APPENDIX

MANAGEMENT OF BIO-MEDICAL WASTE IN HOSPITALS: WITH SPECIAL REFERENCE TO CHITTOOR DISTRICT

<table>
<thead>
<tr>
<th>Research Supervisor :</th>
<th>Research Investigator :</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof.D.V.Ramana</td>
<td>G.Latha</td>
</tr>
<tr>
<td>Professor</td>
<td>Research Scholar</td>
</tr>
<tr>
<td>Department of Business Management</td>
<td>Department of Business Management</td>
</tr>
<tr>
<td>Sri Venkateswara University</td>
<td>Sri Venkateswara University</td>
</tr>
<tr>
<td>Tirupati</td>
<td>Tirupati</td>
</tr>
</tbody>
</table>

INSTRUCTIONS

The present study is undertaken with a view to ascertain the extent to which the hospitals have designed waste management practices that facilitate to the society. The questionnaire consists of questions that require the respondent to write answers or tick mark in parentheses or circle a number that correspond the response.

*We request you to kindly fill in and return the questionnaire completed in all aspects.*
SURVEY QUESTIONNAIRE FOR HOSPITAL WASTE MANAGEMENT

Part - I

SECTION – A IDENTIFICATION DATA

1. Type of Hospital
[ ] Private [ ] Government

2. Place of the hospitals
[ ] Chandragiri [ ] kalikiri [ ] Madanapalli [ ] Pakala
[ ] Piler [ ] Puttur [ ] Vayalpadu [ ] Chittoor
[ ] Kuppam [ ] Nagiri [ ] Palamaner [ ] Punganur
[ ] Srikalahasti [ ] V.Kota [ ] Tirupati

3. Category of hospital
[ ] Gen [ ] Sur [ ] Ped [ ] Car [ ] Ent [ ] Gyn
[ ] Dia [ ] Ortho [ ] Psy [ ] Neuro [ ] Urol [ ] Others

4. Total number of Bed capacity in hospital
[ ] 1-10 [ ] 11-20 [ ] 21-30 [ ] 31-40
[ ] 41-50 [ ] 51 and Above

5. Bed Occupancy per day (in %) ____________ in hospital
[ ] Below 41 [ ] 41-60 [ ] 61-80 [ ] Above 80%

6. Amount of hospital waste generated ___________grams/day/bed
[ ] Up to 200 [ ] 201 - 400 [ ] 401 - 600 [ ] Above 600

7. How many waste handling workers are there in your hospital? ____________
[ ] 1 - 5 [ ] 6 - 10 [ ] 11 - 15
[ ] 16 - 20 [ ] 21 and above

8. How much cost do you pay per bed for Common Bio-Medical Waste Treatment Facility (CBMWTF) in Rs.?
[ ] Rs.3 [ ] Rs.4 - 8 [ ] Rs. 9 - 10 [ ] Rs.11 - 15
9. Are the following segregation methods practiced in your hospital? Place a tick under the corresponding response to indicate your answer.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Segregation Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>In my hospital segregation of Bio Medical Waste will be done at source of waste generation</td>
</tr>
<tr>
<td>2.</td>
<td>Using of colour coding bins are taken seriously for collection of Bio Medical Waste in my hospital</td>
</tr>
<tr>
<td>3.</td>
<td>My hospital encourages use of puncture proof containers for temporary storage and transportation</td>
</tr>
<tr>
<td>4.</td>
<td>In my hospital there would be separation of sharp waste from non sharp waste</td>
</tr>
</tbody>
</table>
SECTION – C : TREATMENT AND DISPOSAL TECHNIQUES EMPLOYED BY THE HOSPITAL

10. Are the following Treatment facilities practiced in your hospital?

Place a tick under the corresponding response to indicate your answer.

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Treatment facility</th>
<th>Never</th>
<th>Occasionally</th>
<th>Sometimes</th>
<th>Often</th>
<th>Regularly</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>My hospital will send Bio Medical Waste to Common Bio Medical Waste Treatment Facility which is located at Pachhipalam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>My hospital is using inhouse Incinerator facility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>My hospital is using inhouse Autoclave facility</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>4.</td>
<td>My hospital is using inhouse Shredder facility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>My hospital is using inhouse Pyrolysis unit facility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>My hospital is using inhouse Needle burner facility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>My hospital is using inhouse Chemical disinfection facility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>My hospital is using inhouse landfill facility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>My hospital is releasing microbial waste into public drains or gutters without treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### SECTION – D : Waste handling safety measures

11. Are the following safety measures in waste handling practiced in your hospital?

Place a tick under the corresponding response to indicate your answer.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Safety measures</th>
<th>Never</th>
<th>Occasionally</th>
<th>Sometimes</th>
<th>Often</th>
<th>Regularly</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>My hospital is providing protective gears for waste handling workers (Glove, Gown, Mask)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>In my hospital workers are using trollys for transportation of Bio Medical Waste from source to dumpyard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>In my hospital workers are using vehicles for transportation of Bio Medical Waste from source to dumpyard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>In my hospital waste handling workers may get injury while handling sharp waste</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>In my hospital staff will wash their hands with only water after working with waste</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>In my hospital staff will wash their hands with water and soap after working with waste</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>In my hospital staff will wash their hands with water and alcoholic gels after working with waste</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>In my hospital there will be spillages while transporting Bio Medical Waste to dumpyard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SECTION – E : Administration

12. Do you have separate department for hospital waste management?
[ ] Yes [ ] No

13. Are your staff trained properly to segregate hospital waste?
[ ] Fully trained [ ] Partially trained [ ] Not trained

14. What is the time interval of waste collection by CBMWTF?
[ ] Everyday [ ] Once in two days [ ] Twice in a week
[ ] Once in a week [ ] More than a week
I. List of Research Papers Published


II. List of thesis related Research Papers presented at International Conferences/Symposia


This Hereby Certifies that

Gaddapara Latha

Attended the
9th International Conference on Urban Health
October 27-29, 2010
1.68 Decentralisation of Healthcare Services in Republic of Macedonia – A Way Forward or an Inequity Trap?
Macedonia
Osebe, Z. 1
"Faculty of Medicine, Department of Social Medicine, Faculty of Medicine, University of散
the Former Yugoslav Republic of

1.69 Urban Renewal and Household Livelihood Security in Metropolitan Lagos
Adeyemi E.O. 1
Lagos State University, Sociology, Lagos, Nigeria

1.70 Ward-level, Multi-stakeholder Coordination Model for Improved Health and Nutrition Services to the Urban Poor
Jhia P.K., Urban Health Resource Center, Indore, India

1.71 Establishment of Referral Channel for the Emergency Management of Postpartum Hemorrhage Cases with a Low-tech, Life-saving Package
Nether D.T.E. 1
Hadie M.D.M.

1.72 Sexual Health among the Homeless
Shastri T.C. 1
Clarkson A.F., Li K.H., Kratzig M.
University of British Columbia, Psychiatry, Vancouver, Canada

1.73 Individual, Environmental, and Cultural Factors Affecting Illicit Drug Use among Latino Migrant Workers in New Orleans
Sheedlin M. 1
Kovacs S.D., Schwartz N., Salivas J., Hemming J., Anderson-Smith C., Kissinger P.
New York University College of Nursing, New York, United States

1.74 Reductions in the Prevalence and Incidence of Geohelminth Infections Following a City-wide Sanitation Program in a Cameroonian Urban Centre
Tilahun Kube M., Kuniku M.G., Warriham J.N.
University of Nkola, Cameron, Health Science Programmes, Cameroon, Faculty of Medicine, Yaounde City, Cameroon

WATER SANITATION

PS3.75 Medical Waste Management Practices in Lagos, Nigeria
Soledo A. 1
Lagos State University, Geography, Planning, Ojo, Nigeria

PS3.76 Urban Health Challenges of Industrial Waste Disposal in Ijebu Industrial Estate, Lagos, Nigeria
Ajala O.A. 1
Odnwali University, Department of Geography, Faculty of Social Sciences, Ile-Ife, Nigeria

PS3.77 Waterborne Health Hazards among Urban Slum Children: A Medical Anthropological Study of Dhaka City in Bangladesh
Talukder M.M.A. 1
Bangladesh University of Engineering and Technology (BUET), Accident Research Institute (ARI), Dhaka, Bangladesh

PS3.78 Knowledge and Practices Related to Sanitation among Urban Communities of Bumbo, Bwunudu, Mbale District
Muguru E. 1
Strawberry University, Business Studies, Kampala, Uganda

PS3.79 A Study of Sanitation Environment in Slums and Prevalence of Diarrhea among Children
Dutta B., Singh C. 1
International Institute for Population Sciences, Population Studies, Mumbai, India

PS3.80 Excreta, Solid Waste Disposal, and Water Supply in Urban Centres in Rakai
Nabatanzi R., Lubinda L., Lubwama R., Mirmbe S.
Environment Awareness Agency, KAA, Kampala, Uganda

PS3.81 Biomedical Waste Management and Health Risk among Healthcare Workers in Sri Venkateswara Institute of Medical Sciences, Tirupati
Latha G., Ramana D. 1
Sri Venkateswara Management Studies, Tirupati, India

PS3.82 Advancing Sustainable Environmental Health in Urban Area of Chittagong
Rashed S.M.A. 1
NID Forum on Drinking Water Supply and Sanitation, Chittagong, Bangladesh
IMPACT OF INNOVATIVE TECHNOLOGIES IN HEALTH CARE WASTE MANAGEMENT IN CHITTOOR DISTRICT OF ANDHRA PRADESH, INDIA.

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Abstract

Health care waste produced in the course of health care activities is receiving greater attention due to recent biomedical waste regulations, 1998. It is estimated that annually 0.33 Million tones of medical waste is generated in India. This poses greatest threat to the human health as well as to the environment due to inappropriate methods of managing the medical wastes. Indian government under Central Pollution Control Board has established Common Biomedical Waste Treatment Facility (CBMWTF) to treat and regulate medical waste. Further the CBMWTF's were given advanced infrastructure to treat the waste. Hence an attempt was made to see the hospital waste generation and management in Chittoor district from different hospitals both from private and government sector.

A comprehensive survey revealed that the number of beds present in private sector hospitals in Chittoor district is 4,189. All the hospitals were registered with CBMWTF located at Pachikapallam for segregation, transportation and treatment of medical waste. Every day 440 Kgs of hospital waste is being treated in the facility. There is a growing interest in alternative technologies for treatment of biomedical waste due to concerns of environmental pollution and management. The present study on CBMWTF reveals segregation methods, management of waste, operational plans and appropriate staff training programmes for the management of hospital waste in Chittoor district.

Key words: Hospital waste, CBMWTF, Regulated medical waste

Introduction

The establishment of health care facility is a basic requirement for every civilized society. During the process of treatment, variety of wastes are produced from the healthcare facilities. When compared to municipal wastes, hospital wastes have greater potential to damage environment as well as health profile of human beings as they contain many infectious materials. If these hospital wastes are not properly treated, all our health care facilities continue to be the breeding places for various disease causing micro organisms. Recognizing the hazardous nature of the hospital waste, the Government of India designed guidelines for proper and safe disposal of waste. Thus, biomedical waste management and handling rule came into existence during 1998, which was formulated by Ministry of Environment and Forest (MOEF), Government of India. The MOEF delegated powers to Central Pollution Control board (CPCB), New Delhi to monitor and to keep up safe and optimum levels of pollution. Common Bio Medical Waste Treatment Facilities (CBMWTF) were established by CPCB, New Delhi, in each district for safe disposal of hospital waste and to treat the infectious waste to reduce ill effects on the human health as well as environment. The treatment was done using
innovative technologies in a cost effective manner. However, there are still pronounced differences in the practical design of disposal systems in India. There is a growing awareness that the enormous volumes of waste is generated in hospitals. Disposing of this waste has become a great challenge and there is a great deal of energy and reusable material in this waste which should not be carelessly discarded and ignored.\(^{16}\) The waste in other way is income generating source for CBMWTF’s. This prompted me to take up a study on hospital waste disposal, segregation and treatment technologies in the entire Chittoor district of Andhra Pradesh. The study also aims to see the viability of modern waste disposal technologies adopted by CBMWTFs in India. An effective and efficient program for the management of health care wastes is a major and critical component for any health care facility and as a result it plays an important role in reduction of hospital borne occupational diseases of the entire staff of the CBMWTF facility.

**Methodology**

The study described here investigated waste handling, segregation, treatment and disposal of hospital waste in Chittoor District of Andhra Pradesh. The data on number of private nursing homes, Government run hospitals and existing beds in each hospital was collected from DM & HO office, Chittoor. The hospitals were categorized into two groups, comprising government run hospitals like Community Health Centers, Area hospitals, District head quarter hospitals, Teaching hospitals and Primary health centers. The other type is private nursing homes and hospitals which were registered with the Government of Andhra pradesh. The data was obtained with full address of each hospital telephone numbers, number of beds registered in Andhra Pradesh Government for the entire Chittoor district. Similarly, the number of different types of government hospitals was obtained from the Andhra Pradesh Vaidya Vidhana Parishad, Hyderabad. Common Biomedical waste treatment facility is a set up where all the biomedical waste generated from entire district will be treated. The information on Common Biomedical Waste treatment facility of Chittoor district was obtained from the A.P. Pollution Control Board, Hyderabad, India. It was established as private company as per industrial laws by name M/s AWN Consulting Ltd., It is located at Pachikapallam village, Vedurukuppam mandal, Chittoor District. The data obtained from A.P.Pollution Control Board was verified by ground truthing by personal visit with a pre designed questionnaire on waste disposal infrastructure and management. Waste management practices in few hospitals along with Sri Venkateswara Ram Narayan Ruia Government General Hospital were examined to confirm the results of the questionnaires. Existing waste disposal practice and treatment was discussed with both the hospital authorities and M/s AWN consulting limited. Basic considerations, such as the health and safety of patients, occupational employees and waste handling workers in CBMWTF’s were also taken into consideration. Thus, besides considering the generation of hospital waste in Chittoor district, the study included the cost analysis of waste treatment, disposal, available innovative treatment technologies and knowledge on ill effects of hospital waste among waste handling workers.

**RESULTS AND DISCUSSION**

A comprehensive survey has been carried out to know the number of both Government and private nursing homes in Chittoor district. Chittoor district of Andhra Pradesh is spread in 15,359 sq kms with 4,170,468 population as
per 2011 census of India. It is located between 12°37' - 14°81 north latitudes and 78°3' - 79°55' east longitudes. The survey revealed that the total number of private nursing homes in Chittoor district is 251, with total 4189 bed strength. Majority of the private hospitals established are General hospitals followed by surgery, pediatric, ophthalmic, diabetic, orthopedic, neurology, urology, gynecology, cardiology and psychiatry. Number of hospitals and beds in each hospital are high in Tirupati town followed by Madnapalli, Chittoor, Srikalahasti, Punganur, Piler and Palamaner, Kalikiri, Pakala, Puttur, Vayalpadu, Kuppam, Nagari and V.Kota. Some of the above said towns have very limited number of private hospitals. (Fig: 1- 4)

<table>
<thead>
<tr>
<th>SL No.</th>
<th>Hospitals</th>
<th>Location</th>
<th>Bed strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>A. Area Hospitals</td>
<td>Madnapalli</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>B. Area Hospitals</td>
<td>Srikalahasti</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>C. Area Hospitals</td>
<td>Nagari</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>D. Area Hospitals</td>
<td>Palamaner</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>E. Area Hospitals</td>
<td>Kuppam</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>F. Area Hospitals</td>
<td>Chandragiri</td>
<td>100</td>
</tr>
<tr>
<td>II</td>
<td>Community health centers</td>
<td>Sanyavedu</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Piler</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Punganur</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chinnagottuallu</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kalikiri</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sadumnu</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vayalpadu</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Puttur</td>
<td>30</td>
</tr>
<tr>
<td>III</td>
<td>District head quarter hospital</td>
<td>Chittoor</td>
<td>300</td>
</tr>
<tr>
<td>IV</td>
<td>Medical education hospital</td>
<td>Tirupati (SVIMS Govt.)</td>
<td>1000</td>
</tr>
<tr>
<td>V</td>
<td>TTD run hospitals (Autonomous</td>
<td>Tirupati</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>hospitals)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Maternity hospitals</td>
<td>Tirupati</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>2. BIRD</td>
<td>Tirupati</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>3. PES medical college, Kuppam</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The government hospitals which come under Vaidya Vidhan Parishad are divided into four major types which are District head quarter hospitals, Area hospitals, Community Health Centers and Primary health centers. Besides hospitals affiliated to Medical colleges like Sri Venkateswara Ram Narayan Ruia Government Hospital. (Table: 1). Bed strength in all Government Hospitals is 2,900 (Table: 1). Based on this, it is clear that the total number of beds registered is 7,089. It is also clear that on an average more than 8,000 kgs/day hospital waste is being generated from Chittoor district.

Observations were made during waste handling process and questions were asked to the staff in-charge regarding the care taken in handling waste. It revealed that few waste handling workers do not know that they are handling with biohazardous materials and if they were careless, it could be infectious to them. Majority of the private nursing homes were not segregating waste as infectious and non-infectious separately according to its characteristics. Whereas hospitals having more than 200 beds like SVIMS and some Government hospitals exactly following waste handling guidelines. The hospitals using color coded high density polythene bags for easy identification and segregation of hospital waste.
infectious waste. Non-infectious waste was collected in black polythene bags, while the infectious waste was collected in red colored bag as per the MOEF guidelines. Both types of wastes were collected daily by CBMWFs from each hospital. The biomedical wastes were not stored for more than 18 hours in the hospitals. Disposal of hospital waste was of two types they are infectious waste which needs treatment with either heat or chemicals using incinerator technology and the other are non infectious waste which need not be treated. Biomedical solid waste comprising human anatomical waste was collected in red bag, sharps and discarded drugs were collected separately in Yellow and blue bags.

Estimation of quantity of medical waste

The quantity of biomedical waste that is to be transported to the CBMWFs by generated is about 81% and remaining 19% is infectious waste. However, 57% of the total quantity of infectious waste is generated from the labor rooms and operation theatres. It was found that about two thirds of total quantity of the waste is generated in different wards.

Common biomedical waste treatment facility

This facility has been established by Andhra Pradesh pollution control board to treat the medical waste generated from entire Chittoor district. The facility was setup and owned by Sri Venkatarao and operated by M/s AWN consulting Ltd. Technical details of the available technologies were given.(Table:2) Advanced incinerator, autoclave, shredder are available in the facility. The incinerated ash was found in a land fill to avoid further contamination to environment. It was observed that the incinerator was working 8 hours per day depending on the power shift. The operating conditions of CBMWF were found to be monitored well with periodic visits by A.P. Pollution Control Board authorities. This facility has been rendering good services since April, 2005 for the entire Chittoor district. However, the transportation facility from hospitals to the CBMWF is inadequate with

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**Table 2: Status Report of CBMWF Located at Pachikapallam**

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Details</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Month and year of establishment</td>
<td>April 2005</td>
</tr>
<tr>
<td>2</td>
<td>No. of health care units covered</td>
<td>229</td>
</tr>
<tr>
<td>3</td>
<td>Waste treatment capacity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Incinerator</td>
<td>115 kgs/hr</td>
</tr>
<tr>
<td></td>
<td>Autoclave</td>
<td>525 lts/cycle (1 hr duration)</td>
</tr>
<tr>
<td></td>
<td>Shredder</td>
<td>40 kgs/hr</td>
</tr>
<tr>
<td>4</td>
<td>Investment for CBMWF</td>
<td>Rs 60,00,000/-</td>
</tr>
<tr>
<td>5</td>
<td>Coverage area</td>
<td>150 kms</td>
</tr>
<tr>
<td>6</td>
<td>Cost charged per bed</td>
<td>Rs 250</td>
</tr>
<tr>
<td>7</td>
<td>Staff involvement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Managerial</td>
<td>6 persons</td>
</tr>
<tr>
<td></td>
<td>Equipment operators</td>
<td>4 persons</td>
</tr>
<tr>
<td></td>
<td>Transportation of BMW</td>
<td>8 persons</td>
</tr>
<tr>
<td></td>
<td>Sanitation and other</td>
<td>4 persons</td>
</tr>
</tbody>
</table>

Government hospitals is very well recorded by the hospital authorities. The data was taken from the hospital registers for 2 months from various departments for each day from each bed. The quantity was assessed per bed. The ratio of non-infectious to infectious wastes in various sections was estimated. The data showed that the amount of non infectious waste
less number of vehicles, consequently transportation and collection of biomedical waste for incineration is delayed. The operating conditions were also not monitored properly.

Treatment technologies

Red bag waste is called as incinerable waste. This is more infectious and it is to be incinerated at temperatures 900° - 1200°c. If the temperature is less than 900°c, incinerated ash would damage the environment as the toxic residues remain as such even after incineration. The ash produced from the incineration process is removed every day and stored in a landfill to avoid soil contamination, the same thing was observed in the CBMWTF.

From this study, it is observed that many private as well as government run hospitals are violating norms prescribed by MOEF by dumping the waste along with municipal garbage. As per the norms the waste segregation must be based on colour coded bags, but majority of the private nursing homes were not following the norms. If proper segregation is not found and plastic is incinerated along with medical waste, it will emanate dioxins and pose threat to the environment. Majority of the hospitals were not registered with CBMWTF and those hospitals which are not showing interest to register with CBMWTF to send their hospital waste is to avoid financial burden. Registration with CBMWTF to send biomedical waste is mandatory. Once they register they have to pay Rs. 4.50/- per bed per day. The quantity of waste generated in Chittoor district is more than 8000 kg/day but the incinerator capacity is 440 kg/day. It clearly shows all the hospitals were not registered with CBMWTF’s, consequently the waste is being dumped in to the municipal waste. It seems it is a big havoc to the environment as well as to the health of human beings. In this context, it is of dire necessity to establish more number of CBMWTF’s for each district by the pollution control board of India, as per the waste generation rate. Health care waste management is not only a technical problem, but also strongly influenced by economic conditions. Plastic waste and sharp waste, after disinfection, turned into economic source for the CBMWTF’s as a result waste treatment cost is being reduced.

Non-incinerable waste

This waste requires disinfection treatment through thermal, chemical and irradiative Autoclaving is an essential and efficient thermal disinfection process. This technology is used to disinfect microbial cultures and sharp waste. Chemical disinfection is usually used to disinfect blood. All the instruments in CBMWTF’s are high quality machines and treatment process is being done in sophisticated manner.

Fig.1: Number of Beds present in private Specialized Hospitals of Chittoor District, Andhra Pradesh

Fig.2: Percentage of Specialised Hospitals present in Chittoor District of Andhra Pradesh

Fig.3: Distribution of beds at different locations of Chittoor District of Andhra Pradesh

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Sustainable solutions can be made by involving local NGOs for people participation to monitor waste management. Efforts have to be made to minimize the hospital waste and also government has to evolve a cost effective plan with adequate financial provisions.

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Level of consumer choice and satisfaction in mobile phone services in Tirupati

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Abstract

Today, the Indian telecommunication network with over 375 million subscribers is second largest network in the world after China. Indian telecom sector has come a long way in achieving its dream of providing affordable and effective communication facilities to Indian citizens. The mobile telephone market has changed dramatically over the past 10 years in India. This paper aims to attempt the consumer choice and satisfaction in the Tirupati town, Chittoor district of Andhra Pradesh state in India. The objectives are to identify demographic profile, level of awareness, satisfaction, and quality of service and purpose of using mobile phones and factors influence individuals to make decisions on consuming particular mobile service. A total of 100 questionnaires have been randomly distributed to the consumers. The data is collected and analyzed by applying statistical tools and techniques. The result of this analysis suggests the degree of choice and satisfaction in the terms of service provided by mobile companies in Tirupati.

Key Words: Consumer Choice, Consumer Satisfaction, Mobile Services, Mobile usage Quality of service

Introduction

Telecommunication is the communication of information over a distance. The Indian telecommunication industry has experienced high growth in recent years. The Telecom Regulatory Authority of India established in the year 1997 by the Government of India to regulate the telecommunication business in India. From then, India’s telecom market is experiencing explosive growth. A technological triumph in telecommunication industry is the cell phone, a radio-linked device. Over the last few years, mobile phones have become a more widespread means of communication. They have become a part of life and people are enjoying the service they provide.

Up to the year 2005, there were only five major players being Bharti Tele-Ventures Limited (Bharti), Bharat Sanchar Nigam Limited (BSNL), Hutchinson-Essar Limited (HUTCH), Idea Cellular Limited (IDEA) and Reliance India Mobile (RIM). But now, they are many mobile phone service providers who are competing with each other in the areas like call tariffs, network coverage and periodical offers etc., to gain competitive advantage over others. The telecom companies are coming with many schemes, packages to attract consumers. The present study is undertaken to study about various telecom services and the satisfaction level of their consumers.

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WORK LIFE BALANCE: A STUDY ON UNIVERSITY FACULTY OF SRI PADMAVATHI MAHILA VISVAVIDYALAYAM,
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ABSTRACT
This paper is about the 'work-life balance' issues that affect faculty working in SRI PADMAVATHI MAHILA VISVAVIDYALAYAM, Tirupati. It is concerned with those factors that influence faculty ability to achieve harmony between their preferred contribution to Teaching, Research on one side of the balance, and with their roles, responsibilities and activities in private life on the other. In this paper, Faculty was defined as those working as Assistant professors, Associate Professors and Professors in Sri Padmavathi Mahila Visvavidyalaya, Tirupati. The objective of this research is to study the work life balance and to study the stressors faced by faculty in Sri Padmavathi Mahila Visvavidyalaya, Tirupati. It also attempts to study the factors that contribute to satisfaction and factors that detract from satisfaction on career progression. The research was conducted among faculty members with reference to Sri Padmavathi Mahila Visvavidyalaya, Tirupati. Work life balance entails attaining equilibrium between professional work and other activities, so that it reduces friction between official and domestic life. Work life balance enhances efficiency and thus, the productivity of an employee increases. The findings of this study reveal the majority of the faculty members feel comfortable in their work place perspective of their marital personal and work environment. The study also examined through questionnaire survey and analyzed with the help of SPSS statistical tools. This paper attempts to identify the various factors which help to maintain work-life balance among faculty employees in Sri Padmavathi Mahila Visvavidyalaya, Tirupati.

KEYWORDS

INTRODUCTION
Work-life balance is about creating and maintaining supportive and healthy work environments, which will enable employees to have balance between work and personal responsibilities and thus strengthen employee loyalty and productivity. Today's workers have many competing responsibilities such as work, children, housework, volunteering, spouse and elderly parent care and thus places stress on individuals, families and the communities in which they reside. Benefits of maintaining work-life balance for both employees and the organization are obtaining better productivity from employees.

Work-life balance is about effectively managing the juggling act between paid work and the other activities that are important to people. Work-life balance has been a concern of those interested in the quality of working life and its role in the broader quality of life. Two factors that can influence work-life balance are autonomy in the workplace and family building. Times have changed, from the time the husband earned, and the wife stayed at home to the time now, when the husband earns and the wife earns too. But the wife still cooks and washes and runs the house. So, how does she balance her work with life at home?

Today's career women are continually challenged by the demands of full-time work and when the day is done at the office, they carry more of the responsibilities and commitments to home. The majority of women are working 40-45 hours per week and 50% are struggling to achieve work-life balance. The interest in work-life balance issues began in the 1980s as more women entered the workforce and focused primarily on helping employees balance work and family responsibilities by offering family-friendly benefits. These practices are now aimed at work-life balance, which is a more encompassing term that reflects the desire of many employees for more flexibility in their work in order to manage the competing demands of work and life outside of work. Educational institutions are regarded as knowledge industry and these are related to creation of knowledge for future generation. All other activities and industries will be meaningless, if knowledge is not created by educational institutions or bodies, public. The persons engaged in creating and imparting knowledge to the balance of their work life and family and personal life. People engaged in imparting educational time to play vital role in the society. In this paper an endeavor has been made to discuss about how the balance of the work life and family, role of the academic working in SRI PADMAVATHI MAHILA VISVAVIDYALAYAM, Tirupati can help to be effective and efficient in their performance and achieving productivity.

REVIEW OF LITERATURE
Mohd. Noor, Sitiainadhal Yudie, 2009 conducted a study on work life balance. The study concludes that the ability to balance between workplace needs and personal life need is perceived as an important issue among workers globally and academics in higher education institutions.

Dundes (2008) argues that work-life balance is about effectively managing the juggling act between paid work and all other activities that are important to 2 people such as family, community activities, voluntary works, personal development and leisure and recreation.

Khabir, Warburton & Hove, 2017 examinate that the articulation of work and life, called as work life balance, has become a key feature of much current government, practitioner and academic debate.

According to a major Canadian study conducted by Lowe (2005), 1 in 4 employees experience high levels of conflict between work and home. Based on work to family interference and caregiver strain, stress overload is included, then close to 60 percent of employees surveyed experience work family conflict.

Brown (2005) observed that balancing a successful career with a personal or family life can be challenging and impact on person's satisfaction in their work and personal life's role.

Guest (2001) has analyzed that the work life balance has always been a concern of those interested in the quality of working life and its relation of broader quality of life.

Parasuraman and Simmons (2001) studied that how work and family role features affected work-family conflict. He also studies indicators of psychological well being among male and female workers who are self-employed or organizationally employed.

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