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Original Research Article

Job Satisfaction among Resident Doctors at Assiut University Hospitals, Egypt

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Abstract

Background: Physician's job satisfaction is a cornerstone for improving the quality of health care, and its continuity. This study aimed to determine the overall level and aspects of job satisfaction among resident doctors at Assiut University Hospitals, Egypt. **Materials and Methods:** The design of the study was descriptive cross sectional based on self-administered questionnaire. The 20 items of the Minnesota Satisfaction Questionnaire was used to measure the level and aspects of job satisfaction. Total coverage of all resident doctors was attempted. However, 330 questionnaires were completed yielding a response rate 83 %. **Results:** The majority of doctors (62.7%) were satisfied with their job. The highest mean score of satisfaction was 3.56 ± 0.91being related to the chance to work alone on the job and the lowest mean score of satisfaction was 1.93 ± 0.84 being related to the pay and the amount of work they do. Physicians not knowing about their job description and those involved in writing reports were less satisfied by their job. Females were less satisfied with their job in comparison with males. Also, the anesthetics were highly dissatisfied in comparison with other specialties. **Conclusion:** In spite of international discussions on unhappy doctors and doctors' discontent, the present study revealed a high and stable level of job satisfaction among doctors. However, job satisfaction among doctors should always be taken into consideration by the management to improve the quality of health care.

Key words: Job satisfaction, Resident doctors, Egypt.

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Introduction

Job satisfaction among physicians is an important concern from the perspective of physicians and patients [1]. Physician's job satisfaction is interrelated with the quality of health care [2], the quality of the workforce attracted to medicine as a career [3], patient satisfaction with the services they receive [4], patient compliance[5], and continuity of care [6]. Moreover, dissatisfaction leads to increased absenteeism, lower productivity, and increased turnover, each of which raises costs to the medical system [7].

Previous studies have proposed a number of determinants of job satisfaction, including demographic characteristics (age, gender, educational level, race, marital status), job characteristics (absolute and relative wages, number of hours worked, tenure, attitude towards work), and employer characteristics (number of staff, specialty, control over the practice environment and support from colleagues). [1, 8, 9, 10]

In Egypt, few studies have been carried out to assess the main predictors of physicians' job satisfaction. Gadallah and co-workers reported that relationship with patients, their career as health care givers and the overall satisfaction seem to have been the most important satisfaction factors, but income and work resources represented the least satisfaction items[11]. Also, Abdel-Rahman et al., 2008 conducted a study among physicians from the Egyptian Ministry of Health and Population Hospitals [12]. They found that 42.9% of the physicians reported job satisfaction. Relationship with colleagues was the most important component of satisfaction with mean of 81.3+19.6 while, salaries/incentives were the least one with mean of 16.2+14. The present study has been conducted to determine the overall level of job satisfaction and the different aspects of job satisfaction among resident doctors at Assiut University Hospitals.

Assiut University Hospitals are considered to be of the largest educational and therapeutic university hospitals in Arab Republic of Egypt. The period of residency in Assiut University Hospitals is the period of training for duration of 3 years after the completion of graduation. After the residence period had finished, the doctor took his master degree. Resident doctors were included in the present study because it has been found in some studies that these doctors have greater dissatisfaction and stress [12, 13, 14]. So resident doctors at Assiut University Hospitals call for paying attention to them. This is in order to improve physicians job satisfaction in Assiut University Hospitals and to meet the needed high standards in health care.

Subjects and Methods

The design of the study was descriptive cross sectional based on self-administered questionnaire. The questionnaires were distributed to the resident doctors of Assiut University Hospitals during face to face interviews with one of the researcher. The study population was all the resident doctors working in Assiut University Hospitals. Only physicians who are willing to participate in the study were given the questionnaire. The numbers of resident doctors at Assiut University hospitals are 400. Total coverage of all resident doctors was attempted however, 330 questionnaires were completed yielding a response rate 83 %. Data collection was completed between March and August 2013.

Instrument

A self-administered anonymous questionnaire was used in this study. It consisted of two parts. The questions in the questionnaire were tested for structure and clarity by the researchers in a pilot study with 10 physicians. After the pilot study, a few necessary revisions were made to the questions for clarity. Data from the pilot study were not included in the study.

The first part of the questionnaire included questions regarding the sociodemographic characteristics and work circumstances of the resident doctors at Assiut University Hospitals. Questions on sociodemographic characteristics included age, sex, marital status, and years of experience, graduation score, accommodation, specialty selection and specialty. Questions on work circumstances included shifts per week, total hours in the shift, daily main activities, knowing about job description and sources of knowing about job description.

The second part of the questionnaire was the short form of the Minnesota Satisfaction Questionnaire (MSQ). The MSQ was developed by Weiss et al. 15 and is a well regarded measure of job satisfaction that has been used in various studies. The short form of the MSQ includes 20 items that are relevant to a number of job facets. Respondents indicate their degrees of relative satisfaction using a 5-point, Likert-type scale ranging from 1 (very dissatisfied) to 5 (very satisfied). Satisfaction score of the resident doctor was calculated by summing up the likert scale values assigned for all domains. Resident doctors with satisfaction score exceeding 60 was considered satisfied. The mean score of each domain in the MSQ was calculated by dividing the sum of the reported likert scale values by the number of resident doctors participating in the study.

Limitation of the study

An important limitation of this study was its cross sectional nature and data collection method, which create difficulties in ascertaining causality. The use of self-reported data collected at one point in time necessitates care about drawing conclusions about the effects of working conditions on job satisfaction.

Ethics

The participation in the study was voluntary and all participants expressed their approval for the study. Before data collection, the necessary approval was obtained from the Ethics Committee of the Faculty of Medicine at Assiut University. Administrators of the hospitals were informed about the study and its purposes.

Statistics

Data analysis was performed using SPSS version 16. Descriptive statistics and chi-square test were performed. A level of $p < .05$ was considered statistically significant.

Results

Table (1): Sociodemographic characteristics of the resident doctors at Assiut University Hospitals, 2013

	No. (n= 332)	%
Age:		
24 - 26 years	212	63.9
> 26 years	120	36.1
Mean ± SD (Range)	26.08 ± 1.10 (24 – 30)	
Sex:		
Male	190	57.2
Female	142	42.8
Marital status:		
Single	235	70.8
Married	84	25.3
Married and have children	13	3.9
Years of experience:		
< 2 years	139	41.9
≥ 2 years	193	58.1
Graduation score:		
Very good	197	59.3
Excellent	135	40.7
Accommodation:		
In the hospital	199	59.9
In private flat	133	40.1
Specialty selection:*		
By my own-will	268	80.7
By my marks	110	33.1
By work needs	26	7.8
Specialty:		
Anesthesia	32	9.6
Special Surgery**	62	18.7
Special Medicine***	71	21.4
Clinical Pathology and Radiology	43	13.0
General Surgery	28	8.4
Internal Medicine	29	8.7
Obstetrics and Gynecology	22	6.6
Pediatrics	45	13.6

** Some physicians reported more than one answer.*

*** Special Surgery includes cardiothoracic, ENT, neurosurgery, ophthalmology, orthopedic, plastic surgery, urology and vascular surgery departments.*

**** Special Medicine includes cardiology, chest, dermatology, hematology, neurology, oncology, rheumatology and tropical medicine departments.*

Table (1) shows that 63.9¬ % of the resident doctors belongs to the age group 24- 26 years and 36.1 % aged > 26 years and the mean age was 26.08 ± 1.1. Regarding the sex of the resident doctors, 57.2% were male and 42.8% were females. The majority of the resident doctors were single (70.8 %) while, 25.3 % were married and 3.9 % married and have children. The years of experience of the resident doctors were < 2 years in 41.9 % and ≥ 2 years in 58.1 %. As regards the graduation score, it was found that 59.3 % of the resident doctors had a "very good" score and 40.7 % had an "excellent" score.

Table (2): Job characteristics of the resident doctors at Assiut University Hospitals, 2013

	No. (n= 332)	%
Shifts per week: *		
1 - 3 shifts	130	39.8
> 3 shifts	197	60.2
Total hours in the shift: *		
< 24 hours	126	38.5
≥ 24 hours	201	61.5
Daily main activities: **		
Patients care	294	88.6
Writing reports, records and requests	169	50.9
Administrative work	154	46.4
Training and research	98	29.5
Knowing about job description:		
Yes	254	76.5
No	78	23.5
Sources of knowing about job description: **		
Teaching staff	164	64.6
Telling during work	132	52.0
Personal affairs	71	28.0
Undergraduate teaching	62	24.4
Training course	28	11.0

* *5 physicians had no shifts.*
** *Some physicians reported more than one answer*.

Considering the accommodation, resident doctors lived more in the hospital accommodation (59.9 %) than the private flat (40.1 %). The specialties of the resident doctors were shown in the table being mainly in special medicine (21.4 %) and special surgery (18.7 %) departments. The table also shows that the specialty selection of the resident doctors was by their own will among 80.7 %, by marks among 33.1% and by work needs among 7.8 %.

Table (2) shows the job characteristics as experienced by the resident doctors. Considering the shifts per week, most physicians (60.2 %) took more than 3 shifts per week. Total hours in the shift were more than 24 hours among 61.5 % of the physicians. Regarding daily main activities of the physicians, most of them (88.6 %) did patient care while, 50.9 %, 46.4 % and 29.5 % of the physicians did report writing, administrative work and training and research respectively. The table also shows that 76.5 % of the resident doctors knew about job description. The sources of knowing about job description were teaching staff (64.6 %), telling during work (52 %), personal affairs (28 %), undergraduate teaching (24.4 %), and training courses (11 %).

Among resident doctors, 62.7 % were satisfied with their job and 37.3 % were not satisfied.

Table (3) shows the level of satisfaction of various domains of job satisfaction which is arranged in five degrees from very dissatisfied to very satisfied. Regarding the pay and the amount of work they do, 54.5 % of the resident doctors were dissatisfied with the pay and 30.1% were very dissatisfied. The table shows

Table (3): The level of satisfaction of various domains of job satisfaction among the resident doctors at Assiut University Hospitals, 2013

	Very dissatisfied		Dissatisfied		Neither		Satisfied		Very satisfied	
	No.	%	No.	%	No.	%	No.	%	No.	%
Being able to keep busy all the time	99	29.8	156	47.0	21	6.3	53	16.0	3	0.9
The chance to work alone on the job	13	3.9	42	12.7	37	11.1	226	68.1	14	4.2
The chance to do different things from time to time	28	8.4	49	14.8	41	12.3	208	62.7	6	1.8
The chance to be somebody in the community	30	9.0	54	16.3	30	9.0	209	63.0	9	2.7
The way my boss handles his/her workers	35	10.5	116	34.9	39	11.7	136	41.0	6	1.8
The competence of my supervisor in making decisions	24	7.2	78	23.5	55	16.6	168	50.6	7	2.1
Being able to do things that don't go against my conscience	33	9.9	52	15.7	59	17.8	185	55.7	3	0.9
The way my job provides for steady employment	69	20.8	191	57.5	38	11.4	33	9.9	1	0.3
The chance to do things for other people	21	6.3	58	17.5	25	7.5	211	63.6	17	5.1
The chance to tell people what to do	13	3.9	95	28.6	31	9.3	188	56.6	5	1.5
The chance to do something that makes use of my abilities	22	6.6	67	20.2	34	10.2	202	60.8	7	2.1
The way company policies are put into practice	43	13.0	213	64.2	45	13.6	29	8.7	2	0.6
My pay and the amount of work I do	100	30.1	181	54.5	28	8.4	20	6.0	3	0.9
The chances for advancement on this job	21	6.3	73	22.0	30	9.0	201	60.5	7	2.1
The freedom to use my own judgment	21	6.3	49	14.8	35	10.5	218	65.7	9	2.7
The chance to try my own methods of doing the job	26	7.8	83	25.0	64	19.3	154	46.4	5	1.5
The working conditions	42	12.7	147	44.3	51	15.4	88	26.5	4	1.2
The way my coworkers get along with each other	19	5.7	58	17.5	37	11.1	203	61.1	15	4.5
The praise I get for doing a good job	36	10.8	147	44.3	30	9.0	116	34.9	3	0.9
The feeling of accomplishment I get from the job	24	7.2	78	23.5	47	14.2	178	53.6	5	1.5

that 64.2 % of the resident doctors were dissatisfied about the way of practicing the company policies and 57.5 % about the way of providing steady employment in the job. The table also shows that 47 % were dissatisfied about being able to keep busy all the time. On the contrary, 68.1 % of the resident doctors were satisfied for being able to work alone, 65.7 % for their freedom to express their own judgment, 63.6 % for having the chance to do things for other people and 63 % for their involvement in the community.

Table (4): Mean scores of various domains of job satisfaction among the resident doctors at Assiut University Hospitals, 2013

	Mean ± SD
Being able to keep busy all the time	2.11 ± 1.04
The chance to work alone on the job	3.56 ± 0.91
The chance to do different things from time to time	3.35 ± 1.03
The chance to be somebody in the community	3.34 ± 1.07
The way my boss handles his/her workers	2.89 ± 1.12
The competence of my supervisor in making decisions	3.17 ± 1.04
Being able to do things that don't go against my conscience	3.22 ± 1.05
The way my job provides for steady employment	2.11 ± 0.86
The chance to do things for other people	3.44 ± 1.04
The chance to tell people what to do	3.23 ± 1.01
The chance to do something that makes use of my abilities	3.32 ± 1.03
The way company policies are put into practice	2.20 ± 0.79
My pay and the amount of work I do	1.93 ± 0.84
The chances for advancement on this job	3.30 ± 1.04
The freedom to use my own judgment	3.44 ± 0.99
The chance to try my own methods of doing the job	3.09 ± 1.04
The working conditions	2.59 ± 1.05
The way my coworkers get along with each other	3.41 ± 1.01
The praise I get for doing a good job	2.71 ± 1.09
The feeling of accomplishment I get from the job	3.19 ± 1.04

Table (4) shows that the highest mean score of satisfaction was 3.56 ± 0.91 being related to the chance to work alone on the job and the lowest mean score of satisfaction was 1.93 ± 0.84 being related to the pay and the amount of work they do.

Table (5) reveals the relationship between job satisfaction and sociodemographic characteristics of the resident doctors. Satisfaction of males was significantly higher than that of females as 67.9 % of males were satisfied with their job versus 55.6 % of females (p = 0.022). Also, there was statistical significant difference between specialty and satisfaction. The anesthetics were highly dissatisfied in comparison with other specialties. However, no statistical significant difference was found between ages, years of experience, marital status, graduation score, accommodation and specialty selection on one hand and satisfaction on the other hand.

Table (6) demonstrates the relationship between job satisfaction and job characteristics. There was statistical significant difference between satisfaction and knowing about job description as 65.7 % of the physicians knowing about job description were satisfied with their job versus 52.6 % of the physicians not knowing about job description. Regarding daily main activities, 51.5 % of the physicians involved in reports

Table (5): Relationship between job satisfaction and sociodemographic characteristics of the resident doctors at Assiut University Hospitals, 2013

	Dissatisfied (n= 124)		Satisfied (n= 208)		P-value
	No.	%	No.	%	
Age:					
24 - 26 years	79	37.3	133	62.7	0.966
> 26 years	45	37.5	75	62.5	
Sex:					
Male	61	32.1	129	67.9	0.022*
Female	63	44.4	79	55.6	
Years of experience:					
< 2 years	51	36.7	88	63.3	0.833
≥ 2 years	73	37.8	120	62.2	
Marital status:					
Single	84	35.7	151	64.3	0.347
Married	40	41.2	57	58.8	
Graduation score:					
Very good	72	36.5	125	63.5	0.715
Excellent	52	38.5	83	61.5	
Accommodation:					
In the hospital	77	38.7	122	61.3	0.536
In private flat	47	35.3	86	64.7	
Specialty selection:					
By my own-will	95	35.4	173	64.6	0.143
By my marks	48	43.6	62	56.4	0.096
By work needs	12	46.2	14	53.8	0.334
Specialty:					
Anesthesia	19	59.4	13	40.6	
Special Surgery	21	33.9	41	66.1	
Special Medicine	31	43.7	40	56.3	
Clinical Pathology and Radiology	8	18.6	35	81.4	0.028*
General Surgery	8	28.6	20	71.4	
Internal Medicine	11	37.9	18	62.1	
Obstetrics and Gynecology	9	40.9	13	59.1	
Pediatrics	17	37.8	28	62.2	

writing were satisfied with their job versus 74.2% of those not involved in this task with statistical significant difference (p = 0.000). However, no statistical significant difference was found between shifts per week, total hours in the shift and other daily main activities on one hand and satisfaction on the other hand.

Discussion

Understanding the causes of physician dissatisfaction is important because dissatisfaction may have adverse effects on the cost, quality, and outcome of health care, together with its effects on physician's mental and physical health [16]. This study was undertaken to provide a description of job satisfaction among resident doctors at Assiut University Hospitals.

In the present study, physicians selected their specialty mainly by their own will (80.7 %). In agreement with the findings of the present study, El-Gendawy et al., 2000 reported that

Table (6): Relationship between job satisfaction and job characteristics of the resident doctors at Assiut University Hospitals, 2013

	Dissatisfied (n= 124)		Satisfied (n= 208)		P-value
	No.	%	No.	%	
Shifts per week:					
1 - 3 shifts	41	31.5	89	68.5	0.053
> 3 shifts	83	42.1	114	57.9	
Total hours in the shift:					
< 24 hours	55	43.7	71	56.3	0.091
≥ 24 hours	69	34.3	132	65.7	
Knowing about job description:					
Yes	87	34.3	167	65.7	0.035*
No	37	47.4	41	52.6	
Daily main activities:					
Administrative work:					
Yes	66	42.9	88	57.1	0.054
No	58	32.6	120	67.4	
Patients care:					
Yes	111	37.8	183	62.2	0.671
No	13	34.2	25	65.8	
Writing reports, records and requests:					
Yes	82	48.5	87	51.5	0.000*
No	42	25.8	121	74.2	
Training and research:					
Yes	41	41.8	57	58.2	0.274
No	83	35.5	151	64.5	

83.6 % of the physicians had decided on their future specialty [17]. Also, Fernandez, 1996 showed that 90 % of the physicians had selected their specialty by their own will [18].

Johnson identified that the major areas of work concern were patient care, management and administrative work [19]. In the present study, the daily main activity of most resident physicians (88.6 %) was patient care with little administrative work, training and research. This was consistent with a study conducted by El-Gendawy et al., 2000, [17].

In the present study, resident doctors were more overloaded by shifts as 60.2 % of them had more than three shifts per week.

Schwartz reported that the factors that have the most negative effects on resident doctors were lack of sleep; frequent night calls, uncompromising attending physicians and large patients' loads [20] also found that sleep deprivation among resident doctors had potentially severe negative consequences on patient care [21]. Residents believed also that sleep deprivation impairs their capacity to care for patients and causes them to have more conflicts with professional staff [22].

The present study showed that 76.5 % of the physicians know about job description. This was higher than that reported by El-Gendawy et al., 2000 as 68.7 % of the resident doctors at Assiut University Hospitals know their job description [17]. So with time the physicians in Assiut University Hospitals become more aware of their job description. The main sources of knowing about job description were teaching staff and telling during work. However, undergraduate teaching and training courses were the least sources. Undergraduate teaching should obtain the upper hand in educating the physicians about their job description in the write manner.

One of the important finding in this study was the high level of job satisfaction among the resident doctors at Assiut University Hospitals as 62.7 % of doctors were satisfied with their job. The high level of job satisfaction in this study is comparable to a study conducted in Kuwait as 61.8 % of Kuwaiti doctors were highly satisfied with their job [23]. This was higher than that reported among physicians from the Egyptian Ministry of Health and Population as 38.7 % of the participated physicians have expressed overall satisfaction with their job [12]. Also, it was higher than that reported among Yemeni doctors as 38.9 % of doctors were satisfied with their job [24]. The overall job satisfaction was reported to be high among developed countries, for example, 92 % of Canadian gynaecologic oncologists [25], 68% of Canadian doctors [26] and 81% of Dutch doctors [27] were highly satisfied with their job.

Resident doctors at Assiut University Hospitals were satisfied with the chance to work alone on the job, the freedom to use their own judgment, the chance to do things for other people and the chance to be somebody in the community. They were dissatisfied about the low payment against amount of work done, the way of practicing the company policies, the way of providing steady employment in their job, and being able to keep busy all the time. Also, the results of the present study show that the highest mean score of satisfaction was 3.56 ± 0.91 being related to the chance to work alone on the job and the lowest mean score of satisfaction was 1.93 ± 0.84 being related to the pay and the amount of work they do. This indicates the importance of these aspects in job satisfaction particularly the financial aspects. Higher individual wages were expected to be associated with higher job satisfaction and a lower probability to intend to quit [7]. The findings in the present study are in keeping with those reported in a previous study in Al-Kuwait where the results showed that doctors were less satisfied with their rate of pay and job variety but they were more satisfied with their colleagues and their job responsibility [23]. Also, a study was conducted by Al Dubai and Rampal showed that Yemeni doctors were more satisfied with colleagues and fellow workers, hours of work, amount of responsibility given, freedom to choose method of working and

opportunity to use abilities. However, Yemeni doctors were less satisfied with remuneration, salary given, physical working conditions and amount of variety in job [24]. Lack of financial incentives was also one of the most important aspects of work which affect job satisfaction in a sample of primary health physicians in Saudi Arabia [28]. Scottish doctors were most satisfied with their colleagues, variety in the job and amount of responsibility given but were less satisfied with remuneration and hours of work [7]. These previous studies confirmed that the financial aspect was an important source of job dissatisfaction for doctors.

The present study found that females were significantly less satisfied than males. This finding was similar to those found in four previous studies [13, 24, 29, 30]. However, Branthwaite and Ross found that female were more satisfied with their work than their male counterparts [31]. Simoens et al., 2002 also found that women reported higher levels of job satisfaction and lower levels of stress than men and this was explained by the author as "women were more likely to work part-time" [7].

Doctor's age and years of experience were not significantly associated with overall job satisfaction in this study. This is because the work in Assiut University Hospitals is usually distributed equally among junior and senior physicians and this work is usually huge and emergency. So, most physicians are not satisfied with their work regardless of age and years of experience. This was consistent with a study conducted among physicians from the Egyptian Ministry of Health and Population [12]. However, Doctor's age and years of experience were significantly associated with overall job satisfaction in other studies [13, 23, 24, 31]. These studies showed that older doctors are more generally satisfied with their job than younger doctors as young doctors have greater demands and less adaptation than old doctors.

In the present study, physicians in radiology and clinical pathology departments had highest job satisfaction and this was consistent with a study conducted by [32]. Satisfaction was lowest among resident doctors in anesthesia department when compared with other specialties in this study. This is because resident doctors in anesthesia department are heavily involved in various tasks in their department as well as other departments. Also, their work was considered as an emergency because they are pursuing the patients in intensive care units. Abdel-Rahman et al., 2008 found that Internal Medicine specialists and General Practitioners, together with Obstetricians/Gynecologists were the most satisfied specialties [12]. Wahls and co-workers reported that generalists, i.e. Family Physicians, General Internists, General Pediatricians and General Obstetricians/Gynecologists were more satisfied than other specialty physicians [33]. Elit and co-workers reported that the majority of Canadian Obstetricians and Gynaecologists were satisfied with their job, but there were clear concerns raised about systems issues in healthcare delivery [25].

This study showed that physicians knowing about job description were significantly satisfied with their job than physicians not knowing. This is because these physicians know a head what to do in ordered manner according to a paper time schedule. This is why they are highly satisfied with their job.

In the present study, doctors not involved in writing reports, records and requests were significantly satisfied with their job than doctors involved. This is a tedious process and the daily main activities of the physicians should be patient care.

Conclusion

Physician satisfaction is an increasingly important issue in improvement of the quality of health care. About 62.7 % of the resident doctors at Assiut University Hospitals were satisfied with their job. Clear areas of satisfaction and dissatisfaction have been defined. The findings of the present study suggest that more attention should be given to the income, the way of practicing the company policies and the way of providing steady employment in the job. Also, physicians should not be kept busy all the time. This information may help us in the development of policy to structure a medical system meeting physician satisfaction.

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Original Research Article

Cancer Burden in India: Evaluating the Cost burden of treatment due to TRIPS

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Abstract

Objectives: TRIPS (Agreement on Trade-related aspects of Intellectual Property Rights) is said to have an impact on drug pricing, thereby creating hurdles in the world-wide access to essential medicines. The objective of this paper is to estimate the effect of TRIPS on the cost burden of cancer treatment in India. ***Methods:*** Information was obtained through a web search on the world-wide best-selling cancer drugs. A cost comparison was done between the brand rates and the estimated discounted Indian government procurement rates. The estimated discounted government procurement rates were calculated using the average price variation (approx. 44%) between branded drugs and generic drugs on the National List of Essential Medicines. The overall percentage cost savings was estimated using the estimated 5-year prevalence of Cancer in India from the WHO GLOBOCAN 2012 Report. ***Results:*** In India, the five most common cancers were cancers of the breast (14.3%), cervix uteri (12.1%), lip-oral (7.6%), lung (6.9%) and colorectal (6.3%), breast cancer being on a constant rise over the years. The top best-selling cancer drugs globally in 2013 for the five most commonly occurring cancers are Bevacizumab ($6.75 billion), Trastuzumab ($6.56 billion), and Cetuximab ($1.87 billion). It was found that these drugs are not produced in India, their biosimilar are not available in India, and is not procured by the Indian government. If these drugs are procured by the Indian government then the estimated percentage savings of the people suffering from the most commonly occurring cancers in India is approximately 58%. ***Conclusion:*** Evidence does suggest that patenting presents a significant increase in costs of treatment and a tradeoff exits between current and future access of medicines and related aspects of trade and investments and thus there is a need to encourage the applicability of compulsory licensing and tiered pricing strategy.

Keywords: TRIPS, Cancer, India, Essential Medicines List, Cost Analysis

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Introduction

"The goal of Universal Health Coverage (UHC) is to ensure that all people obtain the health services they need without suffering financial hardship when paying for them" - World Health Assembly. To achieve the goal of UHC, a country needs a strong, efficient, and a well-run health system that meets the priority health needs of its people. Affordable access to healthcare services enables people to be more productive and active contributors to their families and the society at large.UHC, however, is not just health financing, but it should cover

all the components of the health system to be successful.

An estimate of cost of care for cancer is approximately $130 billion. [1] Approximately three quarters of this cost account for medicine expenditures. India contributes 7.8% of the global cancer burden. In India, the five most common cancers were cancers of the breast (14.3%), cervix uteri (12.1%), lip-oral (7.6%), lung (6.9%) and colorectal (6.3%). Both globally and in India, breast cancer is on a rise with more than 20% increase since 2008.

Many of the Universal Health coverage schemes do not include medicines [2], and, hence, its cost should be fully covered out-of-pocket. Previous studies showed that covering for medicines was not possible due to a variety of reasons, and, thus, there was no impact of UHC on medicines. They further say that, the reason for low impact of UHC on financial protection may be related to the fact that medicines are not covered in the schemes although they account for a majority of the out-of-pocket expenses. [2] One of the main objectives of universal health coverage is access to essential medicines and technologies to diagnose and treat medical problems. Availability of the right medicine, at the right place, at the right time, and at the right price gave rise to the concept of the Essential Medicines List. Essential medicines are those that are needed by the priority health conditions of the population of a nation. Jan Aushadhi project is an initiative of the government of India to set up generic drug stores all over the country to improve the access to essential medicines and to encourage doctors to prescribe generic medicines. [3]

Apart from non-coverage of medicine expenditures under UHC, lack of access to essential medicines can be due to unavailability of medicines in the nation, inventory issues, substandard drug quality, but in most situations, the high prices of the drugs are a barrier to needed treatment. Prohibitive drug prices are often the result of strong intellectual property protection. TRIPS (Agreement on Trade-Related Aspects of Intellectual Property Rights) sets out minimum standards and requirements for the protection of intellectual property rights, including trademarks, copyrights, and patents. The implementation of TRIPS is said to impact the availability of essential medicines at affordable prices, thereby widening the access gap between developed and developing countries. The Doha Declaration on TRIPS and Public Health 2001 granted the governments the sovereign right to take measures to protect public health using the TRIPS safeguards. [4]

Methodology

Information was obtained through a web search on the top 10 best selling cancer drugs globally. Out of the top 10, 3 cancer drugs were selected on the basis of the highest prevalence rates of specific cancers in India. These drugs are to be taken by the patients in combination with the chemotherapy. Evidence in the form of news articles stating the success of these three drugs in different countries was also obtained. The drugs selected for the Cost analysis are currently

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under patent protection which carries expiry dates after June, 2015.

Estimated incidence, mortality and 5-year prevalence of 28 different cancers in India was obtained from the GLOBOCAN 2012 Report[5] published by the International Agency for Research on Cancer (IARC) in collaboration with the World Health Organization (WHO).

The estimated discounted government procurement rates for the cancer patented drugs were calculated using the average price variation (approx. 44%) between generic drugs on the National List of Essential Medicines (NLEM) and the Maximum Retail Price (MRP) (ongoing research at the Indian Institute of Public Health, Hyderabad and APMSIDC – unpublished source).

Results

The 2012 International Association for Research on Cancer (IARC) figures for global cancer burden estimates were 14.1 million new cases (2008 estimate being 12.7 million new cases), 8.2 million cancer deaths, and five-year prevalence of 32.6 million cancers in individuals above the age of 15 years. GLOBOCAN 2012 estimates indicate an increase to 19.3 million new cancer cases by 2025. 57% (8 million) new cancer cases, 65% (5.3 million) cancer deaths, and 48% (15.6 million) five-year prevalence of cancer cases, occurred in less developed and under developed regions of the world.

In India, 1.1 million new cancer cases were estimated, indicating India as a single country (of the 184 countries) contributing to 7.8% of the global cancer burden; mortality figures were 682830, contributing to 8.33% of the global cancer deaths; and the five-year prevalence was 1.8 million individuals with cancer corresponding to 5.52% of global prevalence.

Globally, the five most common cancers were cancers of the lung (1,824,701; 13%), breast (1,676,633; 11.9%), colorectal (1,360,602; 9.7%), prostate (1,111,689; 7.9%), and cervix uteri (527,624; 3.7%), comprising 46.2% of the 28 cancers reported.

In India, the five most common cancers were cancers of the breast (144,937; 14.3%), cervix uteri (122,844; 12.1%), lip-oral (77,003; 7.6%), lung (70,275; 6.9%) and colorectal (64,332; 6.3%), comprising 47.2% of the 28 cancers reported.

Both globally and in India, breast cancer is on a rise with more than a 20% increase since 2008. Breast cancer is also the most common cause of cancer deaths among women (521,817 deaths in 2012 (27%)) and the most frequently diagnosed cancer among women in 140 of 184 countries worldwide.

The top best-selling cancer drugs globally in 2013 for the five most commonly occurring cancers are Bevacizumab (Avastin) which tops the list with a $6.75 billion sales, followed by Trastuzumab (Herceptin) having a sale of $6.56 billion. Cetuximab (Erbitux) a product of ImClone and Merck also comes in the top 10 list of best-selling cancer drugs of 2013 globally with a sale of $1.87 billion. Bevacizumab and Trastuzumab are products of Roche

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Table 1: Globally best-selling cancer drugs of 2013

Drug	Sales (in Billions USD)	Cancer Indications
Bevacizumab (**Avastin**, Genentech/Roche)	6.75	colorectal, lung, kidney, and glioblastoma
Trastuzumab (**Herceptin**, Genentech/Roche)	6.56	breast, esophageal, and gastric
Cetuximab (**Erbitux**, ImClone and Merck)	1.87	colorectal, head and neck

Table 2: Maximum Retail Price and the Estimated Subsidized NLEM Price

Drug	Cancer	Packing(max retail price)*	Estimated NLEM Rate*#
Bevacizumab	Lung, Colorectal, Cervix Uteri	35020 (25mg*1ml*4ml)	15409 (3502, 27315.6)
Trastuzumab	Breast	75000 (440mg*1's)	33000 (7500, 58500)
		110700 (440mg*50ml*50ml)	48708 (11070, 86346)
Cetuximab	Colorectal	96316 (5mg*1ml*100ml)	42379(9631.6, 75126.48)
		18758 (5mg*1ml*20ml)	8254 (1875.8, 14631.24)

**Rates in INR, Rates are mentioned as per unit cost*
#Estimated Average NLEM Rate (Lowest Rate, Highest Rate)

Table 3: Expenditure per unit for the estimated 5-year prevalence in India

Cancer	Prevalence	Brand Cost*	Estimated Cost Saving*
Breast	396991	36.86	24.13
Cervix Uteri	308901	10.82	6.06
Colorectal	86650	4.99	2.79
Lung	32464	1.14	0.64

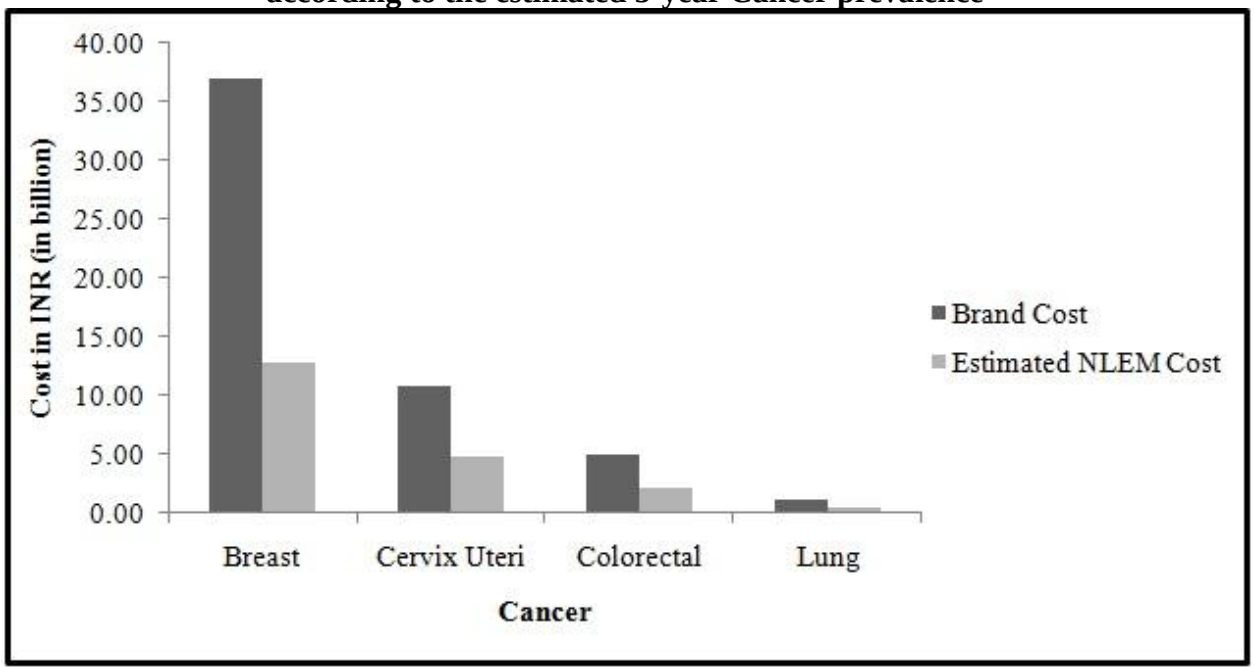
**Costs in INR in billion. Total Cost = Per Unit Cost (from Table 2)*Prevalence*

pharmaceutical company. It was found that these drugs are not produced in India, their biosimilar are not available in India, and is not procured by the Indian government.

The above mentioned drugs are FDA approved and are currently under patent protection carrying an expiry date after June 2015. These drugs are currently imported in India by the respective partner firms and do not come under the National List of Essential Medicines (NLEM) due to lack of availability of their generic versions. The customized Essential Medicines List (EML) which is country specific is known as the National List of Essential Medicines.

Given the high prevalence of specific cancers in India, the government can plan to cover a part of the cost of cancer by adding these medicines in the NLEM. If done so, the rates at which these drugs can be availed will be much lesser

Figure 3.a: Comparison between the Maximum Retail Price and Estimated NLEM Price according to the estimated 5-year Cancer prevalence



as compared to the rates offered by the brand, thereby increasing the access to the pool of people requiring the treatment.

There is a possibility of the price being reduced to almost 10% of the maximum retail price. In table 2, the estimated NLEM rate is calculated for 10% of the MRP (Estimated NLEM Lowest Rate) and for 78% of the MRP (Estimated NLEM Highest Rate).

Table 3 shows the difference between the cost of cancer medicines if purchased from the Brand and the government procured discounted costs if added on the National List of Essential Medicines. Estimated percentage savings of the people suffering from the most commonly occurring cancers in India is approximately 58%. In comparison to the total cost of cancer, 58% savings on the part of the cancer patients is considered a huge save.

Discussion

After the National Health Policy in 1983, India faced several developments in Health Policy. The most important in terms of health systems schemes are the introduction of the Universal Health Insurance Scheme (UHIS), launched by the Ministry of Finance in 2003; the Sanjeevani Scheme, launched by the Punjab government in 2005; and the Chief Minister's health insurance scheme launched by the Assam government in 2004. However, most of these schemes have been dissolved. Learning from the experiences of other major government and nongovernment health insurance schemes in India, progress is being made to roll out new health insurance schemes at the national and state level. In 2007, the state of Andhra Pradesh launched the Aarogyasri health insurance scheme for poor populations. Similar programs are now being adopted in neighboring states based on the Aarogyasri model. One year later at the national

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level, the Ministry of Labor and Employment launched the Rashtriya Swasthya Bima Yojana program to provide health insurance benefits to poor populations. It is being implemented by state governments in 23 different states, with plans to cover the entire BPL population in India (approx. 300 million people). The Indian government aims at offering full coverage including the costs of medicines under these various universal health coverage schemes. [2]

Lack of access to essential medicines in Low and Middle Income Countries (LMIC) is mainly attributable to the high prices of the drugs due to intellectual property protections and unavailability of their generic versions. There have been debates on the issue of ensuring production and export of generic drugs to countries that do not have the needed production capacity. NGOs have played an important role of drawing the attention of TRIPS to increase the access to medicines. One such provision pertains to compulsory licensing, which enables a competent government authority to license the use of an invention to a third-party or government agency without the consent of the patent-holder. The patent holder, however, according to Article 31 of TRIPS, retains intellectual property rights and shall be paid adequate remuneration according to the circumstances of the case. While TRIPS does have a little flexibility and safety against patent abuse, it is unclear whether and how countries can make use of these safety nets when patents increasingly present barriers to medicine access. Developing countries, where three-quarters of the world population lives, accounts for less than 10% of the global pharmaceutical market.

TRIPS is said to have the greatest impact on the pharmaceutical sector and access to medicines. In accordance with the TRIPS, no other pharmaceutical manufacturing company is allowed to copy the formulations of the patented drug. Despite this, BioCon in India manufactured a biosimilar (Canmab and Hertraz) of Trastuzumab priced at INR 57500 (440mg*1's) much lesser than the original manufacturer which is priced at INR 75000 (440mg*1's) and INR 110700 (440mg*50ml*50ml). According to the judgment passed by the High Court on the 5th February, 2014, BioCon Limited is restrained from promoting, distributing or selling Canmab and Hertraz as a biosimilar of Trastuzumab or referring to any other Trastuzumab drug of Roche as its biosimilar. Although a biosimilar drug of Trastuzumab, a top selling drug for Breast Cancer treatment, is in production in India, its use is not acceptable due to the miss-matches with the TRIPS regulations. However, the production of the generic version could have been possible if there was a compulsory license for Trastuzumab, allowing developing countries to import the generic medicines, thereby increasing the access to the drug for those suffering from breast cancer.

Initially, the compulsory license clause of TRIPS was limited only till the boundaries of the patent holding nation. But later amendments to the TRIPS in December, 2005 following the Doha Declaration on TRIPS and Public health,

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permitted developing countries to import generic medicines produced under compulsory licenses issued for export purposes. However, this provision had limited applicability due to complexity, cost and limited duration of the license. This special compulsory licensing provision limits the competition between potential generic manufacturers of those based in countries that issue the compulsory licenses, and thus has only limited effect on market prices. The International Federation of Pharmaceutical Manufacturers strongly opposes Compulsory Licensing by stating that "Compulsory Licensing is a threat to good public health by denying patients around the world the future benefits of R&D capabilities of the research-based industry from which new therapies come". The reach of a compulsory license is limited to the territory of the government that issues it. The government of a given nation could, in theory, issue a compulsory license for a given medicine to a manufacturer based in another country, but that license would have no legal validity in that other country because of TRIPS Agreement requirement that compulsory licensing be predominantly for the supply of the domestic market.

Success of Trastuzumab, Bevacizumab, and Cetuximab can be seen through the news articles been reported. The success stories indicate that these medicines have to be covered by UHC and availed by the people at affordable rates. These drugs are said to have prolonged the life of the Cancer patients. [15, 16, 17, 18]

Since generic versions of branded drugs aren't available, adding them to the NLEM is not a possible option. However, till the time their generic versions are made available, mutual understanding with the partner firms in India; The possible solutions that the government can adopt:

1. The government can work out ways to procure them directly and thereby offer them at discounted rates causing a 58% reduction in cost for the cancer patients. The discounted rates are then attributable to the large government procurement and if the original manufacturers adopted a tiered pricing strategy; the practice of setting different prices for different groups of potential buyers, wherein Ooms et al., suggest that developing countries should be given a discount first on the basis of their GNI per capita (GNI per capita provides an overview of the potential ability of the government to purchase and distribute or subsidize medicines) comparing the country to a reference country. Further discount should be offered in relation to the prevalence of the disease for which the drug is needed. [4] This helps is acquiring the medicines by the government at a larger discount and thus the people can avail it at an affordable rate.
2. If TRIPS can be amended to legalize the international compulsory licensing

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policy, since India has the required production capacity, another possible and efficient solution to reduce the rates would be to give India a compulsory license to produce the generic version of the drugs thereby reducing the cost of the drug by approximately 62%. (Estimated %reduction was calculated from the rates of Herceptin and the Indian brand BioCon's rate of Trastuzumab). On doing so, the generic versions are then produced within the country; these drugs can then be added to the NLEM and made available at the Jan Aushadhi Pharmacies (Generic Essential Medicines Stores). Acquiring an international compulsory license would require India to pay adequate remuneration to the patent holder.

3. The government also plans to increase the participation of the private drug firms in the Jan Aushadhi project. The government can offer attractive incentives to Roche, and ImClone and Merck in India to side-by-side produce the generic versions for the Jan Aushadhi Pharmacies all over the country. This not only serves the purpose of increasing the medicine access to the people, but also benefits Roche, and ImClone and Merck by increasing their list of clients, thus increasing their profits. However, an important challenge to this solution would be to increase the number of doctors prescribing generic medicines for Cancer patients. If doctors can be made aware of the price differences and assured product availability, at least a good number amongst them will start prescribing unbranded generic products, particularly for those who are economically weak.

Conclusion

Figure 3.a summarizes the price variations between the Estimated NLEM Cost and the Branded drug costs. It can be seen that a major part of the expenditure is saved if the generic versions of the drugs are made available and thus added to the National List of Essential Medicines.

The reduction in the cost of cancer by 58% by the Indian government will help in reducing the financial burden of medicine cost on the people. This will be possible with the mutual help of the private drug firms and the efficient functioning of the Jan Aushadhi Pharmacies. The success of the generic drug pharmacies depends on the increase in the number of doctors prescribing generic medicines as compared to branded medicines. Generic drug prescriptions have to be encouraged by the government.

Evidence does suggest that patenting presents a significant increase in costs of treatment and a tradeoff exits between current and future access of medicines and related aspects of trade and investments and thus there is a need to encourage the applicability of compulsory licensing and tiered pricing strategy. There lies

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an urgent need to link the private and the public health sectors to address the health problems of concern.

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Conflict of Interest

The authors declare no conflicts of interest.

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Original Research Article

Pulmonary Function Tests In Healthy Non Smoking Male Transport Workers - A Study From Chennai, India

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Abstract

Pulmonary Function Tests (PFT) were done in 72 healthy non smoking male drivers and conductors of Metropolitan Transport Corporation, Chennai by using Medspirer in Physiology Department, Kilpauk Medical College, Chennai. They were divided into 2 groups: (a) <40 yrs (b) ≥40 yrs. These PFT were compared with 57 healthy control subjects.

a. In <40 yrs (35): FVC was 2.816 L/sec, FEV1- 2.42 L/sec in transport workers and were low compared to FVC 3.7 L/sec, FEV1- 3.25 L/sec of control group subjects (33) (p value <0.001).
b. In ≥40 yrs (37): FVC was 2.584 L/sec, FEV1 2.179 L/sec in transport workers and were low compared to FVC 3.005 L/sec and FEV_1 2.67L/sec in the control group subjects (24) (p value<0.001).

The mean values of PFT in these subjects were significantly lower than healthy control group. Lower PFT in transport workers is probably due to exposure to fumes, dust and other motor exhaust pollutants.

Key Words: Pulmonary Function Tests, Transport Workers, Non Smokers

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Introduction

Individuals engaged in various occupations are subject to health hazards resulting from their exposure to various environmental pollutions. For occupational pulmonary diseases, one important special investigation is the measurement of pulmonary functions. Air quality crisis in cities is mainly due to vehicular emissions. In India, there is limited data on pulmonary functions in Transport workers. Transport workers are exposed to vehicular exhaust pollutants, during their period of work. Exposure to Auto exhaust pollutants produse both Restrictive and Obstructive Pulmonary impairement. It is more pronounced in smokers, compared to non smokers. The present study is undertaken in non-smoking, healthy transport worker.

Materials and Methods

Subjects

Subjects were healthy men working as bus drivers and conductors in the Anna Nagar bus depot of Metropolitan Transport Corporation, Chennai. In all subjects, a careful history was taken about previous illness, of respiratory disorders or symptoms of cough, phlegm, allergies,wheeze and smoking history. All subjects selected were free from respiratory symptoms. Smokers were excluded from this study.

A clinical examination of chest was done. Chest expansion was also measured. Only those free from respiratory illness and symptoms of cough, phlegm, wheezing, as revealed by history and no abnormalities on clinical examination were selected for this study.

Anthropometric Measurements: Height in Cms, Weight in Kgs, BSA in m^2 and Arm span was taken.

Technique

Pulmonary Function Tests (PFT) were done in healthy non smoking drivers and conductors of Metropolitan Transport Corporation, Chennai. PFT was done using the instrument Medspirer with all necessary precautions in standing position at the department of Physiology, Kilpauk Medical College, Chennai. Each test done with three preliminary trials and the highest reading accepted. The significant PFT data obtained in healthy transport workers in this study were compared with control group of healthy adults. These groups were divided into two groups: a. <40yrs and b. ≥40yrs

The FVC (Forced Vital Capacity) and FEV_1(Forced Expiratory Volume in 1 second) data were compared with control group. The significance of difference between mean values of various groups were determined by using the appropriate student 't' test.

Results

122 volunteers were chosen and age of subjects ranged from 27 – 56 yrs of age. Out of 122 volunteers, 50 were rejected, as 12 of them had cough or wheeze and 38 were smokers. Satisfactory data were obtained in 72 subjects and were categorized as follows:

a) 35 were <40 yrs

b) 37 were ≥40 yrs.

Table 1 : The age and anthropometric measurements of transport workers

Category	No.	Statistics	Age (yrs)	Height (cm)	Weight (Kgs)	BSA (m^2)
<40 yrs	**35**	**Mean**	**35.27**	**168.60**	**63.9**	**1.704**
		S.D	**4.37**	**6.11**	**9.16**	**0.133**
≥ 40 yrs	**37**	**Mean**	**45.92**	**168.62**	**66.12**	**1.748**
		S.D	**3.61**	**5.25**	**8.883**	**0.143**

Table 2 : Volume Measurements in L/Sec and FEV_1% in transport workers

Category	No.	Statistics	FVC	FEV_1	FEV_1%
<40 yrs	**35**	**Mean**	**2.816**	**2.42**	**85.93**
		S.D	**0.466**	**0.46**	**11.87**
≥ 40 yrs	**37**	**Mean**	**2.584**	**2.179**	**84.32**
		S.D	**0.451**	**0.381**	**10.47**

Table 3 FVC and FEV1 values in controls

Number& category	Mean Age in yrs	Mean FVC in L/sec	Mean FEV_1L/sec	FEV_1%
33(<40yrs)	**20±3.2**	**3.7±0.328**	**3.287±0.33**	**88.84**
24(≥40yrs)	**44±3.16**	**3.006±0.375**	**2.67±0.231**	**88.7**

Table 4: Comparison of FVC and FEV_1 values in transport workers and controls

<40yrs			P value	≥40yrs		P value
Category	Transport Workers(35)	Controls(33)		Transport Workers(37)	controls (24)	
FVC L/sec	**2.816**	**3.7±0.328**	**<0.001**	**2.584**	**3.006±0.375**	**<0.001**
FEV_1L/sec	**2.42**	**3.287±0.01**	**<0.001**	**2.179**	**2.67±0.213**	**<0.001**

The age and anthropometric measurement are shown in Table 1.

The PFT values for two age groups : a. <40 yrs; b. ≥40 yrs, separately were analysed. As the values in conductors and drivers were not much different, they have been taken as one group of transport workers. All volumes of FVC and FEV_1 are lower in subjects ≥40 yrs compared to <40yrs, FVC, $FEV_{1,}$ and FEV_1% as % of FVC is shown as below in Table 2.

The FVC and $FEV_{1,}$ obtained in 57 healthy control subjects (33 Medical students of <40 yrs and 24 technical staff member of the Medical college ≥40 yrs) are shown in Table 3. The values predicted by instrument for FVC and FEV1 are based on formula of Kamath et al[1]

The FVC and FEV_1 values in transport workers were significantly lower than the controls (Table 4).

Discussion

Road transport is an important means of taking passengers and freight from one part of this vast country to another. Moreover in cities, this is the most important and extensively used means available for people to travel from one part of the city to another, people commuting to office, students going to schools and colleges and others for various form of business, so that lakhs of people use bus everyday. In view of its importance, State Roadway Corporation have been formed by State Governments and employ large number of workers forming an important part of the population. Two main categories of staff are the drivers and conductors who man the buses. One feature of their daily 8 hours shift duty is that apart from short breaks of a few minutes at the starting terminal between the trips, they are for most part confined to the bus. Drivers have to remain seated in their seat in the driving compartment which can get very hot during summer. The conductor has to issue tickets in the over crowded and running bus, moving from passenger to passenger among the jostling crowd. The environment in which these staff function during their shift duty is somewhat different from office workers and those engaged in some other occupations, as

Table 5 : Data of various PFT studies in India

S.No.	year	Author (Ref.)	Range of age in yrs	No of subjects	FVC L/sec	FEV1 (%) L/sec
1	**1970**	**Singh et al [3]**	**30-39** **40-49**	**49** **30**	**3.454** **3.090**	**2.86 (82.2)** **2.57 (80.6)**
2	**1990**	**Vijayan [4]**	**15-40**	**130**	**3.99**	**3.31 (82.9)**
3	**1997**	**Fulmbarker et al [2]**	**16-18**	**137**	**3.69**	**3.02 (81.84)**
4	**1997**	**Kamat et al [1]**	**25-34** **35-44** **45-54**	**205** **157** **72**	**3.594** **3.313** **3.140**	**2.90 (80.6)** **2.60 (78.4)** **2.44 (77.7)**
5	**1998**	**Chatterjee & Saha [5]**	**20-60**	**334**	**3.97**	**3.23 (81.3)**
6	**2005**	**Ingle et al [6]**	**25-55**	**60**	**3.18**	**2.81 (93)**
7	**2011**	**S.Gupta [7]**	**39-48**	**100**	**3.9**	**3.2(82)**
8	**2013**	**Pramanic[8]**	**39.50±2.97**	**50**	**3.81**	**3.36(88.3)**
9	**2013**	**Present Study (Controls)**	**<40yrs** **≥40yrs**	**33** **24**	**3.7** **3.006**	**3.287(88.84)** **2.67(88.7)**

there is greater exposure to atomosphoric dust and fumes. The frequent contaminants of Automobile exhausts are oxides of Nitrogen, Carbon Monoxide, Hydrocarbons, respirable particles, lead & sulphur dioxide. Although there are reports on Pulmonary Function in workers pursuing various occupations, there is limited published data on Pulmonary Function in transport workers. Hence, it was felt that a study of Pulmonary Function Test in transport workers would be a contribution to the present knowledge on lung function in different occupations. Currently there are no reliable prediction equations for Pulmonary Functions applicable to Indian population. Several studies reporting reference values of Pulmonary Functions from India have included smokers and have a narrow age range, they also lack standardized equipments and there are no

definite Indian normal Pulmonary Function Tests guidelines[2]. Data of various PFT studies in India are shown in Table-5 [1,2,3,4,5,6,7,8]

In this study, the FVC and FEV_1 are lower in subjects >40 years compared to subjects <40 years, which is consistent with other PFT studies in India[1,3]. The 72 transport workers studied had FVC and FEV_1 lower than the control group which was statistically significant. [Table 4]. FVC and FEV_1 are the most widely used indices of lung functions as far as volumes are concerned and in this study, these parameters are significantly lower, with normal FEV_1% compared to controls, suggesting that there may be restrictive lung disease. We have not included smokers, as it would be difficult to evaluate the contribution of air pollution in smokers. But further studies are required to confirm these observations and we have not analysed the causes air pollutants for this pulmonary impairment. It is also necessary that Indian guidelines of normal pulmonary functions are made available for easy reference.

To summarize, the values of FVC and FEV_1 in transport workers are significantly lower than the control group. The lower PFT data in transport workers is probably due to exposure to fumes, dust and other motor pollutants [6-10].

Acknowledgment

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Conflict of Interest **NIL**

Source of funding **NIL**

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Original Research Article

VARK - Pattern of Learning Style Preferences among Students

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Abstract

Introduction: Student population is diverse in age, experiences, cultural background, level of preparedness, as well as learning styles. This diversity poses one of the most serious challenges that educators face today in improving the level of student satisfaction with the available curriculum and learning environment. An awareness of the differences among students and an understanding of the ways students learn are the first few steps among many other steps that are required for ensuring better facilitation of learning.

Objectives: 1) To study the pattern of learning style preferences among undergraduate students using the VARK Questionnaire and 2) To compare the same among students of different professional courses.

Materials and Methods: A descriptive cross sectional study was conducted during the month of April and May 2015 among first year students from three professional courses namely Medicine, Dentistry and Engineering. Paper copies of the VARK questionnaire were used for data collection and were administered to the students in a regular class after taking an informed consent. The responses were scored by the researchers according to the VARK questionnaire scoring chart which were sent to the copyright holder of the questionnaire for converting them into VARK categories.Out of the 2 algorithms assigned to each of the student, research algorithm was used for further analysis in our study and was done using statistical software package.

Results: The present study revealed that there is no significant difference among learning styles of students from different courses. Analysis of learning styles showed that majority of the students were unimodal in their preference for learning and highest preference was for aural followed by kinesthetic in medicine and dentistry, and by visual in engineering field. Among those who were multimodal, majority used all the four modes, very few used bimodal and none used trimodal learning style in our study.

Keywords: Learning style, Research algorithm, Unimodal, VARK.

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Introduction

Student population is diverse in age, experiences, cultural background, level of preparedness, as well as learning styles. This diversity poses one of the most serious challenges that educators face today in improving the level of student satisfaction with the available curriculum and learning

environment. Learning style is described as the habitual manner in which a student gathers, processes, interprets, organizes, and thinks about material or gains skills. It is postulated that the compatibility between a student's learning style and the delivery of information is conducive for understanding, processing, and retaining information [1]

The concept of learning styles has many implications for students and educators. Students can understand their learning modalities and develop individual study strategies and perform better in their studies. It can remind educators that students are different and educators should increase their sensitivity to those differences and vary instructions to help students become more aware of the ways they most effectively learn.[2] Specifically, student motivation and performance improves when instruction is adapted to student learning preferences and styles. Because students have significantly different learning styles, it is the responsibility of the instructor to address this diversity of learning styles among students and develop appropriate teaching approaches.[3]

There are a number of ways to determine the learning styles but the most common method is based on the type of sensory modality which one prefers when evaluating and utilizing new information in a learning environment. Four sensory modalities are defined by Flemming and Miles (1992) as visual, auditory, reading-writing and kinesthetic and the VARK(Visual, auditory, reading – writing Kinesthetic) questionnaire developed by Flemming is used to assess the sensory modalities. Visual learners prefer the use of diagrams and symbolic devices such as graphs, flow charts, hierarchies, models, and arrows which represent printed information. Auditory learners prefer "heard" information and thus, enjoy discussions, lectures and tutorials when acquiring new information. Read-write learners prefer printed words and texts as a means of information intake; they also prefer lists, glossaries, textbooks, lecture notes, or handouts. Kinesthetic learning is a multimodal type employing a combination of sensory functions. Kinesthetic learners have to feel or live the experience to learn; they prefer simulations of real practice and experiences, field trips, exhibits, samples, photographs, case studies, "real-life examples," role-plays, and applications to help them understand principles and advanced concepts. Some learners have a preference for one of these learning modalities, whereas multimodal learners do not have a strong preference for any single method. They rather learn via two or more of these modalities.[4]

Undergraduate teaching is not a homogenous process including only one type of subjects and learning tasks, since content and order of the subjects change over years and learning preferences for each subject should also change because of these changes. An awareness of the differences among students and an understanding of the ways students learn are the first few steps among many other steps

that are required for ensuring better facilitation of learning. The present study was therefore undertaken to determine the learning preferences of undergraduate students, in order to help teachers develop new stratergies to promote student learning.

Objectives of the study

1) To study the pattern of learning style preferences among undergraduate students using the VARK Questionnaire.

2) To compare the same among undergraduate students belonging to different professional courses.

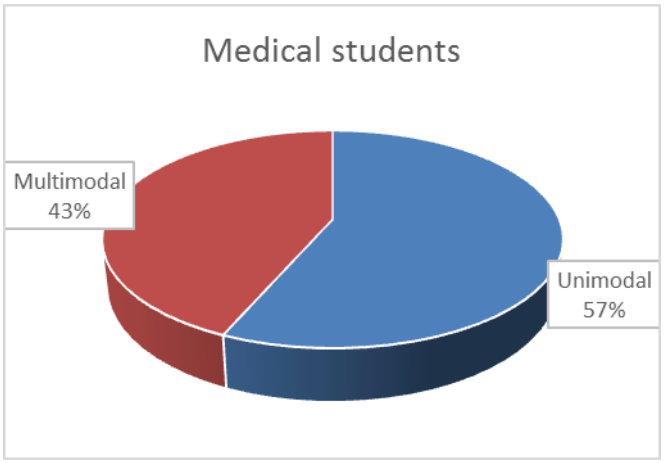
Materials and Methods

A descriptive cross sectional study was conducted in the premises of Karpaga Vinayaga Educational Trust, Maduranthakam during the month of April and May 2015. To have uniformity in data collection, it was decided to include only first year students from all the three professional courses namely Medicine, Dentistry and Engineering. Prior permission for the study was taken from the concerned authorities. Permission to use the VARK questionnaire[5] version 7.8 was obtained from its copyright holder. The validity and reliability of the VARK questionnaire has been tested, and is considered adequate for its intended purposes.[6]

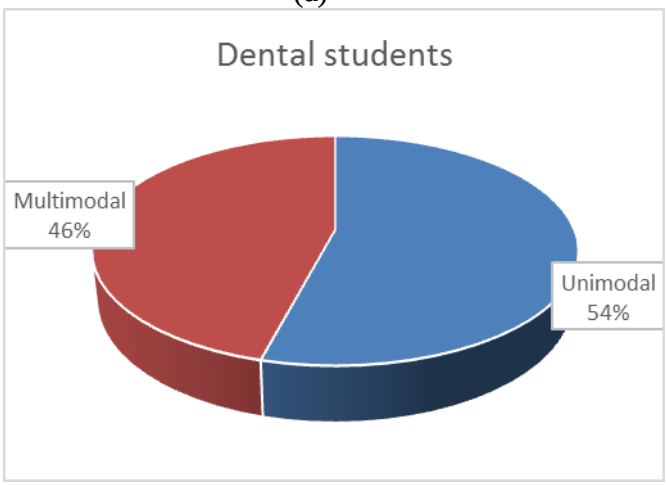
There were 100 medical, 100 dental and around 300 engineering students in the first year. Out of eight divisions in the engineering college, we selected three divisions for data collection by Simple random sampling. Students found to be absent on the day of data collection were excluded from the study. So finally on the day of data collection, there were 99 medical, 85 Dental and 101 Engineering students. Paper copies of the questionnaire were used for data collection which had 16 items, each comprising a statement with four different options. The questionnaires were administered to all the students in a regular class after taking an informed consent. The students were asked to follow the instructions given in the questionnaire. The study was conducted anonymously. The VARK questionnaire responses were scored by the researchers according to the VARK questionnaire scoring chart. The scoring procedure generates a sum ranging from 0 to 16. These scores were entered into the excel sheet and sent to the copyright holder of the questionnaire for converting them into VARK categories for further analysis.

As per their scores, each student were assigned two algorithms by the copyright holder, namely - Standard algorithm and Research algorithm. Standard algorithm was based on arithmetic differences between each respondent's VARK scores noting the differences between his/her highest scores and the next-ranked scores relative to the total score for all four. Research algorithm was specifically designed for research, which is based on standard deviations of individual score from the scores in the VARK database,[7] and the same was used for the present study. Further analysis of the data was done using statistical software package and presented in the form of tables and figures.

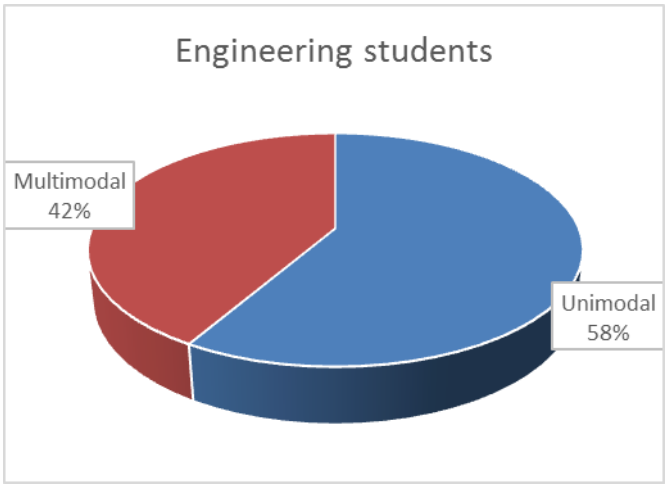
FIGURE 1: Comparison of learning styles of students



(a)



(b)



Results

Students with a single learning style preference are referred to as unimodal, whereas others preferring a variety of styles are known as multimodal. Multimodal learners are further classified into bimodal, trimodal and quadramodal learners, depending on their preference to use two, three or all four styles, respectively.

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In our study there were 99, 85 and 101 students from Medicine, Dentistry and Engineering respectively. The analysis of the learning styles revealed that majority of the students was unimodal in their preference for learning in all the professional courses. Among the students in the field of medicine, 57% had preference for unimodal style of learning against 54% in the field of dentistry and 58% in the engineering field and the rest were multimodal in their learning style preferences (Fig: 1(a), (b), (c)).

Among the students who preferred unimodal style of learning, majority had preference for aural in all the three fields – 22.2% in medical, 25.8% in dental and 25.7% in engineering students. The next preference in unimodal students was for kinesthetic among medical and dental students and visual for engineering students. The least preference was for read/write style of learning among all the students (Fig: 2).

Among those who preferred more than one mode of learning, majority in all the three professional courses i.e. 38.3% students in medical, 41.1% in dental and 36.6% in engineering used all four modes i.e. visual, aural, read/write and kinesthetic for learning. No students in any field were trimodal in our study and the rest were bimodal in their learning styles (Fig: 3).

In different combinations, aural mode of learning was reported by majority in all the fields i.e. 63 (63.3%) among medical, 61(71.7%) among dental and 67 (66.3%) among engineering students followed by visual mode.

FIGURE 2: Comparison of students preferring different styles in unimodal learning

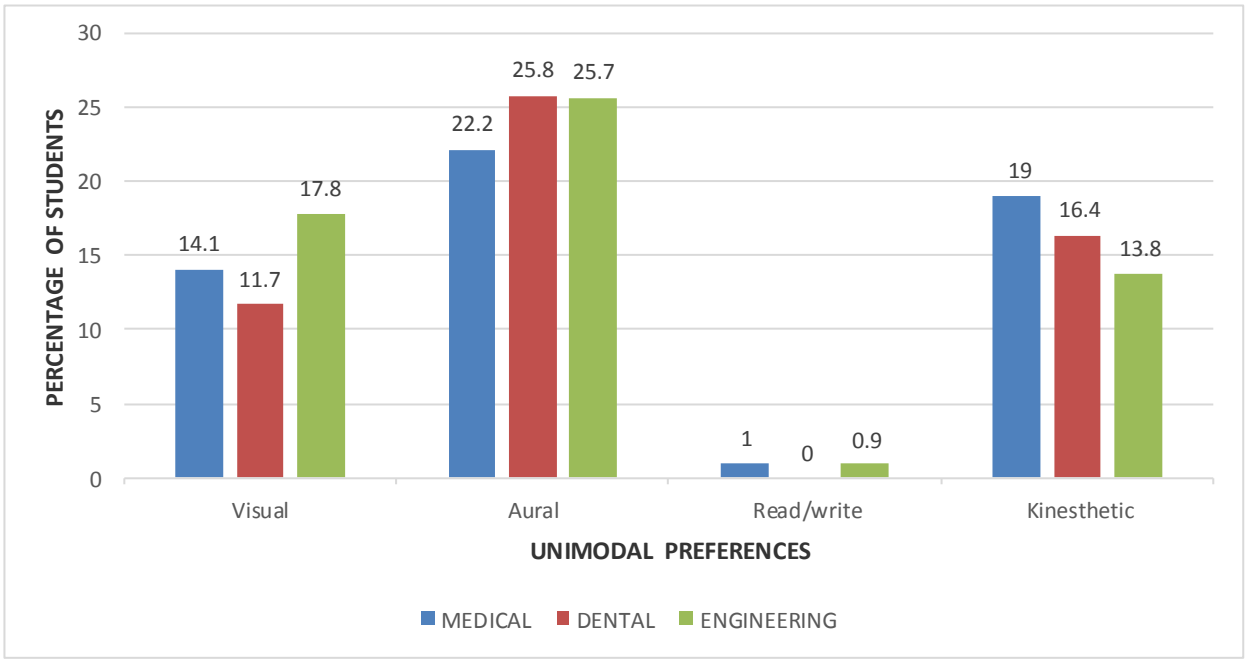

FIGURE 3: Comparison of students preferring different combination in multimodal learning

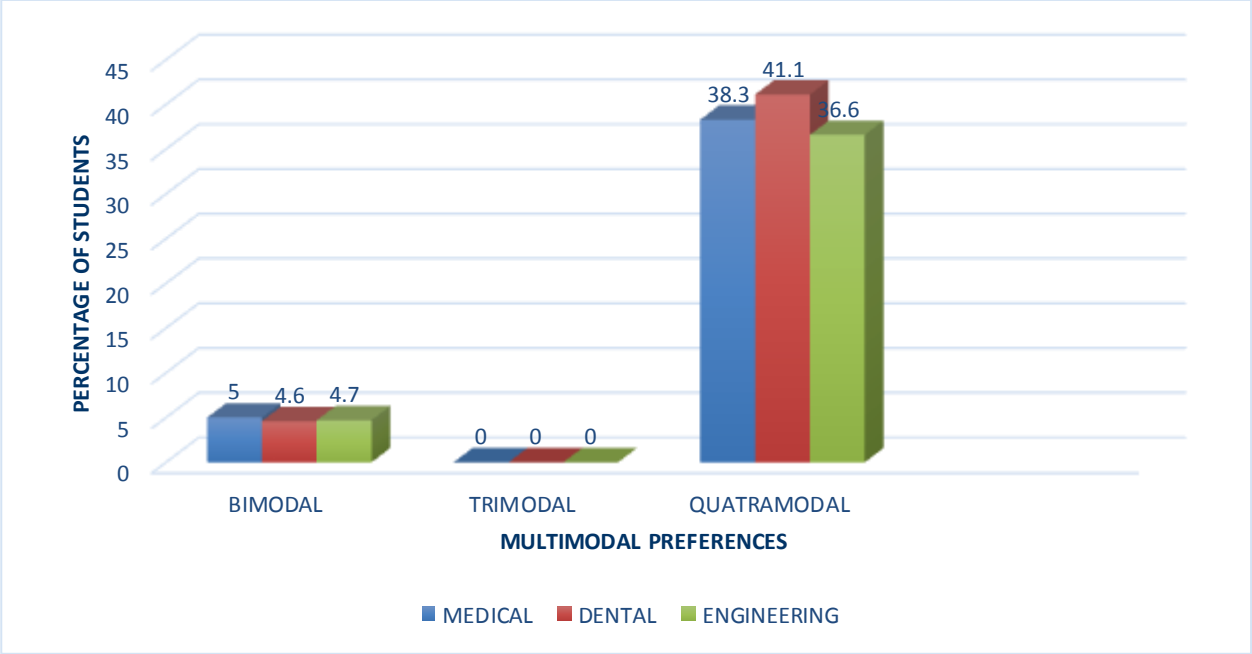

TABLE 1: Comparison of combinations of different learning modes used by students

Learning mode	Medical		Dental		Engineering	
	N	%	N	%	N	%
Visual	14	14.1	10	11.7	18	17.8
Aural	22	22.2	22	25.8	26	25.7
Read/write	1	1.0	0	0	1	0.9
Kinesthetic	19	19.1	14	16.4	14	13.8
Visual and Aural	2	2	3	3.5	1	0.9
Visual and Read/write	0	0	0	0	1	0.9
Visual and Kinesthetic	2	2	0	0	0	0
Aural and Kinesthetic	1	1.0	1	1.17	3	2.9
VARK	38	38.3	35	41.1	37	36.6
Total	99	100	85	100	101	100

Discussion

Using VARK questionnaire to recognize preferred learning styles of students is a key approach which can be used to increase the quality of teaching and learning process. Self-awareness of distinctions and own learning styles lead each learner to individually choose appropriate study techniques. Recognizing learners' interests will help teachers in moving onto the students' learning styles from her/his learning style, in overcoming the situation in which all students tend to prefer specific styles

and in improving teaching structures with consideration of the learners' points of views.[8]

In the present study, it was found that the preference for different learning styles was almost similar among students of all the professional courses. Majority had preference for unimodal style of learning, out of which aural was the most preferred mode of learning. Among the students who were multimodal, majority used all the four modes and none were trimodal. Many authors[2, 8, 9, 10, 11] have done study among medical students and all have found that majority of the students have preferred multimodal style of learning, contrary to the findings of our study. A study done by Narayana MC et.al[12]. among dental students in Karnataka found that majority i.e. 74% of the students had unimodal VARK preferences, similar to the present study. On the other hand, few studies[10, 13] have found that the predominant learning pattern was multimodal among the participants. A study done on engineering students in Turkey[4] revealed that majority i.e. 74.8% preferred unimodal learning style, in line with the findings of our study.

Majority had preference for aural mode among those who were unimodal followed by kinesthetic mode in medical and dental and visual in engineering students, in line to the findings by other authors.[2, 9, 13] A study done among engineering students found that among those who had unimodal style of learning, majority had preference for aural mode as found in our study, but the next preference was for kinesthetic.[4] A very interesting fact that came out of our study was that among those who were unimodal very few students- 1 from medical, 1 from engineering and none from dental field, preferred read/write mode of learning. A study done by Bataduwaachchi et.al[9] among first year medical students, has found out similar findings where only 3(3.9%) students have shown preference for read/write. No other studies have found so much low preference for read/write.[2, 8, 10, 11, 12]

Majority preferred all the four modes among those who were multimodal in our study, very few preferred bimodal and none preferred trimodal, which is again another important finding. Our study results are comparable to others[2, 8, 11] where the major preference was for quadramodal style of learning.

Conclusion:

Learning style diversity, when properly understood by both learners and educators, can be converted into appropriate teaching and learning methods. The present study revealed that there is no significant difference among learning styles of students from different courses. Furthermore, this study found out that there is a high preference for a unimodal learning approach especially aural style of learning among all the students. While we can make use of this information in the structuring of future curriculum and execution of course outlines, more thorough research must be conducted to gain a greater insight into the

relationship between learning style preferences and teaching methods.

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Original Research Article

ROLE OF PARTOGRAM IN EARLY RECOGNITION OF CEPHALO PELVIC DISPROPORTION & PREVENTION OF OBSTRUCTED LABOUR

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Date of Submission: 21.05.2015 **Date of Acceptance: 11.06.2015**

Abstract

OBJECTIVE: To study the benefits of using partogram in primigravidae. The study was conducted on 200 primigravidae in labour ward Government Maternity Hospital ,SriVenkateswara Medical college,Tirupati. Progress of labour in primigravidae was monitored with WHO modifed partogram and compared with 200 primigravidae which were not monitored with partogram and who were referred from peripheries. Duration of labour, rate of operative delivery and neonatal outcome was studied in the cases monitored with partogram. The rate of operative delivery, incidence of obstructed labour and other complications were studied in the referred group. The rate of operative delivery. Maternal and neonatal morbidity and mortality was compared in both the groups. The rate of instrumental delivery was 9% in study group and 23% in the cases not monitored by partogram. The rate of LSCS was 4.5% in the study group and 20% in the unmonitored group. No neonatal deaths occurred in partogram applied cases and 3 deaths occurred in cases not monitored by partogram. Two cases went in to obstructed labour in unmonitored group where as it was nil in study group. The Philpott's alert and action lines on cervicograph appeared to be an appropriate indicator for early recognition of abnormal labour and helps in the prevention of maternal and neonatal morbidity and mortality.

CONCLUSION: Usage of Partogram with necessary interventions in the study group has resulted in less no. of operative deliveries and good neonatal outcome without any neonatal deaths. In spite of MCH services, we are getting referrals in stages of obstruction from peripheral centres. So, training of birth attendants, nurses , midwives and basic doctors in the usage of Partogram helps in identifying labours which are abnormal and thereby helps in timely referral and intervention. The value of Partogram in our setup cannot be ignored.

KEYWORDS: Partogram, Obstructed labor, CPD.

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Introduction

The authenticity of Ian Donald's statement "of all the journeys we ever make the most dangerous one is the very first one we undertake through the last 10cm of the birth canal" can never be doubted[1].

Every day, 1500 women die from pregnancy or childbirth-related complications.

In 2005, there were an estimated 5,36,000 maternal deaths worldwide[2]. Most of these deaths occurred in developing countries, and most were avoidable. Women die from a wide range of complications in pregnancy, or Childbirth or the postpartum period. The four major killers are: severe bleeding (mostly postpartum), infections (also mostly soon after delivery), hypertensive disorders in pregnancy (eclampsia) and obstructed labour[2].

Every year more than 133 million babies are born and 90% of them in low and middle-income countries and around 3 million babies are stillborn[2]. Almost one quarter of these die during birth. Prolonged and obstructed labours are the known avoidable causes for maternal and perinatal morbidity and mortality[2]. The reported incidence of obstructed labour varies widely from as low as 1% in some populations to up to 20% in others.[3]

Obstetric fistula is a devastating yet often neglected injury that occurs as a result of prolonged or obstructed labour in survivors. Without surgical repair, the physical consequences of fistula are, severe urinary and/ or fecal incontinence, frequent pelvic and/or urinary infection, pain, infertility, and often early mortality. Therefore, prevention of obstructed labour is an important intervention towards reducing maternal and perinatal mortality and morbidity, and in achieving the Millennium Development Goals 4 and 5.[2]

Early detection of abnormal progress of labour and prevention of Prolonged labour would significantly reduce the risk of postpartum hemorrhage and sepsis and eliminate obstructed labour, uterine rupture and sequele. The partograph (or partogram) is a simple tool that has been used for this purpose.

A partograph is a composite graphical record of progress of labour and salient condition of mother and foetus, first reported by Friedman in 1954. Philpott subsequently added alert line which is a modification of the mean rate of cervical dilatation of the slowest 10% of primigravidae. Action line introduced later 4hrs to the right of alert line. WHO in 1994 as part of Safe Motherhood produced and promoted partogram to improve labour management and to reduce maternal and foetal mortality and morbidity .

Material & Methods

This study was undertaken at Government Maternity Hospital, S.V. Medical College, Tirupati from October 2010 – September 2012. The study was conducted on 200 primigravidae admitted to labour ward at 4 cm cervical dilatation who fulfilled the following inclusion criteria.

Inclusion criteria

1) Primigravidae,
2) Vertex presentation
3) Women with spontaneous labour
4) Singleton pregnancy
5) No medical / obstetric complications.

Exclusion criteria

1) Antepartum haemorrhage

2) Malpresentations - breech, transverse lie, compound presentation etc.

3) Multiple pregnancy

4) Preterm labour

5) Pre-eclampsia and eclampsia

6) Major degree CPD

The progress of labour was plotted on WHO modified partogram, which includes both fetal and maternal parameters. Cervical dilatation was noted on admission and at 4th hrly intervals thereafter and recorded on the partogram.. Progress of labour was assessed in relation to alert and action lines.

The patients who were on the left side of alert line were considered to be having normal cervimetric progress and were categorized as Group I. While those who crossed this line were considered to be exhibiting abnormal active phase and are identified as slow progressers. Those who are falling between alert and action lines categorized as Group II. Women falling right to action line categorized as Group III .

Cases with hypotonic uterine contraction and which failed to progress as per expectation were accelerated with oxytocin. A standard concentration of 10 units of oxytocin per litre was used. The rate of infusion started at 10 drops and increased every 15 minutes to a maximum of 60 drops per minute depending on uterine action. The drip was operated manually. All the cases were monitored with Partogram.

Dysfunctional labour was identified by following criteria, suggested by Studd et al (1982).

1. Primary dysfunctional labour
2. Secondary arrest of cervical dilatation
3. Secondary arrest of descent

Cases of fetal distress were terminated with instrumental delivery or with LSCS irrespective of the group. Those which were crossing the alert line were reviewed and found with secondary arrest of cervical dilatation with hypotonic uterine action were augmented with oxytocin. Cases crossing the action line and with secondary arrest of cervical dilatation or with caput or moulding suggestive of CPD are terminated with LSCS. Otherwise labor was continued with careful monitoring of maternal and fetal condition with partogram.

The duration of labor, rate of operative deliveries was studied and neonatal outcomes was compared in all the three groups.The rate of operative delivery and the neonatal outcome were also compared with 200 primigravidae, with vertex presentation matching with the above inclusion and exclusion criteria who were

Results

Fig.1 Age Distribution of study subjects

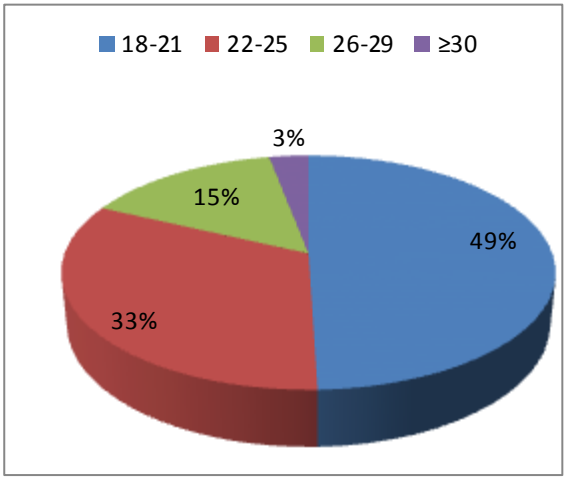
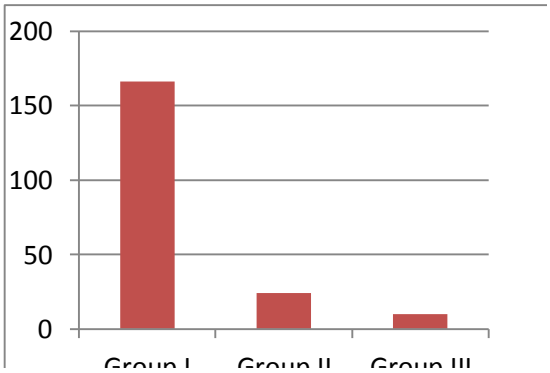
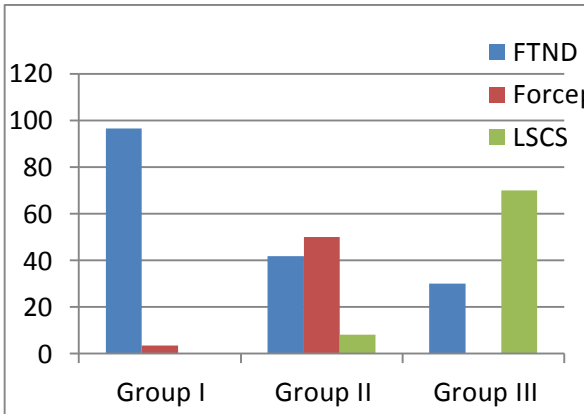


Fig.2: No. of Women in relation to Partogram
Group I-166, Group II- 24, GroupIII-10



A significant association was observed between **Mode of delivery** and groups. Contingency co-efficient value of 8.7 was found to be highly significant ($p < 0.001$) between group II and group III. Maximum number (100%) of normal vaginal deliveries occurred in Group I and minimum number in Group III. Maximum number of operative deliveries noted in Group III , and Nil in Group I.

Fig.3: Mode of delivery

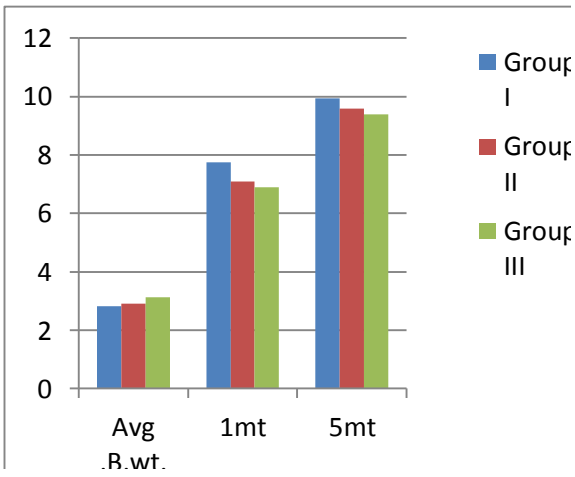


Mean duration labour in Group III was found to be significantly higher than Group II and I as F test revealed a highly significant value (F = 272.46; P < 0.001).The mean duration of labour in Group-I was 4.39 ± 1.53 hours, in Group-II 9.1 ± 1.15 hours, whereas in Group-III it was 13.87 ± 2.13 hour.

Among 200 cases comparatively more % of women in Group II needed acceleration with oxytocin. Contingency coefficient analysis revealed a highly significant value (CC = 1.617: P < 0.0001) indicating that majority of women were improved in Group II with oxytocin as against none of the women improved in Group III. Thus indicating that hypotonic uterine action is common in Group II. Whereas secondary arrest of cervical dilatation and secondary arrest of descent due to CPD is more in Group III and hence they were not improved even with augmentation thereby crossed the action line. Thus the unrecognized CPDs and borderline CPDs were revealed out by monitoring with partogram.

Fig.4 shows that mean Birth wt. is more in Group III compared to GroupII and it is more in Group II compared to Group I. Apgar scores are better in Group I compared to Group II and better in Group II compared to Group III.

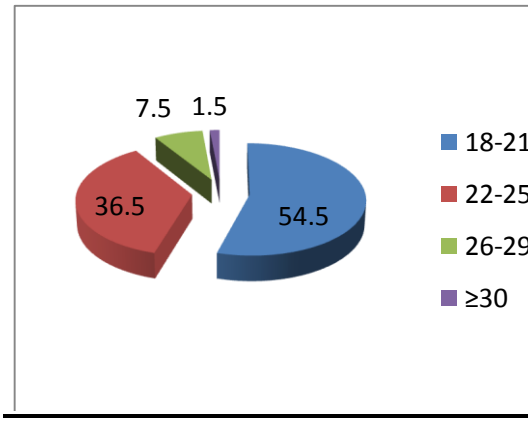
Fig. 4:Neonatal outcome in different groups



Cases Not Monitored With Partogram

Not much variation observed in age distribution between the study group and the group not monitored by partogram.

Fig-5: Age distribution



According to the data, the rate of intervention is significantly raised in unmonitored cases compared to that in monitored cases irrespective of the age group. Operative deliveries are also significantly increased.

Fig 6: Comparision of Mode of Deliveries

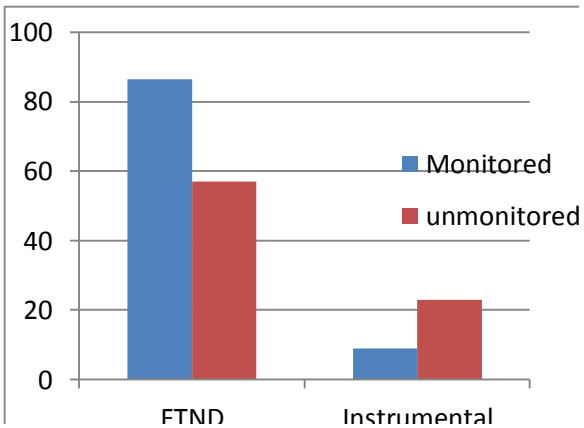


Fig 7: Incidence of LSCS & Obstructed labour

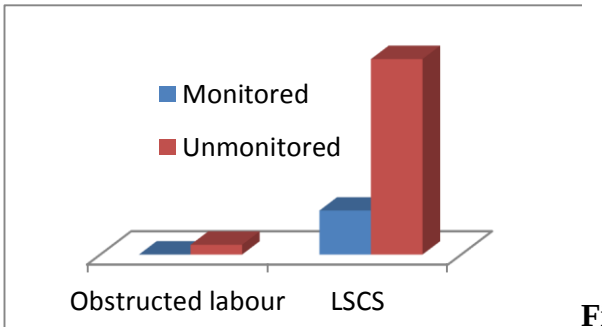
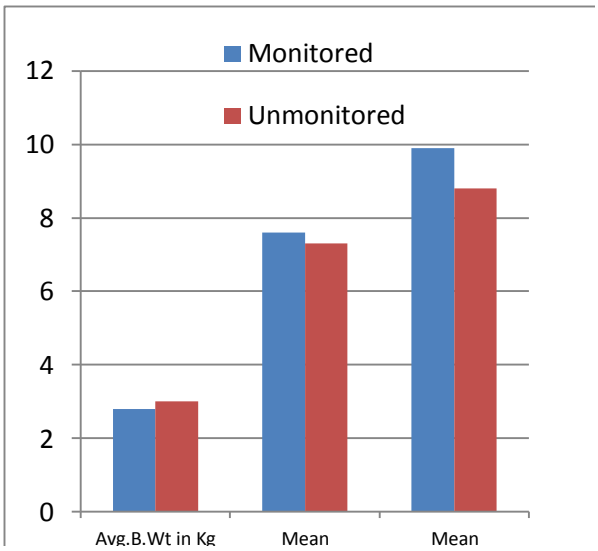


Fig.8: Comparison of Neonatal Outcome



No. of cases delivered by LSCS for the indication of obstructed labor are 2 in unmonitored cases where as it is nil in study group. LSCS for the indication of CPD is 22 in unmonitored cases but it is only 5 in study group.

From the above comparisons it was found that rate of operative delivery, maternal & perinatal morbidity and perinatal mortality are more in cases not monitored with partogram and are significantly reduced in cases where labour was monitored with partogram.

Discussion

In this study of 200 primigravidae, all women were admitted to labour ward at 4cm dilatation with intact membranes. This was taken as zero hour. The mean time taken for the active phase of labour with normal progress according to this study was 4.39 ±1.53 hours. This was compared with following studies.

1. In the study done by Hendricks et al., the average duration was 4.8 hours.[4]
2. The duration of normal cervical dilatation as described by Friedman (1954) lasted for 14.4 hrs.
3. Daftary and Mahatre (1977) studied 96 primigravidae to prepare a standard nomogram and found the duration for full dilatation to be 7 hours 50 mins.[5]
4. Pierre Drouin (1979) in his study of 480 primigravidae showed latent phase to be 9.5 ±4.7 hours and the active phase to be 6.1 ±3.9 hrs.[6]

Thus the duration of cervical dilatation with normal progress in the present study can be compared with the duration of labour in the above mentioned studies.

Rate of cervical dilatation: Melmed and Evans (1976) studied the predictive value of cervical dilatation rate and found the rate of dilatation measured early in labour (active phase) to be accurate. The mean rate of cervical dilatation for spontaneous delivery was 1.75 cm/hr, for assisted delivery was 0.9 cm / hr and for caesarean section was 0.42 cm/ hr.[7]

In the present study, the rate of cervical dilatation in the normal delivery group was 1.8 cm/hr. in the assisted delivery group was 0.96 cm/hr. and in the LSCS group it was 0.6 cm/hr.

In 1995, De Groof, Vangleender Huyson, Junker, (1995) did a study on the impact of introduction of partogram on maternal and perinatal mortality and morbidity and concluded that the introduction of partogram reduces the amount of the time in labour, thereby improving the follow up care the pregnant women receives.[7]

In the present study also, partogram helped in early recognition of prolonged labour and obstructed labour, there by reduced the duration of labour by active intervention at the right time. This in turn helped to bring down the maternal and perinatal mortality rates.

Group wise distribution:

In the present study, among the 200 primigravidae, 81.5% belonged to group I, 13.5% belonged to group II and 5% to group III.

1. In the study by Pierre Drouin, group I consisted of 52%, group II consisted of 18% and group III 30% of the women.[6]
2. In Philpotts study, group I consisted of 78%, group II-11% and group III 12% of women respectively. In the study by Daftary and Mahatre the distribution of patients in Group I, II and III were 66%, 22%, 9% respectively.[5] Thus, the present study

also compares with the above mentioned studies.

The incidence of normal delivery and operative delivery:

1. In the Pierre Drouin study, overall operative delivery rate was 22%, and the same in group I, II and III were 1%, 27% and 72% respectively.[6]
2. In Philopotts series, the incidence of operative delivery was 1.2% in group I, 20.6% in group II and 72.8% in group III. Incidence of normal delivery in group I was 98%, in group II 79% and in group III 28% respectively.[8]

In the present study the incidence of normal delivery in group I was 96.93%, in group II 44.4% and group III 30%. The incidence of operative delivery was 0% in group I, 7.4% in group II and 70% in group III. Thus in this present study as well as in the study shown by Pierre Drouin and Philpott, it was found that there was a higher incidence of operative delivery and interference in group II and group III.

Thus it is quite evident that, with the slow rate of cervical dilatation, the incidence of operative interference is much higher thus increasing the maternal morbidity.

The incidence of acceleration : All the 200 women were accelerated with artificial rupture of membranes. Among them 16% women were accelerated with oxytocin. In group II and III, 68.75% and 21.87% required acceleration with oxytocin. In group I 9.37 women needed acceleration with oxytocin.

In one study by William Ledger and William Witting, it was found that in group I, the incidence of acceleration was 27%, whereas in group II and group III, the rate of acceleration was 72%.[9]

In this present study also, it was found that the acceleration of labour by oxytocin was very much increased in group II and group III.

Incidence of CPD: In the present study, it was found that, in group III, there was a high incidence of CPD among women who showed secondary arrest of descent of presenting part and secondary arrest of cervical dilatation. Among the 2 women who exhibited secondary arrest of cervical dilatation, both underwent LSCS due to CPD.

1. In the study by Friedman and Sachtleban, 50% of women with secondary arrest of cervical dilatation had CPD.[10]
2. In the study by A.N. Shrotri (1991), it was found to have a higher incidence of CPD and fetal malposition among women with prolonged II stage.[11]
3. Sarkar and Paul (1990) found that the incidence of CPD was 69.7% among women with secondary arrest of descent.
4. In the study by Gupta et al. (1991) had 32.0% incidence of CPD.[12]

Mean apgar scores & Average birth weight:

The apgar score in group III were comparable to those of group I and group II.

Mean apgar score in the study group at 1 and 5 minutes was 7.2 and 9.8 respectively. There were no perinatal losses in any of the groups.

The babies were heavier in group II compared to group I and in group III when compared to group II, thus causing CPD and slow progress of labour.

1. In 1979, Jhon, Chen, Studd showed the outcome of normal and dysfunctional labour. According to their study, whose labour progress was to the right of action had low apgar scores at 1 minute and 5 minutes and delivered heavier babies and the babies had to be resuscitated.
2. In the study of A.N. Shrothri, there were more perinatal loss in women with secondary arrest of descent with CPD and in women with dysfunctional labour. The babies were severely asphyxiated at birth.[11]

Comparison between monitored and unmonitored cases:

The rate of operative deliveries and the neonatal outcome in the present study was compared with the cases not monitored with partogram. It was found that the rate of operative deliveries in cases monitored with partogram is 4.5% whereas it is high of about 20% in cases not monitored with partogram.

No case was allowed to go into obstructed labor in the study group whereas 2 cases were delivered in obstructed labor in unmonitored cases.

Babies in the study group are delivered with fair apgar of about 7.6 at 1mt and 9.9 at 5mt where as in unmonitored group with low apgar of about 6.9 at 1mt and 8.8 at 5mts. Neonatal deaths recorded nil in the study group where as 3 deaths were recorded in the unmonitored group.

Thus the study shows that the management of the patients with partograms increases the quality and regularity of observations of the mother and foetus and acts as an "Early warning system" for the detection of abnormal progress, enabling early decision for referral, or intervention, or termination of that labour, thus improving maternal and fetal outcome.

Conclusion

1. Usage of Partogram in the study group has resulted in less no. of operative deliveries. 4.5% of cases were delivered by LSCS compared to 20% of cases in the group not monitored by partogram.
2. Neonatal outcome was good without any neonatal deaths in the study group compared to 1.5% deaths in cases not monitored with partogram.
3. No case of Obstructed labour in monitored group where as 1% of cases went in to obstructed labour in unmonitored group.
4. Inspite of good MCH services , we are getting referrals in stages of obstruction from peripheral centres. So, training of birth attendants, nurses , midwives and basic

doctors in the usage of Partogram helps in identifying labours which are abnormal thereby helps in timely intervention or referral.

5. .The value of Partogram in our setup cannot be ignored.

Acknowledgments:

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Original Research Article

A Study On Active And Expectant Management And Its Outcome On Preterm Premature Rupture Of Membranes Between 32 And 37 Weeks Of Pregnancy In Southern India

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Abstract

PPROM is preterm premature rupture of a membrane that occurred before the onset of labour and before term. A prospective comparative study was conducted to find out the incidence of PPROM and examine the various modes of treatment options. This study was conducted in Govt. Kasturba Hospital, Triplicane, Madras Medical College, Chennai in the period of December 2012 to November 2013. Pregnant women with gestational week of 32-36 completed weeks with confirmed ROM, Singleton pregnancy, Primi and multigravida in the age group between 18-35 years were included. Sample size was calculated to 108 by using 7.72% prevalence of PPROM and 5% precision.

The incidence of PPROM was 3.62%. It was high in 34-36 weeks of gestation. 55 clients were put up in active management and 53 in expectant management. The mean MRO duration during admission was 14.91 hours, admission to delivery interval 15.81 hours and MRO to delivery interval 30.72 hours. Oxytocin induction was high (49) in active management than in expectant management (6). Only three patients were given PGE-2 gel for induction in active management.

The highest number of mothers (94.44%) got admitted in > 24 hrs of MRO in active management but it was highest in <6 hrs in expectant management while comparing between the group. Among delivered within <6hrs after hospital admission, 88.24% in active and 11.76% in expectant management group. These differences were statistically significant. E-coli were identified in 9.25% of high vaginal swabs. The duration of mother hospitilization and post-operative complications like fever, abruption placenta were not statistically associated with active and expectant management ($p>0.05$).

The duration of neonate hospitalisation was more than 5 days in 62.26% in expectant management and 37.74% in active management. The same was less than 5 days in 63.34% in active and 36.36% in expectant management. The difference was statistically significant ($p=0.007$). Apgar score of 1 min and 5 min between the treatment group was not statically significant.

Expectant management is best management for MRO with mother's gestational age of 32-33weeks 6 days and active line of management is for 34-36 weeks 6 days.

KEYWORDS: PPROM, MRO, Abruption placenta, Oxytocin Induction

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Introduction

About 35% of preterm birth follows preterm prelabour rupture of membrane. The early detection of preterm labour or preterm rupture of membranes in traditional antenatal care is problematic because symptoms or signs may vary only a little from the normal physiological

symptoms and signs of pregnancy.[1] More than 1 in 10 of the world's babies born in 2010 were born prematurely, making an estimated 15 million preterm births (defined as before 37 weeks of gestation), of which more than 1 million died as a result of their prematurity.

Over 60% of preterm births occur in Africa and South Asia, but preterm birth is truly a global problem. India had 3 519 100 preterm birth in 2010[2]

-PPROM is defined as a rupture of the amniotic membranes before 37 weeks' gestation and before the onset of labour. PPROM is a serious condition leading to approximately one third of preterm births and it complicates about 3% of pregnancies. It is associated with many perinatal complications including neonatal sepsis, respiratory distress syndrome (RDS), placental abruption, and eventually fetal death, and carries a 1 to 2% risk of fetal death. In addition, PPROM puts the mother at risk for infection (chorioamnionitis) and premature delivery, and increases the risk of Caesarean section delivery.[3]

Preterm birth has multiple causes; therefore, solutions will not come through a single discovery but rather from an array of discoveries addressing multiple biological, clinical, and social-behavioral risk factors.

The aim of this study is to systematically compare early initiation of delivery and expectant management in case of preterm prelabour rupture of membranes between 32 and 37 weeks in terms of neonatal sepsis and RDS, maternal health, health-related quality-of-life and costs.

Materials and Methods

This study was conducted in Institute of Social Obstetrics, Govt. Kasturibai Gandhi Hospital for Women and Children under Madras Medical College, Chennai for the period of one year from December 2012 to November2013after approval from Institutional Ethics Commitee.

Study Method: This was a prospective study which was carried out among pregnant women came with preterm premature rupture of membrane from 32 weeks to 36 weeks 6 days of gestational age. Sample size was calculated to 108 by using 7.72% prevalence of PPROM, 5% precision.

Sampling Frame: The study participants were divided in to two groups, 32-34 and 34-36 weeks completed gestational age group. All the study participants enrolled after their consent in both the groups were further randomised to active and expectant management group. The pregnancy outcomes of above two groups were studied during the course of hospital stay.

Pregnant Women with Gestational age between 32-36 weeks 6 days with Singleton pregnancy, Primi and multigravida, Previous LSCS, Age group between 18-35 years and Confirmed cases of leaking were included. And Multiple pregnancies, Features of chorioamnionitis, Meconium stained liquor, Severe oligohydromnios, Active labour, Non reassuring fetal heart rate in CTG, Major congenital anamolies and Medical or obstetric complications indicating prompt delivery excluded from the study.

The study participants with history of PPROM were admitted and PPROM was confirmed by sterile speculum examination, nitrazine test/fern test.The gestational age was ascertained by LMP and first trimester dating ultrasound. If there is disparity of more than 7 days between the two then gestational ages was assumed as per USG. And maternal temperature, pulse, blood pressure and fetal heart rate were recorded.

Investigations:

All the baseline investigations like Hb, blood sugar, blood grouping and typing, HIV, VDRL and urine albumin and sugar were done. High vaginal swab was taken at the time of admission

for culture and sensitivity. A sterile speculum examination was done to assess the bishops score initially. Then further digital examinations were strictly prohibited

Expectant Management: The patients who were managed expectantly were observed in labour room. The fetal conditions were monitered by continuous external fetal heart monitoring and non-stress test. Modified biophysical profile was done daily till delivery. Delivery was either by spontaneous onset of labour or termination of pregnancy due to development of chorioamnionitis, non-reassuring fetal status in non-stress test and development of severe oligohydramnios. Termination is done by oxytocin induction and cesearean section was done for obstetric indication.

Active Management: In this group, labour was induced either by intracervical instillation of PgE2 gel or continuous infusion of oxytocin depending on the bishops scores. In both the groups progress of labour was monitored carefully by partogram and Cesearean section was done only for obstetric indications.

All the patients in both the groups irrespective of duration of rupture of membranes, will be given intravenous Ampicillin 2 gm 8 hourly for first 48 hours followed by oral amoxicillin 500 mg every 8 hours for 7 days or till the patient goes into labour and delivers to reduce the infections.

In puerperium, all patients will be followed clinically and investigated for evidence of infection (endometritis). Clinical parameters considered for maternal morbidity were fever, tachycardia, abdominal tenderness, foul smelling lochia, sub involution of uterus, and evaluation of stitch line. And other maternal outcome were recorded

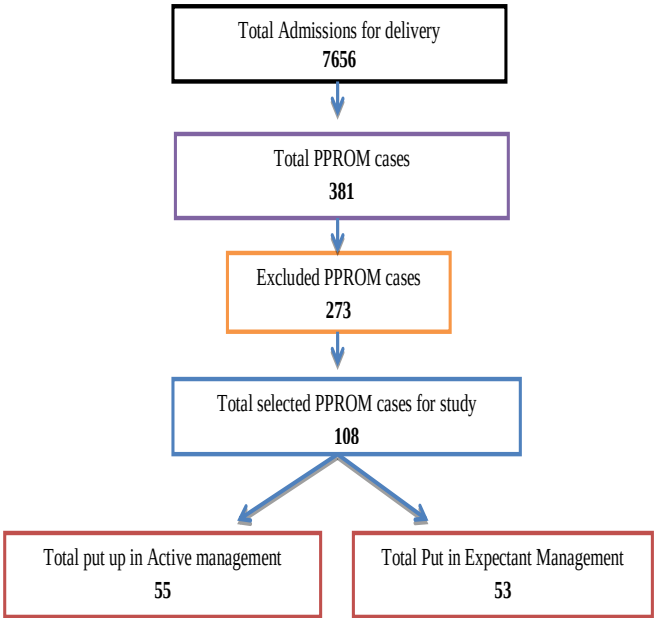
Neonatal morbidity was considered in cases of neonatal septicemia, convulsions, or with birth asphyxia and death.

Statistical analysis: All the data were entered in Microsoft Excel. Statistical analysis was done using SPSS version 12.

Results

There was 7656 admission of pregnant women for delivery purpose during the study period. Out of the total admission in this category in the hospital 381 were presented with pre-term premature rupture of membrane. The selection process of study participants was given in Figure1.

Figure 1. Study participants in the study



The incidence of PPROM in the study was 3.56% during study period.

The height of 155-160 cms was high (44.00%) in active management while it was high in 150-155 cms in case of active management group (39.62%).

Table 1. Relationship between hospital course in the study participants (n=108)

Attributes	Characte-rs	Active management	%	Expectant management	%	Total	p value
MRO at admission group	<6hrs	6	15.79	32	84.21	38	
	6-12hrs	8	30.77	18	69.23	26	
	12-24hrs	24	92.31	2	7.69	26	
	>24 hrs	17	94.44	1	5.56	18	0.000
Admission Delivery interval group	<6hrs	30	90.92	3	9.09	33	
	6-12hrs	21	8400	4	16.00	25	
	12-24hrs	1	0.00	12	100.00	13	
	24-48hrs	3	11.10	24	88.90	27	
	>48hrs	0	0.00	10	100.00	10	0.000
MRO-Delivery group(hrs)	<12	7	46.67	8	53.33	15	
	12-24	16	45.71	19	54.29	35	
	24-48	22	57.89	16	42.11	38	
	>48	10	50.00	10	50.00	20	0.74
Mode of delivery	Labour Natural	36	45.57	43	54.43	79	
	LSCS	18	66.67	9	33.33	27	
	Forceps delivery	1	50.00	1	50.00	2	0.16
High Vaginal Swab	No growth	51	54.84	42	45.16	93	
	E.Coli	3	30.00	7	70.00	10	
	Staphyloc-ocus aureus	1	25.00	3	75.00	4	
	Klebsiella	0	0.00	1	100.00	1	0.22
Total		**55**	**50.93**	**53**	**49.07**	**108**	

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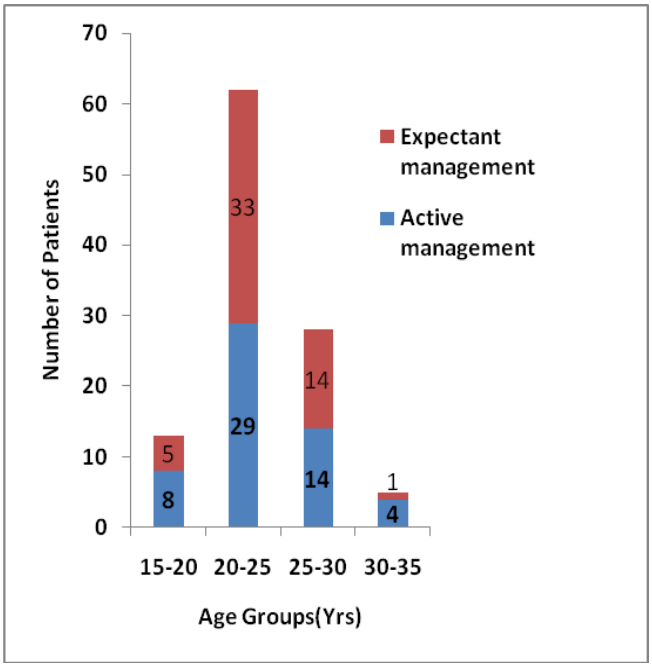
Table 2. PPROM mother hospitalisation between the treatment group(n=108)

Attributes	Characters	Active management	%	Expectant management	%	Total	p value
Duration of Hospitilization-Mother(Days)	<5days	38	53.52	33	46.48	71	0.45
	>5 days	17	45.95	20	54.05	37	
Maternal puerperium	No	55	50.93	53	49.07	108	-
Fever	No	53	50.48	52	49.52	105	0.58
	Yes	2	66.67	1	33.33	3	
Tachycardia	No	55	50.93	53	49.07	108	-
Foul Smelling Vaginal Discharge	No	55	50.93	53	49.07	108	-
Abruptio placenta	No	55	51.40	52	48.60	107	0.30
	Yes	0	0	1	100.00	1	
Total		**55**	**50.93**	**53**	**49.07**	**108**	

Figure 2. Management option and age group of study participants (n=108)



The weight was high in 60-70kgs group both the management groups (44%). The age group of 20-25 years was high in expectant management (53.23%) and 30-35 yrs group was high (80%) in active management while compare both the group. But in both the groups in the age group of 20-25 was high in numbers.(Figure.2)

In MRO to admission group, highest number of persons (94.44%) got admitted in > 24 hrs of MRO in active management but it was highest in <6 hrs in expectant management while comparing between the group. Most of the patients got admitted in active management group (24) in 12-24 hrs. Among delivered with in <6hrs after hospital admission, 88.24% in active and 11.76% in expectant management group. In 6-12 hrs , it was 60% in active and 40 % in expectant management group. Only 10.25% got delivered more than 12 hrs in active management and 89.75% in expectant management (Table 1).

MRO at the time of admission and duration between admission and delivery were associated with active and expectant management. Total MRO to delivery duration, mode of delivery and vaginal growth on high vaginal swab does not have any association with the management options.

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Table 3.Profile of hospitalization based upon preterm group(n=68)

Pre-term group	Attributes	Characters	Active management	%	Expectant management	%	Total	p value
32-34	Duration of hospitalisation-Baby(Days)	<5days	2	100	0	0.0	2	0.03
		>5 days	5	26.3	14	74.7	19	
34-36	Duration of hospitalisation-Baby(Days)	<5days	9	69.2	4	30.8	13	0.12
		>5 days	15	44.1	19	55.9	34	
		1.5-2	3	25	9	75.0	12	
		2-2.5	16	53.3	14	46.7	30	
		>2.5	5	100	0	0.0	5	
		>7	18	51.4	17	48.6	35	
32-34	Sepsis	Yes	1	20.00	4	80.0	5	0.12
34-36	Sepsis	Yes	1	33.3	2	66.7	3	1.00
32-34	RDS	Yes	5	83.3	1	16.7	6	0.01
34-36	RDS	Yes	12	70.6	5	29.4	17	0.07
32-34	LBW	Yes	3	42.9	4	57.1	7	0.63
34-36	LBW	Yes	0	0	6	100.0	6	0.00
32-34	Pre-maturity	Yes	1	20	4	80.0	5	0.62
34-36	Pre-maturity	Yes	2	40	3	60.0	5	0.66
32-34	Asphyxia	Yes	0	0	2	100.0	2	0.53
34-36	Asphyxia	Yes	2	50	2	50.0	4	1.00
32-34	Hypoglycaemia	Yes	1	50	1	50.0	2	1.00
34-36	Hypoglycaemia	Yes	1	100	0	0.0	1	1.00
32-34	Necrotising Entero colitis	Yes	0	0	0	0.0	0	-
34-36	Necrotising Entero colitis	Yes	3	50	3	50.0	6	1.00
32-34	Others	Yes	0	0	1	100.0	1	1.00
34-36	Others	Yes	3	75	1	25.0	4	0.69

The duration of mother stay in the hospital more than 5 days was high in expectant management (54.05%) than in active management (45.95%). Maternal puerperium, tachycardia and foul smelling vaginal discharge were not present in the both the groups. Fever was noted in one patient in expectant and two in active management group (Table 2). Abruptio placenta was noted in one case in expectant management. The duration of mother hospitalization and post-operative complications like fever, abruption placenta were not statistically associated with active and expectant management($p>0.05$)

Duration of hospitalisation of baby was significant between treatment group in 32-34 weeks ($p<0.03$). But it was not statistically significant in 34-36 weeks group. LBW was significant in 34-36 weeks group between two management group ($p<0.001$). Remaining other indicators were not significant between treatment group in both preterm group(Table 3).

Discussion

Among the participants studied for preterm premature rupture of membranes over a period of one year has shown that the incidence of PPROM is more common in younger age group of 20-25 years (57%) and less in > 30 years

(5%). The same results were noted in study by shehla et al where the incidence of PPROM in women < 25 years was 58.8%.[4]Around 85% of patients in both groups are admitted within 24 hours of membrane rupture in the study. In PPROM , most of the patients goes into labour within few hours. In PPROM labour generally occurs within 24 hours 1n 35-50 % , within 72 hours in 70 %, and 90% of patients will deliver within two weeks(Daftary et al).[5] In the present study, in expectant group out of the 53 patients 19 patients (35.84%) were delivered within 24 hours and 10 (18 %) patients have the latency period of > 48 hours . A study by Neerhof et al shows that only 10% of the women managed expectantly had latency period greater than 48 hours.[6] In active management group, about 52 (94%) of patients delivered within 24 hours . This is due to the augmentation of labour by oxytocin and PGE_2 gel in active management group.

The incidence of chorioamnionitis is 5.6% (3 patients) in conservative group and none in active group whereas the incidence of chorioamnionitis is 2% in active group and 16% in expectant group in the study by Naef et al.[7] The decrease in incidence was probably due to prophylactic antibiotics usage.

The mean duration of hospitalisation in active management group is 3.61 in labour natural and 7.67 in LSCS whereas in expectant group is 5.14 in labour natural and 10.44 in LSCS. The duration of hospitalisation is prolonged in expectant group in our study which is due to prolonged latency period. Mercer et al also reported prolonged hospitalisation of mothers in expectant group managed between 32 to 36 weeks.[8] There was one (1.8%) reported case of abruption and one (1.8%) case of puerperal fever in expectant group. There was no reported case of puerperal sepsis or post-partum endometritis.

The incidence of high vaginal swab culture in active management was 7.2% and 20% in expectant management however this difference was not statistically significant. But separate case control studies can be conducted to know the high incidence in expectant management group. These culture positive patients were treated with antibiotics according to antibiotic sensitivity test results.

The mean duration of hospitalisation of new born was 7.10 days in active management and in expectant management 8.49 days which is statistically significant. In the study by Naef et al, shows that there is no significant difference in hospital stay in both groups.[7] The incidence of RDS was high in active (73.90%) than in expectant management(26.10%) whereas the incidence of sepsis is 80% in expectant and 20% in active management. The incidence of Low birth weight is 70.59% in expectant group whereas it is 29.41% in active group which is not statistically significant. Even though there is increased incidence of hospitalisation in both the groups there was no neonatal mortality. This is due to the early detection of the complications and timely intervention and appropriate treatment.

In the present study in 32 to 33 weeks 6 days group 7 patients (33.33%) were put in active group and 14 patients (66.66%) were put in expectant management. About 22.22% and 77.77% were delivered within 48 hours in active and expectant management respectively which is statistically significant. The maximum admission –delivery in this group was 128 hours. There was only one reported case of chorioamnionitis in expectant management. In 34 to 36 weeks 6 days also the admission – delivery interval in both modes management were statistically significant. In the view of admission –delivery interval in both the groups expectant management is the suggested method in 32 to 33 weeks 6 days group and active management is the suggested method in 34 to 36 weeks 6 days group. The mode of delivery, duration of hospitalisation the incidence of fever

and abruptio placenta was not statistically significant in both the groups.

In the analysis of admitted babies the duration of hospitalisation of newborn for more than 5 days were 26.3 % and 74.7% in active and expectant management in 32 to 33 weeks 6 days group which is statistically significant. Whereas the duration of newborn hospitalisation in 34 to 36 weeks 6 days group in both modes of management is not statistically significant. The incidence of RDS was 83.3% in active and 16.7% in expectant group in 34 to 36 weeks 6 which is statistically significant whereas in 34 to 36 weeks 6 days group RDS incidence was 70.6% and 29 .4% in active and expectant group which is not statistically significant. The incidence of sepsis, prematurity and other neonatal complications in both the groups and both modes of management were not statistically significant. Overall there is increased adverse outcomes were noted in active management in 32 to 33 weeks 6 days. However in 34 to 36 weeks 6 days there was no significant hospitalisation and the neonatal outcome in both mode of management were similar .So when considering the maternal factors in active and expectant management in this group ,there is no added advantage of expectant management in 34 to 36 weeks 6 days in this study.

Conclusion

The management of PPROM depends upon the time of admission after MRO, clinical condition of fetus and mother and the gestational age of the mother. The delay in mother admission after MRO increases the chances of complication in mother and baby. Usually the increased time duration between MRO and admission leads to active line of management.

Expectant management is best management for MRO with mother's gestational age of 32-33weeks 6 days and active line of management is for 34-36 weeks 6 days. Apart from this, the mode of management should be decided by the clinical condition of fetus in due course. The active line of management would be preferred in the view of reducing further complication of the baby. Also conversion from expectant to active management is also preferred in such cases. This will reduce the hospitalisation of baby and reduce the complication. So better 'Rooming in" is possible. The respiratory distress syndrome, LBW and sepsis are major complication of MRO in preterm babies and the complication to mother is less evident.

Case control studies may be suggested to find out the causes for PPROM. So it provides chances to prevent PPROM in future.

Conflict of Interest: None

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New Perspectives

Surveillance for Middle East Respiratory Syndrome – Coronavirus (MERS-CoV)

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Introduction:

Coronaviruses are a large group of viruses that cause illnesses in humans and animals. In humans the illness ranges from common cold to the Severe Acute Respiratory Syndrome (SARS).

Middle East Respiratory Syndrome (MERS) is a viral respiratory illness caused by Coronavirus and the acronym is MERS-CoV. This virus was first identified in Saudi Arabia in 2012 and this corona virus is different from other corona virus infections found among people in the past.

Most people who have been confirmed to have MERS-CoV infection developed severe acute respiratory illness. They had fever, cough and shortness of breath. About 30% of people confirmed to have MERS-CoV infection have died.

The origin of this virus type is not known for sure, but it is likely to have originated in animal. MERS-CoV in addition to humans has also been identified in camels in Egypt, Oman, Saudi Arabia and Qatar and among bats in Saudi Arabia. Camels as the source of origin of this virus has been strongly suspected because camels have tested positive for MERS-CoV antibodies or closely related virus in many other countries. The role of camel, bats and/or other animals in transmission to infection to humans is unclear.

So far, all the cases have been linked to countries in and near the Arabian Peninsula. This virus has spread from ill people to others through close contact, such as caring for or living with an infected person. However, there

is no evidence of sustained spreading in community settings.

Countries with confirmed cases

- Saudi Arabia
- United Arab Emirates (UAE)
- Qatar
- Oman
- Jordan
- Kuwait
- Yemen
- Lebanon
- Iran

Countries with Travel-associated Cases

- United Kingdom (UK)
- France
- Tunisia
- Italy
- Malaysia
- Philippines
- Greece
- Egypt
- United States of America (USA)
- Netherlands
- Algeria

Preparedness:

The health professionals should be prepared to detect people potentially infected with MERS-CoV. Since MERS-CoV continues to evolve and information about modes of transmission and clinical presentation is limited, currently detection is based on clinical judgment.

Clinical presentation:

MERS-CoV infection may be asymptomatic or present as acute upper respiratory illness, and rapidly progressive pneumonitis, respiratory failure, septic shock and multi-organ failure resulting in death. Most MERS-CoV cases have been reported in all age groups, more common among males and common people with chronic co-morbidities. Among confirmed MERS-CoV cases, the case fatality was 28-30%.

The clinical presentations at the time of admission to hospital were fever, chills/rigors, headache, non-productive cough, dyspnea, and myalgia. Associated typical symptoms were sore throat, coryza, sputum production, dizziness, nausea and vomiting, diarrhoea, and abdominal pain. Atypical symptoms included mild respiratory illness without fever and diarrhoea before the onset of pneumonia. Patients with febrile upper respiratory tract illness with rapid progression to pneumonia required admission in an intensive care unit (ICU).

Clinical course:

The human to human transmission was limited and the median incubation period for secondary cases was approximately 5 days (range 2-13 days). The median time for hospitalization from the onset of illness was approximately 4 days; median time from hospitalization to admission to ICU was approximately 5 days and median time from onset of illness to death was approximately 12 days. MERS-CoV may progress rapidly to acute respiratory failure, acute respiratory distress syndrome (ARDS), refractory hypoxemia and extra pulmonary complications (like acute kidney injury requiring renal replacement therapy, hypotension requiring vasopressors, hepatic inflammation and septic shock).

Investigations:

To increase the chance of infection detection, multiple specimen collections from different sites at different times is suggested. The specimens are tested by MERS-CoV rRT-PCR assay and serological assay. The laboratory findings on admission may include leukopenia, lymphopenia, thrombocytopenia, and elevated lactate dehydrogenase levels. Viral can be detected in the lower respiratory tract and can also be isolated from feces, serum, and urine. The duration of shedding of the virus from pulmonary and extra pulmonary sites is unclear.

Chest radiographic may show unilateral or bilateral patchy densities or opacities, interstitial infiltrates, consolidation, and pleural effusions. The infection is more common in the lower respiratory tract compared to the upper respiratory tract.

Case definitions:

1. Patient under investigation (PUI): Any person with either, fever with pneumonia or acute respiratory distress syndrome (based on clinical or radiological evidence) with history of travel (or in close contact with a symptomatic traveler) to countries in or near the Arabian Peninsula who developed fever and acute respiratory illness within 14 days of travel OR a patients with severe acute respiratory illness of unknown etiology under evaluation OR visiting/admitted in a health care facility were cases of MERS have been identified.

2. Confirmed case: A confirmed case is a person with laboratory confirmation of MERS-CoV infection. Confirmatory laboratory testing requires a positive PCR on at least two specific genomic targets or a single positive target with sequencing on a second.

3. Probable case: A probable case is a PUI with absent or inconclusive laboratory results for MERS-CoV infection and who is a close contact of a laboratory-confirmed MERS-CoV case. Probable case can also be a case where the laboratory results are considered inconclusive i.e., include a positive test on a single PCR target, a positive test with an assay that has limited performance data available, or a negative test on an inadequate specimen.

4. Contact under investigation of a confirmed case of MERS: A person with fever or symptoms of respiratory illness within 14 days following close contact with a confirmed case of MERS.

Prevention and management:

Prevention:

No specific treatment for MERS-CoV infection is currently available. Clinical management includes supportive management for complications and implementation of recommended infection prevention and control measures. Standard, contact airborne precautions are recommended for management of hospitalized patients with known or suspected MERS-CoV infection and additional prevention mechanism for other co-infections. The universal precautions in the form of personal protective equipment (PPE), source control (i.e., placing a facemask on potentially infected patients and isolation) and standard environmental infection control measures are applicable as per standard protocal.

Key recommendations for prevention of MERS-CoV transmission:

1. The case must be isolated preferably in an Airborne Infection Isolation Room (AIIR) or in an single patient isolated room and provided with face mask and the room door should be kept closed.

2. The movement of the patient, attenders and the health care staff to this room must be restricted.

3. All medical and laboratory procedure should be completed in the isolated room and health professionals should adopt universal precautions. The disposable personal protective equipments (PPEs) should be discarded and reusable PPEs should be cleaned and disinfected. Hand hygiene should be strictly followed.

4. Environmental disinfection (surfaces, instruments, linen, dishware and food utensils) should be as per the country/hospital guidelines or as per manufacturer's instructions.

5. Currently the duration of isolation is based on clinical improvement and determined by case-to-case basis.

6. The movement of visitors should be restricted; visitors should be provided and use PPEs during the visit to isolation room and should not be present during aerosol generation procedure. The movement of the visitors within the hospital should also be restricted to prevent transmission of infection to other patients and attenders in the hospital.

Management:

1. Supplementary oxygen therapy, oxygen therapy should be initiated at 5 L/min and maintain SpO2 > 90%.

2. Serial respiratory collection from multiple sites and on multiple days (2-3) may help detect viral shedding. Respiratory and other specimens should be tested by reverse transcriptase polymerase chain reaction (RT-PCR).

3. Empirical antibiotic to treat suspected pathogens or community acquired pathogen (based on local epidemic) until diagnosis is confirmed.

4. Fluid management should be based on the existing condition of the patient (presence or absence of shock) to prevent worsening of oxygenation.

5. Avoid high dose corticosteroids and adjunct treatment for viral pneumonia unless recommended.

6. Monitor the patient to detect deterioration which indicates the need for endotracheal intubation and mechanical ventilation.

7. Recognize septic shock (SBP < 90 mmHg and blood lactate concentration > 4 mmol/L) should be managed as per protocol.

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Original Research Article

A study on oral diseases among Diabetic patients in a tertiary care Hospital

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Abstract

Introduction: Diabetes is emerging as one of the major problems in India. Periodontal disease has been cited as the sixth complication of Diabetes Mellitus. This study intends to determine the burden of oral diseases in diabetes patients and to find out the correlation of periodontitis with diabetes duration and control status. **Materials and methods**: A cross sectional study was conducted among 100 outpatients attending diabetic clinic of a tertiary care hospital using a questionnaire to find out about diabetes duration, control status, presence of oral and dental problems. Data entry and analysis was done using SPSS version.11. **Results**: Of the subjects only 29% had their blood sugar under control. 42% had periodontitis. Half of them had caries tooth and 40% had dental problems. Subjects with prolonged duration of diabetes had a higher percentage of periodontitis. **Conclusion**: Dental complications is a problem among diabetes patients which needs more attention and patient education for regular follow up.

Key words: Diabetes, oral diseases, periodontitis

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Introduction

The global prevalence of diabetes is estimated to increase from 4% in 1995 to 5.4% by the year 2025. The World Health Organization has predicted that there will be a 42% increase (from 51 to 72 million) in the developed countries and 170% increase (from 84 to 228 million) in the developing countries. The countries with the largest number of diabetes patients are, and will be in the year 2025, India, China and United States. The number of diabetes patients in India currently around 40.9 million is expected to rise to 80 million by 2030[(1)]. Indians are also susceptible to the major complications related to diabetes like coronary artery disease, neuropathy, nephropathy and retinopathy which are evidenced by many studies [(1, 2)]. In recent years, there has been an

emerging interest in the link between periodontal disease and systemic conditions. Periodontal disease has been cited as the sixth complication of Diabetes Mellitus (DM). Both epidemiological studies and case reports have shown diabetes to be a major risk factor for periodontitis. Periodontitis has been found to be more prevalent and more severe in patients with diabetes than the normal population. Other oral complications have been reported in patients with diabetes, such as caries, xerostomia, and mucosal lesions [(3)]. Research suggests that glycemic control (blood sugar level) seems to be very important in determining susceptibility to periodontal disease. Individuals with good diabetes control A1C < 7 have a reduced risk of periodontal disease compared to individuals with an A1C > 8.5 [(4)].This study intends to determine the burden of oral diseases in diabetes patients and to find out the correlation of periodontitis with diabetes duration and control status.

Subjects and Methods

A cross sectional study was conducted among outpatients attending diabetic clinic of a tertiary care hospital for a period of two months from July – September 2011. A total of 100 subjects were included considering 50% prevalence of periodontitis[(5)] and absolute error of 10%. Subjects were chosen by convenient sampling. Ethical clearance was obtained from the Institutional Human Ethics Committee and informed consent obtained from the subjects. A questionnaire was used to obtain background information, history of smoking and alcohol consumption. Patients' records were reviewed to obtain blood sugar values in the previous months and for getting information on diabetic complications. Diabetic control status was inferred from glycosylated haemoglobin (HbA1C) levels in the absence of which the average of previous three months' readings was taken. Diagnosis of oral diseases like caries, candidiasis, gingivitis and periodontitis was based on signs and symptoms. Caries was diagnosed by the presence of brown or black discolouration of tooth or cavities with sensitivity to hot or cold food. Candidiasis was identified with presence of yellowish white mucosal patches on the tongue or hard palate or erythematous tongue with rounded or ovoid depapillated area or angular chelitis. Periodontitis was diagnosed by presence of swollen and inflamed gums or receding root of tooth or mobile tooth.[(6,7)]

Statistical analysis:

Statistical analysis was done using SPSS version 11. Prevalence of oral manifestations in diabetes is presented in percentage. The association between diabetes control status and the
oral manifestations was found out using Chi square test

Results

Out of the 100 participants in the study 46 were males and 54 were females. Their age ranged

Table.1. Percentage of subjects with Micro and macro vascular complications (n = 100)

Complications	Percentage
Microvascular complications	
Periodontitis	42
Neuropathy	50
Nephropathy	10
Retinopathy	3
Macrovascular complications	
Coronary artery disease	7
Stroke	1

Table.2. Percentage of subjects with other dental and oral cavity problems (n = 100)

Dental problems	Percentage
Caries	50
Dry mouth	40
Burning of mouth	2
Halitosis	2
Candidiasis	1

from 30 to 83 years. The duration of diabetes ranged from 1 month to 25 years. Most of them (96%) were type 2 diabetics. Co morbid conditions like hypertension was present in 31% of the participants and 16% had dyslipidemia. Smoking and alcohol consumptions was found in 9% and 7% respectively. Of the subjects only 29% had their blood sugar under control.

Table.1 shows the number of participants with micro and macrovascular complications. Periodontitis was found to be the most common complication next to neuropathy.

Table. 3. Association between diabetes control, duration and periodontitis

Parameter	Percentag th odontitis	Chi square	p value
Duration of diabetes			
Upto 5 years	36	1.5	0.2*
More than 5 years	48.8		
Diabetes control status			
Controlled	48.2	0.6	0.5*
Unc ontrolled	39.4		

**Not statistically significant*

Table.2 shows percentage of subjects with other dental and oral cavity problems. Caries and dry mouth were the most common dental problems apart from periodontitis.

Table. 3shows association between diabetes control, duration and periodontitis . Though not statisitically significant the frequency of periodontitis was higher (48.8%) among subjects with longer duration of diabetes.

Discussion

Diabetes mellitus is a chronic metabolic disease causing oral disease progression. In our study emphasis is placed on establishing a relationship between diabetes and oral diseases. Our study showed diabetics having an increased risk of developing oral diseases.

The most common oral manifestation was caries with 50% of the study population being affected. Several studies reveal a higher association of diabetes with dental caries[8,9]. According to Lamster et al a clear association between diabetes and caries could not be made out. It was noted that diabetics are prone to oral sensory, periodontal and salivary disorders, which could increase the risk of developing new and recurrent dental caries[6]. The incidence dry mouth (40%) was also high. Lamster et al and Moore et al found that diabetics reported of dry mouth more frequently than non diabetics[6,9]. Salivary flow rate was impaired in diabetics. Of the diabetic complications only neuropathy was found to be associated with dry mouth and xerostomia. Salivary flow could be affected due to varied reasons like usage of prescribed medications, increasing age and the subjective feeling of dryness due to thirst. Though no definitive association could be made between salivary flow and diabetes, this complication was observed in diabetics [9].

The other oral diseases which were not frequently found were burning sensation in the mouth, halitosis and candidiasis. One study showed oral candidiasis to be a consistent finding in diabetics which could be attributed to the decreased salivary flow or immunocompromised state[6]. According to Quirino et al the incidence of candidiasis in diabetics was low. The association between oral candidiasis and diabetes was found to be controversial needing better evaluation[7].

The association between duration of diabetes and periodontitis was studied. Though not statistically significant, periodontitis was found to be more prevalent in diabetics with duration of disease more than 5 years. Several studies reported periodontitis to be more prevalent and severe in diabetic patients when compared to their non-diabetic counterparts [3,6]. The severity of periodontitis increased with age. Patients with type 1 diabetes mellitus who had a longer duration of the disease were found to have more loss of attachment of teeth. Extensive periodontal disease was observed in patients with longer duration of diabetes mellitus. The duration of diabetes mellitus adversely affected the severity of periodontitis[3].

In our study a definitive association between periodontitis and glycemic control could not be made out. Most studies revealed a poor glycemic control to be associated with greater periodontal breakdown [3,10]. The risk of poor glycemic control was greater in diabetics with severe periodontitis when compared to those who did not have severe periodontitis[11]. In a literature review, Taylor and Borgnakke investigated the influence of periodontitis on glycemic control. Periodontitis was found to adversely affect the glycaemic control in diabetics. Periodontal therapy was found to improve the glycemic control by reducing the HbA1C levels[11].

Conclusion:

Oral problems especially periodontitis is a common complication among diabetics. It was also revealed that more number of subjects with prolonged diabetes had periodontitis. Hence oral and dental problems should be seriously addressed among diabetic patients and awareness created for periodic checkups.

Conflict of interest: Nil

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Short Article

Are future doctors aware of hazards of global warming? A cross-sectional study among medical students regarding perception of global warming

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Abstract

Introduction: We are witnessing a more frequent occurrence of extreme-weather events like heat waves, droughts and heavy rainfall due to global warming. Effects detrimental to humans include the threat to food security from decreasing crop yields and the loss of habitat from inundation. Climate change has emerged as one of the most devastating environmental threat. The present study was conducted with the objective to assess the awareness regarding global warming and its health hazards among the medical students and to know the attitude and practice regarding global warming among the medical students.**Materials and methods**: The present observational study was conducted on 1st and 2nd year MBBS students. Clearance from the ethical clearance committee was first obtained. A self-administered, pre-tested, questionnaire was used. The purpose of the study and all the terms used in this study were explained to the respondents and confidentiality was maintained. **Results:** .255(90.43%) students commented that global climate is changing while 221 (78.37%) students have opined that human activities are contributing to climate change. 79 (28.01%) students were aware about the meaning of green house gases. 181 (64.18%) students suggested that 3R (Reduce, Recycle and Reuse) can reduce green house gases. Among practices regarding global warming, 165 (58.51%) students does unplug the charger of mobile or laptop etc. when not using. 178 (63.12%) students do turn off the light while leaving room. 144(51.06%) students always have share vehicle with friends and relatives when going to same destination.**Conclusion**: In this study, majority of the students commented that global warming is changing and human activities are responsible for it. The awareness regarding important agencies and protocol in the field of climate change was found to be poor. It is suggested that a large nation-wide awareness survey regarding climate change and its health hazards is necessary to determine the preparedness of medical students and also to suggest any changes in the current curriculum.

Key words:hazards,global warming,medical students

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Introduction

We are witnessing a more frequent occurrence of extreme-weather events like heat waves, droughts and heavy rainfall due to global warming. Effects detrimental to humans include the threat to food security from decreasing crop yields and the loss of habitat from inundation. [1]

Warming refers to an average increase in the earth's temperature, which in turn causes changes in climate. A warm earth may lead to changes in rainfall patterns, a rise in sea level, and a wide range of impacts on plants, wildlife and humans. Global Warming is an increase in

the earth's average temperature. The Green house gases are the main culprits of the Global Warming. The green house gases like carbon dioxide, methane, and nitrous oxide are playing hazards in the present times. These green house gases trap heat in earth's atmosphere and thus result in increasing the temperature of earth.[2]Climate change has emerged as one of the most devastating environmental threat. The United Nation's Intergovernmental Panel on Climate Change (IPCC) stated that there is overwhelming evidence that humans are affecting the global climate and highlighted a wide range of implications for human health.[3]

The future health hazards of climate change are well documented, with forecasts made of increasing health problems caused by heat waves, storms, floods, fires, droughts, and infectious diseases. It is also predicted that climate change will have detrimental effects on agriculture and fisheries and may even result in collapsing ecosystems. [4] Parties to the UNFCCC have agreed that deep cuts in emissions are required, and that future global warming should be limited to below 2.0 °C (3.6 °F) relative to the pre-industrial level. [5] Future risks of pathogens and chemicals could therefore be very different than today, so it is important that we begin to assess the implications of climate change for changes in human exposures to pathogens and chemicals and the subsequent health hazards in the near term and in the future. [6]

The climate change was estimated to be responsible in 2000 for approximately 2.4% of worldwide diarrhea and 6% of malaria in some middle-income countries and was estimated to have caused 150,000 deaths and 5.5 million DALYS in the year 2000. This topic is emerging as a major theme in population health research, social policy development, and advocacy. As

health systems are labor-intensive; they require qualified and experienced staff. [7] In response to this important issue, this study was conducted to determine the awareness of medical students.

The study was conducted with the objective to assess the awareness regarding global warming and its health hazards among the medical students and to know the attitude and practice regarding global warming among them.

Materials and Methods

The present study was conducted on 1st and 2nd year MBBS students. Clearance from the ethical clearance committee was first obtained. A self-administered, pre-tested, questionnaire was used. The purpose of the study and all the terms used in this study were explained to the respondents and confidentiality was maintained. The data were analyzed by using proportions and percentage was used.

Results

A total of 282 medical students were included in this study, of which 154 (54.61%) were females and 128(45.39%) were males . 255(90.43%) students commented that global climate is changing while 221 (78.37%) students have opined that human activities are contributing to climate change. 79 (28.01%) students were

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Table 1: Awareness regarding global warming among the medical students

Awareness	Number(%)
Global climate is changing	255(90.43%)
It increase temperature on earth surface	171(60.64%)
Human activities are contributing to climate change	221(78.37%)
Global warming effects on extreme weather	176(62.41%)
Knowledge about green gas	79(28.01%)
Knowledge about 3R(reduce,recycle ,reuse)	181(64.18%)
Knowledge about ozone depletion	159(56.38%)
Knowledge about health hazards	168(59.57%)
Knowledge about deforestation	173(61.35%)

aware about the meaning of green house gases. 181 (64.18%) students suggested that 3R (Reduce, Recycle and Reuse) can reduce green house gases. 159 (56.38%) students were aware about the meaning of ozone depletion. They revealed that deficiency of ozone layer of atmosphere called as ozone depletion.230 (57.50 %) students were aware about the harmful effects of ozone depletion. They revealed that it increase incidence of skin cancer and cataract.

Among practices regarding global warming, 165 (58.51%) students does unplug the charger

Table 2: Practices regarding global warming among the medical students

Practices	Number(%)
Unplug the charger of mobile or laptop when not using	165(58.51%)
Turn off the light while leaving room	178(63.12%)
Avoid plastic polythene bag while shopping	149(52.84%)
Threw organic and inorganic waste products in separate dust bin	158(56.03%)
Share vehicle with friends and relatives when going to same destination	144(51.06%)
Use back size of pamphlet and leaflet	97(34.39%)
Students donate their old books to library	64(22.69%)
Reduce use of paper plate and tissue paper during party	79(28.01%)
Used bucket of water for bathing instead of using shower	86(30.49%)

of mobile or laptop etc. when not using. 178 (63.12%) students do turn off the light while leaving room. 144(51.06%) students always have share vehicle with friends and relatives when going to same destination. 64 (22.69%) students do donate their old books and magazine to public library. 97 (34.39%) used back side of pamphlet and leaflet. 79 (28.01%) reduce use of paper plate and tissue paper when hold a party. 86(30.49%) used bucket of water for bathing instead of using shower.

Discussion

In this study a total of 282 medical students were included, out of which 128(45.39%) were males and 154(54.61%) were females. 255 (90.43%) students commented that global climate is changing while 221 (78.37%) students have opined that human activities are contributing to climate change. Similar findings were reported by Pandev HT and Atul R [8] , 246 (98.40%) students commented that global climate is changing, while 245 (98%) medical students opined that human activities are contributing to climate change.In a study done by Majra JP and Acharya D [7], 113 (87.00%) were aware that there is a climate change.

In the present study, 79 (28.01%) students were aware about the meaning of green house gases.. 181(64.18%) students suggested that 3R (Reduce, Recycle and Reuse) can reduce green house gases. 159 (56.38%) students were aware about the meaning of ozone depletion. They revealed that deficiency of ozone layer of atmosphere called as ozone depletion. Warming of the climate system is unequivocal, and scientists are more than 90% certain that it is primarily caused by increasing concentrations of greenhouse gases produced by human activities such as the burning of fossil fuels and deforestation.

The effects of an increase in global temperature include a rise in sea levels and a change in the amount and pattern of precipitation, as well a probable expansion of subtropical deserts.

In a study conducted by Pandve et al. [9] suggested that (65.10%) of the students, natural disaster-related health hazards (43.50%), waterborne diseases (27.60%), vector-borne diseases (17.60%), and malnutrition (10%); 77.60% of the students reported that health related events are not the same in all the places. In another study by Majra and Acharya, [7] revealed that most of the respondents (122, 94%) were aware of the direct health hazards. In our study, 173 (61.35%) of the students commented that deforestation (cutting down forest) contributes most significantly toward climate change. 125 (31.25%) students commented that industrial pollution contributes to climate change.A study , conducted by Pandve et al. [9] revealed that 77.10% of the students commented that deforestation and 62% commented that industrial pollution contributes to climate change.In the study done by Majra JP and Acharya D,[7] majority of the respondents were aware of the various human activities, such as the ever increasing population (85%),and industrialization (88%), urbanization (92%), deforestation (92%), increase in international trade or travel (85%), and our increasing dependence on carbon-based energy, such as fossil fuels (88%), which contribute to the climate change.

Conclusion

In this study, majority of the students commented that global warming is changing and human activities are responsible for it. The awareness regarding important agencies and protocol in the field of climate change was found to be poor. The awareness regarding

green house gases, 3R and effects of ozone depletion was found to be poor. Students had awareness regarding health hazards of the climate change, but improvement for mitigation is required. It is suggested that a large nation-wide awareness survey regarding climate change and its health hazards is necessary to determine the preparedness of medical students and also to suggest any changes in the current curriculum.

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