practices. These practitioners need to be familiarized regarding current guidelines.

Lack of time in a busy OPD or higher cost of pack of inhalational drugs vs. choice of buying oral medications on day to day basis may be the factors for under usage of inhalational therapy.

As in other studies,[5,10] in our study it was seen that baseline use of inhalational therapy was only 46% amongst elderly and 66% amongst young. This may be because young are more receptive to physicians advise but elderly are hard to shed their myths regarding inhalational therapy. Out of 44 patients on oral therapy, when started on inhalational therapy, 8 could not sustain when noted at 3rd month, because of cost. This can be taken care by providing inhalational medications free or at subsidized costs in resource poor settings. It has been proved worldwide that inhalational steroids and treatment of asthma is economical because of the lesser emergency room visits, cost of hospitalizations, better quality of life, fewer loss of working days and lesser side effects.

Failure to instruct patients about use of inhalers and their reinforcement decreases compliance.[11]

Young asthmatics were more confident and correctly used the inhalational therapy than elderly ($p=0.045$). Similar results were seen by Pereira.[10] Elderly are less confident, have poor memory, poor effort and poor coordination of the various steps. This necessitates the importance of repeated demonstrations by the treating physician for the use of inhalational device at every visit for efficient drug delivery especially in case of elderly. Information dissemination must include verbal instructions, demonstrations and practice sessions and these must be checked periodically.

The presence of comorbidities is relevant with respect to presentation, recognition and management of older patients with asthma. There may be poor perception of symptoms of asthma itself because the patient may under rate symptoms and attribute his symptoms to be because of

aging or associated co morbid conditions. It is not uncommon, even for the physician to be in a diagnostic dilemma. for the same because the hallmark symptoms of asthma, including shortness of breath, wheeze and cough are non specific and mimicked by other disease such as Congestive Heart Failure, Chronic Obstructive Pulmonary Disease, chronic aspiration, GERD (Gastro Esophageal Reflux Disease) and trachea-bronchial tumour. The high prevalence of comorbidities in our study is similar to other studies.[3,6,9,12]

Higher incidence of GERD can be because GERD is known to trigger exacerbation of bronchial asthma. Asthma can also lead on to GERD because of aerophagia, hyperinflation of lungs and anti asthma medications can cause relaxation of lower esophageal sphincter.[13] GERD in patients of asthma having ≥ 4 comorbidities was more and could be medication related.

Higher incidence of hypertension in elderly may be important because these patients can have breathlessness and rhonchi on auscultation. Similarly, a patient of asthma can have breathlessness. It will be judicious clinical practice to rule out asthma in elderly with hypertension and cardiac disease.[2]

In elderly, higher visual impairment can be because of presbyopic and senile changes leading to difficulties with identification of medications. This can be overcome by assigning different colors to reliever/controller medications.[2]

Higher depressive symptoms in elderly may be because of asthma, comorbidities, loneliness and inability to earn or socio psychological problems.

Osteoarthritis, hearing impairment, senile dementia and BHP are the problems related to normal physiological processes of aging, but gain more importance in elderly because of impact of comorbid conditions.

The patient may be already on many medications for comorbidities and adding asthma medications may pose further difficulty in daily medication regimens.

It has been postulated a number of times that GERD in many patients may be due to the excess of the various medications they are already taking. These include the drugs like anticholinergics, smooth muscle relaxants (badrenergic agents, aminophylline, nitrates, calcium channel blockers and phosphodiesterase inhibitors) etc.[13] This was confirmed from our study, where it was seen that all (100%) patients who were already on ≥4 drugs use, complained of GERD (p=0.009 amongst elderly and p=0.001 amongst young).

As seen by Pereira[10], in our study also more of young were compliant in taking their medication than elderly. In our study, relief of symptoms was an important reason for leaving medication in young. Reason may be that in the young, without any comorbid conditions, the symptoms which were only due to asthma disappeared on taking medications but in elderly, symptoms because of other comorbid conditions may persist.

Young had more contact frequency with confidante than elderly. Importance of confidante lies in the fact that if patient can share his/her problems with someone, he/she may have a better quality of life with improvement in disease parameters. The patients who were not having any confidante had more severe disease with more of non compliance and poor quality of life. Similar results were obtained by Adams.[12] Elderly are more likely to have fewer confidante because they may be more likely to have lost spouse in old age and may not be able to mix with people because of physical, financial and psychological problems.

Poor quality of life amongst elderly may be because of asthma, comorbid conditions, psychosocial and financial factors and poor family support. This is similar to study by Enright[14]. Statistically significant differences in elderly and young for depressive symptoms, fatigue, emotional well being and impairment of social functioning were similar to other studies.[8,15]

Continued inhalational treatment is important because of growing evidence that persistent airway inflammation predisposes to airway remodeling causing fibrosis and irreversible airflow obstruction.

This risk increases with duration of asthma and age, stressing need for anti inflammatory medications (inhaled steroids) in elderly. Despite clinical stability on hospitalization, persistent airway inflammation necessitates usage of controller medications to prevent relapse.

During first follow up at 15th day, all patients had already been put on inhalational mediations. Both groups showed improvement in symptoms, compliance, technique of inhalation and PEFR.

During 2nd follow up at 1st month, all elderly and young improved symptomatically with improvements in lung functions. Compliance fell from a previous of 68% amongst elderly to 48% and rose from 86% to 90% amongst young necessitating requirement of continued follow ups, especially in elderly. Technique of inhalation also improved in both groups stressing need of demonstration of device usage at follow up visits. The adverse effect profile also fell down further. There was no admission.

During follow up at 2nd month, symptomatic profile, compliance, drug delivery techniques and mean PEFR further improved. No patient complained of adverse effects due to inhalational medications. However, 7 patients amongst elderly and 1 amongst young were put on only oral medications because of cost. Also, 3 elderly were admitted for the worsening of the disease, while there was no admission amongst young.

During follow up at 3rd month, symptomatic improvement was seen in 94% elderly and 96% young and none were admitted for exacerbations. Compliance further improved however, adverse effect profile deteriorated showing that oral medications are associated with a poorer adverse effect profile. Technique of inhalation was checked amongst all patients, irrespective of the fact that whether they were on inhalational medication or not and it was found that it further improved with improvements in mean PEFR as well.

Limitations of the study: Allergic rhinitis was not studied as a comorbidity. Also, though the sample size and follow up period was adequate, had these been even greater, the differences would have got further reflected.

CONCLUSIONS

It can be concluded that there is significant difference between elderly and young asthmatics, right from the presentation to the final outcomes. This includes differences in symptomatic profile, history of atopy, severity of disease, baseline lung function tests and management parameters including the treating physician, routes of drug delivery, compliance with medications and confidence and technique of taking inhalational medications. There are also differences in psycho social profile, presence of living spouse, family support and quality of life indicators. Elderly are likely to have significant comorbid conditions and higher number of drug usage. Thus there is under-diagnosis at first stage. Once diagnosed, it is undertreated because of physician concerns regarding availability and safety of various medications, problems with compliance and various psycho social and economic factors.

Physicians need to be made aware of these parameters and the differences between young and elderly.There must be continued motivations by the physician for improving compliance and friendly discussions are a must with a good patient–doctor relationship to improve final outcomes of disease, especially in elderly. Since patients managed by pulmonologist fared better as compared to primary care physicians, quacks and alternate system of medication, so the latter group need to be educated regarding asthma guidelines and practice them properly.

REFERENCES

1. Savage B A. Lung disease and asthma severity in adults with asthma: data from the Third National Health and Nutritional Examination. J Asthma 2005;42:519-23.

2. Braman SS, Hanania. NA Asthma in Older Adults. Clinics In Chest Medicine 2007;28:685-702.

3. Diette GB, Krishnan JA, Dominici F. Asthma in Older Patients. Arch Intern Med 2002;162:1123-132.

4. Quadrelli SA, Roncoroni AJ. Is Asthma in the Elderly Really Different? Respiration 1998;65:347-353.

5. Parameswaran K, Hildreth AJ, Chadha D, Keaney NP, Taylor IK, Bansai SK. Asthma in the elderly: underperceived, underdiagnosed and undertreated; a community survey. Respir Med1998;92:573-7.

6. Weiner P, Magadle R, Waizman J, Weiner M, Rabner M, Zamir D. Characteristics of asthma in the elderly. Eur Respir J 1998;12:564-68.

7. Burrows B, Barbee RA, Cline MG, Knudson RJ, Lebowitz MD. Characteristics of Asthma among Elderly Adults in a Sample of the General Population. Chest 1991;100:935-42

8. Barr RG, Somers SC, Speizer FE, Camargo CA. Patient Factors and Medication Guideline Adherence among Older Women with Asthma. Arch Intern Med. 2002;162:1761-8.

9. Sin DD, Tu JV. Underuse of Inhaled Steroid Therapy in Elderly Patients with Asthma. Chest 2001;119:720-5.

10. Pereira LMP, Clement Y, Silva CKD, McIntosh D, Simeon DT. Understanding and Use of Inhaler Medication by Asthmatics in Specialty Care in Trinidad: A Study Following Development of Caribbean Guidelines for Asthma Management and Prevention. Chest 2002;121:1833-40.

11. Cochrane MG, Bala, MV, Downs KE. Inhaled cortico steroids for asthma therapy : patient compliance devices, and inhalation technique. Chest 2000:117:542-50.

12. Adams RJ, Wilson DH, Taylor AW, Daly A, Espaignet ET, Grande ED, Ruffin RE. Coexistent Chronic Conditions and Asthma Quality of Life: A Population-Based Study. Chest 2006; 129:285-291

13. Goyal RK. Diseases of the Esophagus. Harrisons Principles of Internal Medicine. McGraw-Hill Companies, Inc. 16th Ed. 2005;2:1742-3.

14. Enright PL, McClelland RL, Newman AB, Gottlieb DJ, Lebowitz MD. Underdiagnosis and Undertreatment of Asthma in the Elderly. Chest 1999;116:603-613.

15. Ng T, Chiam P, Kua E. Mental disorders and asthma in the elderly: a population-based study. International Journal of Geriatric Psychiatry 2006;22:668-74.

WHAT DO THEY KNOW ABOUT HIV/AIDS – ADOLESCENTS AND YOUNG ADULTS FROM SLUMS IN MUMBAI, INDIA

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ABSTRACT

Introduction: In compliance with guidelines from NACP III, wide spread activities are continued, by public, private and NGO sectors, to enhance the level of knowledge about HIV/AIDS among vulnerable adolescent and young adult population in urban areas, in the forms of various projects, so as to facilitate positive behavioural changes among them . Present cross-sectional study, was conducted in three, representative administrative wards (namely L, K/East & R/North) of Municipal Corporation of Greater Mumbai (MCGM), India, in December 2010, to assess the level of knowledge and attitudes about HIV/AIDS amongst the adolescents and young adults.

Methodology: Total 4306, adolescents and young adults representing all 28 health posts from selected wards were interviewed by 100 trained NSS volunteers of University of Mumbai, under the leadership of Department of Community Medicine, T. N. Medical College & Nair Hospital. Data was analysed with the help of statistical software (SPSS).

Results: Seventy-nine percent (3407/4306) and 49.81% (2145/4306), of respondents had heard about HIV/AIDS, and STI/RTIs respectively. Unsafe sexual relationship, as route of transmission is known to 51.81 % (2231/4306) respondents, whereas use of condom, as preventive measure is known to 87% (3746) of people. Only 30.05% (1294/4306) respondents know nearby testing facilities. Everybody should be tested for HIV, to reduce transmission, is believed by 93.96%, (4046/4306) respondents. Knowledge grade given to each respondent based on the score obtained by them out of total obtainable 25 score, reveals, 57.36%, (2470/4306), in poor grade. Multinomial logistic regression confirms the significant influence of age and education status of respondents on their knowledge and positive attitudes.]

Conclusion: When compared with other relevant studies, the present status of knowledge of adolescents and young adults from slums of Mumbai appears to be poor and justifies the need for intensified efforts towards improving the same, taking into account their vulnerability. Well planned coordinated efforts of public, private and NGO sectors, would go a long way to get the desired impact.

Key words: HIV/AIDS, Adolescents, Young adults, Knowledge, Attitudes

INTRODUCTION

HIV/AIDS is the biggest public health challenges in the world today. Even though the prevalence of HIV infection is showing declining trend in present times, globally, estimated 33.2 Million individuals are infected with HIV so far and total number of 2.1 million deaths are reported since the identification of first case of HIV/AIDS, in US in the year 1981. In Asia, an estimated 4 million people are living with HIV/AIDS, in 2007.[1] Taking into account number of people living with HIV/AIDS, India, ranks second, in the world and has estimated 22.7 lakh HIV infected

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people with an estimated 0.29% prevalence rate, among general public, at the end of 2008.[2] State of Maharashtra, has the identity of high prevalence state in the country with ANC prevalence rates as high as, 0.5%. Mumbai is said to be the epicentre of the epidemic in Maharashtra.

Young people are especially vulnerable to HIV infection, more so if they belong to slum areas. Although young people, 15–24 years of age, account for 45% of all new HIV infections in adults, many young people still lack access to adequate health information and services.[1] Around the world empowering youth (aged 15-25 years) with the information and skills to protect themselves and their families from HIV infection is considered one of the best long term strategies to contain the HIV/AIDS epidemic. The youth in the age group 15-25 years, usually incorporates two categories, adolescents (15 – 18 years) and young adults (19-25 years). Adolescent stage, represent transition from puberty to adulthood, while young adult stage represents adoption to mature, responsible adulthood, and hence influencing behaviour pattern of this youth group with wide spread advocacy, communication and social mobilization activities would yield great result.

Studies on knowledge, attitude, behaviour and practices (KABP), conducted in different parts of India, reveal widespread ignorance and misconceptions about the disease among adolescents. Efforts are intensified in compliance with guidelines from NACP III, by public, private and NGO sectors, to enhance the level of knowledge about HIV/AIDS among vulnerable adolescent and young adult population in urban areas, in the forms of various projects. Present study was undertaken to assess the level of knowledge and attitudes about HIV/AIDS, among adolescents and young adults (15 – 24 years), from slum areas of Mumbai, India, to understand the impact of IEC activities, so far in this respect, and identify the scope for further improvement to sustain declining trend of HIV epidemic.

METHODOLOGY

Present community based, descriptive epidemiological study, carried out in December 2010, adopted cross sectional exploratory survey design, to assess the knowledge and attitudes of adolescents and young adults (15-25 years) about HIV/AIDS, from slum areas in Mumbai, India. Three representative administrative wards (L, K/East & R/North) were randomly selected, out of total 24 wards under Municipal Corporation of Greater Mumbai. Total slum population of these 3 wards together is 20.3 lakhs, out of which 20% belong to the age group of 15-25 years. For the purpose of health care delivery, each ward is divided into health post areas, and each health post, further divided into different sections and areas within each section. To represent entire study area, data is collected from 24 health post areas (out of total 28 health posts) in all 3 wards, which includes 75 sections (out of total 152 sections in 3 wards) and 150 areas (out of total 858 areas). Convenient sample of total 4306 respondents (Average 180 from each selected health post, adolescents, 15 – 18 years, 120, and young adults, 19 – 25 years, 60), constitutes study group subjects with adequate representation of males (2224) and females (2082).

Total number of 100 trained, National Service Scheme (NSS) volunteers of University of Mumbai, who worked in pairs, were involved in data collection by undertaking house to house survey, with the help of preformed, pre tested semi structured interview schedule, which included questions on knowledge as well as attitudes of the people about HIV/AIDS. Informed oral consent of the respondents was obtained prior to their interview. The data was analysed with the help of statistical software (SPSS,17.0 version) package, in terms responses to each question and score obtained by each respondent to the correct responses, out of maximum obtainable 25 score, for all questions.

RESULTS

Out of total number of 4306 study subjects, who belonged to L ward (1980), K/East ward (1447) and R/North ward (879), 2224, 51.65% are males (1285 adolescents and 939 young adults) and 2082, 48.35%, are females (1219 adolescents and 863 young adults) (Table 1). Educational status wise distribution, reveals maximum number of respondents educated up to secondary school level (2867, 66.58%), followed by college going youths (1234, 28.66%) and rest were educated up to only primary level (89, 2.06%) or illiterate (116, 2.70%). Overall high percentage of individuals educated up to secondary school level and above, (as against the findings of NFHS III data[3]) is mainly because of availability and accessibility of low cost education facilities extended to slum areas through MCGM run schools, and overall general awareness among the people about the importance of education, being residing in urban areas. Among the adults, 13.63% males (128/939) and 39.39% females (340/863) are married and the corresponding figures for adolescents are 2.64% (34/1285) and 5.17% (63/1219), which are much less than NFHS III data.[3]

Knowledge grade given to each individual is based on the score obtained by him/her, on the questions as per the interview schedule, with maximum obtainable score of 25. Those who scored 8 or less than 8 are given poor grade, those who scored in the range of 9 to 16, are given average grade and those who scored 17 & above are given good grade. The mean knowledge score is 6.98 with the range of 0 to 19 & Standard Deviation of 4.45, for L Ward. Similarly mean score for K/East & R/North wards are 6.85 (SD=3.64) & 9.39 (SD=5.36) respectively. The average score obtained by all respondents is 7.74 out of 25 i.e.30.96 %. The average score obtained by all in poor grade is 3.21 whereas it is 13.05 and 17.12 for those in average and good grade respectively. Poor, Average and Good grades are obtained by 2470 (57.36%), 1706 (39.61%) and 130 (3.01%) respondents respectively (Table 2). Mean score of males (7.73/25) is more than females (7.11/25) and it is statistically significant (P < 0.01). Similarly mean score in adult males (8.53) and adult females (7.73) significantly defers from their adolescent counterparts (Males - 7.14 & Females - 6.67). Among the unmarried respondents, 57.92% (2167/3741) obtained Poor grade, 38.92% (1456/3741) obtained Average grade and only 3.16% (118/3741) obtained Good grade. Among the married individuals the corresponding figures for Poor, Average & Good grade are 55.22% (312/565), 42.47% (240/565) and 2.31% (13/565) respectively. Even though the situation apparently appears to be better for married individuals as compared to unmarried individuals, difference

Table 1. Educational status of study subjects (N = 4306)

Sex	Illiterate		Primary		Secondary		College		Total
	Ado	Adu	Ado	Adu	Ado	Adu	Ado	Adu	
M	22	32	25	14	1075	412	163	481	2224
F	13	49	29	21	954	426	223	367	2082
Total	35	81	54	35	2029	838	386	848	4306

Ado – Adolescents, Adu – Adults

Table 2. Education Vs Knowledge Grade (N = 4306)

Ward Knowledge Grade	Educational Status								Total
	Illiterate		Primary		Secondary		College		
	M	F	M	F	M	F	M	F	
Poor	28	45	25	39	891	923	244	275	**2470**
Average	22	17	14	10	554	412	383	294	**1706**
Good	4	0	0	1	42	45	17	21	**130**
Total	54	62	39	50	1487	1380	644	590	4306

χ^2=7.487, df-1, P=0.0062, Poor & Average/ Good grades Vs Education status
χ^2= 8.929, df-1, P < 0.0001, Poor & Average/ Good grades Vs sex,

is not statistically significant. There is significant difference in knowledge level between males and females, as well as among those who are educated up to primary level (68/205, 33.17%), Vs those educated up to secondary school level and above (1768/4101, 43.11%), (Table 2). This indicates the influence of education level on the awareness about HIV/AIDS. Present study thus indicates the importance of focusing on non student youth.

Significantly more number of males & adult population, have heard about HIV/AIDS (1571/1802, 87.18%) and STIs (1050/1802, 58.26%) as compared to females and adolescents. (For HIV/AIDS – 1836/2504, 73.32% and for STIs – 1095/2504, 43.73%), (Table 3). This may be because of more exposure to the knowledge on HIV/AIDS and STIs among adults (either in college or working place, through peers or other sources) as compared to Adolescents.

Table 3. Heard of HIV/AIDS & STI (N = 4306)

Sex	HIV/AIDS		STI s	
	Adolescents	Adults	Adolescents	Adults
M	957	842	584	596
F	879	729	511	454
Total	1836	1571	1095	1050

	χ^2	df	P value
Heard of HIV/AIDS Vs Adolescents and adults	120.99	1	< 0.0001
Heard of STI Vs Adolescents and adults	88.017	1	< 0.0001
Heard of HIV/AIDS Vs sex	8.485	1	0.0036
Heard of STI Vs Sex	19.087	1	< 0.0001

Table 4 shows that 34.81% (1499/4306) of study population did not know any modes of transmission of HIV. Almost 52% (2231/4306) of study population reported that they knew about unsafe sexual intercourse transmits HIV and 44.93%, 32.60% & 13.93% of subjects knew about transmission of HIV by contaminated needle, contaminated blood & parent to child transmission respectively. Findings that sharing tooth brushes (0.18%), living with infected persons, sharing their cloths (0.86%), contaminated air or water (0.23%) and mosquito bite (0.11%) can lead to infection, are indications of ignorance & lack of awareness.

Table 4. Modes of transmission (N=4306)

Modes of transmission	Total (N=4306)	
	No	%
Unsafe sexual relationship	2231	51.81
Contaminated needle, blade	1935	44.93
Contaminated blood	1404	32.60
Mother to child	600	13.93
Sharing toothbrushes	8	0.18
Staying together, sharing personal things, towels, cloths	37	0.86
Through air & water	10	0.23
Mosquito bite	5	0.11
Do not know	1499	34.81

Table 5 reveals that almost 87% (3746/4306) know the use of condom as preventive measure against HIV. The number of individuals who have mentioned use of new needles by IVDUs (748/4306, 17.37%), use of blood from accredited blood bank (521/4306, 12.09%), Safer sex practices (431/4306, 10.00%) and PPTCT (115/4306, 2.67%), are very low.

When specifically enquired to identify nearby places where diagnostic tests for HIV are done only 30.05% (1294/4306) respondents could mention them correctly (Table 6).

Table 5. Knowledge about ways of prevention of HIV infection (N=4306)

Ways of prevention	Total (N=4306)	
	No	%
Use of condom	3746	86.99
New needle for IVDUs	748	17.37
Take blood from accredited blood bank	521	12.09
Safe sex (be faithful + Abstinence)	431	10.00
PPTCT	115	2.67
Not to talk/ touch infected person	33	0.76
Avoid kissing	29	0.67
Contraceptive pills/I pills	22	0.51

Table 6. Knowledge about nearest ICTC Centre		
Nearest ICTC Centre	**Total (N = 4306)**	
	No	**%**
Know them correctly	1294	30.05
Do not know	2375	55.16

Rest of the individuals (Total – 637, L ward – 414, K/East ward – 5 & R/North ward – 218) gave irrelevant answers to this question like any dispensary, non allopathic private practitioners, any small pathology laboratory, where routine investigations are carried out, etc.

Total number of 5 attitudinal questions as mentioned in Table 7 were asked to each respondent. The expected or correct responses given are shown in the given table. It is apparent that, more than 50% of respondents are aware about true facts and have expressed their positive attitude to the statements number 2, 4 & 5 i.e. 2276/4306, 2738/4306 & 2499/4306 respectively. However majority of the people still believe in getting everybody tested for HIV infection and around 69% (2938/4306) individuals are not awareness about more vulnerability of women for HIV, than males. This deserves attention in the scheduled training programmes for the beneficiaries at different levels and by different organizations.

Respondents giving expected responses to the statements are significantly higher among more educated classes as compared to illiterates and those who have learned only up to primary level. Similarly, percentages of married respondents is better as compared to unmarried respondents as far as desired responses to the statements number 3 & 4 are concerned, as against statement 1, 2 & 5. (Table 7).

Table 7. Expected responses to attitudinal questions – education and material status wise

Statement	Illiterate		Primary		Secondary		College		Total
	U	M	U	M	U	M	U	M	
Everybody should undergo HIV testing	0	3	0	2	159	18	70	8	260
Once HIV infection is diagnosed, person cannot survive at all	22	21	26	15	1271	206	635	80	2276
Women are more vulnerable to HIV/AIDS	14	17	21	3	776	107	395	35	1368
People should not interact with HIV infected person	24	28	32	13	1496	240	806	99	2738
No nursing care should be provided to HIV infected person at home	18	21	30	13	1375	223	739	80	2499

U – Unmarried, M - Married

Statements		χ^2	df	P value
Everybody should undergo HIV testing	Married Vs Unmarried	0.2002	1	0.6546
	Illiterates and those who have learned up to primary level Vs more educated classes	4.184	1	0.0408
Once HIV infection is diagnosed, person cannot survive at all	Married Vs Unmarried	3.072	1	0.0797
	Illiterates and those who have learned up to primary level Vs more educated classes	11.509	1	0.0007
Women are more vulnerable to HIV/AIDS	Married Vs Unmarried	20.472	1	< 0.0001
	Illiterates and those who have learned up to primary level Vs more educated classes	2.108	1	0.1466
People should not interact with HIV infected person	Married Vs Unmarried	4.076	1	0.0435
	Illiterates and those who have learned up to primary level Vs more educated classes	21.716	1	< 0.0001
No nursing care should be provided to HIV infected person at home	Married Vs Unmarried	0.6961	1	0.4041
	Illiterates and those who have learned up to primary level Vs more educated classes	27.688	1	< 0.0001

Table 8. Knowledge Grade Vs Expected responses to Attitudinal questions

Responses	Knowledge Grade						Total
	Poor		Average		Good		
	M	F	M	F	M	F	
Everybody should undergo HIV testing	82	74	69	32	2	1	260
Once HIV infection is diagnosed, person cannot survive at all	503	556	622	505	43	47	2276
Women are more vulnerable to HIV/AIDS	331	282	422	254	37	42	1368
People should not interact with HIV infected person	581	666	781	611	46	53	2738
No nursing care should be provided to HIV infected person at home	571	591	712	550	30	45	2499

M- males, F-Females

χ^2 = 23.168, df-4, P =0.0001, Responses among those who have obtained poor knowledge grade Vs average/good grade	χ^2 = 5.437, df-1, P = 0.0197, Statement 1, Males Vs Females
χ^2 = 0.1843, df-1, P = 0.6677, Statement 2, Males Vs Females	χ^2 = 29.514, df-1, P < 0.0001, Statement 3, Males Vs Females
χ^2 = 0.1280, df-1, P = 0.7205, Statement 4, Males Vs Females	χ^2 = 2.576, df-1, P = 0.1085, Statement 5, Males Vs Females

It is evident from table 8 that, desired responses by the individuals to the attitudinal statements are influenced by the knowledge grade obtained by them. Those who have obtained either average or good grade have shown significantly better performances to the attitudinal questions as compared to those who have obtained poor grade. Similarly significant difference in correct responses is also observed among males and females for statements number 1 & 3. This indicates positive attitudinal changes towards HIV/AIDS among general public, because of IEC activities through various sources. However there is still enough scope to improve the situation still further especially related to statements 1 and 3.

Application of two way analysis of variance, shows statistically significant difference in level of knowledge among males and females in adults and adolescents as well as in married and unmarried population. However, multinomial logistic regression confirms the influence of only age (adults more than adolescents) and education status (Secondary and above more than Primary and below) on the overall level of knowledge and attitudes about HIV/AIDS. (Table 9)

Table 9 - Results of Two way ANOVA and Multinomial Logistic Regression

Two way ANOVA			
Determinant	F	DoF	Significance
Sex & Age group			
Sex	21.196	1	0.000
Age group	78.644	1	0.000
Sex by Age group	1.338	1	0.247
Sex & Marital status			
Sex	15.052	1	0.000
Marital status	3.538	1	0.06
Sex by Marital status	1.207	1	0.272
Multinomial Logistic Regression			
Determinant	OR (Adjusted)	95% Confidence Limit	P value
Sex (Male Vs Females)	1.419	0.988-2.037	0.058
Education level	0.998	1.103-2.590	0.000
Age	0.536	0.360-0.797	0.002
Marital status	0.815	0.434-1.530	0.524

DISCUSSION

In the present study, undertaken in December 2010, to assess the level of knowledge and attitudes about HIV/AIDS among adolescents and young adults (15 – 25 years age group) in slum areas of Mumbai city, India, total number of 4306 individuals were interviewed by 100 trained National Service Scheme volunteers of University of Mumbai. Total number of 3407 (79.12%) individuals, from slum areas, have heard about HIV/AIDS, as against only 2145 (49.81%) study subjects who have heard about STIs. Similar findings are made by the study conducted in Hyderabad[4] among general population, which reports, 80% & 51% study subjects have heard of HIV & STIs respectively. Around 45%, Youths from Shahapur block of Thane district, also have heard of STIs.[5] Studies conducted by Bhalla et el[6], in Jamnagar, Gujarath among secondary school students & Lal et el[7], among college students in Kerala, reveal that almost all their respondents have heard of HIV/AIDS. This is mainly because of the difference in the study populations. In the present study the respondents are from slum areas, especially belonging to low socioeconomic profiles, who are difficult to reach. However, in this study, according to the grades given to the respondents, it is clearly found that, level of knowledge, is significantly better among those who are educated up to secondary school level and above as compared to illiterates and educated up to only primary school level (Table 2). Similar results were obtained by Sangole et el[8], Sarkar P et el[9], Sogarwal et el[10], Bassey et el[11], Sarkar S et el[12], in their study where respondents with higher education had good knowledge of HIV/AIDS compared with respondents with lower level of education.

According to the NFHS III data[3], 94.2% males and 80.7% females from urban areas have heard of HIV/AIDS, whereas here corresponding figures for males and females are 85.38% and 77.23% respectively. Studies carried out by Chakrovarty et el[13] & Singh et el[14] confirm awareness among males significantly more as compared to females. Present study also confirms desired responses, significantly more among males than females, when compared independently. This could be because of accessibility and availability of opportunities to obtain knowledge, more likely among males as compared to females, especially among slum population.

Unsafe sexual relationship is identified as the most important route of transmission of HIV/AIDS by 2231 (51.81%) individuals, followed by 1935 (44.93%) and 1404 (32.60%) respondents, who identified contaminated needles and syringes and contaminated blood, responsible for the transmission. Population First's Report[5], on a Knowledge, Attitude and Practice (KAP) Study of Adolescent Reproductive and Sexual Health (ARSH) issues, among youth of Thane district, reports that, according to 57% of respondents, HIV spreads through Unprotected sexual intercourse. According to the study conducted by Lal et al[7], among college students, 48% of study subjects identified, unsafe sex as mode of transmission of HIV. A study done among slum-dwellers in another metropolitan city of India (Chennai), showed that 67% males and 55% females were aware of the sexual mode of transmission.[15] Study conducted by MAAIF Uganda under aegis of FAO revealed that over half of the respondents (53.7%) reported that HIV spread was as a result of people having multiple sexual partners & 46% of respondents agreed that condom use would prevent HIV infection.[16]

Only 1935 (44.93%), 1404 (32.60%) and 600 (13.93%) individuals in the present study are aware about transmission through contaminated needles and syringes, contaminated blood, and from mother to child, respectively as against the reported figures of, 72%, 98.5% and 83-96% respectively for the same, in other studies[4-7]. This may be because of only limited accessibility to the knowledge among slum dwellers in Mumbai. It is also observed in the present study that people are very hesitant to talk on the sensitive topic like HIV/AIDS, may be a social taboo, because of which almost 1499 (34.81%) have denied to give information on modes of transmission as well as ways of prevention (560, 13.00%). More intensified IEC efforts are justified on this ground especially for the people residing in slum areas.

In present study area, 3746 (86.99%) individuals are aware about use of condom as one of the most important ways of prevention of transmission of HIV, followed by use of new needle among IVDUs (748, 17.37%), receiving blood from accredited blood banks (521, 12.09%) safer sex practices (abstinence & be faithful, 431, 10%) and PPTCT (115, 2.67%). Study conducted by Bibi et el[17] reveals 62% & 41% of study subjects, aware about Condom use & receiving blood from accredited blood bank, as ways of prevention of HIV transmission respectively.

Even though the insignificant numbers, present study also reveals that there are still misconceptions regarding modes of transmission & ways of prevention of HIV infection. These are spread of infection through staying together and sharing personal things, contaminated air or water, mosquito bite, etc., and no talk or touch with infected person, avoid kissing, use of contraceptive pills etc. Similar misconceptions are evident from the studies by Kore et el[18], Gaash et el[19], Lal et el[7], Jaiswal et el[20], Bassey et el[11], Unnikrishnan et el.[21] These issues deserve attention while reaching to these slum dwellers with intensified IEC efforts.

In our study 58.03% (2499/4306) respondents said that 'No nursing care should be offered to the patient with the HIV at home'. This finding is similar to the study by Gaash et el[19] where 48% respondents said that AIDS patients must not be managed at home. [12]

In the present study application of Multinomial logistic regression analysis confirms the significant influence of age (adults & adolescents) and education status of respondents (Educated up to primary level Vs secondary level and above) on their knowledge and positive attitudes.

CONCLUSION

Present study undertaken to assess level of knowledge and attitudes about HIV/AIDS among slum population of Mumbai, which has identification as epicentre of HIV/AIDS epidemic in India, reveals that majority of people, have heard of HIV/AIDS and are also aware about use of condom as one of the important method of prevention of infection. However, overall level of knowledge among them as assessed by composite score is low, especially among adolescents and those who are educated only up to primary level. Knowledge in relation to modes of transmission, measures of prevention and availability of nearby testing facilities deserves more attention. Level of knowledge and positive attitudes will go a long way, towards influencing behaviour of the people conducive to prevention of HIV. There is a scope to promote intensified IEC activities about HIV/AIDS especially for slum dwellers, adolescents and those with low level of education, who are difficult to reach, even though vulnerable, being dominated by migratory people, low socioeconomic profile, and reluctant to accept discussions on sensitive topic like HIV and STIs. Community based, need oriented, IEC activities to cover non student adolescents and youth would be an ideal strategy for the same.

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REFERENCES

1. UNAIDS. Geneva: AIDS epidemic update UNAIDS; December 2007-21. http:// data.unaids.org/ pub/ epislides/2007/2007_epiupdate_en.pdf.

2. National AIDS Control Organisation, New Delhi: Department of AIDS Control, Ministry of Health & Family Welfare,2009-10, http:// www.nacoonline. org /upload/ AR%202009-10/ NACO_AR_ English% 20corrected.pdf

3. National Family Health Survey, India (NFHS-3), International Institute for Population Sciences (IIPS) and Macro International, Mumbai, India. 2005-06 (2007)

4. Sudha RT, Vijay DT, Lakshmi V. Awareness, attitudes, and beliefs of the general public towards HIV/AIDS in Hyderabad, a capital city from South India. Indian J of Commun Med 2005;59:307-316.

5. Population First. Report on Knowledge, Attitude and Practice (KAP) Study of Adolescent Reproductive and Sexual Health (ARSH) issues among youth in Shahapur Block – Thane. (http:// www. populationfirst.org/ pthaneactivities01.html)

6. Bhalla S, Chandwani H, Singh D, Somasundaram C. Knowledge about HIV/AIDS among senior secondary school students in Jamnagar, Gujarat. HPPI 2005; 28:178-188.

7. Lal SS, Vasan RS, Sarma PS,Thankappan KR. Knowledge and attitude of college students in Kerala towards HIV/AIDS, Sexually Transmitted Diseases & Sexuality. Natl Med J India 2000;13:231-6

8. Sangole S, Tandale BV, Bagde PS, Thorat DM. Evaluation of impact of health education regarding HIV/AIDS on knowledge and attitude among persons living with HIV. Indian J of Commun Med 2003; 28:30-33.

9. Sarkar P, Mostofa G, Rahman M. Knowledge of transmission routes & prevention ways of HIV/AIDS: Bangladesh context. The Soc.Sci.2010;5:525-31.

10. Sogarwal R, Bachani D. Awareness of women about STDs, HIV/AIDS and condom use in India: lessons for preventive programmes. HPPI 2009;32:148-58.

11. Bassey EA, Abasiubong F, Ekanem U, Abasiatai AM. Awareness and knowledge of HIV/AIDS at booking among antenatal clinic attendees in Uyo, Nigeria. Int J Med Med Sci 2009;1:334-38.

12. Sarkar S, Danabalan M, Kumar GA. Knowledge and attitude on HIV/AIDS among married women of reproductive age attending a teaching hospital. Indian J of Commun Med 2007;32:82-83.

13. Chakrovarty A, Nandy S, Roy R, Sengupta B, Chatterjee S, Chaudhuri R. A study of awareness on HIV/AIDS among higher secondary school students in Central Kolkata. Indian J of Commun Med 2007;32:228-29.

14. Singh R, Garg SK, Singh JV, Bhatnagar M, Chopra H. An awareness study about AIDS and safe blood among higher secondary girl students; Indian J Commun Med 2004;29:114.

15. Kalasagar M, Sivapathasundharam B, Einstein T, Bertin A. AIDS's awareness in an Indian metropolitan slum dweller: A KAP (knowledge, attitude, practice) study. Indian J Dent Res 2006;17:66-9

16. Ministry of Agriculture, Animal Industry and Fisheries Uganda (2002). The impact of HIV/AIDS on agricultural production and mainstreaming HIV/AIDS messages into agricultural extension in Uganda. (http:// www.fao.org/ docrep/ 005/ac912e/ ac912e00.HTM)

17. Bibi P, Panda P, Purty AJ, Bazroy J. Awareness on HIV/AIDS among Women in a Refugee Community. Indian J of Commun Med 2006;31:208-9.

18. Kore SJ, Pandole A, Nemade Y, Putharaya S. Attitude, Knowledge, beliefs about HIV/AIDS in college going adolescents. Bombay Hospital Journal 2004;46

19. Gaash B, Ahmad M, Kasur R, Bashir S. Knowledge, attitude and belief on HIV/AIDS among the female senior secondary students in Srinagar district of Kashmir. HPPI 2003;26:101-9.

20. Jaiswal S, Magar BS, Thakali K, Pradhan A, Gurubacharya DL. HIV/AIDS and STI related knowledge, attitude and practice among high school students in Kathmandu valley. KUM J 2005;3:69-75.

21. Unnikrishnan, Mithra P, Rekha T, Reshmi B. Awareness and attitude of the general public toward HIV/AIDS in coastal Karnataka. Ind J of Commun Med 2010;35:142

KNOWLEDGE ON HIV/AIDS AMONGST BUS DRIVERS OF DHULIKHEL, NEPAL

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ABSTRACT

Introduction: One of the growing epidemics in the world today is HIV/AIDS. In the cities with high mobility, bus drivers and transport workers are considered as the risk group for HIV/AIDS. In Kavre district, the increased mobility along with Araniko highway and Banepa Bardibas highways has drastically increased the vulnerabilities of younger populations in particularly to HIV/AIDS and STDs. Most of these young people do not have access to information, condoms, supportive services which enable them to have safer sex.

Methodology: A descriptive cross sectional study was done to assess knowledge about HIV/AIDS among bus drivers of Dhulikhel.

Results: After the analysis and interpretation of the data, study revealed that majority of the respondents i.e. 38% (n=19) were between age 20-24 years. Among them vast majority of the respondents i.e 82% (n=41) have heard from media (radio, Television and newspapers). Regarding transmission of HIV/AIDS 90% (n=45) of the respondents mentioned that unsafe sex is the means of transmission. Still 24% (n=12) believe that sharing clothes and 2% (n=1) believe that kissing can transmit HIV/AIDS. As per prevention measures 90% (n=5) have the knowledge that using condom during sexual intercourse can prevent HIV/AIDS. 8% (n=4) of the respondents still believe that HIV/AIDS is curable and rest of them i.e. 92% (n=46) of the respondents knew that HIV/AIDS is not curable.

Conclusion: The present study strongly recommends that there is immediate need of program to create awareness of public motor drivers and co-workers, vulnerable youths and other high risk groups of people including migrant populations.

Key words: Drivers, HIV/AIDS, Knowledge

INTRODUCTION

HIV/Acquired Immune Deficiency Syndrome (AIDS) remains a public health problem of major significance in most parts of the world. In 2009, there were an estimated 2.6 million [2.3 million–2.8 million] people who became newly infected with HIV.1 Nepal is experiencing transition of HIV epidemic. Various predisposing factors are prevalent for the rapid spread of HIV in Nepal. Poverty, ignorance, and conflict are the root causes in undertaking high-risk behavior. 2 HIV thrives on mobile population. Kavrepalanchowk district of Nepal is center for the migrant of young population because this district is in proximity to Kathmandu valley and it has relatively extensive road networks. This along with the increased mobility along Araniko highway and Banepa Bardibas highways has drastically increased the vulnerabilities of younger populations in Kavre particularly to HIV/AIDS and STDs. Thus the influence population

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of these highways, public motor drivers and co-workers, workers of body building workshops, workers of hotels and restaurants where hidden flesh trade exist increases the high risk of spreading HIV/AIDS. All these circumstances favor the district in wider spreads of HIV infection among new population. Hence the present study was conducted to assess the knowledge regarding HIV/AIDS among the risk group and expected that the findings of the present study will be beneficial to design appropriate preventive strategies.

METHODOLOGY

A descriptive cross sectional study was carried out to assess the knowledge about HIV/AIDS among Bus drivers of Dhulikhel-Kathmandu route. 50 drivers were randomly selected for the study. A pretested questionnaire was administered to assess the knowledge about HIV/AIDS. Verbal consent was taken from all the participants prior of collecting the information and privacy were maintained during data collection. Data was collected through close ended questionnaire and interview method was done to collect the data.

RESULTS

Among the participants all 100% (n=50) of the participant were male. Majority of the respondents i.e 38% (n=19) were between age 20-24 years. 62% (n=31) of the respondents had secondary level of schooling. As per ethnicity 60% (n=30) of respondents were Newars followed by Tamang, Chhetri and Brahmin as shown in table 1. 100% (n=50) respondents have heard about HIV/AIDS. Among them vast majority of the respondents i.e 82% (n=41) have heard from media (radio, Television and newspapers). 12% of them (n=6) have heard from health worker and rest of them i.e 4% (n=2) have heard from friends.98% (n=49) of the respondents knew that HIV/AIDS is a communicable disease. Regarding transmission of HIV/AIDS 90% (n=45) of the respondents mentioned that unsafe sex is the means of transmission, 100% (n=50) of the respondents mentioned that sharing of the needles, 92% (n=46) mentioned that transfusion of the blood and 90% (n=45) of the respondents mentioned that HIV transmits from pregnant mother to fetus. However still 24% (n=12) believe that sharing clothes and 2% (n=1) believe that kissing can transmit HIV/AIDS as shown in table 2. 98% (n=48) respondents believe that having STDS and intravenous drug users are the risk group for HIV/AIDS. As per prevention measures 90% (n=45) have the knowledge that using condom during sexual intercourse can prevent HIV/AIDS. rest of them i.e. 10% (n=5) don't know that using condom can prevent HIV/AIDS.8% (n=4) of the respondents still believe that HIV/AIDS is curable and rest of them i.e 92% (n=46) of the respondents knew that HIV/AIDS is not curable.

Table 1. Demographic characteristic of the respondents

Sex	Frequency(n)	Percentage
Male	50	100%
Female	0	0%
Age		
15-19 years	4	8%
20-24 years	19	38%
25-29 years	13	26%
>30 years	14	28%
Ethnicity		
Newar	30	60%
Tamang	8	16%
Brahmin/Chhetri	12	24%
Educational Status		
Primary level	19	38%
Secondary level	31	62%
Higher secondary and above	0	0%

Table 2. Knowledge regarding transmission of HIV/AIDS

Mode of Transmission	Knowledge	Percentage
Unsafe sex	Yes	45(90)%
	No	5(10)%
Pregnant mother to fetus	Yes	45(90)%
	No	5(10)%
Sharing of infected needle	Yes	50(100)%
	No	0(0)%
Sharing of cloths	Yes	12(24)%
	No	24(76)%
Kissing	Yes	1(2)%
	No	49(98)%

DISCUSSION

The descriptive analysis of present study of 50 bus drivers from Dhulikhel revealed that all the respondents have heard about HIV/ AIDS, however knowledge about modes of transmission and methods of prevention are still inadequate. As per our study 100% (n=50) respondents have heard about HIV/AIDS. Our study was supported by the study done in India amongst the truck drivers which revealed that (97.2%) truck drivers were aware of HIV/AIDS.[3] As per our findings, regarding transmission of HIV/AIDS 90% (n=45) of the respondents mentioned that unsafe sex is the means of transmission, 100% (n=50) of the respondents mentioned that sharing of the needles, 92% (n=46) mentioned that transfusion of the blood and 90% (n=45) of the respondents mentioned that HIV transmits from pregnant mother to fetus. It infers that most respondents knew that HIV/ AIDS can be transmitted through sexual intercourse, sharing of needles, blood transfusion and from mother to fetus. Our study finding is supported by the finding of Chaturvedi et al[3] who revealed that 94.6% of the drivers were aware that HIV can be transmitted by heterosexual route, 86.2% were aware about transmission by contaminated needle and 84.4% were aware about transmission by blood transfusion. Likewise the study done in West Indies amongst taxi drivers revealed that 76.7% of them were aware of the various modes of transmission and 73.3% were knowledgeable about risk of contracting the infection. Several misconceptions about transmission were recorded in our study. Misconceptions as regards to transmission of HIV/AIDS by sharing of clothes, kissing were present among bus drivers. Our study revealed that still 24% (n=12) believe that sharing clothes and 2% (n=1) believe that kissing can transmit HIV/AIDS. Chaudhry et al[5] also reported the misconception among the drivers. As per their findings forty to fifty percent of respondents had the misconception that AIDS can be contracted by casual contact and being in the same room with a person with AIDS. Misconceptions as regards to transmission of HIV/AIDS by mosquito bite and using public toilet were present among truck drivers. The prevalence of misconceptions among these workers is probably due to their low educational status. These misconceptions can lead to increased discrimination against patients of HIV/AIDS. These misconceptions need to be addressed through AIDS intervention programmes as it has implications for wrong attitudes towards people living with AIDS in the community. HIV/ AIDS prevention programmes for this group of workers should focus on eliminating these misconceptions and include specific interventions to effect a change in sexual behaviour in order to reduce the risk of transmission of the disease in the community.

The electronic media and news paper have been reported as the commonest source of information about HIV/AIDS. Our study has revealed that mass media has played an important role in spreading the message about HIV/AIDS. In our study it was observed that 82% of the drivers had gained the knowledge about HIV/AIDS from TV, radio and newspapers. Like wise the study done in Tanzania amongst the bus drivers revealed that 93.9% of the respondents have heard about HIV/AIDS from the media particularly radios, televisions and newspapers.[6] Our finding is consistent with the findings of Chaturvedi et al[3] who reported that 67% truck drivers had gained the knowledge about HIV/ AIDS from TV, radio and newspapers. Like wise the study done in India amongst truck drivers reveled that 67.28% got information from mass media.[3]

As per prevention measures 90% (n=45) have the knowledge that using condom during sexual intercourse can prevent HIV/AIDS, rest of them i.e. 10% (n=5) don't know that using condom can prevent HIV/AIDS. The finding of the study done in Tanzania supports the finding of our study where 75.5% of the drivers believe that using condom can prevent HIV/AIDS.[6]

As per our study 8% (n=4) of the respondents still believe that HIV/AIDS is curable. Likewise the study done amongst automobile workers in Nigeria revealed that (16%) thought that HIV/AIDS can be cured by modern medicine.[7]

CONCLUSION

Being the sexually active age group and frequent mobility, drivers are epidemiologically important risk group as far as transmission of HIV infection is concerned. Thus, their knowledge regarding HIV/AIDS is of paramount importance to protect these drivers. Knowledge on the transmission of HIV/AIDS and means of prevention needs to be articulated to them. Though they have been targeted by IEC campaigns there still exist major lacunae in their knowledge regarding transmission of HIV/AIDS and means of prevention as brought out by this study. To overcome these lacunae there is an immediate need of program to create awareness of public motor drivers and co-workers, vulnerable youths and other high risk groups of people including migrant populations. The study gives some direction for prospective studies assessing the knowledge and attitude of bus drivers and co-workers, vulnerable youths and other high risk groups of people including migrant populations.

REFERENCE

1. United Nation Program on HIV/AIDS. UNAIDS report on the global AIDS epidemic; 2010,
2. Suvedi BK Transition of HIV epidemic in Nepal KUM J 2006; 4:115-18
3. Chaturved S, Singh Z, Banerjee A, Khera A, Joshi RK, Dhrubajyoti D. Sexual Behaviour Among Long Distance Truck Driver. Indian J of Commu Med 2006 ;31:153-56.
4. Orisatoki RO, Oguntibeju OO. HIV-related knowledge and condom use by taxi drivers in Southern St. Lucia, West Indies. Scientific Research and Essays 2010;5: 304-8.
5. Chaudhry MA, Naeem M, Iqbal R, Shabbir I. Level of awareness about HIV/AIDS among truck drivers and their attitude towards persons with AIDS. GJMS 2005;3:19-23.
6. Mugoyelaand V, Charles V. Knowledge of HIV/AIDS and preventive measures use by city commuter-bus drivers and conductors in Dar Es Salaam, Tanzania. East Afr J Public Health. 2009;6:73-6.
7. Omokhodion FO, Osungbade KO, Ojanen MA, Barengo NC. Knowledge About HIV/AIDS and Sexual Practices Among Automobile Repair Workers in Ibadan, Southwest Nigeria Afr J Reprod Health 2007; 11:24-32.

Case Report

PULMONARY HYDATID CYST – A RADIOLOGICAL CHALLENGE !

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ABSTRACT

Hydatid disease is a parasitic infestation caused by Echinococcus granulosus. The resulting large cysts in the lung, a special clinical entity called giant hydatid cysts, is rare. Our case involves a middle-aged man who presented to us with vague chest complaints. Chest X-ray revealed a large cavity with an air-fluid level in the right hemithorax, which brought to the mind a constellation of differential diagnoses. A diagnosis of hydatid cyst was made intraoperatively. This case report provides evidence that radiological findings may be misleading and cause a diagnostic delay in such cases.

Key words: Hydatid cyst, Echinococcus, Air-fluid level

INTRODUCTION

Hydatid disease is one of the major health problems in endemic countries like India.[1,2] It is a parasitic infestation caused by *Echinococcus granulosus,* characterized by the formation of cysts in the liver (commonest site in adults) and lungs (2nd commonest site, in 10-30% cases),[3,4] and rarely in other parts of the body.[5,6] Uncomplicated pulmonary hydatid cysts are usually seen as round radio-opaque lesions on chest x-ray, more frequently in the right lower lobe.[7,8] Superimposed infection and rupture may alter the radiological appearance, causing incorrect diagnosis and delayed treatment.[9,10] Here we present the case of a pulmonary hydatid cyst appearing as an air-fluid level on chest X-ray.

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CASE REPORT

We report the case of a 45 year old male patient admitted with chief complaints of *dry cough for two months duration which increased over five days*. There was also right sided dull, diffuse anterior chest pain for last five days, more on coughing. There was no history of fever, breathlessness and hemoptysis. He had no past history of anti-tubercular treatment, coronary artery disease, diabetes mellitus, hypertension, or *contact with* pets. He had a smoking history of 12 pack years, was non-alcoholic and vegetarian. General examination was unremarkable but chest auscultation revealed *reduced breath sounds* on right side, no succusion splash or other added sounds. Investigations revealed hemoglobin= 12.8 gm%, TLC=11,100/mm^3, DLC=$P_{78}L_{18}E_2M_2$, sputum for AFB stain negative, urine r/m normal, RBS=149mg%, blood urea=30.9mg%, serum creatinine=0.6mg%, PFT *(Pulmonary Function Tests)* normal. Ultrasound-abdomen did not reveal any cystic lesions in liver or kidney. The pre-operative *chest radiograph* (figure 1) showed a cavity with air fluid level on the right side. CECT *(Contrast-Enhanced CT Scan)* chest (figure 2) showed approximately 500cc volume thick-walled cystic lesion with air-fluid level seen anteriorly in the right hemithorax causing compression of the

underlying right upper lobe and mild displacement of the heart towards left side, with significant right pleural effusion, patchy consolidation and nodule seen in right upper lobe, with mediastinal lymphadenopathy. *The queried differential diagnosis included* encysted hydropneumothorax/ infected giant bulla. ELISA for Echinococcal antigen was positive. Right sided thoracotomy was done under general anesthesia – a large cyst was seen which ruptured during surgery, and daughter cysts were noted. *Histopathological report of the surgical specimen was consistent with infected parasitic cyst of lung with daughter cysts.* An intercostal tube was placed to achieve adequate drainage. The patient was put on intravenous ceftriaxone (1gram b.d.) during the post-operative period for one week, and subsequently discharged on oral faropenem (200mg t.d.s.) for ten days, plus oral albendazole 400mg b.d. Post-operative course was stable, and Chest X-ray (figure 3) showed expanded underlying lung and ICD *(Intercostal Drainage Tube)* was removed.

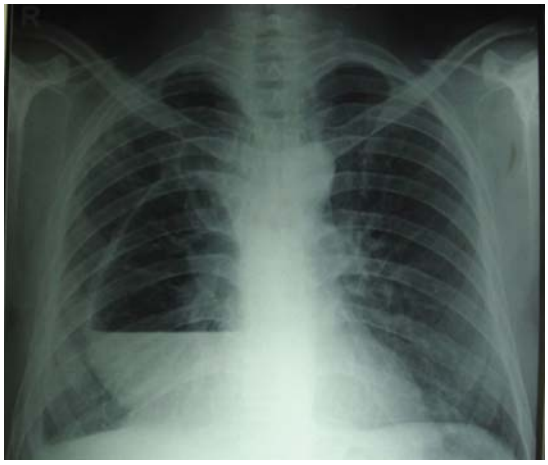

Figure 1. Pre-operative Chest X-Ray

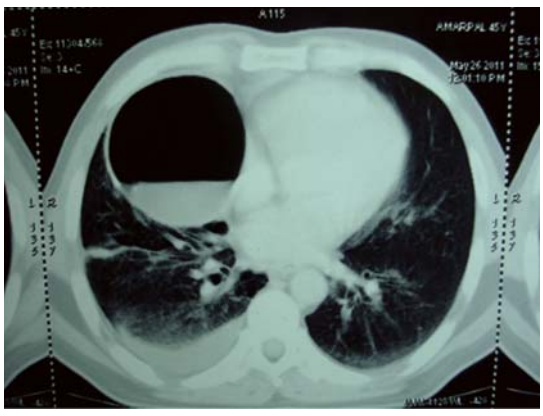

Figure 2. CECT- Chest

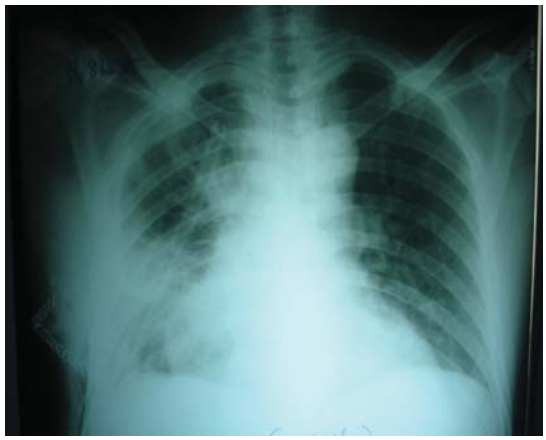

Figure 3. Post-operative Chest X Ray

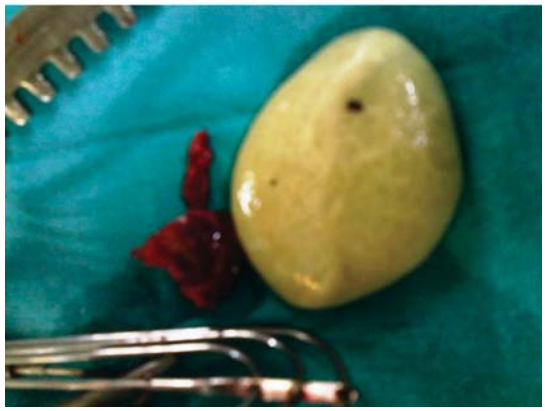

Figure 4. Intraoperative picture of daughter cyst

DISCUSSION

The purpose of reporting this case is to share a confusing radiological presentation of pulmonary hydatidosis which often causes diagnostic dilemma and delay. Our case was unusual in terms of radiological picture, absence of cysts in any other parts of the body except the lung, and no history of contact with pets.

Echinococcus granulosus occurs more frequently in rural grazing areas. Its *life cycle* involves two hosts. Sheep (ungulates-intermediate host) acquire infection during grazing by ingesting eggs in dog's feces. These eggs hatch into larvae in sheep intestines and later on migrate to other parts of the body (liver, lungs, brain) and form hydatid cysts. Dogs (canids-definitive host) acquire infection by ingesting meat of infected ungulates. Larvae mature into adults in small intestine of dogs and subsequently form eggs which are excreted in dog's feces. Humans are not natural hosts. They usually get infected by close contact with food,

water or fomites contaminated with dog's feces carrying Echinococcus eggs. These eggs migrate from human gut to other parts of the body and form hydatid cysts. Site of involvement in our patient was only the lung.

Radiologically, uncomplicated pulmonary hydatid cysts usually present as homogenous, round, radio-opaque lesions on chest x-ray. Infected cysts may appear as a solid mass lesion.[12] A number of different CT signs to indicate ruptured membranes of hydatid cyst have been described e.g. inverse crescent, water lily, signet ring, mass within a cavity or Monod's sign.[10,13] However, if air-bubbles are seen within the cyst together with ring enhancement, it is a strong indicator for infected hydatid cysts.[14] None of these radiological signs were evident in our case, and the CT scan did not demonstrate details of cyst wall or daughter cysts (figure 4).

The diagnostic efficacy of ELISA is around 92.3%.[11] In this case, the ELISA was positive. Nearly 10% patients with hepatic cysts and 40% patients with lung cysts exhibit false negative results. Hepatic cysts are more likely to elicit antibody response than cysts in the lung, brain or spleen. *Antibody detection tests* are least sensitive in patients with intact hyaline cysts. Rupture of a cyst is associated with abrupt stimulation of antibodies. Senescent, calcified or dead cysts usually confer seronegativity.

Complications of cyst rupture include fever, urticaria, eosinophilia, anaphylactic shock, cyst dissemination, obstruction of biliary/bronchial tree, pneumonitis, pleural effusion, pneumothorax.

Surgical removal of parasite mass is not usually 100% effective. Post-operative *recurrence rate* is 2-25%, and medication may be necessary to prevent recurrence. Albendazole is the drug of choice and is given as per body weight:

>60kg – 400mg P.O. BID;

<60kg – 15mg/kg/day P.O. in divided doses (maximum 800mg/day)

Above regimen is given for four weeks followed by a gap of two weeks, and repeated for three cycles. Usual duration of treatment is 3-6 months.

Antibody responses have been monitored as a way of evaluating the results of treatment and *follow-up,* but with mixed results. Following successful surgery, antibody titers decline and sometimes disappear. Titers rise again if secondary cysts develop. Chemotherapy has not been followed by consistent decline in antibody titers. Consequently, the usefulness of serology to monitor disease is limited.

The uniqueness of this case report is that isolated pulmonary hydatid cyst is uncommon in adults. Lungs are the commonest site in children.[15] Additionally, none of the classically described radiological signs were found in our case except an air-fluid level shadow compressing the underlying lung. The diagnosis was finally confirmed by histopathological examination of right thoracotomy specimen.

REFERENCES

1. Anadol D, Gocmen A, Kiper N, Ozçelik U. Hydatid Disease in Childhood: A Retrospective Analysis of 376 Cases. Pediatr Pulmonol 1998;26:190–6.
2. Rebhandl W, Turnbull J, Felberbauer FX et al. Pulmonary Echinococcosis Hydatidosis in Children: Results of Surgical Treatment. Pediatr Pulmonol 1999;27:336–40.
3. Kulpati DD, Hagroo AA, Talukdar CK, Ray D. Hydatid disease of lung. Indian Chest Dis 1974;16:406–10.
4. Reddy CR, Narasiah IL, Parvathi G, Somsundra RM. Epidemiology of hydatid disease in Kurnool. Indian Med Res 1968;56:1205–20.
5. Kavukcu S, Kilic D, Tokat AO et al. Parenchyma-preserving surgery in the management of pulmonary hydatid cysts. J Invest Surg 2006;19**:**61-8.
6. Safioleas M, Misiakos EP, Dosios T, Manti C, Lambrou P, Skalkeas G. Surgical treatment for lung hydatid disease. World J Surg 1999;23**:**1181-5.
7. Grainger RG, Pierce JW. Inflammatory diseases of the lung. In, Sutton D(ed). A Textbook of Radiology and Imaging, Ch 14. Edinburgh, Churchill Livingstone 1980;327–9.
8. Morar R, Feldman C. Pulmonary echinococcosis. Eur Respir J 2003;21:1069–77.

9. Beggs I. The radiology of the hydatid disease. Am J Roentgenol 1985;145: 639–48.

10. Turgut AT, Altin L, Topcu S, Kilicoglu B, Altinok T, Kaptanoglu E et al. Unusual imaging characteristics of complicated hydatid disease. European Journal of Radiology 2007;63:84–93.

11. Sbihi Y, Rmiqui A, Rodriguez-Cabezas MN, Orduña A, Rodriguez-Torres A, Osuna A. Comparative sensitivity of six serological tests and diagnostic value of ELISA using purified antigen in hydatidosis. J Clin Lab Anal 2001;15:14–8.

12. Gouliamos A, Kalovidouris A, Papailiou J, Vlahos L, Papavasiliou C. CT appearance of pulmonary hydatid disease. Chest 1991;100:1578–81.

13. Koul PA, Koul AN, Wahid A, Mir FA. CT in pulmonary hydatid disease: Unusual appearances. Chest 2000;118:1645–7.

14. Kervancioglu R, Bayram M, Elbeyli L. CT findings in pulmonary hydatid disease. Acta Radiol 1999;40:510–4.

15. Thumler J, Munoz A. Pulmonary and hepatic echinococcosis in children. Pediatr Radiol 1978;7:164–71.

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