"A STUDY TO DEVELOP AND ASSESS THE EFFECTIVENESS OF TRAINING MANUAL ON DISASTER MANAGEMENT IN TERMS OF KNOWLEDGE AND SELF EXPRESSED PRACTICES AMONG THE TEACHERS OF SELECTED SCHOOLS IN PUNE CITY DURING 2009-11"

A thesis submitted to

Tilak Maharashtra Vidyapeeth, Pune

For the Degree of Vidyavachaspati (Ph. D.)

(Doctor of Philosophy) in Management

Under the faculty of Modern Sciences and Professional Skills

By

Prof. Joshi Sonopant Ganpatrao

M.Sc (DM), M.Sc (N)

PRN : 15808018726

Guide

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M.Com., M.A. (Eco.) PGDBM, MMS, Ph. D.

Director – Sinhgad Institute of Management, Pune

March 2011

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Month and Year : March 2011

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CANDIDATE'S DECLARATION

I hereby declare that, The thesis entitled **"A STUDY TO DEVELOP AND ASSESS THE EFFECTIVENESS OF TRAINING MANUAL ON DISASTER MANAGEMENT IN TERMS OF KNOWLEDGE AND SELF EXPRESSED PRACTICES AMONG THE TEACHERS OF SELECTED SCHOOLS IN PUNE CITY DURING 2009-11"** completed and written by me has not previously formed the basis for the award of any Degree or other similar title upon me of this or any other University or examining body.

Place : Pune (Prof. Joshi Sonopant Ganpatrao.)

Date : Researcher

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RESEARCH GUIDE

CERTIFICATE

This is to certify that the thesis entitled **"A STUDY TO DEVELOP AND ASSESS THE EFFECTIVENESS OF TRAINING MANUAL ON DISASTER MANAGEMENT IN TERMS OF KNOWLEDGE AND SELF EXPRESSED PRACTICES OF TEACHERS IN SELECTED SCHOOLS OF PUNE CITY DURING 2009-11"** which is being submitted herewith for the award of the degree of Vidyavachaspati (Ph. D.) in **Management** of Tilak Maharashtra Vidyapeeth Pune, is the result of original research work completed by **Prof. Joshi Sonopant Ganpatrao** under my supervision and guidance. To the best of my knowledge and belief the work incorporated in this thesis has not formed the basis for the award of any Degree or similar title of this or any other University or examining body upon him.

Place: Pune

Date: March 5, 2011

Dr. Daniel Jacob Penkar

M.Com., M.A. (Eco.) PGDBM, MMS, Ph. D.

RESEARCH GUIDE

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“There is no happiness except in the realization that we have accomplished something”

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Prof. Joshi Sonopant Ganpatrao.

ABSTRACT OF THE THESIS

1. INTRODUCTION

Open a newspaper and no matter what part of the world you happen to be in, you are bound to read reports of all sorts of natural and man-made disasters.

This proposed thesis is mainly related to the “Disaster management (DM)”. Its main focus is to highlight the **H**uman **R**esource **D**evelopment in disaster management. Capacity building of the community is one of the important aspect of human resource management. People need competencies like knowledge, attitude and practices to perform tasks. Success of the disaster management mostly depends upon efficient capacity building of the society through educational intervention to them. The thesis title is to assess the effectiveness of training manual on disaster management in terms of knowledge and self expressed practices of secondary school teachers in Pune city during 2009-11.

2. REASON FOR THE CHOICE OF THE TOPIC

Disasters are on rise, at global as well as in India. The loss of life and property due to disasters has increased substantially during last two decades. People are now at risk from disasters. Flood, Earthquake, Terrorist attack, fire and road accidents has created concern across the country for preparedness. There is urgent need to adopt multidimensional, multi disciplinary and multi sectoral approach to reduce the losses.

School children and their teachers are some of the most receptive group to disaster preparedness education and training. These children, in turn share this valuable education with family and community. Recognizing the value of school children as “multipliers” of disaster information. School teachers are valuable social group to educate children about disasters. This strategy is proving its long term effectiveness.

Justification of the study was based on the facts that safety of the school children is basic right of children. Teachers must be aware of disaster management in schools and gain knowledge and implement safety practices in school environment. Identifying learning needs of adult learner in very important aspect in disaster education. According to Cox 2001, adult will learn when they feel a need to learn at their own pace. Disaster management booklet, training manual, handouts are easy ways of learning at own pace and it is preferable means of learning on the topic. Hence researcher has taken initiative to develop a training manual and assess its effectiveness.

Some of the recent disasters that have affected the education sector in India are the Gujarat earthquake (2001) where 971 students and 31 teachers were killed, 1,884 schools collapsed; Tamil Nadu Fire (2004) incident where 93 children died in a fire due to explosion of a cooking gas cylinder; Kashmir earthquake (2005) where 17,000 students died at school, and 10,000 school buildings destroyed (Petal 2007). Unfortunately, it is impossible to prevent most

disasters. Nevertheless, we can alleviate its worst effects by being prepared. Education for disaster management is a trans-disciplinary exercise aimed at developing knowledge, skill and values at all level. Government of India in its eleventh five year plan document, have emphasized the need to enhance knowledge, skill and values to reduce the impact of disasters on the education sector. To build in a culture of safety and resilience at all levels in the education sector, there is a need to carry out a large number of initiatives. (Balaka Dey Chillibreze -2009)

3. STATEMENT OF PROBLEM

"A study to develop and assess the effectiveness of training manual on Disaster Management in terms of knowledge and self expressed practices among teachers of selected schools in Pune city during 2009-11"

4. OBJECTIVES

1. To assess the knowledge of the secondary school teachers of Pune city regarding disaster management before administration of training manual.

2. To assess self expressed practices of secondary school teachers of Pune city regarding disaster management before administration of training manual.

3. To find out effectiveness of training manual on disaster management among the secondary school teachers of Pune city in terms of knowledge and practices.

4. To corelate the knowledge of secondary school teachers of Pune city regarding disaster management with self expressed practices

5. To associate the findings with selected demographic variables.

5. HYPOTHESES

Following hypotheses were formulated by the Researcher for the study:

a. There is no significant difference in the level of knowledge among the school teachers of Pune City before and after administration of disaster management training manual.
b. There is no significant difference in the self expressed practices among the school teachers of Pune City before and after administration of disaster management training manual.
c. There is no correlation between knowledge and self expressed practices of Secondary School Teachers of Pune city regarding disaster management.
d. There is no association of knowledge of secondary school teachers of Pune city regarding disaster management with demographic variables

e. There is no association of self expressed practices of secondary school teachers of Pune city regarding disaster management with demographic variables

6. REVIEW OF LITERATURE

According to UNICEF 30,000 children die each day in the poorest villages on earth due to poverty, malnutrition and communicable diseases

The Asia pacific region is home to 53% of the world's population and 20% of the land area experiences a disproportionate share loss of life and impact to socio-economic processes. According to a United Nations' report, nearly 70% of all lives were lost due to natural disasters occurred within Asia Pacific Region.

India's road has become highways of death. We have dubious distinction of having the largest number of road accident fatalities for the number of vehicles in the world. Almost 100,000 Indians die on our roads every year in over 300,000 accidents. Studies by World Health Organization and Government of India show that our road safety record is declining alarmingly at 5% a year. A 2002 Planning Commission study estimated India's loss from such accidents at a colossal Rs 55,000 crore a year, which works out to 3 percent of GDP at 2000 prices. Another statistics: there are 12.7 road fatalities per 10,000 vehicles in India in USA road fatality rate is 1.79, fatality rate in UK and Germany are 1.0 and 1.1 respectively.

Pala I. and Vankar GK 1997 Assessment of knowledge and attitude of primary teachers about disasters suggests that only one fifth teachers out of 113 were confident about dealing with an accidents. It was revealed that there was a knowledge deficit, especially regarding the prevalence of accidents. Misconceptions regarding first aid were also common. Communication about accidents among the teachers, parents and doctor was virtually non existent. even primary care givers showed poor knowledge score on home safety and first aid (Thein M M and others, 2005) though the score of knowledge of road safety was satisfactory. This study was conducted in Singapore as childhood injuries are the leading cause of death for children between 5 to 14 years of age.

Ghosh A and Bharat R (Burns 2004) reports that ‘Community Awareness Programme for the target group of ladies and teenage girls and ‘School Education Programmes for the target group of school children of standard 8 in the steel producing city, Jamshedpur. He revealed that not only the formal Disaster Management training helps to improve the knowledge of the people, but the efforts like giving information booklet on child and infant safety and first aid treatment are also effective.

Above review of literature has shown that although there is information and recognition of the issues related Disaster Management, there are very few

studies done on need assessment on primary or secondary school teachers in India regarding basic first aid course or refresher course. In India around 30% of population is below 15 years of age, and they are spending their maximum time in schools.

7. RESEARCH DESIGN AND METHODOLOGY

Research approach adopted was quasi-experimental. Single group pre test post design in which researcher observed the group prior to the intervention of training manual (Pre test). The same group was observed after seven days (Post test). The study was conducted in secondary schools in Pune city. There are 306 secondary schools in Pune city under Pune Municipal Jurisdiction. Researcher divided the Pune city in five regions viz. East, West, South, North and Central. A random method was used to select the 30 schools for the research. This was done to ensure that participating schools were sufficiently representative of each region, programme level (State Board, CBSE, and ICSE) and language of instruction.

Researcher has given due justice to all five regions. 18 teachers from each school were selected in the study by simple random method. While selecting the schools researcher ensured that equal percentage was maintained between English and Marathi medium schools (page 154) The state board schools, CBSE schools and ICSE schools were also given equal representation. Total 540 teachers across the city from 30 schools (on an average 18 teachers from each school by simple random method) were included in the study. In order to collect the necessary data

to assess the effectiveness of the training manual on disaster management, a **semi structured questionnaire** was developed. Questionnaire design consists of three sections, first section consists of demographic data such as age, sex, education, experience, medium of teaching, type of teacher's training programme and teaching experience. Second section comprised of items to assess knowledge of teachers regarding disaster management. Section three consists of self expressed practices checklist regarding disaster management. Knowledge questionnaire developed were multiple choice question in which one correct answer and other three distracters. Correct answer carries one score and wrong answer carries zero score. There were 30 items of knowledge assessment. Practice checklist was having responses like yes, no and do not know right practice carries one score while wrong practice carries zero score. There were 15 items of self expressed practices.

Training manual was developed by researcher in English as well as in Marathi language. The language in the manual was kept as simple as possible. A training manual includes chapters like basic concept of disasters, causes, types, effects of disasters, do's and don't during disasters, school disaster management plan and life saving skills (First Aid)

Validity and Reliability : The tool for collecting data was prepared and given to 20 experts in the field like defense personnel, educationist, authorities from social sciences and expert from the disaster management field. All identified

experts were Ph D qualified persons. After validity of the tool, modification was made and final draft of the **tool** is prepared. In this study, the reliability was determined by test retest method. The reliability coefficient was found to be 0.8430 (84%). Pilot study was undertaken on 10% of the sample in various schools to test the practicability of the tool.

Administrative permission was procured formally from the principal of the schools prior to the data collection. 30 schools were covered for data collection which includes 540 teachers. Teachers were explained about the purpose of the study. Their willingness was sought before the study. Researcher himself administered the semi structured questionnaire for the pre test. Training manual was given to study group. After seven days post test was conducted by researcher.

8. RESEARCH FINDINGS

Description of subjects

Age and Gender: The mean age of the school teachers is found to be 38.2 years. The average ages of male-teachers and female teachers were 37.06 years and 38.65 years respectively. The sample distribution shows that out of 540 teachers majority 284 (52.6%) were between the age group of 35-44 years, 148(27.4%) were in age group of 25-34 years, 88(16.3%) samples were in above 45 years and 20 (3.7%) were in age group 18 – 24 years. It interprets that very few teachers are in young age group and majority of the teachers are

in middle age group. Of the 540 responses 394 (73%) respondents were female teachers and 146 (27%) were male teachers.

Education : The educational attainment of this city is higher, as it was found majority of the teachers had completed post graduate degree 256 (47.4%) followed by graduate degree 248 (45.9%) and undergraduates were 36 (6.7%).

Teaching Experience: Teachers in Pune City are found to be well experienced in their job. 166 (31%) teachers having 11 – 15 years of experience, 140 (26%) teachers had up to 5 years experience, 111(21%) with 6 to 10 years, 79 (14%) with 16 to 20 years and 44 (8%) possessing 21 or more years in the field.

Medium of instructions: Teachers from Marathi medium schools were in majority 306 (57%) followed by English medium school teachers 234 (43%).

Programme wise distribution : Teachers from Maharashtra state board were in majority 466(86.3%) followed by CBSE 54 (10%) and ICSE 20 (3.7%).

Teacher's Training wise : B. Ed trained teachers were 431 (80%) whereas D. Ed teachers were 81(15%) and others were 28 (5%).

Training of First aid or Disaster Management : Of the 540 responses 399 (74%) of them had not been exposed to any type of first aid or disaster

management programme, while nearly 141 (26%) had participated in some of the first aid training programme which was organized by school authority.

Assessment of overall knowledge of Disaster Management: The Researcher, through Questionnaire, had asked 30 questions covering various aspects of Disaster Management. In the Pre-Test, it was revealed that, overall score of all teachers is observed to be 15.9 i.e. 53%. The maximum score observed was 25 (81.3%) which is achieved by 0.5% of respondents only. Researcher also observed score less than 10 (33%) by 4.5% of respondents. 65.6% respondents could achieve their score above 50% while distinction (70% +) is achieved by 7.1 % of respondents.

Association of Knowledge : Age wise distribution of knowledge score shows that young teachers are more knowledgeable, as age advanced score shows in downward trends. As mean knowledge score of teachers in age group 18 -24, 25 -34, 35-44 and 45 & above shows 17, 16.37, 15.97 and 15.18 respectively. Researcher tried to investigate whether this score has any association with gender of the respondent. It is observed that females are comparatively more knowledgeable than males. The mean scores of females was 16.42 and mean score of male was 14.82. It is also noticed that, those respondents whose scores are below 10 (out of 30) have 13 females and 12 males. Researcher also made an attempt to correlate the scores with the **educational qualification** of the respondents. It is found that average scores (out of 30) of

UG, Graduates and Post-Graduates are 17.39, 14.99 and 16.82 respectively. The increment in scores from Graduate to Post graduate level could be the indication of association between qualification and DM knowledge. The confirmation of this association of knowledge is separately done under Testing of Hypothesis. The high score of under graduate teachers, despite their low (6.7%) sampling contribution, may have come possibly by mere chance only.

Similarly, Researcher, tried to find out association of **teaching experience** and that of DM knowledge. As no trend in these figures is observed, it can be concluded that, increase in teaching experience may not necessarily be useful to increase knowledge of DM. Researcher also made an attempt to find out any kind of association attached with the score and that of **previous training of Disaster Management or First Aid**. It was observed that, previous training in DM and / or FA definitely adds to the knowledge but not to a large extent. This is so, because average score of Teachers who were trained in Disaster Management is found to be 16.94 against 15.69 who had not received any kind of training on Disaster Management or First Aid.

'Marathi' is the regional language of the state of Maharashtra. Therefore majority of schools are teaching in Marathi. Researcher made an attempt, to see whether '**Medium of teaching'** affects the overall knowledge of teacher regarding DM. Survey revealed that on an average, knowledge of teachers

from Marathi medium schools is comparatively lower than those from English medium schools, with their respective scores as 16.54 and 15.56.

Region wise knowledge distribution shows that teachers in central and eastern region is on higher side i.e. 17.31 and 17.28 whereas north, south and western region score was 14.63, 13.11 and 12.93 respectively.

Assessment of Break-up of knowledge

Break-up of Questionnaire

The Questionnaire designed for assessment of knowledge was broken into 30 questions. These 30 questions were grouped into 3 major categories as under

Question No. 1 to 11 – Knowledge regarding Disasters and its management.

Question No. 12 to 18 –Do's and Don'ts related to Disaster Management

Question No. 19 to 30 – First Aid Skill and safety.

Break-up of knowledge assessment

The overall score of all teachers is observed, for all 30 questions, to be 15.9 i.e. 53%. However average scores of the above mentioned sub-group of questions are found to be 6.4 (58.18%), 4.5 (64.28%) and 5.1 (42.5%) respectively.

It is clear from the above scores that teachers are well-aware about what 'should be done and should not be done' during 'Disaster'. Also their

knowledge and its management is comparatively better but they are lacking in First-Aid and Safety.

These were the trends observed on overall basis. The Researcher probed to find out any kind of relation, if it exists, among these trends and gender, education and experience of the teacher.

Break-up of knowledge and Demographical parameters.

Researcher analyzed the data to see any kind of relation between sex of the teacher and parameters of the knowledge. The following findings were observed. It is seen that 'knowledge of Disaster and its Management' is not altered drastically with the gender of the teacher, since their average scores are found to be around 58.2% only. However Females are more knowledgeable than men about 'Do's and Don'ts' about the Disaster since score of females has recorded as 66.57% against male's score as 57.86%. Also Females are more alert than men when First Aid and Safety is concerned.(Score of 45.08% against 35.33%). Similarly data was also analyzed for scores and various age-groups of respondents. The following observations were revealed: It is seem that, knowledge of school teachers regarding 'Disaster and its Management' does not fluctuate much more due to age factor. There appears to be a small declining trend over the age for Do's and Don'ts. Similar trend is also observed for First-Aid Skill and Safety. Thus it is confirmed that knowledge of School-Teachers regarding Disaster and its Management does not vary to a large extent as far as Age and Sex of a Teacher is concerned.

Question wise knowledge description

1. Correct definition of disaster management was given by 27% respondents, while correct meaning given by 78% respondents.
2. It was observed that about 85% respondents could identify types of disasters.
3. Researcher asked question regarding phases of disasters only 42 % respondents could give correct answer.
4. Drop, cover and hold method is very simple way to save life during earthquake, unfortunately only 18% respondents could answer correctly.
5. Among the total respondents majority of them (96 %) knows to move higher level during floods to save life, while only 62% identified cause of death during floods is drowning.
6. Road traffic accident is biggest killer in Pune city is, fortunately 72 % teachers are aware of safe way of driving the vehicle but in practice scenario is different
7. Fire accident is common and fatal disaster in school, 73% respondents knows common cause of fire in schools.
8. 74% teachers knows best place to keep first aid box in schools.
9. Only 48 % respondents could able to give correct definition of first aid.
10. CPR is sure way of saving life when in cardiac arrest, 72% teachers could not know even full form of CPR.
11. Pouring water is only immediate treatment for burns, only 49% responded correctly.

12. Activation of EMS is only way to tackle road accident and other emergencies 41% responded correct toll free number of EMS.
13. Evacuation drill and school disaster management plan is safety initiative of the school, only 40% teachers were aware of school disaster management plan (SDMP).
14. Researcher asked fire emergency telephone number, 70% responded correctly.

Evaluation of Practices Adopted- the researcher asked 15 questions related to self expressed practices and the responses collected are as follows. The mean score of practices observed was 7.05 i.e. 47%. It clearly indicates that safety practices of teachers were needs to be improved.

Categories of Practices Adopted – researcher tried to identify the age related practices and found that mean score of safety practices of 18 – 24 age group was 5.25, mean score of 25-34 years age was 7.36 and mean score of 45 years and above age group was 7.19. It shows that very young teachers are very poor in safety practices and as age progresses safety practices improves. There was no significant association of sex, teaching medium, education, pattern of teaching and safety practices with practices adapted.

Question wise self expressed practices

1. Cell phone is nowadays become important electronic gadget carries by everyone, in case of emergency (ICE) number may be stored in phones e.g. ICE1,ICE2 etc Unfortunately only 33% respondents expressed correctly.
2. Display of emergency telephone numbers were not done in 80% of schools.
3. Only 41% of teachers undergone first aid training organized by school authorities.
4. Using mobile phone even by hands free mode is dangerous during driving a vehicle, 39% respondents not operating phones while driving.
5. Only 22% respondents expressed about recovery position.
6. Only 33% expressed need of school disaster management plan
7. Treatment of bleeding, burns and fractures correctly expressed by only 53% of respondents

9. STATISTICAL ANALYSIS

Post Test Findings

The mean score obtained by school teacher in the pre test was 15.9 (53%), S. D. was 3.673 and in the post test score was increased to 24.07 (80%), S.D. was 5.568. Researcher also observed that in all the areas (Knowledge of disasters and its management, do's and don'ts during various disasters, first aid and safety) there was significant increase in knowledge and self expressed practices which indicates that the training manual is effective to improve knowledge and practices of school teacher.

10. TESTING OF HYPOTHESIS

Based on the various objectives, the researcher decided to test various hypotheses as mentioned below:

Hypothesis 1

Hypothesis of the study was: “there is no significant difference in the level of knowledge among secondary school teachers of Pune city before and after administration of training manual on disaster management.” To test this hypothesis researcher used paired‘t’ test. The calculated‘t’ value was 19.69 and is greater than table value (1.96) and was found highly significant at both 0.01 and 0.05 level of significance. Hence null hypothesis is rejected. Thus proving that manual on DM is useful in increasing the level of knowledge.

Hypothesis 2

Second Hypothesis of the study was “there is no significant difference in the self expressed practices among secondary school teachers of Pune city before and after administration of training manual on disaster management.” To test this hypothesis researcher also used paired‘t’ test. It was found that the ‘t’ value so obtained viz. 14.88 is greater than table value i.e.1.96 and was also found highly significant at both at 0.01 and 0.05 levels of significance. Hence null hypothesis is rejected. This clearly indicates that training manual is effective in improving self expressed practices of the teachers.

Hypothesis 3

Researcher also identified correlation of knowledge with practices of the teachers by calculating correlation coefficient (r) between these two parameters. It was found to tend to r=0 (0.0254). It indicates that knowledge is not correlated with practices of teachers.

Hypothesis 4

Researcher also tried to test the hypothesis. “There is no association of knowledge of school teachers regarding disaster management with demographic variables” and also subsequent hypothesis “There is no association of self expressed practices of school teachers regarding disaster management with demographic variables”. For this purpose researcher applied chi square test and found that age, experience and previous disaster management and first aid training is associated with improvement in knowledge and practices at ($p<0.05$) whereas other variables are non associated.

11. CONCLUSIONS & RECOMMENDATIONS

Conclusions

School safety is very important concern. Every school and community must take it seriously and strive continually to achieve highest safety in schools. Every school is unique by virtue of its teachers, students, location and culture. Teachers role is very important in mitigating the hazards and disasters in schools. The teacher who is aware of disasters and its management can

improve the practices successfully. Hence researcher has chosen teacher as a target population to investigate an issue as well as provide them educational material.

The primary aim of this study is to determine the effectiveness of training manual on disaster management among secondary school teachers in Pune city. Semi structured questionnaire was administered.

Majority of the school teachers were in middle age group with an average age of 38.2 and are heavily dominated by females. Overall mean knowledge score was 15.9 (53%) and self expressed practice score was 7.05 (48%) indicated that teachers knowledge and self expressed practices are not at satisfactory level. Young teachers (below 25) and female teachers found more knowledgeable than their counterparts. Knowledge was positively correlated with teaching experience and level of education of the teachers. Of the 540 respondents 26% had participated in first aid training programme but their knowledge level was not significantly more than those who have not undergone the training. Questionnaire was divided under three headings, concept of disasters, does and don't related to disaster management and first aid and safety. Out of these three components first aid and safety knowledge among teachers was found very poor (42%)

The effectiveness of the manual was tested statistically at 0.01 and 0.05 level of significance which indicated that training manual was effective in improving knowledge and practices of the teachers.

Recommendations:

Knowledge and Practices

1. The survey revealed a general lack of information among school teachers regarding disaster management. This highlights the need for disaster safety education. It is evident that disaster has significant impact on school children . Improvement in knowledge and practices of teachers equip the teachers with knowledge of how to react if an emergency situation arises. Teacher should take initiative to improve their knowledge and practices by using booklet, posters, brochures, charts etc. The school authority should provide such material to the teachers.

2. School authority should display all the important telephone numbers at prominent places of the school as researcher found that teachers were ignorant about emergency medical services available in the city as well as important telephone numbers like ambulance, fire, disaster helpline, child helpline etc

3. Researcher observed that majority of the schools have been given low priority to disaster education. No disaster plan was available in surveyed

schools. School authorities, therefore should take initiative and sensitize the school community (students, teaching and non teaching staff, management staff and parents) regarding disaster preparedness and management. It is therefore strongly recommended that each school must prepare their own school disaster management plan (SDMP). The SDMP should consists the following components namely viz. SDM committee, safety assessment, evacuation map, formation and training of DM team and establishment of task force.

4. Periodical mock drill and evacuation drill should be exercised in all the schools at least urban schools of the state in collaboration with concerned authorities such as Police, Fire brigade etc.

5. Capacity building is one of the WHO strategy for improving disaster preparedness. Indian Red Cross is universally recognized institution for capacity building of the communities. School authorities should collaborate with such agencies to raise awareness among the school teachers and students and every teacher must undergo such training.

School safety

6. In Pune city, schools are located in very crowded areas, the approach road was found very narrow and school children commute by auto rickshaw or motorbike. Since large number of vehicles are found parked on the way to

school creating unsafe environment to children. Traffic authorities should ensure that if any mishap occurs there should be way to enter ambulance or fire engine. Researcher strongly recommends that at least schools located in city should have one way traffic control around the schools up to the main road so that vehicles will come in one direction traffic mishap will be avoided. In addition to this speed breaker at the entrance of the school should be constructed to control on the speed.

7. Every school should ensure that children coming to school must use school bus facility. School bus should have unique colour code system (currently color code adopted is yellow) and every school must adhere to this norm.

Training Manual

8. World Health Organization stresses the importance of validating current and future disaster preparedness training needs by developing instrument to assess, validate and evaluate training needs. The school training programme on disaster management needs to be evaluated because teacher undergone training also found unaware of disaster management.

9. Subject of disaster management should be included in the curriculum of the standard 5^{th} to 10^{th} standard.

10. Study revealed that there was improvement in knowledge and practices of disaster management after administration of manual. Accordingly greater emphasis need to be placed on implementing the manual for the teachers.

11. Various other means of educational interventions should be used to train the teachers on disaster management e.g. Video learning, on line learning, games, workshops etc.

12. The training module can be used by teachers while teaching the subject of Disaster management.

Limitations :

Considering availability of time, financial component and availability of respondents following limitations were faced by the researcher.

1. Only secondary schools were considered for the study.
2. Knowledge and practices regarding disaster management is included in the study other components like attitude, culture and behavior were excluded.
3. Instead of imparting actual training disaster management training manual was developed.
4. Due to vast distribution of geographical area of Pune city sample size (540) and number of schools (30) were limited.
5. Because of the language constraint of the researcher schools other than English and Marathi medium were excluded.

Area for further research:

1. In this study it was found that there is low level of knowledge among school teachers regarding disaster management with regional disproportinality. Therefore school based disaster education activities remains a phenomenon. The more researches are needed in this area

2. This study covered component of knowledge and practices of disaster management. Other components such as behavior, attitude and culture is open for research.

3. Some studies can be conducted to assess the school safety and security, school building, grounds, in which fire extinguishers, unsafe parking area etc should be assessed, safety index should be determined for each school. The school below safety standard may be identified and precautionary measures may be taken.

4. Similar study can be conducted among school students, college students, and general public. Taking into account entire state of Maharashtra.

5. Similar study can be undertaken as comparative study between Rural and Urban teachers.
6. Similar study can be conducted by using advanced technology like simulation, online learning, virtual classrooms etc

7. There is urgent need for international data sets to provide sex-disaggregated data on disaster related mortality, morbidity and long term consequences.
8. Research is needed both at local and at national level on structural processes and factors that increase disaster vulnerability in women and men across different social groups.
9. Effects of funding, programming, training and the consequences of these for demographic variables in disaster situations is another important area that needs to be addressed by research studies.

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Abbreviations Used

ADRC	Asian Disaster Risk Reduction
ATI	Administrative Training Institutes
CBSE	Council of Board of School Education
CRED	Centre for Research on Epidemiology of Disasters
DM	Disaster Management
DRC	Disaster Research Centre
EOC	Emergency Operation Centers
FA	First Aid
ICSE	Indian Certificate for Secondary Examinations
IDRN	India Disaster Resource Network
IDNDR	International Decade for Natural Disaster Reduction
IFRC	International Federation of Red Cross
IMD	India Meteorological Department
NCDM	National Centre for Disaster Management
NERF	national Emergency Response Force
NDMA	National Disaster Management Authority
SF	Swine Flu
UNDP	United Nation Development Project
UNDRC	United Nations Disaster Relief Organization
WHO	World Health Organization

Chapter - 1

AN OVERVIEW OF DISASTER MANAGEMENT

1.1. Introduction to Disasters

“The earth provides enough to satisfy one’s need but not everyone’s greed”

Mahatma Gandhi

Let us, today, remember these words of Mahatma Gandhi and resolve to simplify our needs. The environment should serve our need, not our greed.

1.1.01. Disasters are affecting mankind from ages. The disaster events concern every community and no community is immune from it. According to the Greek Philosopher Empedocles, the universe consist of five elements the Earth, Fire, Air, Sun and Water from which come the manifestation of violence such as Earthquake, Volcanoes, Cyclones, Droughts and Floods. The root of the word disaster ("bad star" in Greek) comes from an astrological theme in which the ancients used to refer to the destruction or deconstruction of a star as a disaster.

1.1.02. Oxford English dictionary states that the word disaster derives from the 16th century French word “desastre”, which is a combination of two terms

'des' meaning bad or evil and 'astre' meaning star. The expression of term disaster is bad or evil star.[2]

1.1.03. A disaster is a perceived tragedy, being either a natural calamity or man-made catastrophe. It is a situation which poses threat to life, health, property, or that may deleteriously affect society or an environment. Disasters have existed ever since the history of mankind and have shaped the destiny of the earth and its people. Disaster strikes quickly-it changes the lives of all that it touches and its effects are felt long after the event. Its forces are outside the control of the people whom it most affects. The disaster event concerns every community and no community is immune from it.

1.1.04. In contemporary academia, disasters are seen as the consequence of inappropriately managed risk. These risks are the product of hazards and vulnerability. Developing countries suffer the greatest costs when a disaster hits. More than 95 percent of all deaths caused by disasters occur in developing countries, and losses due to natural disasters are 20 times greater (as a percentage of GDP) in developing countries than in industrialized countries. For more than a century researchers have been studying disasters and for more than forty years disaster research has been institutionalized through the Disaster Research Center. The studies reflect a common opinion that, majority of the hazards can

prevents it developing into a disaster. All disasters are hence the result of human failure to introduce appropriate disaster management measures. Hazards are routinely divided into natural or human-made, although complex disasters are more common in developing countries.[3]

1.1.05. Natural disasters kill thousands of people and destroy billions of dollars of habitat and property each year. The rapid growth of the world's population and its increased concentration often in hazardous environment has escalated both the frequency and severity of natural disasters. With the tropical climate and unstable land forms, coupled with deforestation, unplanned growth proliferation non-engineered constructions which make the disaster-prone areas mere vulnerable, tardy communication, poor or no budgetary allocation for disaster prevention, developing countries suffer more or less chronically by natural disasters. Asia tops the list of casualties due to natural disaster.(WHO – 2008)[4]

1.1.06. Among various natural hazards, earthquakes, landslides, floods and cyclones are the major disasters adversely affecting very large areas and population in the Indian sub-continent. These natural disasters are of (i) geophysical in origin such as earthquakes, volcanic eruptions, and landslides and (ii) climatic in origin such as drought, flood, cyclone, forest fire. Though it may not be possible to control nature and to stop

the development of natural phenomena but the efforts could be made to avoid disasters and alleviate their effects on human lives, infrastructure and property. Rising frequency, amplitude and number of natural disasters and attendant problem coupled with loss of human lives prompted the General Assembly of the United Nations to proclaim 1990s as the International Decade for Natural Disaster Reduction (IDNDR) through a resolution 44/236 of December 22, 1989 to focus on all issues related to natural disaster reduction. In spite of IDNDR, there had been a string of major disaster throughout the decade. Nevertheless, by establishing the rich disaster management related traditions and by spreading public awareness the IDNDR provided required stimulus for disaster reduction. It is almost impossible to prevent the occurrence of natural disasters and their damages.[5]

1.1.07. Living in such highly populated conglomerates; people are now more at risk from disaster, either natural or man-made than ever before. This risk evolves from either static plants or transportation accidents by road, rail or air which has grown in proportion to the development of industry. It is quiet evident that there are no recognizable patterns to disaster events. Each disaster is different to the last. All disasters by their very nature are unpredictable

1.2. Definitions of Terms

1.2.01. Disaster

- **WHO definition**: it as an event, natural or man-made, sudden or progressive, which impacts with such severity that the affected community has to respond taking exceptional measures.

- The oxford dictionary defines ‘disaster’ as a sudden or great misfortune and ‘management’ as ‘skillful handling’

- **AMERICAN RED CROSS (ARC)** Defines a disaster as “an occurrence, either natural or man made that causes human suffering and creates human needs that victims cannot alleviate without assistance”

- **BY FEMA (FEDERAL EMERGENCY MANAGEMENT AGENCY)** “An occurrence of a severity and magnitude that normally results in death, injuries and property damage that cannot be managed through the routine procedure and resources of government”

- The definition given by OED is “Anything that befalls of ruinous or distressing nature: a sudden or great misfortune, mishap, or misadventure, a calamity.

- By Disaster Management act 2005

  Disaster means a catastrophe, mishap, calamity or grave occurrence affecting any area from natural and manmade causes, or by accident or negligence, which results in substantial loss of life or human suffering or damage to, and destruction of property, or damage, or degradation of environment and is of such a nature and magnitude as to be beyond the capacity of the community of the affected areas.[16]

1.2.02. Hazard

- A Hazard is a rare or extreme event in the natural or human-made environment that adversely affects human life, property or activity to the extent of causing a disaster.

1.2.03. Emergency

- A disaster might be regarded as a particular type (or sub-set) of an emergency. “Disaster” suggests an intense time period and level of urgency. Whereas a disaster is bound by a specific period in which lives and essential property

are immediately at risk, an emergency can encompass a more general period in which there is a clear and marked deterioration in the coping abilities of a group or community, or coping abilities are only sustained by unusual initiatives by the group or community or by external intervention.

1.3. Fundamental of Disasters

1.3.01. A hazard is a rare or extreme event in the natural or human made environment that adversely affects human life, property or activity to the extent of causing disaster. Natural phenomena are extreme climatological, hydrological or geological processes that do not pose threat to persons or property. A massive earthquake in an unpopulated area is natural phenomena, and not a hazard.

1.3.02. Disasters and emergencies are all too often regarded as aberrant events, divorced from “normal life.” In reality, however, the opposite is true. Disasters and emergencies are fundamental reflections of normal life. They are consequences of the ways societies structure themselves, economically and socially; the ways that societies and states interact; and the ways that relationships between the decision makers are sustained. Hence a flood or an earthquake is not a disaster in and of itself. The disaster stems from the fact that certain communities or groups are forced to settle in areas susceptible to the impact of raging

river or a volcanic eruption. It is essential to make a distinction between hazards and disasters, and to recognize that the effect of the former upon latter is essentially a measure of the society's vulnerability.[9]

1.4. Causal Factors of Disasters

The magnitude of each disaster, measured in deaths, damage, or costs for a given developing country increases with increased marginalization of the population. This is caused by high birth rate, problems of land tenure and economic opportunity, and the lack of misallocation of resources to meet the basic human needs of an expanding population. Each of these factors are described below.[10]

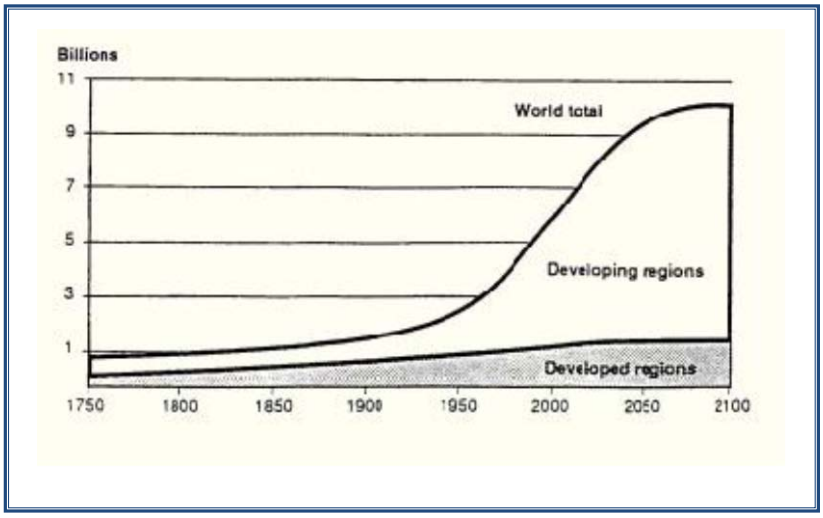
1.4.01. Geological and climatic changes – this causes destruction and alters the demographic structures. It may be part of evolutionary process. This catastrophe causes changes in living and non living things on earth.

1.4.02. Poverty – The most important single influence on the impact of disaster is poverty. Studies proved that healthiest the populations survive the disaster unaffected or able to recover quickly. Poverty generally makes people vulnerable to the impact of hazards because they settle on hills that are prone to land slide, along the riverside invaluably flood their banks.

1.4.03. Population growth - There is an obvious connection between the increase in losses from a disaster and the increase in population. If there are more people and structures where a disaster strikes, then it is likely there will be more of an impact. The growth of population has been so spectacular that it is inevitable that more people will be affected by disaster because more will be forced to live and work in unsafe areas. Increasing numbers of people will be competing for a limited amount of resources (such as, employment opportunities, and land) which can lead to conflict. This conflict may result in crisis-induced migration. Such growth occurs predominantly in developing countries, resulting in various contributors to disasters[10]

Figure 1.1

World Population Trend



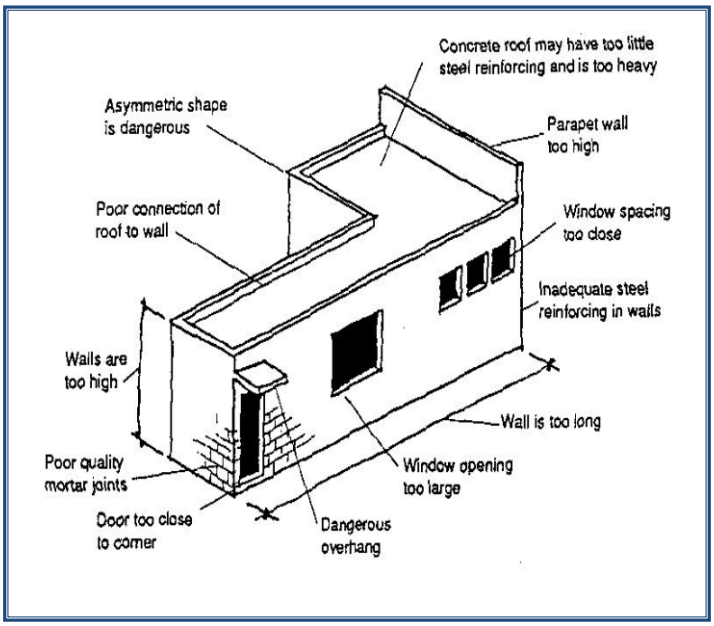
Source: Thomas Merrick,et. al., "World Population in Transition," *Population Bulletin,* Vol. 42, No.2 (1986).

1.4.04. Rapid urbanization – Rapid population growth & migration are related to rapid urbanization. It is characterized by rural poor moving to metropolitan areas in search of economic opportunities & security. They may not find safe and desirable places to build their houses; it can lead to human made disasters.

1.4.05. Transitions in cultural practices: - Many of the inevitable changes that occur in all societies lead to an increase in the societies' vulnerability to disasters. Obviously, all societies are constantly changing and in a continual state of transition. These transitions are often extremely disruptive and uneven, leaving gaps in social coping mechanisms and technology. These transitions include nomadic populations that become sedentary rural people who move to urban areas, and both rural and urban people who move from one economic level to another. More broadly, these examples are typical of a shift from non-industrialized to industrializing societies. One example of the impact of these transitions is the introduction of new construction materials and building designs in a society that is accustomed to traditional materials and designs. This often results in new materials being used incorrectly. In disaster prone areas, inadequate new construction techniques may lead to houses that cannot withstand earthquakes or wind storms.

Fig – 1.2

Physical Vulnerabilities of House



New house badly built using modern materials.

1.4.06. Environmental degradation – Deforestation leads to rapid rain run of contributes to flooding – creation of drought – poor cropping pattern over grazing, stripping of topsoil, depletion on of water supply.

1.4.07. Lack of awareness & information – Disasters can also happen because people vulnerable to them simply didn't know how to get out of harm's way or to take protective measures. This ignorance may not necessarily be a function of poverty, but a lack of awareness of what measures can be taken to build safe structures on safe locations. Perhaps some people did not know about safe evacuation routes and

procedures. Other populations may not know where to turn for assistance in times of acute distress. Nevertheless, this point should not be taken as a justification for ignoring the coping mechanisms of the majority of people affected by disasters. In most disaster-prone societies, there is a wealth of understanding about disaster threats and responses. This understanding should be incorporated into any efforts to provide external assistance.[10]

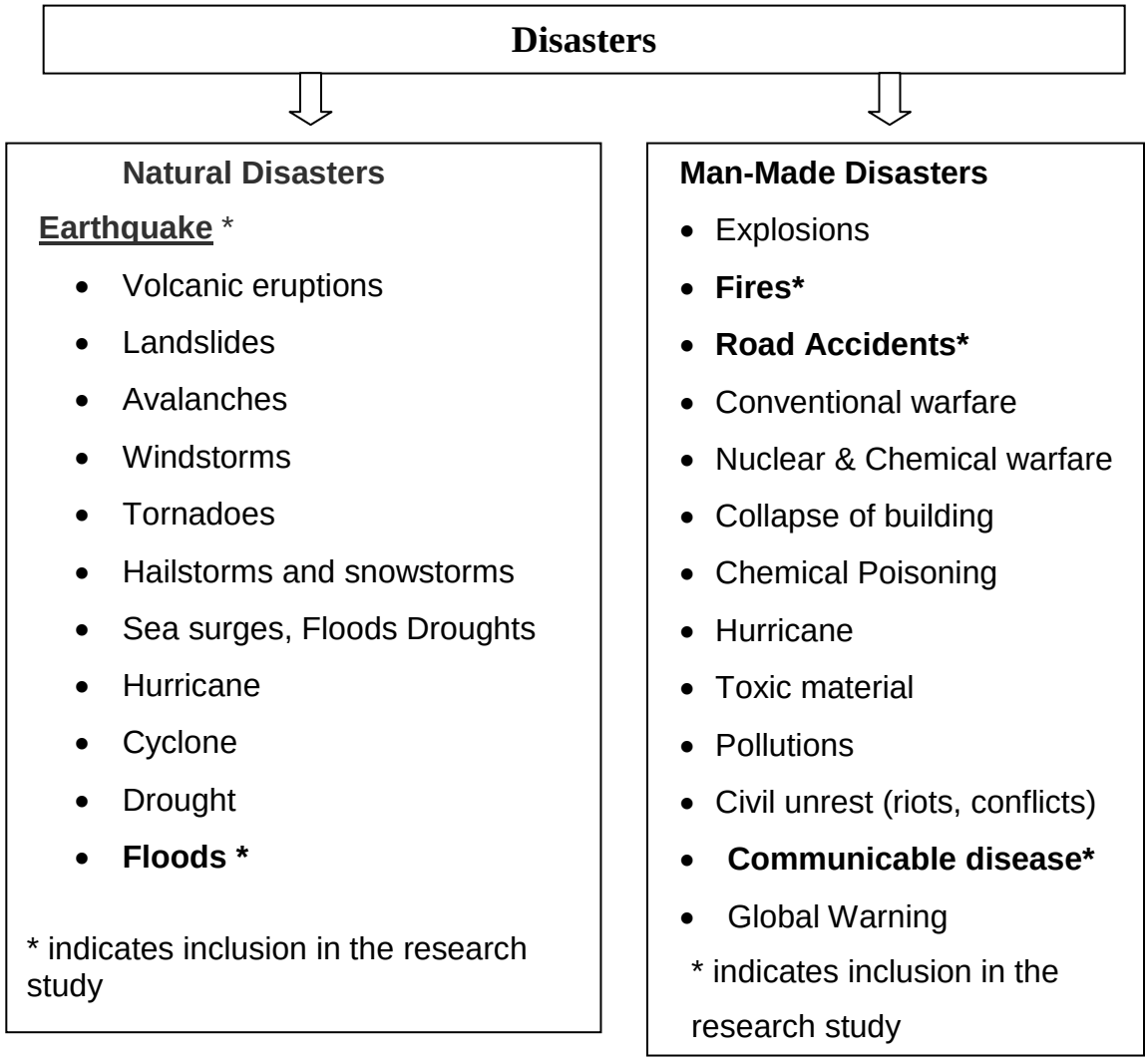
1.4.08. War & Civil strife – In this text war and civil strife are regarded as hazards, that is, extreme events that produce disasters. War and civil strife often result in displaced people. The causal factors of war and civil strife include competition for scarce resources, religious or ethnic intolerance, and ideological differences. Many of these are also byproducts of the preceding six causal factors of disasters.

1.4.09. Technology - Peoples in industrialized countries are less self-sufficient because they rely on technology and social and economic system within their community.[11]

1.5. Types Of Disasters

Figure – 1.3

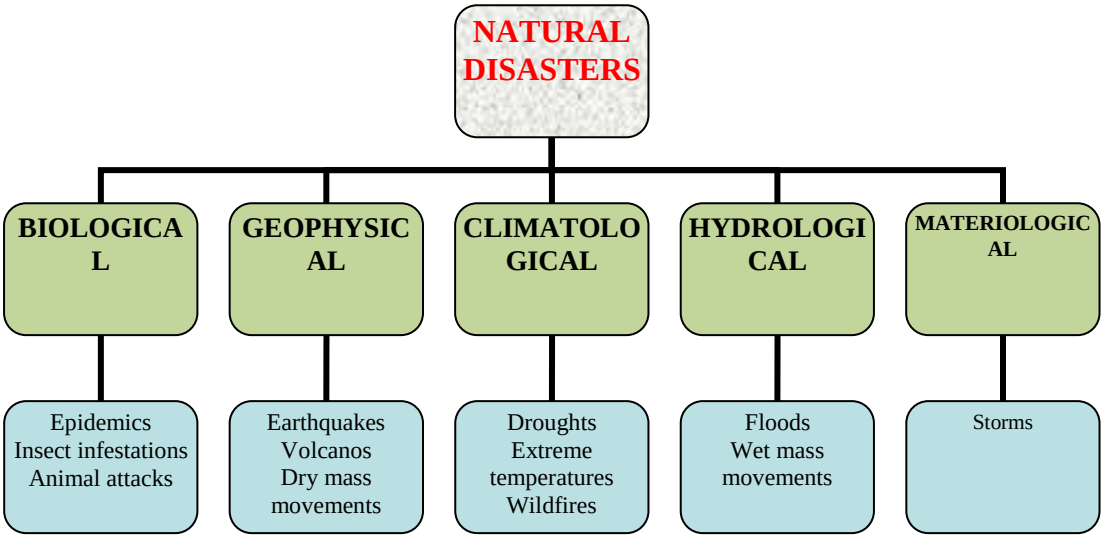
Types of Disasters



Source: Annual Disaster Statistical Review 2007

Fig - 1.4

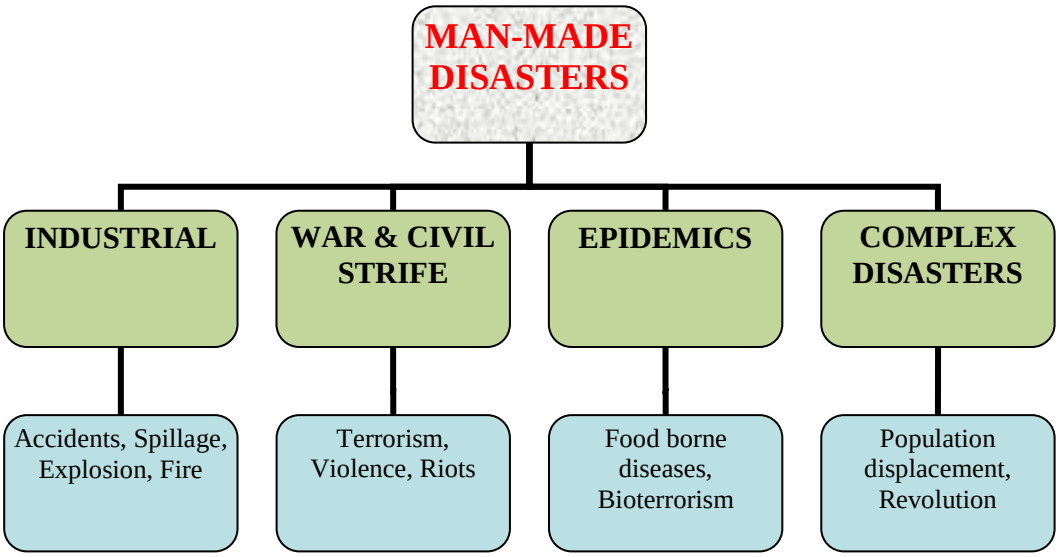
Detailed classifications of natural disasters



Sources : Annual Disaster Statistical Review 2007

Figure – 1.5

Detailed classifications of man-made disasters



Sources : Annual Disaster Statistical Review 2007[12 & 13]

1.5.01. Disasters types depending upon its nature of occurring

- **Natural Disasters** - It is result of natural phenomena. e.g. earthquake, volcanic eruptions hurricane, tornado, avalanche or flood. In this loss of life can range from few individuals to thousands of people, there are plenty of warning signals and man has to regard them and encourage people to take action. E.g. earthquakes, Volcanic eruptions, flood etc.

- **Anthropogenic Disasters** - It is result of man's interaction with artificial environment e.g. air borne hazards, nuclear accidents, union carbide plant disaster at Bhopal. All these disasters are caused by human failure e.g. air borne hazards, nuclear accidents

- **Hybrid disasters** - It arises from a linkage of man – made events and natural events e.g. Air pollution, water pollution, drought, floods hurricanes, landslide and wildfires. [14]

1.5.02. Depending on time of continuity, disasters are divided into-

- **Rapid onset disasters** – (Geological and climatic hazards) – e.g. Earthquake, Tsunamis, Floods, Tropical storms, Volcanic eruptions and Landslides

- **Slows onset disaster** – (Environmental Hazards) – e.g. Drought, Famine, Environmental Degradation, Desertification, Deforestation etc

Table – 1.1

Disaster Classification and Predominant Agents

S.N	DISASTER TYPE	NATURAL	MAN-MADE	HYBRID
	Earthquake	Yes	No	No
	Flooding	yes	No	Yes
	Transport • Air • Road • Marine • Rail	 No No No No	 Yes Yes Yes Yes	 Yes Yes Yes Yes
	Climatic	Yes	No	Yes
	Drought/Famine	Yes	Yes	Yes
	Epidemic	Yes	No	Yes

Source : Dr. Priyaranjan Trivedi, Disaster Management Pg 3

1.6. The characteristics of disasters

The basic characteristics of disasters and appropriate response measures can be structured as follows:

☐ Causal phenomena

☐ General characteristics

☐ Predictability

☐ Vulnerability Factors

☐ Adverse effects

☐ Risk reduction measures

☐ Specific preparedness measures

☐ Post-disaster needs

1.6.01. Earthquakes

- **Causal phenomena :** Slippage of crustal rock along a fault or area of strain and rebound to new alignment.
- **General Characteristics** : Shaking of earth caused by waves on and below the earth's surface causing:
    - Surface faulting
    - Aftershocks
    - Tsunamis
    - Tremors, vibrations
    - Liquefaction
    - Landslides

- **Predictability :** Probability of occurrence can be determined but not exact timing. Forecasting is based on monitoring of seismic activity, historical incidence, and observations.

- **Vulnerability Factors**
    - Location of settlements in seismic areas.
    - Structures which are not resistant to ground motion. Dense collections of buildings with high occupancy.
    - Lack of access to information about earthquake risks.
- **Adverse effects**
    - Physical damage–Damage or loss of structures or infrastructure. Fires, dam failures, landslides, flooding may occur.
    - Casualties–Often high, particularly near epicenter or in highly populated areas or where buildings not resistant.
    - Public health–Fracture injuries most widespread problem. Secondary threats due to flooding, contaminated water supply, or breakdown in sanitary conditions.
    - Water supply–Severe problems likely due to damage of water systems, pollution of open wells and changes in water table.

- **Risk reduction measures**
    - Hazard mapping
    - Public awareness programs and training
    - Assessing and reducing structural vulnerability
    - Land use control or zoning, building codes
    - Insurance

- **Post Disaster needs**
    - Search and rescue
    - Emergency medical assistance
    - Damage needs and assessment survey
    - Relief assistance
    - Repair and reconstruction
    - Economic recovery

1.6.02. Tsunamis

- **Causal Phenomena**
    - Fault movement on sea floor, accompanied by an earthquake
    - A landslide occurring underwater or above the sea, and then plunging into the water. Volcanic activity either underwater or near the shore

- **General Characteristics**
    - Tsunami waves are barely perceptible in deep water and may measure 160 km between wave crests
    - May consist of ten or more wave crests
    - Move up to 800 km per hour in deep water of ocean, diminishing in speed as the wave approaches shore
    - May strike shore in crashing waves or may inundate the land Flooding effect depends on shape of shoreline and tides

- **Predictability**
    - Tsunami Warning System in Pacific monitors seismic activity and declares watches and warnings. Waves generated by local earthquakes may strike nearby shores within minutes and warnings to public may not be possible.

- **Vulnerability factors**
    - Location of settlements in low lying coastal regions
    - Lack of tsunami resistant buildings
    - Lack of timely warning systems and evacuation plans
    - Unawareness of public to destructive forces of tsunamis

- **Adverse Effects**

    - Physical damage–The force of water can raze everything in its path but the majority of damage to structure and infrastructure results from flooding.

    - Withdrawal of the wave form shore scours out sediment and can collapse ports and buildings and batter boats.

    - Casualties and public health–Deaths occur principally by drowning and injuries from battering by debris.

    - Water supply–Contamination by salt water and debris or sewage may make clean drinking water unavailable.

    - Crops and food supplies–Harvests, food stocks, livestock farm implements and fishing boats may be lost. Land may be rendered infertile due to salt water incursion.

- **Risk Reduction Measures**

    - Protection of buildings along coast, houses on stilts

    - Building barriers such as breakwaters

- **Post Disaster Needs**

    - Warning and evacuation; search and rescue; medical assistance; conduct disaster assessment, provide food, water and shelter

1.6.03. Floods

- **Causal Phenomena**

    - Naturally occurring flash, river and coastal flooding from intense rainfall or inundation associated with seasonal weather patterns, human manipulation or watersheds, drainage basins and floodplains.

- **General Characteristics**

    - Flash Floods : Accelerated runoff, dam failure, breakup of ice jam
    - River floods–Slow buildup, usually seasonal in river systems
    - Coastal floods–Associated with tropical cyclones, tsunami waves, storm surges

- **Predictability**

    - Flood forecasting depends on seasonal patterns, capacity of drainage basin, flood plain mapping, surveys by air and

land. Warning possible well in advance for seasonal floods, but only minutes before in case of storm surge, flash flood, or tsunami.

- **Vulnerability Factors**
    - Depth of water, duration, velocity, rate of rise, frequency of occurrence, seasonality.
    - Location of settlements on floodplains
    - Lack of awareness of flooding hazard
    - Reduction of absorptive capacity of land (erosion, concrete)
    - Non-resistant buildings and foundations, high risk infrastructural elements.

- **Adverse effects**
    - Physical damage–Structures damaged by washing a way, becoming inundated, collapsing, impact of floating debris. Landslides from saturated soils. Damage greater in valleys than open areas.
    - Casualties and public health–Deaths from drowning but few serious injuries.
    - Possible outbreaks of malaria, diarrhea and viral infections.

- Water supplies–Contamination of wells and groundwater possible. Clean water may be unavailable.
- Crops and food supplies–Harvests and food stocks may be lost to inundation.
- Animals, farm tools and seeds might be lost. Floodplain mapping, Land use control

- **Risk Reduction Measures**
  - Flood control (channels, dikes, dams, flood-proofing, erosion control) Flood detection and warning systems
  - Community participation and education
  - Development of master plan for floodplain management

- **Post Disaster Needs**
  - Search and rescue; medical assistance; disaster assessment; short term food and water supplies; water purification; epidemiological surveillance; temporary shelter

1.6.04. Epidemics

- **Causal Phenomena**
    - Unsanitary Conditions, crowding, poverty
    - Ecological changes that favor breeding of vector
    - Non-immune persons migrate to endemic disease area
    - Decline in nutritional status
    - Contamination of water or food supply

- **General Characteristics**
    - Risk of introduction or spread of the disease
    - Possible large number of cases
    - Severe disease leading to disability or death
    - Risk of social or economic disruption
    - Lack of adequate professional personnel, needed supplies
    - Danger of international transmission

- **Predictability**
    - Epidemics may increase due to rise in travel migration and long-term dormant symptoms of sexually transmitted diseases. Reports of epidemics may increase due to better medical coverage. Prediction is assisted by epidemiological studies but may be constrained in newly formed settlements or emergency camps

- **Vulnerability Factors**
    - Poverty
    - Lack of immunity (or vaccination) to diseases
    - Poor nutrition, poor sanitation, poor water quality, crowding
    - Poorly organized health care delivery
    - Drug resistant diseases

- **Adverse effects**
    - Illness and death
    - Social and political disruption, economic loss
    - Increased trauma in emergency settlements

- **Risk Reduction Measures**
    - Structuring and emergency health service
    - Preparing a contingency plan with inventory of required resources
    - Establishing an early warning system through routine surveillance
    - Training of national staff in emergency operations

- **Post Disaster Needs**
    - Emergency medical assistance; international aid, if outbreak

uncontained

- Epidemiological surveys; evaluation of health care systems and emergency response

1.6.05. Environmental Pollution

- **Causal Phenomena**
  - Air pollution–pollutants such as sulphur dioxide, nitrogen oxides, particulates, carbon monoxide, and lead from industry and transport.
  - Marine pollution –Sewage, industrial effluents, marine litter, petroleum spills and dumped radioactive substances.
  - Fresh water pollution– Discharge of human waste and domestic wastewaters into lakes and rivers, industrial effluents, use of irrigation and pesticides, run off of nitrogen from fertilizers. Increased runoff from deforestation causing sedimentation.
  - Possible global warming – Accumulation of Carbon dioxide from combustion of fossil fuels, deforestation, and methane from livestock.
  - Ozone depletion – Chloroflorocarbons (CFCs) released into the atmosphere deplete ozone shield against ultraviolet light

- **Predictability**
    - Pollution is related to per capita consumption so, as countries develop pollution will also tend to increase. Deforestation is increasing in some countries.

- **Vulnerability Factors**
    - High levels of industrialization and per capita consumption
    - Lack of regulation of pollutants
    - Insufficient resources to counter the impact of pollution

- **Adverse Effects**
    - Air pollution – Damages agricultural crops, forests, aquatic systems, structural materials and human health.
    - Water pollution – Spread of pathogens, injury to marine animals, spread of chemicals to the environment effecting the health of humans, animals and sealife.
    - Global warming – Sea level rise, climate change, temperature rise
    - Ozone depletion – Increase in skin cancer, cataracts, reduction in immune system functions, damage to marine life

- **Risk Reduction Measures**
  - Set ambient air quality standards
  - Set emission limits for every pollutant
  - Establish protection policies for water supplies
  - Reduce the use of pesticides by integrated management
  - Reduce the rate of deforestation and increase planting of trees
  - Promote energy efficiency
  - Regulate use of aerosols and disposal of refrigeration units
  - Prohibit manufacture and use of CFCs

- **Preparedness**
  - Establish a national environmental safety and protection plan
  - Create education programs for environmental awareness
  - Training of government personnel as part of development programs

1.7. Effects of Disasters

1.7.01. After disaster a generalized panic, anxiety and stunned expression is exhibited, many survivors recover rapidly from the psychogenic shock and spontaneously start the actions .Some spread the remarks causing the panic resulting the disturbance in rescue operation . The

trauma caused due to disaster is an unique experience in the individual be it for child or adult or an old person .Taught death & its bereavement is an explicit outcome of any disaster, the psychological consequence left back in the community is of gross significance to the survivors.

1.7.02. In natural & man-made disasters, for different type disaster, the effect differs; Deaths, severe injuries, anxiety, dispersion, communicable diseases, food & water scarcity, social displacement and damage to health infrastructure are common in both the types of disasters.

1.7.03. The psychosocial consequence on the people involved in meeting the needs of victims under stressful and chaotic condition increases. They performs strenuous , stressful & often dangerous work .They scale to ease the suffering of the victims putting their life at risk. [15]

1.7.04. Health problems common to all disasters

- Mass casualties
- Deaths
- Climatic exposures – Extremes of temperature
- Food and Nutrition – Scarcity & Problems in large scale distribution
- Mental Health – Acute mental illness anxiety neuroses depressions
- Communicable Diseases: -

- Diarrhoeal diseases, Measles, Malaria, T.B. Scabies, Respiratory Complaints
- Social reaction – For obvious reasons
- Damage to health infrastructure – Direct consequence of disaster[15]

1.8. The Concept of Disaster Management

1.8.01. Disaster Management is a discipline that involves preparing, supporting and rebuilding society when natural or man-made disaster occurs. It is continuous process by which all individuals, groups and communities manage hazards in an effort to avoid or ameliorate the impact of disasters resulting from the hazards. Action taken depends upon perceptions of risk of those exposed. Effective emergency management relies on thorough integration of emergency plans at all levels of government and non government involvement. Activities at each level (individual, group and community) affect the other levels. [16]

1.8.02. Disaster management encompasses all aspects of planning for and responding to disasters, including hazard analysis, vulnerability reduction (preparedness), prevention, mitigation, response, recovery and rehabilitation. It may refer to the management of both the risks and consequences of disasters. Contingency planning relates to events, which may or may not occur, in which objectives and scenarios are agreed, managerial and technical actions defined, and potential

responses put in place to prevent, or respond to an emergency situation.[17 & 19]

1.9. Phases of Disaster Management

There are four phases of disaster management: mitigation, preparedness, response and recovery. They are described as follows.

Fig. - 1.6

Disaster Management Cycle

Source: Overview of Disaster Management UNDP 2008

1.9.01. Mitigation: Mitigation is action to reduce the consequences of a disaster. While it may not be possible to prevent all disasters, the effects can be modified or reduced if appropriate steps are taken. Mitigation of hazards is the means by which people strive in advance to

reduce the effects of disasters. The goal of mitigation is to find ways to minimize injuries and death and property loss in the event of a disaster. Most effort focuses on reducing the physical effects of a disaster, and may involve strengthening buildings and structures, or changing land-use designations. The first people to respond to any disaster are communities themselves, not governments. Their resourcefulness and resilience is the key to disaster mitigation.

1.9.02. Preparedness: Preparing for a disaster is the process of planning for and warning people about hazards. Activities include emergency planning, ensuring adequate response, and providing adequate warning. These may take the form of educational initiatives, simulation exercises, and the creation of communication networks for the rapid transmission of information during a disaster.

1.9.03. Response: After a disaster strikes, emergency response actions are initiated. Response to an emergency begins with services to ensure the immediate safety of the population. These include:

- First-aid medical treatment of victims
- Evacuation
- Search and rescue operations
- Extinguishing fires
- Provision of emergency food and shelter

- Secondary response activities include the restoration of essential services, and include:
- Restoration of electricity, telecommunications, and water services
- Coordination of personnel and volunteers
- Management of donations of supplies and funds
- Minimization of further loss or damage

Responses can be divided into early and late phases. Early responses are rescue and relief; later responses are rehabilitation and reconstruction. Local people are also the main drivers of reconstruction and continued development. In developing countries, longer-term effects of a disaster on local economies, social conflict, nutrition and disease patterns can cause far more deaths than the event itself. Many international disasters have been described in terms of the ideal management, and what actually happened. Characteristically, even quite predictable and regular events have not been planned for; communities have been far more vulnerable than they could have been; and authorities have been slow to recognize and declare disasters. Responses have ranged from superb to downright incompetent or absent; relief has often been too little, too late, misdirected, or inappropriate. Often disaster responses are clouded in apathy and confusion; there are often severe deficiencies in communication and

information systems. The usual distortions from a rational response are caused by political and media factors, corruption, inadequate resources, and various local and foreign agencies working at cross purposes. Disaster responses often focus on short-term, high profile rescue operations and neglect the bigger, long-term issues. Finally, several authors have described the interconnections between disaster management and sustainable development. While good disaster planning minimizes interruptions to development, poor responses can divert scarce resources, increase dependency, and actually increase vulnerability to further disasters. Post-mortems, enquiries and evaluations are an essential part of the cycle. While it is easy to criticize after the event, they are also opportunities to do better the next time.[18]

1.9.04. Recovery: the aim of recovery phase is to restore the affected area to its previous state. It differs from the response phase in its focus. Recovery efforts are concerned with issues and decisions that must be made after immediate needs are addressed. Recovery efforts are primarily concerned with actions that involve rebuilding destroyed property, reemployment and their repair of their essential infrastructure. The recovery phase starts when immediate threat to human life has subsided. Recovery efforts include:

- Medical and psychological assistance
- Insurance and public-sector payouts

- Reconstruction or repair of damaged private property
- Reconstruction or repair of damaged public property and infrastructure
- Removal and disposal of debris

Depending on the severity of the disaster, the recovery process could take days, months or years. The recovery process should take into consideration mitigation measures to reduce the impact of future disasters.[17 & 18]

1.10. Various Agencies Involved In Disaster Management

The major agencies involved are central and state government departments, the district administration, armed forces, the paramilitary forces, NGO's, the international agencies including those of the united nations and the media.[19]

1.10.01. National Organizations

Department of Agriculture and Co-operation (DAC)

1. Natural Disasters – Ministry of Agriculture
2. Railway Disasters – Ministry of Railways
3. Air Disasters - Ministry of Civil Aviation
4. Health Including Biological Disasters - Ministry of Health
5. National Institute of Disaster Management – New Delhi

6. National Centre for Disaster Management – Ministry of Agriculture, India

7. Bombay city Ambulance Corps[16]

1.10.02 International Organizations

1. International Decade of Natural Disaster Reduction. (IDNDR)
2. Centers for Disease Control and Prevention (CDC)
3. International Red Cross Society
4. Rotary Club
5. Sulabh International
6. UN Department of Humanitarian Affairs
7. Food and agriculture Organization (FAO)
8. UNESCO
9. UNICEF
10. World Food Programe (WFP)
11. WHO
12. Asian Development Bank
13. Asian Disaster Preparedness centre (ADP)
14. International Institute for Environment and Development (IIED)ssistance
15. International Federation of Red Cross and Crescent Societies

1.11. Global Scenario

1.11.01. Today, the world is facing disasters on an unprecedented scale: more than 255 million people were affected by natural disasters globally each year, on average, between 1994 and 2003, with a range of 68 million to 618 million. During the same period, these Disasters claimed an average of 58,000 lives annually, with a range of 10,000 to 123,000. In the year 2003, 1 in 25 people worldwide was affected by natural disasters. In 2007, 414 natural disasters were reported. They killed 16847 persons, affected more than 211 million others and caused over 74.9 US$ billion in economic damages.

1.11.02. The Swine Flu pandemic shattered the world From April till August 2009 which has taken over 100 lives in Mexico. The scare of a pandemic affected millions of people across the globe. The most affected countries were India, US, UK, Canada, France and New Zealand (TOI April 24, 2009) In India Pune city was in eye of Flu storm. 62% of the H1N1 death in India has been from Pune city. Record show that out of 6249 people found to have symptoms and then tested for SF, 1107 were identified symptomatic positive.[20]

1.11.03. Over 3 million lives have been lost in the past decade as a result of conflict (including terrorism) and both natural and technological disasters. In addition to the mortality, 5 billion more people each year

have had to deal with the injuries, disease. The spectrum of occurrence of disasters indicates that nearly twenty major disasters strikes the world every year resulting in many deaths and several casual Besides the major disasters, innumerable moderate and minor disaster strike the world community every year. The study of global statistics of disasters over three decades reveals that there is a significant increase in impact of disasters. The Asia-Pacific region witnesses a large number of natural disasters due to its geographical location and geological make up. The Asia-Pacific region is most disaster prone and is exposed to almost every type of natural hazard. Sixty percent of the major natural disasters reported in this region.[21]

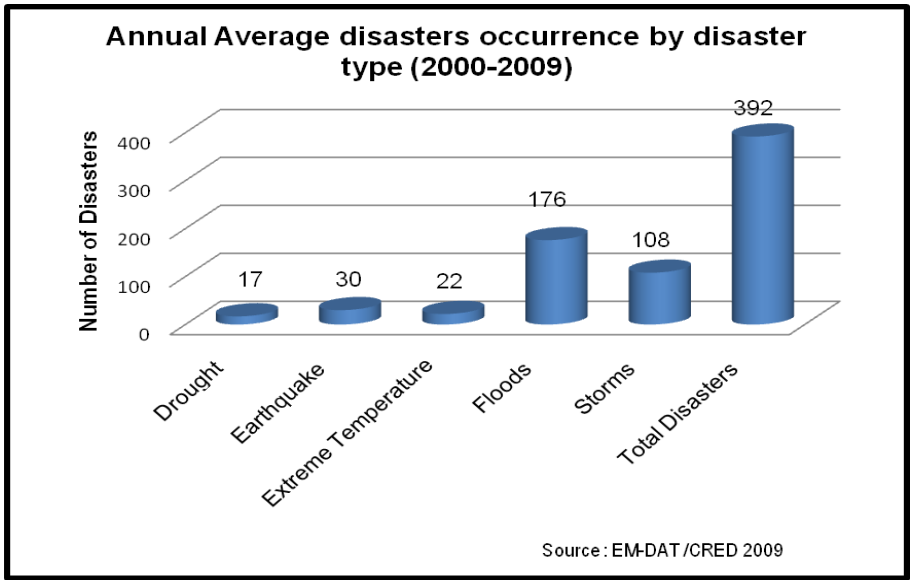
1.11.04. Disasters have their greatest economic and social impact in the poorest countries. From 1991 until 2000, major natural disasters cost an estimated $78.7 billion per year (International Federation of Red Cross [IFRC], 2001)[22].

1.11.05. Some one million people have died in earthquake, in the past 100 years worldwide, another one million in hurricanes, typhoons and tropical cyclones and as many as nine millions in floods. Millions of deaths from disease and famine directly caused by these catastrophes. In the 1970s and 1980 alone almost 3 million lives were lost in natural disasters and 800 million people were adversely affected. There was worst flood in China in 1990, the largest volcanic

eruption in Philippines this century and cyclone in Bangladesh claimed at least 1,50,000 lives. The global spread of drought may be part of a general global climatic change, which is now widely thought to be influenced by human activities.[23]

Fig 1.7

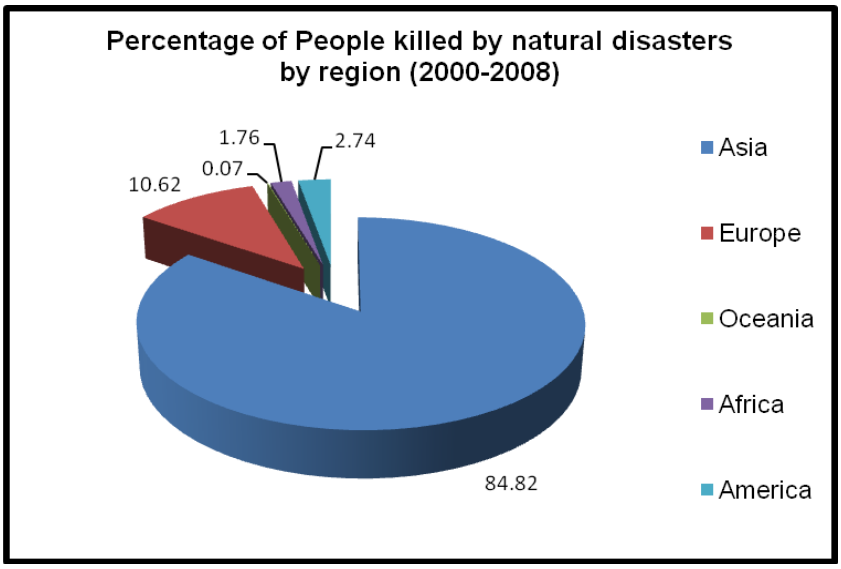
Annual Average disasters occurrence by disaster type (2000-2009)



1.11.06. The world has seen many disasters over the years. Many were caused by people - wars, terrorists... Others are sometimes referred to as "acts of God". It's very difficult to rank them because there are different ways of defining "worst" (some would just count the dead, others would include the injured, still others would measure in terms of the amount of dollars required to repair the damages, or somehow calculate the damage to the environment...) All of these disasters took more than 25,000 lives. 43 of these disasters took over 100,000 lives[24]

Figure 1.8

Percentage of people killed by natural disasters by regions



1.11.07. South Asian Nations, 2004 – 2005 Earthquake of 9.0 and the resulting tsunami creates one of the world's worst disasters. It does major damage to: Indonesia, India, Sri Lanka, Thailand, Malaysia, Myanmar, the Maldives, Somalia, Tanzania, Seychelles, Bangladesh, and Andaman. Deaths: Between 235,000 and 285,000 and still counting. South Asia, 2005 Earthquake, primarily affecting Pakistan, but also India and Afganistan. Current figures: over 50,000 dead. [25]

Table – 1.2

Recent tropical storms

Type	Year	Country	Death
Cyclone Sidr	2007	Bangladesh	3500
Typhoon Durian	2006	Philippines	450
Typhoon Xangsane,	2006	Philippines	279
Typhoon Saomai	2006	China	460
Typhoon Bilis	2006	Philippines	672
Hurricane Katrina,	2005	US	1800

Resource: Asia pacific disaster statistics 2009[26]

1.11.08. Each year, on average, disasters worldwide kill more than 250,000 people, make more than 140 million homeless, and cause tens of billions of dollars' worth in property damage. Disasters are a global problem, resulting in widespread human suffering, financial loss, and sometimes political instability. Reducing disaster losses is a fundamental goal for most governments. In the last 100 yrs 1 million people have died in earthquake, 1 million in cyclone, 9 million in floods, millions of death from disease. In last decade 3 millions of lives were lost in natural disasters and 800 million people were adversely affected. At the close of 20th century, more information about disasters and hazards is being produced than ever before.[28]

Table –1.3

Distribution of natural disasters by origin

	1970-79	1980-89	1990-99	2000-05	Total (century)
Hydro meteorological	776	1498	2034	2135	7486
Geological	124	232	325	233	1252
Biological	64	170	361	420	1083
Total	964	1900	2720	2788	9821

Source : Disaster statistics: international strategy for disaster reduction-2005 [29]

1.11.09. The disturbing fact is that even in a region like South Asia, where poverty, deprivation, and death due to disasters are a common enough feature of life, India remains the worst-affected country. In fact, the frequency of all categories of disasters, varying from epidemics to road accidents and perennial droughts and floods, is escalating, resulting in a multifold growth of injuries, disabilities, diseases, and deaths, disrupting life-supporting systems, and adding to the health, social, and economic burden of an already impoverished people.[29]

Table – 1.4

Number of natural disasters by type 1991-2005

Region	Hydro-meteorological disasters	Geological disasters	Biological disasters	TOTAL
Africa	607	31	393	1031
Americas	1072	114	76	1262
Asia	**1532**	**298**	**199**	**2029**
Europe	581	44	42	667
Ocenia	184	24	13	221

Source: Centre for research on epidemiology of disasters - USA

Table – 1.5

Number of Disaster in SE Asian Countries since 1960

Country	1960-69	1970-79	1980-89
India	34	102	172
Bangladesh	18	37	77
Indonesia	20	46	88
Myanmar	10	10	24
Nepal	7	8	19
SriLanka	5	8	25
Thailand	4	5	25
TOTAL	**98**	**216**	**430**

Source : Health Action NOV 2007[30]

1.11.10. Indonesia is prone to seismic upheaval due to its location on the pacific "ring of fire" an arc of volcanoes and fault lines encircling the pacific Basin.

In December 2004, a massive earthquake struck off Indonesia's Sumatra island and triggered a tsunami that killed more than 2,30,000 people, including 131,000 people from Indonesia alone.(TOI Mar 7,2007) on May 17, 2008 china suffered from massive attack of Eartquake of 6.1 rishter scale and killed more than 50,000 people including school children (Sakal May 18, 2008)[31]

1.12. Indian Scenario

1.12.01. The frequency distribution of disasters in the Asian region between and 1986 showed that India is one of the most disasters prone country faced the largest number of disaster events in this region. India manifests natural disasters like floods, earthquakes, cyclone, drought and accidents regularly due to the vast variation of geographical terrain and climatic condition. The effect of disaster is far more serious in this region. India with 2.4 percent of world land area, seventh largest country in the world, fifteen percent of the world population and population density of persons per square kilometer makes the effect of disasters very serious.

1.12.02. Recent flooding in Mumbai and tsunami on India's east coast, have shown how unprepared we are to tackle extreme weather related

disasters. According to study done specially on Indian conditions, the sea could rise by 15-38 cm by 2050. This, in turn, would mean a five fold increase in the number of floods caused by storms. A study done by IIED, UK, shows that almost 75% of the people vulnerable to catastrophes caused by environmental imbalance.

1.12.03. India is one of the most flood prone countries in the world. On an average, the area affected by floods annually is about nine million hectares and accounts for one fifth of the global death count due to floods. Out of the 96 internationally recognized natural disasters the country experienced between 1960 and 1981, 28 were due to floods.

1.12.04. The country has about 56.3 percent of its total area amounting to 3.3 million square kilometers as vulnerable to seismic activities of varying intensity. The entire northern part of the Indian subcontinent from Hindukush to Eastern Himalayas lies in an earthquake prone belt of violent subterranean volcanic activity. The earthquake prone areas have witnessed over 31 major earthquakes in the last century. The 26 Jan 2001 earthquake in Gujarat virtually flattened the Bhuj area, which resulted in death of over 30,000 people and severe economic losses. The morbidity and mortality due to earthquake depends upon the magnitude, intensity, focal depths, distance from epicenter and other

parameters. Seismicity is one of the most serious natural hazards to threaten the country.

1.12.05. India has been divided into five zones with respect to severity of earthquakes. Of these, zone v is seismically the most active where earthquakes of magnitude 8 or more could occur, historic data are insufficient to define zones because recurrence intervals are much longer than the recorded human history this may often give a false sense of security.[27]

Figure 1.9

Seismic Zonation map of a country

Source: *http://earthquake.usgs.gov/hazards*[27]

1.12.06. The 5700-kilometer long coastline of India is vulnerable to tropical cyclones arising in the Bay of Bengal and Arabian Sea. Cyclonic storms have been causing considerable damage to life and property in the

coastal area of India. The havoc caused by the cyclone is mostly due to strong winds, accompanied by torrential rains, tidal waves, and the resultant inundation. Every year five to six cyclones occur out of which two to three may be severe. More cyclones occur in the Bay of Bengal than in the Arabian Sea and the ratio of their frequencies is about 4: 1. The funnel shape of the Indian coastline and the shallow off shore waters acts as catalysts in intensifying the cyclonic storms. Due to the high density of population along the coastal areas the devastation is also on a large scale. The severity of the effect of cyclone on the community, risk potential and vulnerability makes it inescapable that emphasis focus on prevention and preparedness for response is laid to reduce loss of lives.

Table – 1.6

RECENT FLOODS IN INDIA

Date	**City/Country**	**Disaster type**	**Victims and damages**
19 September 2008	Orissa, India	Climatic: flood	56 killed
16 June 2008	North-eastern India	Climatic: flood	50 killed, two million homeless
25 Aug 2008	Bihar	Flood	90 Killed
10 September 2007	Assam	Flood	10 Killed
30 July 2007	South Asia:	Flood	1,100 Killed

Source: Health Action Nov 2009

Table – 1.7

RECENT EARTHQUAKES IN INDIA

DATE	MAGNITUDE Richter Scale	LOCATION	DEATH	CASUALTIES
January 26, 2001	7.7	Bhuj, Gujrat	20,000	1,67,000
March 29, 1999	6.8	Chamoli, Uttarakhand	103	
September 30, 1993	6.4	Latur Maharashtra	7928	30,000

Source: Health Action Nov 2009

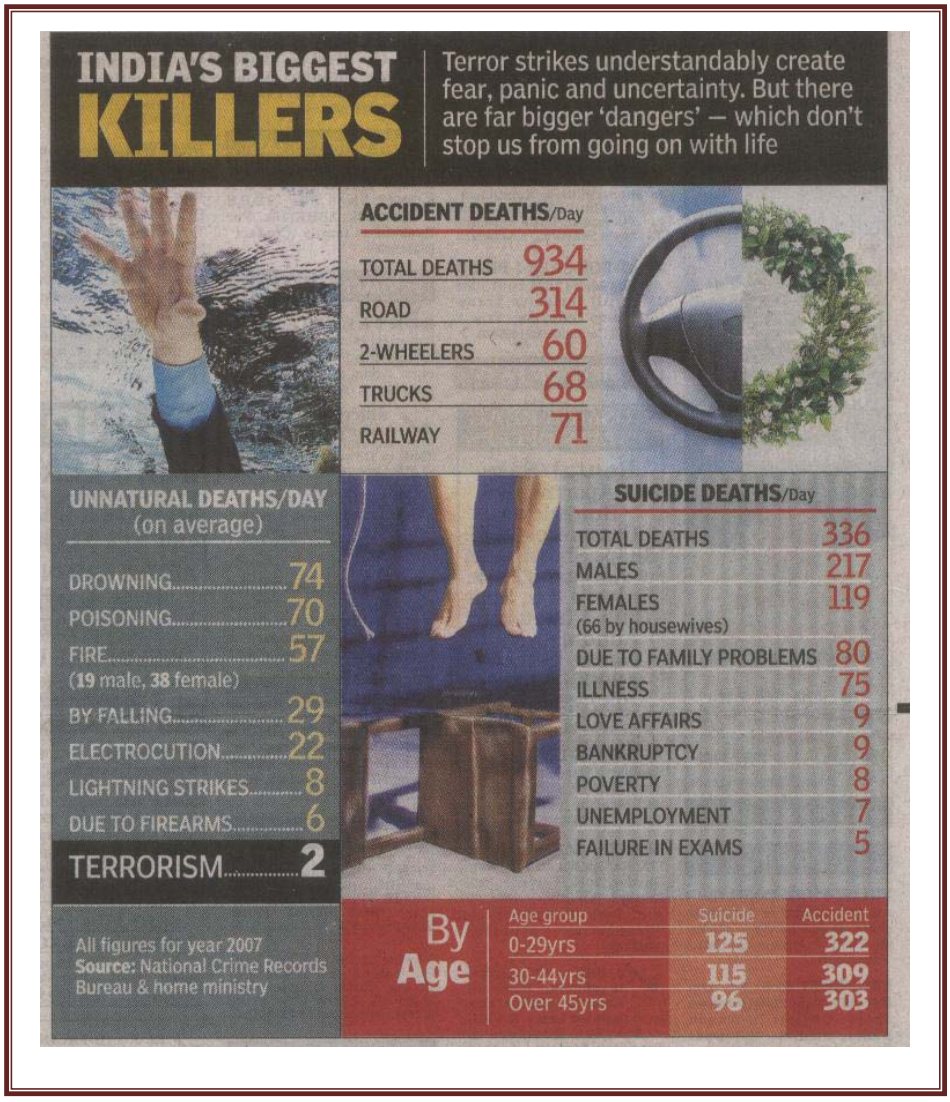
1.12.07. Many of the contemporary disasters have been man-made. India has been witnessing an increasing incidence of man-made disasters. The list of man-made disasters like Gas tragedy, train accidents, aircraft crashes, fire in high rise buildings, mine disasters, industrial and chemical disasters are ever increasing for various reasons. The spectrum of occurrence of man-made disasters focuses attention on policy imperatives for disaster management, preparedness and response to provide relief to the community.[32]

1.12.08. India has been witnessing an increasing incidence of man-made disasters. India faced one of the worst man-made disaster on 3rd Dec 1984 when Bhopal gas Tragedy occurred. The train accidents, bus accidents, missile failures air craft accidents, fire in schools are ever increasing disasters.

1.12.09. The figure 1.9 depicts that India is in grip of calamities, many Indians are dying each year due to various fatal events. According to WHO the third largest killer of India is unintentional injuries which includes road accidents, Fire drowning etc. according to National Crime record bureau 2007 around 2700 people were killed by lightening while 733 lives were lost in insurgency and terror related incidents. (Figure 1.9)

Figure 1.10

India's Biggest Killers



Source : National Crime Records Bureau 2007

1.13. Background Of The Study

1.13.01. Each year natural disasters take a heavy toll on human life and property. The United Nations estimates that in the past two decades nearly three million lives have been lost to natural disasters and some 800 million affected by them. Every year at least four cyclones of varying intensity hit parts of India's nearly 6,000 km long coastline, earthquakes of varying magnitude rock northern India and hundreds die of severe cold/ heat waves in north India.

1.13.02. Across the world or in our own backyard, disasters have devastating results due to inadequate preparation, the latest being the Gujarat quake. Since natural calamities tend to be unavoidable and earthquakes unpredictable, efforts have to be made to withstand the aftermath of catastrophes. Disaster Management training is useful for NGOs, social work students or volunteers providing support and rehabilitation measures during disasters, personnel of home guards, paramilitary organizations, civil defense personnel, scientists, meteorologists, and environmentalists. It also proves useful for functionaries of rural development and primary health centers, administrative services and relief workers.

1.13.03. Pune is top ranks in the road accidents. There were 402 deaths in last year due to road mishaps. The total number of accident events were

2157. The majority death occurs in age group of 16 – 25 years and the cause of death are head injuries.

1.13.04. Though it is not common in India, the incidences like fires in schools and taking lives of peer children, incidences like fire in school in Tamilnadu has taken lives of seventy school children, and the teachers were not able to give even first aid efficiently.

1.13.05. Teachers or religious leaders, and may be willing to assist in the promotion of emergency programs within their ethnic or lingual community. They may offer valuable opinions on the group's needs, capabilities, and limitations, or provide suggestions on ways of reaching out. Emergency education through schools is effective, as children tend to be attentive to discussions on disasters. Children learn quickly and can transmit the information, often by translation, to their family members. School boards and parents organizations may be willing to assist in emergency preparedness programs and be able to provide volunteers and resources.

1.13.06. Thankfully the education of disaster management is already included in curricula of various middle and secondary educations. This not only will make our future citizens learn about disasters, but will also make them able to equip themselves to cope with various disasters in an improved manner.

1.13.07. At a very fundamental level, knowledge of the vulnerability of developing countries to different types of disasters is necessary for the most effective relief and preparedness planning. The usefulness of a disaster database as a tool in this planning has become increasingly evident to many government and international agencies engaged in disaster relief as well as in mitigation and prevention programmers. Though most of the disasters can be prevented, sometimes it is beyond the control of individual person, being prepared to handle it.[35]

1.13.08. Large number of students in various academic institutions must learn to share the pain of those who have suffered in an extraordinary tragedy. Without finding fault with government or other agencies, the duty of every right thinking person at this moment is to take initiative and contribute one's mite in alleviating suffering in whichever way we can.

Long term learning measures were not undertaken after Gujarat earthquake. And if these are not undertaken again, we will all have to blame ourselves for not equipping our country with better self help and more efficient information systems.

1.13.09. The earthquake in Gujarat and the subsequent chaos were indicators of how crucial prior planning is in managing relief and rehabilitation during disasters. The Kutchh region required massive and immediate assistance at that time, which came but was very poorly managed. This made the need for a proper disaster mitigation plan very apparent. Learning from experience is essential in building a knowledge resource which would help in being better prepared in the future. [35]

1.13.10. Let us wish that such calamities never happen again. But if they do happen we must be prepared. A report of the Gujarat State Disaster Management Authority said in the absence of safety measures, schools across the state might expose nearly 600,000 students to various hazards. [India News] Ahmadabad, Aug 26,2005 . After a devastating blaze in a Tamil Nadu school killed 95 children, an NGO in Gujarat has launched an initiative to train authorities in schools to deal with fires and calamities like floods and earthquakes.

1.13.11. Disaster Mitigation Institute established in the early 1990s is now reaching out to schools in Ahmedabad, Bharuch, Bhavnagar, Jamnagar and Rajkot, helping them plan safety measures.

1.13.12. "School safety in urban areas is more acutely vulnerable due to unrestricted land use, crowding and bypassing of building laws. The school boards of towns can take a more active role in promoting school safety," said Bhatt. The government's Common Minimum Programme for governance puts emphasis on providing universal access to quality basic education, but making this access safe is not on the agenda.(Indo Asian News Service) [34]

1.14. Reason for choice of the study

1.14.01. In the 2001 Bhuj earthquake, three million children were directly affected in 18 districts of the Gujarat State. The fire tragedy (2004) in a school in Kumbakonam (Tamil Nadu State) claimed the lives of 90 children. During the 2004 tsunami about 60,000 children were killed. In the above cases the number of deaths and losses was mainly due to concerned authority not following disaster preparedness activities and the children being not aware of the do's and don'ts at the time of such events. Moreover, disaster management and mitigation plans are prepared in isolation without targeting the concerned target population. A combination of clear and accurate warning messages with high level of preparation with an effort of self reliance during the crisis time needs to be looked into. Education program with a wider range of people representing entire age groups needs to be strongly advocated. The best way out is to include the disaster management education in the school / college curriculum. Education and awareness programme

should be designed in such a way that it is sustainable and continuous process as the target population continuously changes and grows.

1.14.02. In India there are various different types of school system - the Central Board of Secondary Education, State Education Boards, and the Council for Indian School Certificate Examinations (CISCE), National Open School and International Schools. According to the latest government survey there are 1,124,033 schools in India. School children contributes 35% of the country's population. it is high time the 35% of the country's future generation has been prepared to combat future disasters. GOI, Ministry of Human Resource Development has recommended the different school boards to incorporate Disaster Management in the school curriculum.

1.14.03. The role of schools in the community is very important and it would be befitting to call schools as cradles of the society. Children are a dynamic and powerful force of change and are supporters in creating awareness in the community. They can contribute in a unique manner with energy and vision to find local solutions. School teacher should be encouraged to take up tasks which make them realize their importance as necessary stakeholders in the change process. School safety has been given a major focus by the United Nations International Strategy

on Disaster. If we empower the school teacher, they will be able to provide help in emergency and many lives can be saved.[36]

1.14.04. Major earthquake (January 2001) in Gujarat also highlights the need and importance of policy development in disaster preparedness and management, to optimize the effectiveness of limited resources and provision of feasible and necessary first aid. Some casualties were required to walk/travel 200 kms. For first aid/primary care. (Bremer R. 2003)[35]

1.14.05. Pune –scenario

Pune is the eighth largest metropolis in India, largest city in the western ghat. Pune is a cultural capital of Maharashtra, Oxford of the East. Pune is a global city. There are number of aspects that make Pune different. Whether it is the cultural richness, simplicity of citizens, electrifying life or global education hub. Pune is industrial city of Maharashtra too. It is considered to be one of the most progressive and developing city of India. The city blessed with several propellers of growth. In recent years education in Pune has become very exhaustive and vast. These activities and job opportunities attract migrants and students from all over India. Central Pune is located at the confluence of Mula and Mutha rivers.

1.14.06. Pune lies close to the seismically active zone around Koyna Dam, about 100 km south of city, rated in Zone IV most prone to earthquake.

Pune has experienced some moderate intensity and many low intensity earthquakes in the history. Although no major earthquake have originated in Pune, an earthquake of magnitude 3.2 took place in the Katraj region on May 17, 2004. The population of Pune is estimated to be around 44 lakhs in 2005. The growth of education sector has lead to an influx of population from all over India. Pune has more than a hundred educational institutes and twelve universities. Pune has more schools, colleges and universities than any other city in the world. Pune is connected by air, rail and roads. In recent past Pune suffered from various disasters like floods, road accidents and epidemics like Swine flu which makes people very panic and devastative.

1.14.07. Training is one of the WHO strategies for improving disaster preparedness. In recent years, the scope of training has broadened substantially. Initially, it focused on teaching top –level managers how to make decisions under crisis circumstances. Today emphasis is shifting increasingly to training first responders, co-coordinating operations among different sectors, and community education.[33] According to World Health Organization Disaster management education is a step forward in generating an understanding of the implications of disasters, their control and management.[36]

1.14.08. School children and their teachers are some of the most receptive group to disaster preparedness education and training. In Costa Rica,

the health and education sectors have joined forces to organize courses to help teachers deal with disaster situations that threaten the health of their students. These children, in turn share this valuable education with family and community.[38]

1.14.09. Recognizing the value of school children as “multipliers” of disaster information. School teachers are valuable social group to educate children about disasters. This strategy is proving its long term effectiveness.

1.14.10. Recent research shows that over half of children in the UK would not know how to carry out live-saving first aid at the scene of an accident. A new UK-wide survey conducted for the British Red Cross and Toyota by The Children’s Forum found that over half (60%) of children who are currently most at risk from road traffic accidents (those aged 9 – 13) do not have enough knowledge of first aid to help themselves and others at the scene of a traffic accident. [47]

1.14.11. Children, particularly those aged 9 – 13 years, are the group most at risk from road traffic accidents. Over 1,800 children aged 9 – 13 years are killed or seriously injured in road traffic accidents every year and research shows that many of these children’s lives could have been saved if first aid was given at the scene before the arrival of the emergency services. Despite their lack of knowledge the majority (94%) of children agreed that it was very important for them to learn first aid and most of them wanted to learn more.[40]

1.14.12. The British Red Cross' started with 150 free first aid sessions taking place throughout the UK at various venues including shopping centers, parks, schools, town centers, and beaches. Parents will be encouraged to come along with their children to find out more about first aid. Based on all above facts the investigator felt the need of assessing the knowledge and practices of school teachers on disaster management.[42]

1.14.13. Girijakumari conducted study (2002) and she revealed that educating Industrial workers on selected first aid measures in Tamilnadu helped them to develop positive attitude and lead to better practice of appropriate first aid measures.

1.14.14. Prevention measures are designed to lessen the physical impact of disasters and reduce the loss of lives. Preparedness, on the other hand, while accepting the inevitability of disasters focuses on how to lessen their effects on the population. Effective preparedness measures enable communities to provide a quick, organized response to disasters.[37]

1.14.15. In view of the above facts and figures researcher highlighted the need of conducting the study to assess the effectiveness of training manual on disaster management among teachers of secondary schools in Pune city.

Chapter – 2

DISASTER MANAGEMENT: POLICIES, PROTOCOLS AND PREPAREDNESS

2.1. INTRODUCTION

2.1.1. Natural disasters have been visiting every part of the globe at one time or the other. The world is becoming increasingly vulnerable to various disasters. From earthquakes to floods and famines, mankind is even more threatened by the forces of nature. Disasters can strike at any time, at any place. The traditional perception has been limited to the idea of “calamity relief”, which is seen essentially as a non-plan item of expenditure. However, Disasters can have devastating effects on the economy they cause huge human and economic losses, and can significantly set back development efforts Two recent disasters, the Orissa Cyclone and the Gujarat Earthquake, are cases in point With the kind of economic losses and developmental setbacks that the country has been suffering year after year, the development process needs to be sensitive towards disaster prevention and mitigation aspects. There is thus needed to look at disasters from a development perspective as well.[52]

2.1.2. Recently, expert bodies have dwelt on the role of the Planning Commission and the use of plan funds in the context of disaster management. Suggestions have been made in this regard by finance

commission. And also the High Powered Committee on Disaster Management An approach on planning for safe development needs to be set out in the light of these suggestions[53]

2.2. THE GLOBAL CONTEXT

2.2.1. There has been an increase in the number of natural disasters over the past years, and with it, increasing losses on account of urbanization and population growth, as a result of which the impact of natural disasters is now felt to a larger extent. According to the United Nations, in 2001 alone natural disasters of medium to high range caused at least 25,000 deaths around the world, more than double the previous year, and economic losses of around US $ 36 billion. These figures would be much higher if the consequences of the many smaller and unrecorded disasters that cause significant losses at the local community level were to be taken into account. Devastations in the aftermath of powerful earthquakes that struck Gujarat However, what is disturbing is the knowledge that these trends of destruction and devastation are on the rise instead of being kept in check.[54]

2.2.2. Natural disasters are not bound by political boundaries and have no social or economic considerations. They are borderless as they affect both developing and developed countries. They are also merciless, and as such the vulnerable tend to suffer more at the impact of natural disasters For example, the developing countries are much more seriously

affected in terms of the loss of lives hardship borne by population and the percentage of their GNP lost. Since 1991, two-third of the victims of natural disasters was from developing countries, while just 2 per cent were from highly developed nations. Those living in developing countries and especially those with limited resources tend to be more adversely affected. With the alarming rise in the natural disasters and vulnerability, the world community is strengthening its efforts to cope with it as a number of the most vulnerable regions are in India, natural disaster management has emerged as a high priority for the country. Going beyond the historical focus on relief and rehabilitation after the event, we now have to look ahead and plan for disaster preparedness and mitigation, in order that the periodic shocks to our development efforts are minimized

2.3. THE INDIAN EXPERIENCE

2.3.1. Regional Vulnerabilities

Physical vulnerability relates to the physical location of people, their proximity to the hazard zone and location of people, their proximity to the hazard zone and standards of safety maintained to counter the effects. For instance, some people are vulnerable to flood only because they live in a flood prone area. Physical vulnerability also relates to the technical capacity of buildings and structures to resist the forces acting upon them during a hazard event.[56]

Box -2.1

INDIA'S KEY VULNERABILITIES

- Coastal States, particularly in the coast and Gujrat are vulnerable to cyclones,
- 4 crore hectare land mass is vulnerable to floods.
- 68 percent of net sown area is vulnerable to drought
- 55 percent of total area in seismic Zones III-IV and vulnerable to earthquake.
- Sub-Himalayan/ Western Ghat is vulnerable to landslides.
- Over population in India

Source: Disaster Management Act 2005

The extent to which a population is affected by a calamity does not purely lie in the physical components of vulnerability, but is contextual also to the prevailing social and economic conditions and its consequential effect on human activities within a given society. Research in areas affected by earthquakes indicates that single parent families, women, handicapped people, children and the aged are particularly vulnerable social groups. The geophysical setting with unplanned and inadequate developmental activity is a cause for increased losses during disasters. In the case of India the contribution of over-population to high population density, which in turn results in escalating losses, deserves to be noted. This factor sometimes tends to be as important as physical vulnerability attributed to geography and infrastructure alone.

The continent of Asia is particularly vulnerable to disaster strikes. Between the years 1991 to 2000 Asia has accounted for 83 per cent of the population affected by disasters globally. While the number of people affected in the rest of the world were 1, 11,159, in Asia the number was 5,54,439. Within Asia, 24 per cent of deaths due to disasters occur in India, on account of its size population and vulnerability. Floods and high winds account for 60 per cent of all disasters in India While substantial progress has been made in other sectors of human development, there is need to do more towards mitigating the effect of disasters

Many parts of the Indian sub-continent are susceptible to different types of disasters owing to the unique topographic and climatic characteristics. About 54 per cent of the sub-continent's landmass is vulnerable to earthquakes while about 4 crore hectares is vulnerable to periodic floods The decade 1990-2000, has been one of very high disaster losses within the country, losses in the Orissa Cyclone in 1999, and later, the Gujarat Earthquake in 2001 alone amount to several thousand crore of Rupees, while the total expenditure on relief and reconstruction in Gujarat alone has been to the tune of Rs 11,500 crore

Similarly, the country has suffered four major earthquakes in the span of last fifty years along with a series of moderate intensity earthquakes that have occurred at regular intervals Since 1988, six earthquakes have struck

different parts of the country. These caused considerable human and property losses

Table – 2.1

Major Earthquake in India 1988 -2004

Date	Location	Magnitude
August 21, 1988	Bihar – Nepal Border	6.4
October 20, 1991	Uttarkashi, Uttar Pradesh	6.6
September 30, 1993	Latur – Osmanabad, Maharashtra	6.3
May 22, 1997	Jabalpur, Madhya Pradesh	6.0
March 29, 1999	Chamoli Uttar Pradesh	6.9
January 26, 2001	Bhuj Gujrat	7. 7
December 26, 2004	Andhra Pradesh, TamilNadu, Kerala	9.0

Source : World health manual - April 2005

Disasters lead to enormous economic losses that are both immediate as well as long term in nature and demand additional revenues. Also, as an immediate fall-out, disasters reduce revenues from the affected region due to lower levels of economic activity leading to loss of direct and indirect taxes. In addition, unplanned budgetary allocation to disaster recovery can hamper development interventions and lead to unmet developmental targets

Disaster may also reduce availability of new investment, further constricting the growth of the region. Besides, additional pressure may be imposed on finances of the government through investment in relief and rehabilitation work. in the recent earthquake in Gujarat, more than 14,000 lives were lost, ten lakh houses were damaged and the asset loss has been indicated to be worth 15,000 crore. It gives an indication of the magnitude of the damage and losses by the country in recent natural disasters.

The dimensions of the damage, emphasize the point that natural disasters cause major setbacks to development and it is the poorest and the weakest that are the most vulnerable to disasters. Given the high frequency with which one or the other part of the country suffers due to disasters, mitigating the impact of disasters must be an integral component of our development planning and be part of our poverty reduction strategy[34]

2.4. Institutional Arrangements

2.4.1. The country with its federal system of Government has specific roles for the Central and State Governments However, the subject of disaster management does not specifically find mention in any of the three lists in the 7th Schedule of the Indian Constitution, where subjects under the Central and State Governments as also subjects that come under both

are specified. On the legal front, there is no enactment either of the Central or of any State Government to deal with the management of disasters of various types in a comprehensive manner

2.4.2. The country has integrated administrative machinery for management of disasters at the National, State, District and Sub-District levels. The basic responsibility of undertaking rescue, relief and rehabilitation measures in the event of natural disasters, as at present, is that of the State Governments concerned. The Central Government supplements the efforts of the States by providing financial and logistic support

2.5. Role of Central Government

2.5.1. At the national level, the Ministry of Home Affairs is the nodal Ministry for all matters concerning disaster management except drought, which continues to be handled by the Ministry of Agriculture. The Central Relief Commissioner (CRC) in the Ministry of Home Affairs is the nodal officer for coordinating relief assistance for the natural and manmade disasters. The CRC receives information relating to forecasting/warning of a natural

Box – 2.2

Global Losses Through Natural Disasters

According to the 'Munich Re' costs associated eith natural disasters has gone up 14 fold since 1950. Each year an average 211 million people were killed by natural disasters

Source: World Disaster Report, 2001

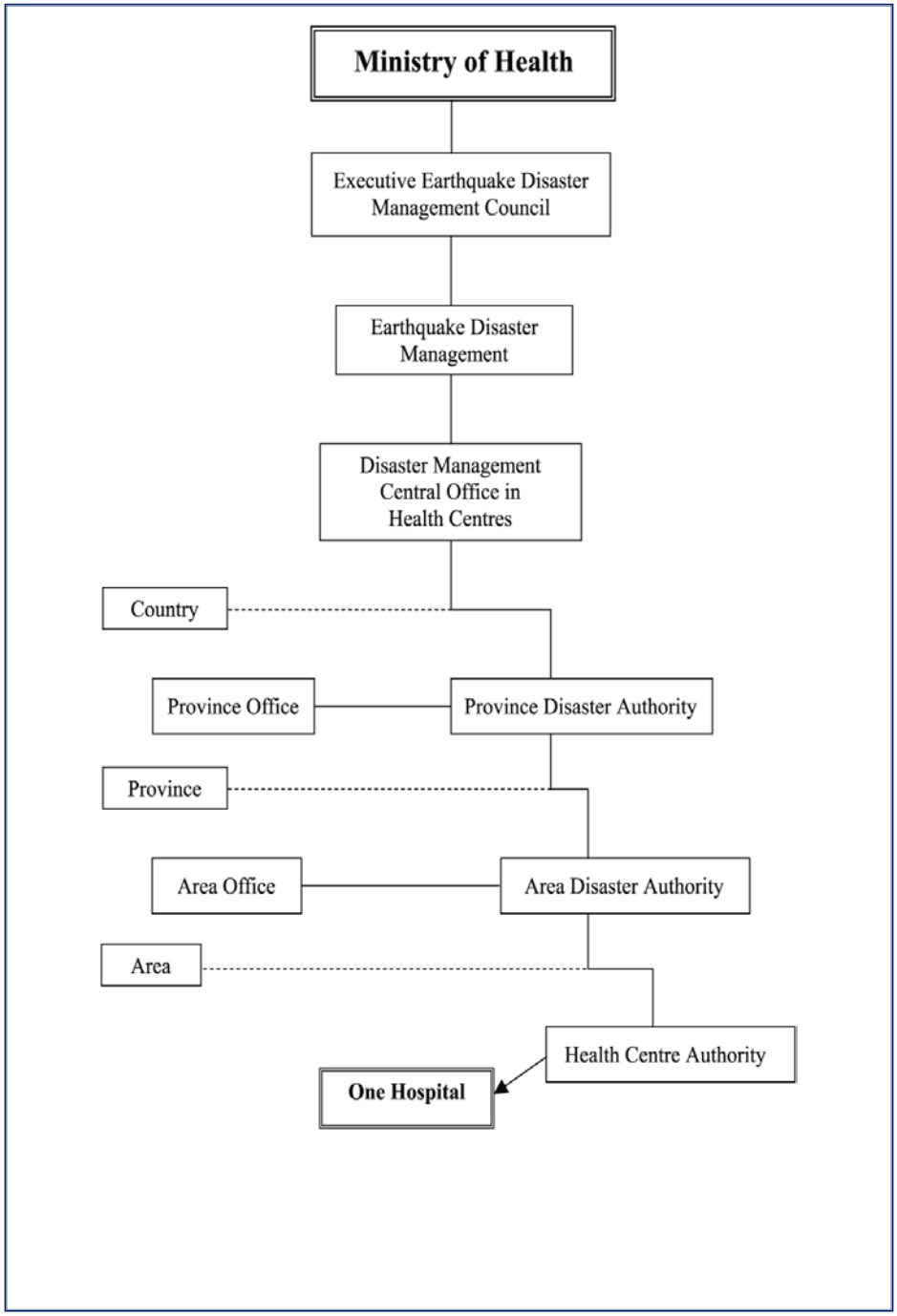
calamity from India Meteorological Department (IMD) or from Central Water Commission of Ministry of Water Resources on a continuing basis. These forecasts are also concurrently passed onto the State by the Agencies responsible for early warning. Whenever assistance is required by the States for handling a natural calamity, the assistance is coordinated by the Ministry of Home Affairs. Nodal Officers have been appointed in each Ministry/Department responsible for emergency support functions in the event of a disaster. The Central Relief Commissioner coordinates with the Nodal Officers to ensure that the requisite assistance is made available to the State.

2.5.2. National Policy on Disaster Management

National Policy serves as a framework for action by all the relevant Ministries/Departments. A National Policy on Disaster Management has been drafted. In line with the changed focus, the policy proposes to integrate disaster mitigation into developmental planning.[54]

Fig – 2.1

Organizational Chart showing Disaster Management Authorities



Source : NDMA 2008

2.5.3. Awareness Campaign

This in itself will not be sufficient unless the people living in the seismic zones are also made aware of their vulnerability as well as the means of reducing that vulnerability. A nation-wide media campaign is proposed. The Home Secretary had taken a meeting with the Secretary (I&B), DG, Doordarshan, and DG, DAVP to discuss this.

2.5.4. Earthquake Engineering in Undergraduate Engineering Curricula

Up till now, earthquake engineering was not a part of the undergraduate Engineering curriculum which was the reason for the structural engineers not being aware of the elements necessary for earthquake resistant construction. A draft curriculum has been finalized for incorporation in the undergraduate engineering courses to be introduced from the current academic year. A similar curriculum has been finalized for architects, to be introduced in the Schools of Planning and Architecture.

2.5.5. Awareness Generation for safe construction in rural areas

For the rural areas, where people go for non-engineered construction, the strategy is of awareness generation by distribution of pamphlets bringing out essential features, which need to be incorporated into the construction so that it is safe; and of training the masons. Samples of pamphlets/posters which could be circulated have been compiled, and

have been made available to States for adoption/translation into local languages.

2.5.6. Retro-fitting of lifeline buildings

The above measures will take care of the future building stock. Insofar as existing building stock is concerned, these will need retrofitting. Since it is not possible to retrofit all the buildings, the focus is on life line buildings/buildings where people congregate – hospitals, schools, cinema halls, multi-storied complexes etc.

2.5.7. GOI-UNDP Disaster Risk Management Project

169 districts in seventeen multi-hazard prone States have been taken up under the GOI-UNDP project. Under this project, the States are being assisted to draw up State, district and Block disaster management plans; village disaster management plans are being developed in conjunction with the Panchayati Raj Institutions and disaster management teams consisting of village volunteers are being trained in various preparedness and response functions such as search and rescue, first aid, relief coordination, shelter management etc.

2.6. Disaster Preparedness Initiative

2.6.1. National Emergency Response Force

It is proposed to constitute these eight battalions into a special Force called the National Emergency Response Force (NERF). The elements which need financial sanction have already been included in the Note for the Empowered Group of Ministers on Disaster Management. The States have also been advised to set up their own specialist teams for responding to disasters. They have been advised that we will provide assistance for training of trainers. Resources have been an important constraint for the States. We have, therefore, with the concurrence of the Finance Ministry, provided that 10% of the annual inflows into the CRF can be used for the procurement of search and rescue equipment and communication equipment. Apart from the eight battalions which are being developed into specialist units, it was decided that all the CPMFs should have the basic expertise in search and rescue so that they can be requisitioned for search and rescue by the States/District Administration. A curriculum for this has been drawn up and integrated into the training curricula of the CPMFs.

2.6.2. Fire Services as Multi-hazard Response Units

In order to further strengthen our capacity for response, the fire services are proposed to be developed into multi-hazard response units (as is the practice in other countries). This will require additional equipment and

training. A project for this (with an estimated cost of Rs.2457 crore) has been drawn up. The Planning Commission has given in-principle clearance to the project. The project is being submitted for in-principle approval of Home Minister. A Note for the Committee on Non Plan Expenditure is being finalized.

2.6.3. Regional Response Centers

Regional Response Centres are being set up. Fourteen Regional Response Centres have been identified – these are Group Centres or battalion headquarters where a cache of essential search and rescue equipments will be stored so that they can respond to any disaster in the neighbouring States immediately. Proposals for the cache of equipments are under consideration of Finance.

2.6.4. Emergency Operations Centres

The States are being assisted to set up control rooms/emergency operations centres at the State and district level. Assistance for this is being given under the GOI – UNDP project in the States covered by the project. Assistance under the Modernization of Police Scheme is also available for setting up EOCs. A state of the art National EOC with superior structural features and communication facilities is proposed to be set up.

2.6.5. Communication System

The communication network between the national and the state EOCs and the site of the emergency/crises is currently based on the DOT network. It has been observed that in a calamity/hazard, communication is the first casualty. It is therefore decided to put in place multi-mode and multi-channel communication systems so that enough redundancy is available. ISRO will be making available alternate satellite communication units to connect with State EOCs and mobile units which can be transported to the site of a disaster. A Group had been set up for drawing up a communication plan for disaster management and the said group has submitted its report. This provides for a dedicated communication system for disaster management with built in redundancies. Phase I of the National Disaster Management Communication Plan to provide satellite based mobile voice/data/video communication between National EOC/State EOCs/mobile EOCs and remote disaster/emergency sites is under implementation and is expected to be completed by August, 2004. Phase II of the communication plan to connect National/State/District EOCs with disaster/emergency sites is proposed to be completed by March, 2006. The communication backbone to be used will include terrestrial link (DOT), POLNET, NICNET, ISDN and SPACENET.

2.6.6. India Disaster Resource Network (IDRN)

One major step towards strengthening of our response system has been the launch of India Disaster Resource Network (IDRN). This is a web based inventory of all specialist equipment required for emergency/disaster response. This will give at the touch of a button the location of specific equipment/specialist resources as well as the controlling authority for that resource so that it can be mobilized for response in the shortest possible time. This was launched on 1st September, 2003. This inventory already has about 66,000 records/entries from 534 districts in 29 States/UTs. District Administration and that this may be rehearsed once every year. It has also been prescribed that these industries will carry out awareness campaign for the population in the vicinity regarding the dos/don'ts in case of any accident involving hazardous material[45]

2.6.7. Incident Command System

In order to professionalize the response, it is proposed to introduce the Incident Command System in the country. This system is in vogue in the United States and it provides for specialist Incident Command Teams with an Incident Commander and officers trained in different aspects of Incident Management –logistics, operations, planning, media management etc. We are working with the US experts for training of officers in this system here. The LBSNAA, Mussoorrie has been designated as the

mother training institution. Three programme for training of trainers has so far been held at LBSNAA. 42 officers-trainers have been trained so far in basic and intermediate ICS course and 29 officers-trainers trained in planning module.

2.6.8. Human Resource Development

In order to further professionalize our response, it was decided to incorporate elements of disaster management in the training curriculum of All India Services (IAS, IPS and Indian Forest Service). Curricula have been drawn up for this purpose and have been integrated into the training curriculum of these All India Services. People are vulnerable to disasters; they don't know how to get out of harm's way or to take protective measures. This ignorance may not necessarily be a function of poverty, but a lack of awareness of what measures can be taken to build safe structures on safe locations. Perhaps some people did not know about safe evacuation routes and procedures. Other populations may not know where to turn for assistance in times of acute distress. Nevertheless, this point should not be taken as a justification for ignoring the coping mechanisms of the majority of people affected by disasters. In most disaster-prone societies, there is a wealth of understanding about disaster threats and responses. This understanding should be incorporated into any e fforts to provide external assistance[57]

2.6.9. Public education and training

The focus of a disaster preparedness plan should be to anticipate, to the extent possible, the types of requirements needed for action or responses to warnings and a disaster relief operation. The plan should also specify the most effective ways of ensuring that such requirements are met. Yet, the process will only be effective if those who are the ultimate beneficiaries know what to do in times of disasters and know what to expect. For this reason, an essential part of a disaster preparedness plan is the education of those who may be threatened by disaster. Such education takes many forms, such as: (1) Public education in schools for children and young adults, emphasizing what actions should be taken in case of a disaster threat (for example, earthquake tremors); (2) Special training courses, designed for an adult population either specifically or as an extra dimension of on-going programmes such as Preventive Health Care or Maternal and Child Health programmes; (3) Extension programmes, in which community and village-based extension workers are instructed to provide relevant information and trained for the tasks they should undertake during the event; (4) Public information, through mass media, be they television, radio or the printed word, will never really replace the impact of direct instruction. However, if sensitively designed and presented, mass media may provide a useful supplement to the overall educational process.

2.6.10. Capacity Building, Training & Education

Personnel involved in the exercise have to draw upon knowledge of best practices and resources available to them. Information and training on ways to better respond to and mitigate disasters to the responders go a long way in building the capacity and resilience of the country to reduce and prevent disasters. Training is an integral part of capacity building as trained personnel respond much better to different disasters and appreciate the need for preventive measures.

2.6.11. The multi-sectoral and multi-hazard prevention based approach to disaster management requires specific professional inputs. Professional training in disaster management should be built into the existing pedagogic research and education. Specialized courses for disaster management may be developed by universities and professional teaching institutions, and disaster management should be treated as a distinct academic and professional discipline something that the American education system has done successfully. In addition to separate diploma/degree courses in disaster management, the subject needs to be discussed and taught as a specific component in professional and specialized courses like medicine, nursing engineering, environmental sciences, architecture, and town and country planning

2.6.12. The focus towards preventive disaster management and development of a national ethos of prevention calls for an awareness generation at all levels. An appropriate component of disaster awareness at the school level will help increase awareness among children and, in many cases parents and other family members through these children. Curriculum development with a focus towards dissemination of disaster related information on a sustained basis, covering junior middle and high schools may be worked out by the different school boards in the country.

2.6.13. Training facilities for government personnel involved in disaster management are conducted at the national level by the National Centre for Disaster Management (NCDM) at the Indian Institute of Public Administration, in New Delhi which functions as the nodal institution in the country for training, research and documentation of disasters. At the State level, disaster management cells operating within the State Administrative Training Institutes (ATIs) provide the necessary training. Presently, 24 ATIs have dedicated faculties. There is a need for strengthening specialized training, including training of personnel in disaster response.

2.7. Community Preparedness and Response

Every individual - notwithstanding the age, has an instinct to survive. However, for our discussions, we need to concentrate on those who are in a position to act independently - say in the age group of 10 years to 80 years and are physically and mentally fit enough to react.

Study of any disaster, however big or small reveals some hard facts which are: -

- No amount of preparedness is ever enough - like a shrewd enemy, disaster attacks in the most unsuspecting manner and at the most unsuspecting time; thus, putting out of gear even the most thorough plans.
- The first lot to react at the site of a disaster is 'the general public', when a disaster occurs without warning. Government agencies react depending upon the speed of information and proximity of the responding agency to the disaster site. Thus, the ability of the general public to respond dictates the degree of damage or the degree of mitigation of immediate damage.

2.7.1. Success of mitigation depends upon the following

- Warning available.
- Ability of the administration to put in place the procedures and deploy resources for responding to any disaster.

- The training, preparedness and psychological strength of the community (general public and various organizations) to prevent and take appropriate steps in mitigation and the ability of the administration to prepare the community towards it.

- Every disaster creates disorders. Lesser the disorders, greater the ability to restore normalcy. To elaborate on the above statements one could consider the disasters that occurred in the recent past –

- On 9/11, when the World Trade Centre was hit, the administration reacted with great speed. It was through their actions that many thousands were saved. However, in spite of a higher level of education, panic did set in and some people lost their power of logic and ventured into the building to retrieve petty things. Some people also jumped out of the windows from great heights. There were many people who helped others to move to safety.

- Consider the blasts in London's metro rail on 7/7/2005. The security personnel were able to control situation within no time and the general public showed great discipline in handling the crisis.

- Consider the Delhi blasts on 29/10/2005. The response of the general public was spontaneous in removal of injured people. The

administration did react, but by then, most of the injured were in the process of being evacuated.

- Consider the fire in a school at Kumbhakonam, in Tamil Nadu (India). The teachers were not trained at all and they panicked. That resulted into avoidable loss of lives. The school was not geared up to face such a situation.

- On 22nd December 1982, Air India Boeing 707 landed at Mumbai's international terminus in the early hours. Justice PB Sawant committee brought out certain glaring errors in administration - lack of passage of information by the ATC, lack of immediate response by the airport authorities to evacuate the casualties from the debris of the plane and inadequate medical aid available at the airport, apart from the pilot errors.

- All the above examples show that there is a need to strengthen the community in preparing for and responding to disasters. This chapter attempts to bring out the issues that are relevant to community preparedness and response.

2.7.2. Individual Preparedness.

Each living being has an instinct to survive. However, each one is not so alert and composed so as to take correct and speedy actions to protect own self. The following list suggests the kind of preparedness each individual must have for better survivability:-

- Increasing awareness through a formal training on disasters and their prevention, first aid, fire fighting, casualty evacuation and self-rescue. Each individual must know emergency procedures.

- Carrying identity papers - school/ college/ office identity cards should be carried at all times when setting out of the homes. For those not working, an identity document like the voter's identity card or driving license should be carried. The identity card must mention name in full, address, name and contact number of the next of kin, blood group and thumb impressions and signatures and the date of birth.

- A small first aid kit, a lace, a scarf or big handkerchiefs are preferable items to carry at all times. They help in administering self-aid.

- Each individual must let other members of the family (know about the keys to cupboards, insurance policies and important documents relating to health, ownership of property, passport, ration cards etc. Individuals must inform their location to the family or office staff whenever they shift the locations. It is especially applicable to those who have a continuous touring job - within or outside a city. Thus, possible schedules of movement should be known before one sets out for work.

- Everyone must know the whereabouts and schedules of the family members and the closest office colleagues.

- One must be alert during journey and learn to observe keenly the place and people around, the material lying around and get to know behavior of people. This helps in identifying possible risks and suspicious people. Presence of mind and use of common sense is what helps in saving own self and others. During Tsunami, a fisherman was walking along the coast in front of his house with his two teenage daughters. He saw the giant wave approaching. He and his daughters tried to run back. Realizing that the wave would engulf them, he ordered his daughters to hold hands around a coconut tree. With the tree between them they made a tight human chain just in time when the wave hit them. The wave lifted them

high with the tree acting as the pivot. The wave brought them down while receding. These three clutched one another and were saved. In absence of any other shelter within reach, this method was their best bet to survive. Sheer presence of mind saved their lives.

- Through training and frequent rehearsals, one needs to build up own reaction capability and gradually increase it for the benefit of the society.

2.7.3. Family Preparedness,

Family is considered as the smallest community unit. Each family or the household should be prepared for any disaster.

To make our home a safe and secure place, the following is required to be implemented:-

- Ensure that when you construct or buy a house, the builder has followed building norms regarding foundations etc
- Keep all your important documents at a place from where it is easy to extract them while vacating. Do not bother to extract anything other than the documents and cash, emergency rations, water and essential medicines. For this to happen, keep them in a ready state.
- Keep your gas cylinder tubes and electric connections regularly checked. Make it a point to switch off the gas regulator knobs when not in use - only switching off the gas stove knob is not enough.

- Do not accumulate too much of trash - particularly the one that could act as fuel during fires. Do not keep inflammable material in the kitchen.
- If you use inverters, do not keep any inflammable material close to the battery and keep the battery under regular inspection.
- Keep a list of telephone numbers of the neighbors and important numbers of everyone's place of work at hand. Also, keep emergency police, fire brigade and medical services numbers prominently displayed next to the telephone.
- Keep blood group listings of own family members and similar blood groupings of people who can donate and react within a short time, at hand.
- Every household must have a well-equipped first aid box with triangular bandages, enough cotton, disinfectants and 3 ft long laces for tourniquets. This box should be different from the medicine box that may be used normally by family members regular regime of medicines.
- Ensure that the house has a security door and an srnergency exit. Those staying on the higher stories must have an emergency exit, which could be opened only when necessary. The evacuation would be only through trained rescuers. It is seen that when the main exit is not accessible, evacuation of the people trapped inside becomes difficult as generally most people enclose their verandahs

with security grills. The security grills must have an emergency exit constructed, the one that is lockable from inside.

- There should always be one bucket full of water stored at ajl times in the house. There should be a jute mat outside bathrooms, capable of being used for fire beating. It is important to keep torches at hand with cells inside and a small cutting knife. In fact an emergency tool kit should be prepared and kept ready at all times.
- Today, with nuclear families existing in urban areas and either small children or old people at home throughout the day, plans should be discussed to react to emergencies like fire or quakes or other medical emergencies. Children above 8 years of age may not be able to take initiatives, however, with due training, they are capable of raising alarms.

2.7.4. Housing Societies and Residential Complexes.

The following is suggested:-

- Every housing society must have trained security guards who could help during emergencies.
- Young members of the housing society must form teams for providing emergency rescue and relief. Teams should be formed with dedicated duties under the leadership of secretary of the society. These are the 'self-help' groups.

- Every housing society should preferably hold a *2"* thick and 30 ft long nylon rope and a 15 ft long sturdy ladder. All members must exchange their telephone numbers. During daytime, members must know who all are present in the neighbor's house so that during emergencies, they could help one another.
- Housing societies must possess fire-fighting equipment at a central place and more such sets on each floor. Members should be formally trained to operate this equipment During a training session in a modern housing complex, we observed that not only the people were unaware of the use of fire extinguishers, but even the fire hoses provided by the construction company were not having brass couplings. These were stolen, for obvious reasons. Even the security guards were not aware of it.
- Everyone should be instructed not to use lifts during quakes and fires. There should be a central switch to shut off electricity in emergencies to avoid further complications.
- All members must practice the drills of rescuing people stuck in the lifts. Manual operations of lifts should be explained to all and rehearsed.
- Where possible, the water tanks at ground level should be made accessible for emergency water usage.
- A central alarm system should be installed for emergencies and everyone should know the operations.

- The societies must display list of emergency numbers at the entrance and near society office.
- For independent houses, it is important to inspect area around the houses for drainage blocks, cracks in the ground and dangerous trees. Those on the hill slopes must regularly observe for likely places of landslides. Observing the soil condition prior to, during and after rains is essential. Residential complexes on hill slopes and tops need to have more secure foundations and preferably a retainer wall to hold the sliding debris, towards the upper flank of the hillside.

2.7.5. Industries

Industrial safety and security norms do exist everywhere. However, frequency of industrial accidents is fairly high. Study of a fire in one of the chemical industries in Bharuch (Gujarat) revealed that a fire broke out when a boiler used for mixing continuity. Some chemicals at high temperatures burst spewing burning chemical. The boiler had a temperature control mechanism that had malfunctioned. The time when this happened, the factory's night shift was operating and the supervisor who had been trained in emergency duty had the presence of mind to switch off the main current flow to the boiler plants. The burning chemical started spreading along the ground. There were 'Foam Type' fire extinguishers mounted on trolleys

available; however, no one remembered to use them. Someone on duty called for fire brigade and the fire engine started spraying water with full force. The burning chemical floated on water and started spreading much faster. Within no time the factory premises had a raging fire, reducing it to ashes and killing some workers. This could have been avoided. Considering all this, the following is suggested for implementation:-

- There is a need to form safety groups of the workers to keep each plant under regular supervision. Senior workers who have a good experience need to undertake such inspections collectively.
- Each worker - permanent, quasi-permanent or temporary should go through disaster mitigation training and training in safety and security. Accident and emergency mock drills should be regularly conducted. This should be treated as the responsibility of the plant in charge. When delegated to lower levels, it looses its importance and a sense of complacency starts setting in.
- Teams of the workers should be formed as self help groups. These groups should get restructured as per changes in the shifts.
- Rescue equipment like ladders, ropes and digging tools should be kept under the charge of the security department, a little away from the main plant. In the main plant, heavy first aid kits - with adequate bandages and cotton, elastic straps for stopping bleeding from wounds should be placed.

- Shop floor workers and visitors should have helmets $_3$s part of their kit and fire resistant suits as part of their uniform. Chemical factories must have masks with breathing apparatus attached as part of emergency kit.
- Emergency warning sirens should be placed and tested regularly. There should be an arrangement of fire hydrants and heavy pumps to pump out water.
- Heavy-duty fire extinguishers, depending upon the type of industry, mounted on trolleys should be placed in adequate quantum.
- Residential areas around the industries should be made aware of the type of hazard possible due to industry and precautions should be taken accordingly. Industrial sirens should be so operated that residential complexes around should also get warning of the hazards. (During Bhopal gas tragedy, there was no warning available through sirens at all).
- Fire tenders should be also placed especially keeping in mind industrial disasters.

2.7.6. Corporate Offices

Corporate offices are generally complacent about safety and security. The nature of job is such that security is the lowest on their list of priorities. It is also found that the 'white collared culture' is rampant. During critical times such sections of the society suffer

the most. Also, they hardly venture into physically taxing and risky acts of rescue. This mindset should change. In the face of a disaster, job content should be the last on anyone's agenda. My experience of training a nuclear group in a leading corporate in Pune indicated that no one wanted to spend time in learning about disasters and emergency procedures. This corporate has a five storied building with more than 2000 employs involved in software development. The office had only one staircase for use of the employees. Since everyone used lifts and backup generator never failed the lifts, it was beyond their comprehension to imagine a condition where they would have to use the staircase. To follow the regulation: the .corporate had plentiful of fire extinguishers; however, n one knew the way to use these - not even the security personnel. The corporate had a captive generator set kept m the underground car parking area. This generator is overheating and sparking with waste cotton lying strewn about - an invitation to fire. The corporate had strict checking of people going in and out and that no unauthorized person had a free access to their facilities. However, the canteen contractor had an independent access and his staff could easily approach any place within the building. What a false sense of security! On the whole, it appeared that the corporate was more oriented towards keeping their product well secured and the facilities spruced up but not the building and the

employees. Keeping the above in view, it is felt that every Corporate should adopt the following procedures:-

Notwithstanding the hierarchy of jobs, everyone should be put through a regime of emergency drills and these need to be rehearsed periodically.

It should be incumbent on the security agencies to impart disaster mitigation training to security staff. Only after the training is imparted that they should be allocated the security duties.

Disaster Mitigation Marshals should be nominated by the corporate and the industries, within their employees. These disaster mitigation marshals should be senior enough in the hierarchy so that they are in a position to implement the procedures and drills. Under the control of the disaster mitigation marshals, a trained team from each department should operate. If it is not possible to have a team for each department, floor wise teams should be formed.

Disaster mitigation plans should be drawn whereby each individual would know the duties during critical periods and there would be lesser panic.

Apart from placing fire-fighting equipment, each employee must know how to use it. They should be motivated to jump into the fray and actively conduct rescue drills.

There should be a facility available to establish a control centre within the premises at a safer place and shift all communications to the control center. Evacuation drills should be set up and rehearsed.

The institutions granting ISO certification should have a surprise checking of emergency drills of every business house, apart from the procedures and other validations. Without it, no organization should be granted certificates of standardization.

Mitigation plan for each facility should be drawn in writing, validated and all employees should be briefed about it. Any new inductee into that organization should be also briefed on disaster drills, as part of the corporate induction programmes. -

Offices should be geared up to hold their staff safe for at least 24 hours, administering them at a minimal survival scale laid down.

2.7.7. Places of Entertainment.

Cinema and concert halls are not really geared up to face disasters. A study of fire episode in Upahar Cinema Hall of Delhi is a live example. Break out of fire could be avoided if due care is taken. In India, there are no periodic rehearsals of evacuation of the public from any place of entertainment. This needs to be made obligatory. Though, cinema halls do display fire extinguishers, it is generally noticed that the staff is not trained to handle the equipment. Cinema halls and other theatres must announce the standing orders for emergencies before any show begins. Making these rules is the responsibility of civic administration. With terrorism showing its ample presence in India and elsewhere such orders become mandatory. Availability of well-equipped first aid kits is another area that needs looking into.

2.7.8. Religious Places and Celebrations.

The orders for religious places should be same as for cinema halls. Here, the difference is that during festivities, crowd management is by and large tardy, even chaotic. The rate of inflow is not commensurate with the rate of outflow of the devotees. Use of oil and lamps is at times so negligent that chances of an accident are high. Stampede is another syndrome that needs to be controlled. Strict adherence to safety norms should be imposed. Long queues

outside religious places are also problematic. Fire that raged at Mandhardevi temple in Satara district of Maharashtra is an example of how slip-shot the administrative arrangement was made.

Presence of small time vendors adds to the woes and there is no control over them at all.

Sanitation facilities are never up to the mark during such big gatherings and onset of an epidemic is always on the cards.

During Kumbha Mela at Nashik in Maharashtra in 2003, lack of space created maximum problems and the police were not geared up (not withstanding the tall claims of the administration prior to the festivities) to face acute emergencies.

Ganesh festival or Durga Pooja require better handling everywhere. In fact, the concepts of erecting temporary structures that occupies roads leads to uncall for traffic congestions and create greater hazards. This practice needs to be immediately reviewed.

The temporary structures could be erected on open grounds. There is no aversion to religious celebrations; however, the functions

should ensure public safety and avoidance of inconvenience to the public.

There are no fire precautions taken by most of the organizations celebrating such festivities. Also, we need to change our mind set as per the changing lifestyles and the demography.

There should be 3 serious thought given to decentralizing of processions, this should be true for any celebration - be it a political rally or a social function.

During festivities, roads are used for bursting firecrackers. This creates tremendous hazards to the congested traffic and needs to be totally stopped.

Every year, firecracker shops and factories report fire accidents. This could be very much avoided through strict regulations. For all this to happen, the administration and the judiciary need to study the matter and pass bills and laws in the larger interest of the society. After all, every unwanted accident imposes load on the administration and causes damages.

CHAPTER - 3

REVIEW OF LITERATURE

3.1. Introduction

3.1.1. Review of literature is an essential step in the development of a research project. It enables the researcher to develop insight into the study and plan the methodology. Further, it provides the basis for future investigation, justifies the need for replication, throws light on the feasibility of the study, and indicates constraints of data collection. It helps to relate the findings from one study to another with a view to establish a comprehensive body of scientific knowledge in a professional discipline, from which valid and pertinent theories may be developed. (Abdellah and Levine, 2009).

3.1.2. Review of published and unpublished research and non- research literature is an integral component of any scientific research. It involves a systematic identification, location, scrutiny and summary of written material that contain information regarding a research problem. It broadens the understanding and gives an insight necessary for the development of a broad conceptual context into which the problem fits (Polit and Hungler, 2003).[55]

3.1.3. Review of literature is broad, comprehensive, in depth, systematic and critical review of scholarly publications, unpublished scholarly print materials, audiovisual materials, and personal communications. Review of literature is key step in management research process. It refers to an extensive, exhaustive and systematic examination of publications relevant to the research project. Management research may be considered a continuing process in which knowledge gained from earlier studies is an integral part of research in general, before any research can be started whether it is single study or an extended project, literature review of previous studies and experiences related to the proposed investigations should be done. One of the most satisfying aspects of the literature is the contribution it makes to the new knowledge, insight and general scholarship of the researches, analyzing existing knowledge before delving into a new area of study while conducting a study, when interpreting the results of the study, and when making judgments about applications of a new knowledge in management practice. (Basavanthappa, 2003) [56]

3.1.4. Review of literature helps in many ways. It helps to assess what is already known, what is still unknown and, what is untested; also it justifies the need for its replication, and throws some light on the feasibility of the study and problem that may encountered. It also helps to uncover promising methodology tools which shed light on ways to improve the efficiency of

data collection and obtain useful information and on how to increase the effectiveness of data analysis. (Best, 2002)

3.1.5. Related research and non-research literature was viewed to

- Broaden the understanding
- To gain insight into the selected problem under study.
- Choose certain methodologies in conducting study

3.1.6. The literature review serves several important functions

- Give credits to those who have laid the groundwork for your research
- Demonstrates knowledge of research problem
- Demonstrate understanding of theoretical issues related to research question
- Provides new theoretical insights or develops a new model as the conceptual framework for your research
- Convinces reader that proposed research will make a significant and substantial contribution to the literature.

3.1.7. Review of related research is organized as per following broad topics

1. Book Review on Disaster Management
2. Worldwide survey reports
3. Nationwide Disasters
4. Studies regarding First Aid and Safety in Schools
5. Training programmes on Disaster Management
6. Role of teachers in disaster management

3.2. Book Review on Disaster Management

3.2.1. Managing Disaster : Strategies and Policy Perspectives, Duke University Press London – ISBN-0 -8223-0800-2

The authors, in this book explains the response of individuals and communities to disasters as sudden, unplanned disruptions of the social order. This book highlighted interdisciplinary aspects of disastrous events, acknowledging the interaction between natural hazards and human systems. Two factors have prompted a systematic effort to reexamine the roles and limits of public service agencies in disaster management. These factors are, first, an increased acceptance of public responsibility for the burden of costs engendered by disasters, exemplified by the Disaster Relief Act of 1974, and, second, the continuing movements of civilian populations into hazard-prone areas. While public service agencies have the legally mandated responsibility to protect life and property of citizens in events of disaster, attention and interest have largely shifted.[61]

3.2.2. Randolph Kent, Disaster Preparedness 2nd Edition UNDP 2008

This training module, Disaster Preparedness, is designed to introduce one aspect of disaster management to an audience who form disaster management teams, as well as to government counterpart agencies, non-governmental organizations and donors. This module is designed to increase the audience's awareness of the nature and management of disasters, leading to better performance in disaster preparedness and response. The content has been written by experts in the field of disaster management and in general follows UNDP/UNDRO guidelines. In the second part discussed about international collaboration for preparedness with awareness of the roles and limitations of international agencies in coordinating disaster preparedness efforts. The implementation of disaster preparedness plans is discussed in part three from promoting these plans to considering advice based on common pitfalls related to implementation.[62]

3.2.3. An overview of Disaster Management, 2nd Edition UNDP - 2008

This book is divided into four parts. Part One describes what hazards are, why they become disasters, and how they affect development. Part Two identifies the scope of disaster management, what your role may be in it, and focuses on preparedness aspects. Part Three accepts that some disasters will occur and examines how to respond to them. Part Four

presents disaster mitigation as a set of activities that reduce the risk and impact of disasters. This training module is complemented by two short videos, “The UN and disaster response,” and “Disaster mitigation: how to lessen the damage through proper development.” You would benefit from making arrangements to view these videos and from reviewing the accompanying discussion questions.[63]

3.2.4. Col. P. P. Marathe – Concept and Practices in Disaster Management. Diamond Publication Pune 1/E 2006-07 ISBN 81-89724-95-9

This book is useful to decision makers, stake holders and respondents. It covers a broad spectrum of disaster management it gives an insight into all stages of disaster management covering concepts and practices. It covers multiple levels from the national level interventions, down to common man’s preparedness, it is also useful for teachers and students [45]

3.2.5. Rajdeep DasGupta – Disaster Management and Rehabilitation – Mittal Publication 2/E New Delhi -2009

This book brings a comprehensive coverage of the issue of disaster management. The book starts with an enunciation of the types of disasters, immediate aid and the risk factors it also gives compendious amount of information on emergency aid and long term plans to benefits the victims. Chapters have also been included to help the disaster management professional to gauge potential risks and assess damage.[11]

3.2.6. Gaur, S., & Chandrashekhar, T. (2006). The environmental threats that get discussed within the book include the scarcity of fresh water resources, the food security crisis and increasing fuel needs. Regional institutions are becoming an important component of the global architecture for environmental governance. In this context a section within the book seeks to answer the questions about the role that regional institutions can and do play in managing environmental concerns, the parameters that could be used for gauging their effectiveness and the manner in which they relate to other actors such as the State, NGOs in managing the environment.

3.2.7. R. K. Singh –IAS, Jt Secretary Disaster Management, Ministry of Home affairs Govt of India – Together Towards Safer India – Published by NDM Division – New Delhi

This books explains about set of activities that helps to reduce the impact of disaster on society, importance of community as a first responder. In this book following aspects are covered

- Difference between hazards and disasters
- Various kinds of disasters
- The importance of being prepared for disasters
- How to protect ourselves from earthquake, floods and accidents.[150]

3.2.8. Disaster Management and Preparedness (Occupational Safety & Health Guide Series) Larry R. Collins, CRC Press, 2006 *Eastern Kentucky University, Richmond, USA* ISBN: 9781566705240

Disaster Management and Preparedness book details a new and innovative method for preparing companies and organizations to address the substantial risk of disasters in the workplace. It encompasses not only the tried and true tactics used by safety experts for decades but also focuses on areas often overlooked during the reactive and post disaster phases. Technological progress and terrorist activities has forced safety professionals to rethink their modus operandi for disaster preparedness and expand their proactive measures to safeguard assets on all levels and at all times. From natural disasters to acts of terrorism, we never know when something catastrophic will happen to our organization. But once it does, it is too late to go hunting for a plan of action. Be prepared. Be proactive. Make your disaster management plan before disaster strikes. Disaster Management and Preparedness gives you the how-to for avoiding the common mistakes which turn natural and man-made catastrophes into economic disasters.[64]

3.2.9. Disaster Mitigation: A Community Based Approach, INDEX CODE MF 35-834, book, 100 pages, by Andrew Maskrey, 1989.

Disaster mitigation is about reducing the hazards that make populations vulnerable to cyclones, floods, earthquakes, landslides, and so forth.

Community-based disaster mitigation seeks to involve local communities in mobilizing local resources to reduce hazards and address the fundamental sources of vulnerability, while avoiding the ignorance of local needs and inequitable assistance often seen in government programs.

"As disaster risks increase due to urbanization, deforestation and population growth pressures, concerned officials in government or voluntary agencies will be wise to reflect on lessons from the Peruvian experiences described so vividly in this book. The community based approach may be the only way forward given the frequent pattern of governmental apathy towards their poor citizens and the limitations of overstretched public sectors.[65]

3.2.10. Environmental Health Management after Natural Disaster, **Scientific Publication No. 430, INDEX CODE MF 35-817, booklet, 58 pages, 1982, Pan American Health Organization, WHO.**

This manual provides planners and administrators of disaster relief health services with specific advice for establishing procedures and setting priorities for sanitation and water supply. The measures suggested involve the use of health professionals and non-professionals alike, and make use of widely available disinfectant chemicals.[66]

3.2.11. **Shelter after Disaster: Guidelines for Assistance**, **INDEX CODE MF 35-828, book, 82 pages, 1982, from UNDRO, United Nations, New York, New York 10017, USA.**

This guide for relief organizations and governmental agencies sets down principles and offers advice on procedures for providing shelter for emergency victims. Most notable is the emphasis on self-help and the observation that housing is a process inseparable from local custom and not a product to be dispensed without regard to local conditions, cost effectiveness, and its effect on the long-term development efforts of the recipient country or national group. Each chapter/topic concludes with explicit policy guidelines that, with the numerous examples cited, should prove very useful for fieldworkers and administrators of disaster relief. With appendices and reference lists.[67]

3.2.12. **United Nations High Commissioner for Refugees Handbook for Emergencies, Part I: Field Operations**, **INDEX CODE MF 35-829, book, 194 pages, 1982, CH-1211 Geneva 10, Switzerland.**

Long experience in managing the influx of refugees resulting from emergencies is apparent in this manager's guide for relief work. Several chapters relevant to inter- and intra-agency protocol are followed by very thorough, practical discussions of refugee management, especially the establishment of camps, which is considered an option of last resort. Involvement of the refugees in decision-making and implementation is

stressed throughout, as is the need to preserve past social arrangements, use local skill and materials, respect local cultural patterns, and plan for a worst case scenario, e.g. long-term detention in a "temporary" refugee camp. Topics include: supplies and logistics, site selection and shelter, health, food and nutrition, water, social services and education, etc. The need to call in expert assistance is often cited in place of detailed information on certain topics, which, like the pointers on common mistakes in camp management and the advice to encourage self-reliance and discourage dependency, appears to have been learned through hard experience. Further reference listings follow each chapter.[68]

3.2.13. Flirting with Disaster Public Management in Crisis Situations by SAUNDRA K. SCHNEIDER M. E. Sharpe Armonk, New York London, EnglandThis book breaks new theoretical and empirical ground. A truism of public administration is that bureaucracies handle large-scale tasks of a routine nature especially well. For effective performance, political elites need merely to set clear goals, provide sufficient resources, and let bureaucracy develop its own routines and expertise. What the field of public administration does not know much about is how to manage catastrophic events. This book elaborated comprehensive look at the process of managing natural disasters. The management task is made even more complex by a federal system that requires that local governments, which generally lack the experience, be in the front line of

managing disasters while the federal bureaucrats, who have a great deal of expertise, are restricted in their range of authority. Professor Schneider fills a major void in public administration and public management. Her insights, both empirical and normative, could be applied to organizational disasters as well as natural ones. Professor Schneider finds that structure interacts with task demands in disaster management. Whether the situation is a success or a failure depends on how well the public's response fits with bureaucratic expectations. Where emerging public norms in a disaster do not fit bureaucratic norms, major management problems occur. The size of the gap between public norms and bureaucratic norms is the key variable in determining how well a disaster is managed. *Flirting with Disaster* is an important book for public administration; it explores a rarely examined dimension of bureaucracy crisis management -- and thus merits reading in any introductory, intermediate, or ad- vanced course.[69]

3.2.14. Damon P Coppola, Introduction to International Disaster Management ebook DS:79 ISBN: 20110115

Written from a global perspective on risk, hazards, and disasters, Introduction to International Disaster Management provides practitioners, educators and students with a comprehensive overview of the players, processes and special issues involved in the management of large-scale natural and technological disasters. The book discusses special issues

encountered in the management of international disasters, and explains the various private, non-governmental, national, and international agencies that assist in the preparedness, mitigation, response and recovery to national and regional events. Concentrating on the four major phases of emergency management — mitigation, preparedness, response, and recovery — Introduction to International Disaster Management deals with such timely topics as Hurricane Katrina, the 2004 Asian tsunami, and SARS. It also serves as a reference to governmental and other agencies involved in international disaster management activities. This book is the first of its kind to take a global approach to the topic of international disaster management.* Serves as the first comprehensive resource dealing with the issues of international disaster management* Contains numerous case studies, examples of Best Practices in international disaster management, and a contact list of the governmental and nongovernmental agencies involved in international disaster management* Provides a global perspective on risk, hazards, and disasters that is written both for students within disaster management programs and for professionals [70]

3.2.15. King's Human Resource Development – 2009

In this book it explains importance of HR to each individual because it can assist in improving and using his capacities and potentialities to the utmost. With ever developing skills and aptitudes, the individual has become increasingly proficient in overcoming many hurdles which has

primeval ancestors could not. It explains HR is one of the most vital resources of the country because this is the force which exploits the natural environments for the entire population of the country. [57]

3.2.16. Badrinarayan Shankar Pawar, Theory building and hypothesis specification in organizational studies, Sage Publication CA ISBN 8132102444, 2010

This book focuses on developing theory that leads to the specification of hypothesis that can be taken up for subsequent empirical examination. It is concise and holistic guide to theory building for such hypothesis specification. This volume breaks down the process of theory building into its components steps and explains each of them starting with formative concept of theory, units of theory etc. the uniqueness of the book lies in its focus on theory building for specific purpose of hypothesis creation rather than for propounding any grand idea or concept. It is enhanced with insightful texts and citation of thinkers and researchers of international repute. This book is referred by the researcher to formulate the hypothesis and theory building.[75]

3.3. Worldwide survey reports

3.3.1. United Nations Disaster Relief Coordination. Disaster Prevention and Mitigation. UN, New York 2009

The United Nations estimates that in the past two decades nearly three million live have been lost to natural disasters and some 800 million affected by them worldwide. Disasters have their greatest economic and social impact in the poorest countries. It is also estimated that the disaster events globally cost about 50,000 million US dollars each year and result in approximately 2,50,000 deaths in a year. The spectrum of occurrence of disasters indicates that nearly twenty major disasters strike the world every year resulting in many deaths and several casualties, besides the major disasters, innumerable moderate and minor disasters strike the world community every year. [71]

3.3.2. The United Nations Development Programme (UNDP) has estimated that between 1980 and 1999, globally, a total of 1,429,412 people were killed by disasters about 96.4% (1,377,318) of those deaths occurred in developing countries, of which 38% (520,165) occurred in the countries that comprise the African Region. about 96% (499,510) of the disaster-related deaths in the Region resulted from natural disasters and the remaining 4% (20,655) from technological disasters Out of the 499,510 deaths that were caused by natural disasters, 80.9% resulted from droughts, 14.5% from epidemics (e.g. cholera, acute watery diarrhoeal

syndrome, Ebola haemorrhagic fever, meningococcal disease), 2.3% from famines, 0.6% from earthquakes, 0.4% from volcanoes and 0.4% from windstorms (tornado, storm, cyclone). On the other hand, of the 20,655 technological disaster-related deaths, 83% were caused by transport accidents, 13% by industrial accidents and 4% by miscellaneous accidents (UNDP 2008)

3.3.3. Munich Re by Staff Writers Frankfurt (AFP) July 9, 2008

Disaster deaths worse so far in 2008 than tsunami year: Natural disasters killed at least 150,000 people in the first half of this year, more than in the whole of 2004 when south-east Asia was struck by a tsunami, The figures came from German re-insurance group Munich Re which warned that the pattern this year fitted a trend of worsening weather-driven catastrophes, and the company called for increased efforts to fight climate change. Specialists at the German group recorded about 400 natural catastrophes in the first half of 2008, with overall losses so far estimated at 50 billion dollars (32 billion euros). In 2007, a total of 960 disasters caused about 82 billion dollars in damage, of which 30 billion was covered by insurance. In Burma, the cyclone Nargis killed 138,000 people in early May, and in mid May an earthquake left 69,200 dead or missing in China, the company said in a statement. [72]

3.3.4. IFRC World Disaster Report of 2009

The above report indicates that in the year 2008, 89,546 people were killed in 542 disaster events with average estimated damages of 71.9 million dollars.. Nearly 80 percent of deaths were due to natural disasters. The study of global statistics of disasters over three decades reveals that there is a significant increase in impact of disasters.[73]

Amongst the major disasters the floods, cyclones and earthquakes account for the largest number of deaths, persons affected and damage inflicted.

3.3.5. According to Havidán Rodríguez, Director. Disaster Research Center (DRC) Department of Sociology and Criminal Justice University of Delaware.

The December 26, 2004 earthquake and the tsunamis it generated have already been described as one of the “worst disasters” in recent history. Very few natural disasters in historical times have had such far-flung, catastrophic consequences as the Sumatra Earthquake and the tsunamis it generated across the Indian Ocean. We have been deeply touched by this disaster, the devastation resulting from these events, the still increasing loss of life, and the valiant response and recovery efforts undertaken by the survivors and outside volunteers.[74]

3.3.6. According to J M Scheuren et al in Annual Disaster Statistical worldwide review that in 2007alone, 414 natural disasters were reported. They killed 16847 persons, affected more than 211 million others and caused over 74.9 US$ billion in economic damages.[76]

Table : 3.1

Distribution of Natural Disasters worldwide and damage

S.N.	Year of Occurrence	Number of Disaster Events	Victims in Million
1	2007	414	225
2	2006	445	150
3	2005	354	175
4	2004	421	300
5	2003	411	275

Source: Annual Disaster statistics – CRED 2007

3.3.7. Global Losses Through Natural Disasters

According to Reinsurance Company 'Munich Re' costs associated with natural disasters has gone up 14 fold since the 1950s. Each year from 1991 to 2000, an average of 211 million people were killed or affected by natural disasters – seven times greater than the figure for those killed or affected by conflict. Towards the end of the 1990s, the world counted some 25 million 'environmental refugees'- for the first time more people

had fled natural hazards than conflict. Source: World Disasters Report, 2001

3.3.8. Conference on gender and disaster risk reduction in Beijing, China from 20-22 April 2009.

Proceeding of the above conference concluded that Women and men are affected differently by disaster due to the economic, social and cultural roles they play in society. 90 per cent of the people killed in the 1991 cyclone in Bangladesh were women. It was the same in USA, when hurricane Katrina hit New Orleans African American women were among the worst affected. Women are often the main victims of disasters as they account for more than 70 per cent of the worlds poor. [77]

Table -3.2

Distribution of worldwide natural disasters by origin(1980-2005)

SN	TYPE	1980-89	1990-99	2000-05	TOTAL
1	Hydromateorological	1498	2034	2135	5667
2	Geological	232	325	233	790
3	Biological	170	361	420	951
4	TOTAL	1900	2720	2788	7408

Source : Annual Disaster Statistics 2007

According to above table it is indicated that as decade progressed number of disasters increased. There is increasing trend of disasters during decade 1990-99 there were 2720 disasters occurred the same number or in fact more than this number of disasters occurred in next five years i.e. 2000 to 2005.[78]

3.3.9. World Health report 2008

The above WHO report indicates that more than 11000 medical institutions were damaged in China's Wenchuan earthquake in May 2008, forcing tens of thousands of people to seek treatment elsewhere. In line with the World disaster Reduction Campaign: WHO dedicates its World Health Day 2009 to "Make hospitals safe in emergencies". During that day, 7 April, many events will be organized around the world, with the global launch taking place in Beijing, China, with the WHO Director-General Dr Margaret Chan in attendance. WHO advocates for safe facility design and construction and for the continuation of health care during emergencies. WHO – 2009[79 & 80]

3.3.10. According to UNICEF, Every day major earthquake killing over 30,000 children. They die quietly in some of the poorest villages on earth, far removed from the scrutiny and conscience of the world. due to poverty, malnutrition and communicable diseases.[81]

3.3.11. The Asia pacific region is home to 53% of the world's population and 20% of the land area experiences a disproportionate share loss of life and impact to socio-economic processes. According to a united Nation'a report, nearly 70% of all lives lost due to natural disasters occur within Asia Pacific Region. There is an 18% increase in number of natural disasters worldwide from 2004 – 2005. although loss of life was significantly lower in 2005, the number of people affected continues to rise. Climate change, environmental degradation the impact of epidemics developed in high risk zones. [82 & 83]

3.3.12. Recent series of ten coordinated terrorist attacks across Mumbai, India's financial capital which began on 26 November 2008 and lasted until 29 November, killed atleast 173 people and wounded at least 308 (Press Information Bureau – Govt of India)[84]

3.3.13. David Hall compiled the data 2009 and it reveals that every year Malaria takes 2 -5 Million lives worldwide. In South Asia Earthquake in 2005 Pakistan, India and Afghanistan were affected the human loss was around 5000. During 2004 -05 earthquake of 9.0 Richter Scale resulting Tsunami damaged to Indonesia, India, Srilanka, Thailand and Malaysia death toll between 2,35,000 to 2,85,000. [85]

3.4. Nationwide Disasters

3.4.1. According to National Crime Records Bureau 2007, Indians are almost four times more likely to be killed by lightning strikes than be felled by bullet from terrorists., more than 2700 people were killed by lightning while 733 lives were lost in insurgency and terror related incidents including as many as 498 being killed in the Northeast itself. Accident alone killed 934 peoples including road accidents 314, two wheeler accidents 60, trucks 68 and railway 71 in 2007. death by age shows that youngsters below 29 yrs died 322 in accidents while over 45 yrs people died 303 in the same year[131]

3.4.2. Studies by **World Health Organization** and **Government of India** show that our road safety record is declining alarmingly at 5% a year. India's road has become highways of death. We have dubious distinction of having the largest number of road accident fatalities for the number of vehicles in the world. Almost 100,000 Indians die on our roads every year in over 300,000 accidents. A 2002 Planning Commission study estimated India's loss from such accidents at a colossal Rs 55,000 crore a year, which works out to 3 percent of GDP at 2000 prices. Another statistics: there are 12.7 road fatalities per 10,000 vehicles in India in USA road fatality rate is 1.79, fatality rate in UK and Germany are 1.0 and 1.1 respectively. [77]

3.4.3. Recent study conducted by city based environmentalist revealed that infections are rising due to climate change, a study was based on data of the

patients suffering from Diarrhoea, Tuberculosis at Hospital in Solapur. It says that despite improvement in sanitation and quality of potable water over the years occurance of diarrhea has gone up by 43 percent in solapur district. Many studies reveal that climate change and rise in temperature are among the most common causes for outbreak of infectious diseases. Similarly occurrence of tuberculosis has also gone up by 37% during the same period. Dhanraj patil, Assistant Professor in sociology at YASHDA said that the London school of hygiene and tropical medicine has also stated that outbreak of diarrhea will continue till global temperature continues to rise. The data was collected from government sub district rural hospital at Akluj in Solpur from 2000 – 2006. the data was analysed with statistical technique such as frequency mean, median and standard deviation[134]

3.4.4. Press Trust of India – December 15, 2007Eighteen people including seven children were Killed in Satluj Express tore into private mini bus carrying mostly student and teachers in thick fog at manned railway crossing in the Moga district of Punjab. The victims were mostly student and teachers on their way to different educational institutions in the area. Railway minister announced a compensation of Rs 5 lakh to the families of each of dead. [135]

3.5. Studies Regarding First Aid And Safety in Schools

3.5.1. Pala I. and Vankar GK 1997 Assessment of knowledge and attitude of primary teachers about disasters suggests that only one fifth teachers out of 113 were confident about dealing with an accidents. It was revealed that there was a knowledge deficit, especially regarding the prevalence of accidents. Misconceptions regarding first aid were also common. Communication about accidents among the teachers, parents and doctor was virtually non existent. even primary care givers showed poor knowledge score on home safety and first aid (Thein M M and others, 2005) though the score of knowledge of road safety was satisfactory. This study was conducted in Singapore as childhood injuries are the leading cause of death for children between 5 to 14 years of age.[90]

3.5.2. S.,Kuthubutheen J., Fowler B. and others 2005 conducted study to assess the knowledge of primary care givers regarding first aid after burns at Royal Perth Hospital

He revealed over all poor knowledge scores, though knowledge about first aid of burns was satisfactory. Case by case analysis of patients (n=227) admitted to Royal Perth Hospital was done, to whom first aid was given by the primary health care givers, showed that only 39% patients received appropriate first aid and 50% patients received inappropriate first aid. Similar results were found to O'Neill and others from Reconstructive surgery Dept. of University College Hospital, (O'Neill and others 2005)

when they assessed the first aid measures taken by the patients and primary care gives following burns injury. Only 23.2% patients (n=63) had received appropriate first aid. In case of accidents at work place, only for 20% cases first aid facilities were available at work place. This study illustrates that the knowledge regarding the initial management of burn injury is very poor. In today's competitive life only formal school education is not enough for over all development of child. With peer pressure or with pressure from parents, and with their own interest children are also attending hobby classes, sports coaching and tuition classes along with formal schooling. There fore having first aid knowledge to formal school teachers is not sufficient. It will be beneficial if teachers from areas like sports, hobby classes and tuition classes have first aid knowledge. [91]

3.5.3. N Students of physical education faculty are also lacking in knowledge of first aid. Findings of study done in Egypt (Aly and S A and Ahmed N I, 1993) support this. It was found that more than half of the students had correct knowledge of three injuries only out of eight namely fracture, cramp and bleeding. Lack of knowledge noted regarding cut wounds, penetrating wounds, falling, sprains and epistaxis. [92]

3.5.4. Ransone J. and Dunn-Bennett LR 1999 conducted study for assessment of the first aid knowledge and decision making of inter scholastic athletic coaches exposed to athletic injuries was done.

Which reveals that the athletic coaches did not adequately meet the first aid standards as established for the study in accordance with the American Red Cross. In addition, coaches who passed the first aid assessment, tended to return an injured starter to the game, where as those who failed, decided to keep the player out of the game.[82] People who play injury prone games and their coaches are also ignorant about first aid. Evaluation of first aid knowledge of mountaineers was done. (Kuepper T and others) Which showed inadequate first aid knowledge and the investigator recommended educating mountaineers. [93]

3.5.5. Newman L J and Crawford P J 2009 conducted study on dental injuries Assessment of knowledge of first aid among 66 physical education teachers revealed that 64% of respondents gave correct answer about the first aid for tooth fracture where as only 43% gave appropriate answer relating to avulsion of permanent tooth.[94]

3.5.6. Cunningham A, 2002 Findings of audit of first aid qualifications and knowledge among team officials in two football leagues revealed that the officials responsible for providing first aid are not adequately qualified and there is knowledge deficit among those who are providing first aid.[95]

3.5.7. Anderson L, Al-Asfour and Al-Jame Q 2006

In school health programme every child is considered as a health worker. That means it is expected that every school going child should have first aid knowledge. Assessment of knowledge of school children for first aid measures for avulsion and replacement of teeth was done in Kuwait City. An interview of 221 Kuwaiti School children revealed that there was low knowledge level regarding tooth avulsion, replacement and first aid measures.[96]

3.5.8. Knowledge of cardiac resuscitation has gained considerable importance in recent years. It is expected that every member of the society should know it. However findings of a study done by (Teich N and others 2005) to assess the knowledge of lay German people regarding cardiac resuscitation suggests that (a) ABC – like first aid rules are largely unknown among the population; (b) the value of a stable lateral position is overestimated and (c) first aid skills of elderly persons are worst.[97]

3.5.9. Similar findings revealed from the study done (Schafhalter- Zoppoth I and others 1994) to assess the awareness about cardiopulmonary procedures such as artificial respiration or cardiac massage. Investigators found that the general first aid and resuscitation has been known sufficiently, where as special cardiopulmonary procedures such as artificial respiration and cardiac massage were unknown to most.[89]

3.5.10. Pediatric is special, sensitive and most important branch of medicine. Giving first aid in pediatric emergencies require more skills. Usually mother is the first person who can give first aid. Assessment of mother's knowledge using a questionnaire comprising 13 multiple choice questions was done. (Langly J and Silva P 1986) The results showed that approximately three quarters of mothers correctly answered 70% of the questions. Whilst higher intelligence and previous training in first aid were shown to be associated with better score, the effects were small. Some aspects of first aid which deserve more emphasis in training course were identified.[90]

3.5.11. These findings are also supported by another study (Conrad and Beattie TF 1996) carried out in Edinburgh, to assess the knowledge of pediatric first aid. Sample was randomly selected from general population. The study highlights that the knowledge of first aid is generally deficient, with only 13% of people are able to correctly treat all pediatric emergencies. [91]

3.5.12. Large group of population is working in industrial sector. In India, health services are inadequate in industries under the control of employee's state insurance scheme. In an article on Educational and training issues in occupational first aid (Sacco A, and others 2005) authors says that the need to achieve high training standards for workers responsible for first aid at work place is to a large extent justified by the difficulty of the role of employees. This need follows the current tendency in regulations to

guarantee adequate and up-dated training also for the other agents operating within the system of workplace prevention. In this context the occupational physician plays a significant role in the training programmes for designated workers.[101]

3.5.13. 'Are pre hospital deaths from accidental injury preventable?'' a study done to evaluate the possibility of preventing accidental deaths in prehospital period (Hussain LM and Redmond AD 1994) The investigators were of opinion that, Death was potentially preventable in at least 39% of those who died from accidental injury before they reached hospital.[93]

They also have suggested in their study that training in first aid should be available more widely, and particularly to motorists as many pre hospital deaths that could be prevented are due to road traffic accidents.

3.5.14. With westernization, competitive life and over all change in life style, life has become stressful and mental health has gained its due importance. There is continuous migration from rural areas to urban slums creating major health and economic problems. One can not neglect the mental health first aid awareness among primary teachers as well as general population. There was eight fold increase in budget allocation for the national mental health programme. (10th five year plan) [114]

3.5.15. Some problems women are facing, an article written by Tokle M (1994) highlights need of mental first aid. In his article, he says after earth quake

women are afraid. Destitute women and widows have no emotional and economical support. They are afraid that they and their children will become beggars. He adds in his article that women are facing physical problem too and there are no sufficient gynecologists and nurses to deal with physical health problems. This situation adds to their emotional problems.

3.5.16. Psychological assessment of people in Andaman and Nicobar islands after Tsunami (Math SB and others 2005) was done. The study revealed that 5 to 8% populations suffering from significant mental health problems. In developing countries like India, limited availability of mental health professionals and poor knowledge about disaster mental health among the medical and paramedical staff may lead to poor psychological rehabilitation of the survivors. Hence presence of a disaster mental health team is required during the early phase of the disaster in developing countries. [129]

3.5.17. Similar findings were found in study conducted at New Delhi. (Khandelwal SK and others 2004) It is pointed out that there is significant increase in general health manpower, but mental health manpower is not adequate. A lot has still to be done towards all aspects of mental health care in India in respect of training, research and provision of clinical services in all sections of society.[96]

3.5.18. Not only in India, but a national survey conducted in Australia (Jorm A F and others) reveals that there is room for improving the range of mental health first aid services.[97]

3.6. Literate related to assess the effects of training programme on the disaster management.

3.6.1. Ali, N., & Jaswal, S. (2000). This paper reports the impact of the on-going political unrest in Srinagar on the mental health of low-income urban people in Srinagar. The Kashmiri translation of the Self-Reporting Questionnaire 20 (SRQ-20) was used to assess current psychiatric morbidity in the respondents in Baramulla. The SRQ-20 was validated against the ICD-10, which was used as a gold standard. A cut-off of 11/12 was arrived at by testing for sensitivity and specificity. The findings of the study indicate high mental health morbidity in the respondents, especially in homemakers and in unskilled workers as a result of the on-going long term unrest and the consequent trauma in the region.

3.6.2. Gauthamadas, U. (2007). Trauma counselling is recognised as a focus for disaster relief efforts. However, the scope of trauma counselling is limited by geographic, social access, cultural, language, and human resource limitations. In an attempt to transcend these limitations, a crash course in psychological first aid was designed for personnel from the affected communities by Academy for Disaster Management Education

Planning and Training (ADEPT). The paper is an account of the training and its application in the aftermath of the tsunami. The attempt to assess the effectiveness of the training after 8 and 16 months.

3.6.3. Chakrabarti, P. G. D., & Bhat, M. R. (Eds.). (2006). The book is based on the proceedings of the International Workshop on 'Disaster Risk Mitigation: Potential of Micro-finance for Tsunami Recovery', held at New Delhi in 2005. The backdrop to the workshop and thereafter the book was the comparatively higher level of suffering that the economically poorer sections of society have to go through in the aftermath of a disaster and the potential of micro credit in enabling them to recover from the disaster. The book begins by the proposition that while the rich have their assets insured such is not the case with the poor. Further in the virtual absence of proprietary or tenancy rights over their little property, they stand little chance of getting compensation from the authorities. In such a situation, the jewellery of the women becomes the first collateral for obtaining credit from money lenders at a very high rate of interest. This begins an unending cycle of indebtedness. It is in this backdrop that micro credit is explored to examine its potential in acting as a safety net and shock absorber for people to cope up with a disaster situation. To this end the workshop wanted to draw a comparison between the coping capacity of communities with micro credit groups and without micro credit groups. It also wanted to understand the problems that such groups faced in maintaining liquidity when everybody wanted to withdraw their savings and

in further advancing credit at an affordable rate. The linkage of these groups to relief and rehabilitation agencies of the local government was also explored through the means of this workshop.

3.6.4. Suja Suresh (2009) conducted study to determine the effectiveness of structured teaching programme on knowledge and practices of disaster management among school teachers. She found that there was gross inadequacy of knowledge on disaster management among school teachers. They had unsatisfactory practice towards cardiopulmonary resuscitation. The structured teaching programme was found to be effective. There was highly significant difference in knowledge and practice of school teachers before and after administration of structured teaching programme. There was positive correlation between the knowledge and practices of school teachers.[118]

3.6.5. Afrasyab Khan, Sumaira et al conducted study on knowledge, attitude and practices of undergraduate students regarding first aid measures and found out that overall knowledge of the first aid amongst the university students is low. The low rate of the first aid training was also observed in a study, even if students wanted to get first aid training very few (12%) knew of places in Pakistan that offered First aid course. Many students realized that (94%) first aid training should be part of curriculum with 84% suggesting it should be part of pre university curriculum. Even though

medical students scored higher yet their knowledge was not sufficient. Suggesting first aid training in curriculum. Students had inadequate knowledge and many recognized the need for introduction of formal first aid training programme at school /college level in order to decrease the early mortality and morbidity of accidents and emergencies. [114]

3.6.6. Spranger et al (2007) conducted a cross sectional study to assess physicians preparedness and response capacity to bioterrorism in major metropolitan area of Tarrant, Texas and found that there was no correlation between the level of knowledge and management skill and previous bioterrorism training. Approximately 90% of responders rated current knowledge is fair-poor. Only 9% rated their current knowledge level as good – excellent. Those who have had training experience were 18 times more likely to report good knowledge and management skills compared to those who rated their knowledge as fair poor. Additionally the physician with bioterrorism training was proportionally more willing to serve as consultant.[99]

3.6.7. Etsuko Tsunozaki, Asian Disaster Risk Reduction Centre (ADRC) conducted a survey on tsunami awareness (2005) in Srilanka, Maldives and Indonesia targeting a residents, school children, teachers and Govt officials. The result of survey showed that in Srilanka 93.5% of residents did not know about tsunami 77% residents answered that most effective way to prevent future tragedy was integration of disaster study into school

curriculum. (capacity building and awareness raising for disaster reduction through formal education)[118]

3.6.8. Over 1,100 children from 20 schools throughout the UK answered a series of questions about first aid and road safety. Over half (53%) of these children had never learnt first aid and most said they did not adopt safe behavior on the road – the majority (84%) of children admitted that they do not wear a cycle helmet when on their bicycle and most (74%) do not normally use a pedestrian crossing to cross the road.[51]

3.6.9. Education brings about change in thinking process and behaviour. Training helps in understanding the concepts and in acquiring skills. Disaster Management is not different. Training in Disaster Management is not exception. It will definitely help the individual in acquiring the knowledge and in developing skills related to the Disaster Management. It will also help in building confidence in individual. And if the person has confidence, he can do the work more effectively and more efficiently in Disaster situation. This belief is supported by the study done in Ireland (Steele JA 1994) to find out the effect of first aid training on public awareness of the management of seriously injured casualties. The results showed that confidence as independent variable was associated with better knowledge, those who had some form of training were significantly more confident about their own abilities and also performed better in the assessment.

3.6.10. Disaster Management and basic life support skills were taught to medical students in their early period of studies (Das M and Elzubeir M, 2001) and the results were evaluated**.** The results showed that teaching Disaster Management in early period is useful and the programme provides students with sound basic knowledge and adequate practical skills in Disaster Management and basic life support and that adequacy of time, physical and human resources are important prerequisites to facilitate practice and engender confidence in skills.

3.6.11. The author (Eisenburger P and others 1999) in his paper on 'Life supporting first aid training of the public – review and recommendations' says that Since introduction around 1960 of external cardiopulmonary resuscitation (CPR) basic life support (BLS) without equipment, training courses by instructors have been provided, first to medical personnel and later to some but not all lay persons. At present fewer than 30% of out of hospital resuscitation attempts are initiated by lay bystanders. The number of lives saved has remained suboptimal, in part because of a weak or absent first link in the life support chain. This review concerns education research aimed at helping more lay persons acquiring high life supporting first aid skill level and to use these skills.

3.6.12. Uray T and others from University of Vienna, Australia, are of opinion that (2003) not only for the medical students or adults, teaching life saving training is feasible for 6 to 7 years old school children who might well be

in a position to save the lives of cardiac arrest victims. The findings should be used to convince politicians and administrators of the need of LSFA training as mandatory subject in schools.

3.6.13. Ghosh A and Bharat R (Burns 2000) reports that ‘Community Awareness Programme for the target group of ladies and teenage girls and ‘School Education Programmes for the target group of school children of standard 8 in the steel producing city, Jamshedpur, increased the awareness about burns prevention among school children and community members, and steady increase in the number of parents who use water as first aid.

3.6.14. Not only the formal Disaster Management training helps to improve the knowledge of the people, but the efforts like giving information booklet for individuals attending OPD or mass mailing of calendar which focuses on child and infant safety and first aid treatment are also effective.

3.6.15. Such effort done by Sunde K and others shows that mailing calendar with information on removal of foreign body from the airways and infant CPR was helpful. The knowledge and skills were tested in two groups using a previously validated checklist before and after introduction of calendar. The knowledge was improved; there was not much improvement in skills. These findings are also supported by study done in Australia (Jorm A F and others 2004). They say that Disaster Mental Health training produces positive changes in knowledge, attitude and behavior of individual

3.6.16. Above review of literature has shown that although there is information and recognition of the issues related Disaster Management, there are very few studies done on need assessment on primary or secondary school teachers in India regarding basic first aid course or refresher course. In India around 30% of population is below 15 years of age, and they are spending their maximum time in schools.

3.6.17. One of the important components of the school health programme is to provide first aid to the students and it is the responsibility of the teacher. Secondly, through teacher, we can train students and then to the community. The investigator felt that not only the student but the teacher also can also become the health worker if we assess their existing knowledge, plan the Disaster Management teaching programme based on the findings. In order to help the scholar, teachers and the society and for the full-fledged implementation of the school health programme the investigator undertook this study.

3.6.18. According to local education bureau in Taiwan (2006) elementary school teachers attitude towards disaster prevention are positive, the teachers attitude of disaster prevention are different according to different gender. The female teachers attitude of disaster prevention are more positive than male teachers. Based on their findings following suggestions were given.

- Teacher should participate more in education and training about disaster prevention.

- The institute of teacher training should hold more education and training about disaster prevention.

- The concept of disaster insurance should be given more emphasis in order to increase the disaster insurance by institute.[147]

3.7. Role of teachers in disaster management

Desai, A. (2008). The article discusses the contribution made by the profession of social work in natural and human induced disasters and its unique role in a multi-disciplinary effort. Using the framework of the integrated social work practice model, steps for intervention are detailed with examples of work with those affected by the disaster as well as other actors such as the government, donors, NGOs, and academic institutions. The assessment of impacts is discussed on rehabilitation policies, institutions for social work education and the students.

3.7.1. Lakshminarayana, R. (Eds.). (2004). The editors begin the book by acknowledging that psychosocial interventions in respect of disasters have seen a shift from identifying psychiatric ailments to providing psychosocial care, psycho education, enhancing coping mechanisms of survivors and encouraging formation of community based self help groups. It is in this

light that the Indian Red Cross Society desired to have a Disaster Mental Health/Psychosocial Care component integrated into their Disaster Preparedness and Disaster Response plan. The book was seen as a means to it since it provided a forum/opportunity to understand disaster mental health responses in India. The chapters in the book have been written by representatives from several governmental and non governmental organisations, who have had direct experience of engaging in the field on this area. The themes on which the authors have delved include the nature of psychosocial interventions undertaken by various organisations in the case of recent disasters, the theoretical underpinnings for these interventions, the status of disaster mental health in India at the policy level and the roles of different professionals such as psychiatrists, psychologists, social workers and nurses following a disaster. The religiocultural, socioeconomic and political dimension of disaster response is also examined through the book. Finally the book concludes by tracing the trajectory that disaster mental health interventions have traversed from the Bangalore circus fire tragedy in 1981 to the Gujarat riots in 2002 and the challenges that were faced therein. The book brings into the discourse both natural disasters and human made disasters such as communal riots.

3.7.2. Andharia, J. (2002). Stated that in developing countries like India, academic institutions of higher learning can contribute to disaster and rehabilitation in a variety of ways. The article attempts to capture the

experiences of one such institute and its involvement in disaster situations over five decades. The changing contours of the role played by an academic institution and the gradual upscaling of its work illustrated how higher education and innovations in paedagogies can promote value orientation in the learning process, promote critical thinking and contribute to social development. The modalities of this involvement, the nature of tasks performed and the lessons learnt are discussed from the standpoint of a social science institute Imparting post graduate education in practice based profession of social work.

3.7.3. Koichi Shiwaku et al, Future perspective of school disaster education in Nepal Disaster Prevention and Management Vol 16/4 Emerald Group Publishing Ltd 2007

Result of this study showed that current school disaster education which is based on lectures can raise risk perception but it cannot enable student to know the importance of pre disaster measures and to take actual action for disaster reduction. Future disaster education in school should be active learning for students [148]

3.7.4. Interview Mr Ashish Sharma – PCM Commissioner

According to PCM Commissioner Mr Ashish Sharma PCMC has started 24 hrs central flood control cell on June 7, 2010. The objectives behind starting the cell is to reduce damages to life and property from possible

floods during rainy season in rivers like Pavana, Mula and Indrayani which flows through Pune city. Pre monsoon nullah cleaning and keeping the megaphone ready to give direction about flood to citizen demarcating the flood prone areas and providing necessary facilities to flood affected families in the city. This information was found useful for researcher for preparing the manual. [149]

3.7.5. This chapter dealt with the review of published and unpublished literature related to the problem stated. This enabled the investigator to have deep insight into the problem under study and helped to develop tool and in completing the study.

Chapter - 4

RESEARCH DESIGN AND METHODOLOGY

4.1. Introduction

This chapter explains the research design, overall plan for the study. It is concerned with the Setting of the study, sampling technique. data collection technique, tool, pilot study means used to obtain the needed data and plan for data analysis.

4.2. Scope of Management Research

Management research is used to solve operational and planning problems that arise in the various organizations in the society or community. These may include problems related to social, economic and health aspects. Operations research involves use of mathematical, logical and analytical methods to find optimal solutions. Motivational research involves analyzing the reasons and motives behind people's behavior. It is also used to create awareness and understanding certain issues related to social, economical and health aspect.

4.3. Research in Human Resource

Human resource management is concerned with human being in any organization. It reflects new philosophy, new outlook a new approach which deals with manpower as its resource. Recently human resource

management has taken new name instead of training. Today most organizations thinks in terms of HRM as creating awareness, motivating people, understanding problems, potential development and healthy working conditions. Thus HR development has become a new dimension of modern management. It empowers every individual and it is great awareness about the investment potential in training and development all over the world.

4.4. Research Design

Research design can be defined as the plan and structure of the enquiry, formulated in order to obtain answers to research questions on management aspects. The research plan constitutes the overall programme of the research process. The planning process includes the framework of the entire research process, starting from developing the hypothesis to the final evaluation of collected data.

A research design outlines the actual research problem on hand and details the process of solving it. A good research design will clearly describe the techniques to be used for selecting samples, collecting data, managing costs and other aspects that are essential for conducting management research. Decisions are taken depending on certain crucial issues like the study's purpose and objectives, the type of data needed, the method adopted for obtaining the data and analyzing it.

4.5. Need for Research Design

Research design is essential because it facilitates the smooth flow of various research processes. A good design means that good research results can be obtained with minimum utilization of time, money and effort. Therefore, it can be said that design is highly essential for planning research activities. An ideal research design can be developed, if available resources such as time, money and man power are considered before beginning the design. The validity of research results is based on the initial research design. If it is not properly prepared it will jeopardize the whole research process and will not meet its purpose. Therefore research design has to be developed very carefully, as it forms the foundation for the entire research process that follows. The characteristics of efficient research design should first be properly understood.

4.6. Characteristics of Good Research Design

Some important characteristics of a good research design are flexibility, adaptability, efficiency and economy. A good research design should minimize bias and maximize accuracy of the data obtained and should have as few errors as possible. The most important requirement of good research design is that it should provide adequate information so that the research problem can be analyzed on a wide perspective. An ideal design should take into account important factors like

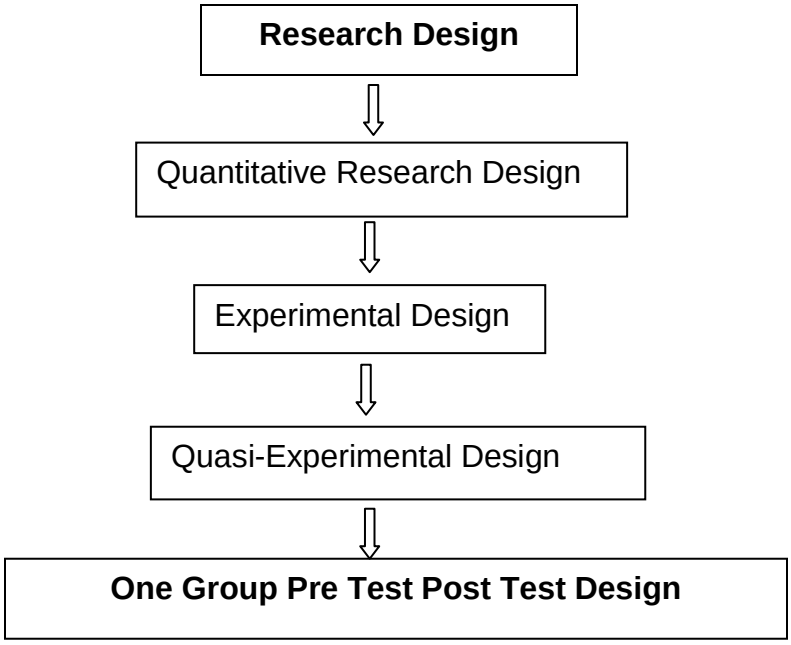
- Identifying the exact research problem to be studied
- The objectives of the study
- The process of obtaining information
- The availability of adequate and skilled man power
- The availability of adequate financial resources for carrying out research.

4.7. Research Approach

There are several ways to classify research designs. There are two broad catagories of research approach viz. quantitative and qualitative designs. Quantitative design is selected by researcher. There are experimental and non experimental designs under this heading. The following figure 4.1 depicts the research design selected for present study. The research approach is systematic, objective method of discovery with empirical evidence. The research method adopted for the study was quasi-experimental method because the present study was aimed at development of training manual on disaster management for school teacher in Pune city and determining its effectiveness statistically. This method was widely used in management and educational researches.

Fig – 4.1

Research design framework for present study



4.7.1. In this design researcher is trying to establish a cause-and-effect relationship. There are some advantages to the use of quasi-experimental designs. By this method the real world is more closely approximated. This method is widely used in management and educational researches.

4.7.2. Ghosh (2006) says that "in a quasi-experimental study, one must be familiar with the subject, to determine the scope and limit of research, to clarify the concepts and to formulate the hypothesis, and the main idea is the discovery of facts and insights". Quasi-experimental method or research approach helps to obtain pertinent and precise information

concerning the current status of phenomenon and whenever possible, to draw valid general conclusions from the facts discovered.

Example of one group pre-test-post-test design

A one group pretest-posttest design was used by Taylor, Kee, King and Ford (2004) to study the effects of a one day educational symposium on knowledge, impact and self management of older African Americans living with osteoarthritis. Subjects were from community senior centre. Knowledge score was significantly higher after the symposium.

According to Wood and Catanzaro (1988), " quasi-experimental studies serve the purpose of scrutinizing unknown regions for the purpose of discovery".

4.7.3. Many different designs fall into the category of quasi-experimental designs. Researcher selected one group pretest-posttest design because it provides a comparison between a group of subjects before and after the experimental treatment. The Researcher, therefore, decided to carry out a quasi experimental study with one group pretest-posttest design to find out effectiveness of manual among school teachers. The interaction of Researcher with school teachers, known experts in this field and the gaps / issues identified after literature

review were taken into account for crystallization of the objectives of the study. Keeping in the view the objectives of the study, the investigator administered pre test prior to the intervention of training manual the same group was given training manual and the group was administered post test again to find out effectiveness of training manual.

4.8. Research Statement and Objectives

4.8.1. Research Statement "A study to develop and assess the effectiveness of training manual on Disaster Management in terms of knowledge and self expressed practices among teachers of selected schools of Pune city during 2009-11"

4.8.2. Objectives Of The Study

1. To assess the knowledge of the secondary school teachers regarding disaster management before administration of training manual.

2. To assess self expressed practices of secondary school teachers regarding disaster management before administration of training manual.

3. To find out effectiveness of training manual among the secondary school teachers regarding disaster management in Pune city

4. To associate the knowledge of secondary school teachers regarding disaster management with self expressed practices

5. To co-relate the findings with selected demographic variables.

4.9. Hypotheses

Following hypotheses were formulated by the Researcher for study

a. There is no significant difference in the level of knowledge among the school teachers of Pune City after administration of disaster management training manual.

b. There is no significant difference in the self expressed practices among the school teachers of Pune City after administration of disaster management training manual.

c. There is no correlation between knowledge and self expressed practices of Secondary School Teachers regarding disaster management.

d. There is no association of knowledge of secondary school teachers regarding disaster management with demographic variables

e. There is no association of self expressed practices of secondary school teachers regarding disaster management with demographic variables

4.10. Period of the study

The period of the research work started in March 2009 and closed in November 2010. Period of data collection started from June 2010 till November 2010. Period for collection of reference material considered was from 2001 till date

4.11. Operational Definitions

Definitions of terms and variables-

Assess: According to Oxford dictionary assess means appraisal or evaluation

In this study assess means appraisal of knowledge of school teacher regarding disaster management.

Effectiveness: According to Oxford dictionary: effectiveness means having desired effect.

In the study effectiveness means having desired effect of manual for improving the knowledge of school teachers in relation to disaster management

Knowledge: According to Oxford dictionary:

Person' range of information. Sum of what is known

According to researcher knowledge is the information given to the school teachers on disaster management

Manual: According to Oxford Dictionary refers to book containing information or practical instructions (on a given subject)

In this study: Manual means a booklet, which will guide and extend the knowledge of schoolteachers regarding disaster management.

Disaster: According to WHO Disaster is any occurring that causes damage, economic disruption, loss of human life and deterioration in health services on a scale sufficient to warrant an extraordinary response from outside the affected community area

In this study: selected disasters like earthquake, fire, floods and Epidemics and road accidents.

Management: according to Oxford dictionary control and organization of event and skill in dealing with people

In this study: skillful handling of selected disasters like earthquake, fire, floods etc

School: Institution for educating children

In this study: Secondary schools in Pune city (Pune Municipal Jurisdiction only)

4.12. Settings of the study

'Setting' refers to the area where the study is conducted. To give justice to the study and to get reliable information in the desired time-frame, the Researcher restricted his attention to the secondary school teachers, teaching in schools located in Pune Municipal Corporation area only. Serious efforts were made to cover schools from various locations, having various types of management, with various mediums of teaching and adopting various teaching patterns. The investigator did not encounter any difficulty in gaining access to it, to conduct his study. There are 306 secondary schools in Pune city under Pune Municipal Jurisdiction. Researcher divided the Pune city in five regions viz. East, West, South, North and Central. A random method was used to select the 30 schools for the research. This was done to ensure that participating schools were sufficiently representative of each region, programme level (State Board, CBSE, and ICSE) and language of instruction. The distribution of the schools in each of geographical area is outlined in Table 4.1, 4.2, 4.3. page 158, 159.

4.13. Selection of the Schools

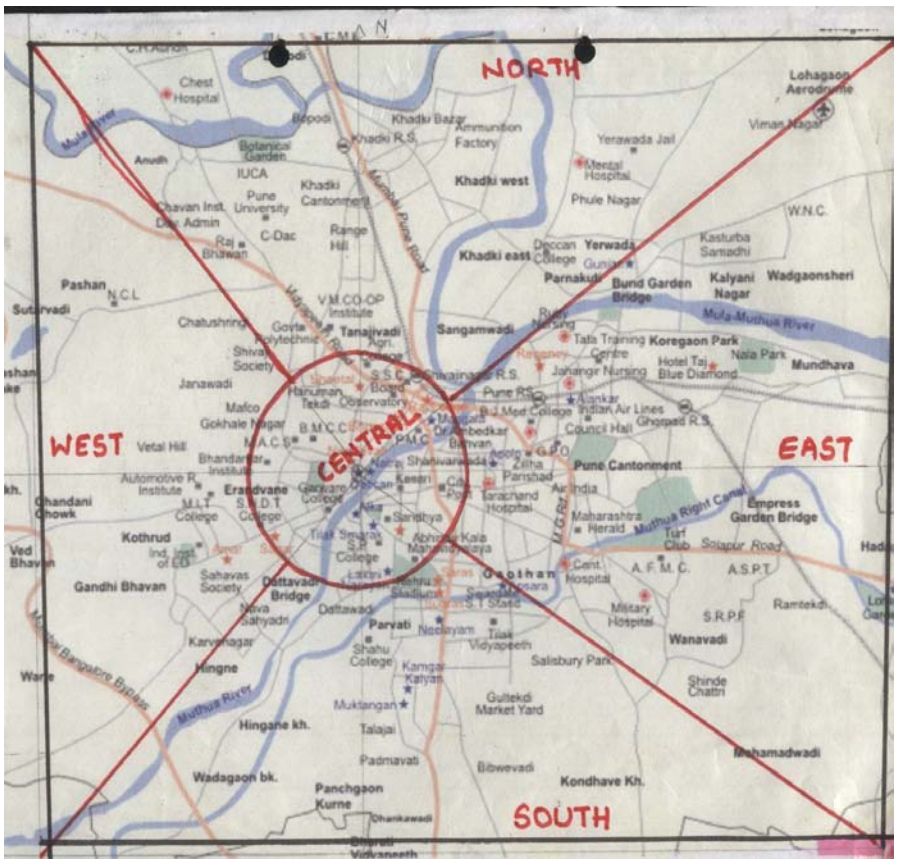
4.13.1. Schools from PMC Area

Names of schools teaching up to 10^{th} standard or above were collected from various official sources. Researcher firstly prepared a database of schools falling within PMC area. By making various

permutations and combinations, random sample from out of database was designed in such a manner that it will try to maintain similar percentage of above mentioned criteria, viz., medium of teaching, geographical location and examining body, to represent the population of secondary schools in Pune city area.

Figure 4.2

Map of Pune city showing five regions



4.13.2. Sample of 30 schools from out of 306 schools, i.e about 10% was selected. From each of the schools, 18 teachers were planned to be selected.

Table 4.1.

Selection of the School from different regions

Region	Number of schools	Percentage (%)	Schools included in study	Percentage %
East	112	36.60	11	36.66
West	32	10.46	3	10.00
South	42	13.72	4	13.34
North	32	10.46	3	10.00
Central	88	28.75	9	30.00
Total	306	100	30	100

Figure 4.3

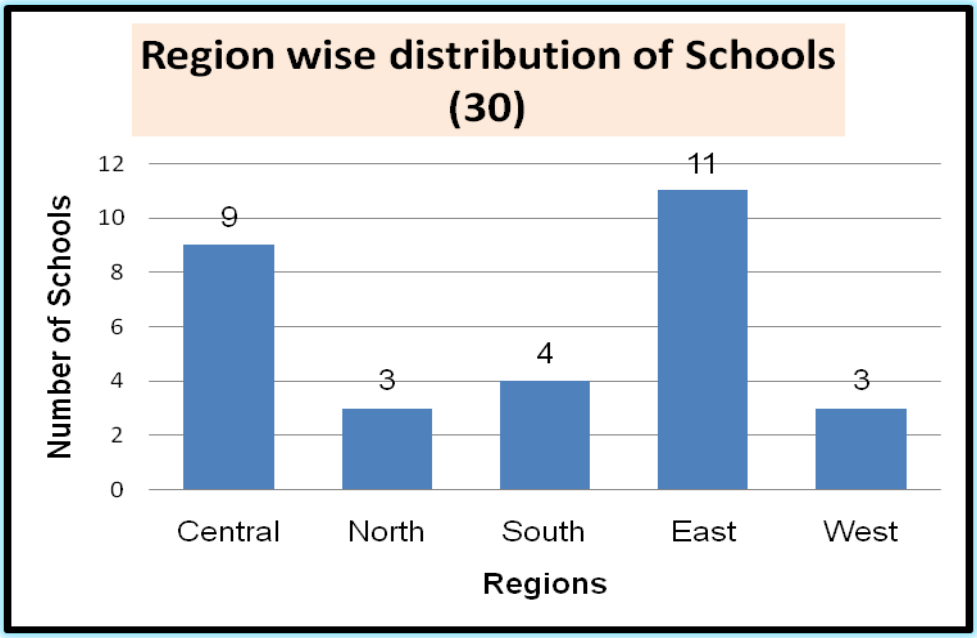


Table 4.2.

Selection of schools from different boards

Boards	Number of schools	Percentage (%)	Schools included in study	Percentage %
State Board	263	86	26	86.6
CBSE	34	11	3	10
ICSE	9	3	1	3.4
Total	306	100	30	100

Figure 4.4

Break up of school according to the examining body

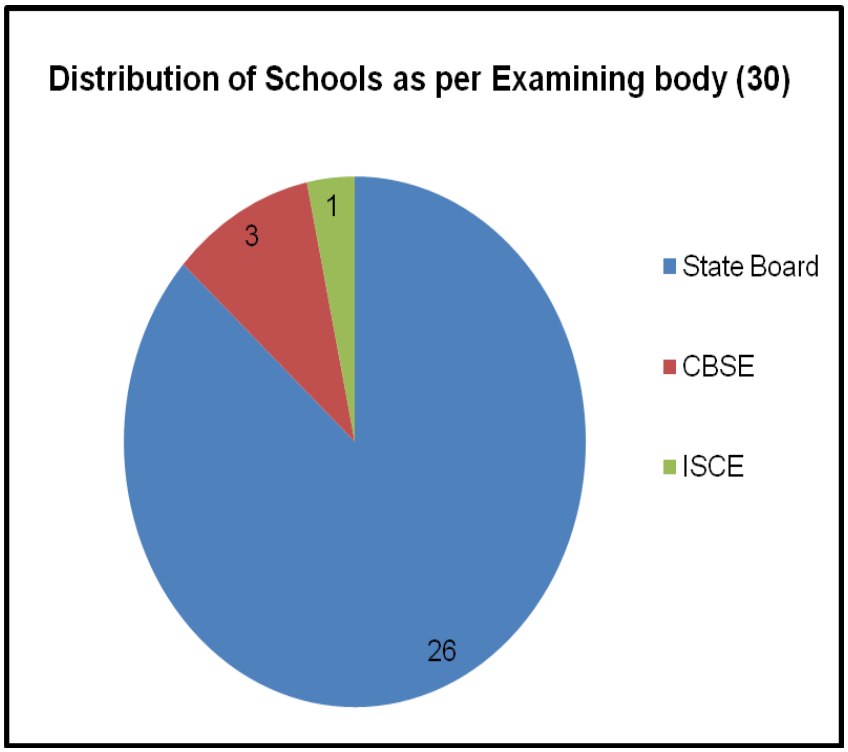


Table 4.3

Medium wise selection of school

Medium of Instruction	Total Number of schools	Percentage (%)	Schools included in study	Percentage (%)
English	129	42	13	43.33
Marathi	177	58	17	56.67
Total	306	100	30	100

Table 4.4

Medium wise selection of school

Location	Number of Schools	Percentage	Medium of Teaching	
			English	Marathi
Central	9	30 %	4	5
North	3	10 %	2	1
South	4	13 %	1	3
East	11	37 %	5	6
West	3	10 %	1	2
TOTAL	30	100 %	13	17

The data was sorted according to various parameters required for the study. Major highlights of information on Secondary Schools in Pune city are presented in subsequent paragraphs.

Figure 4.5

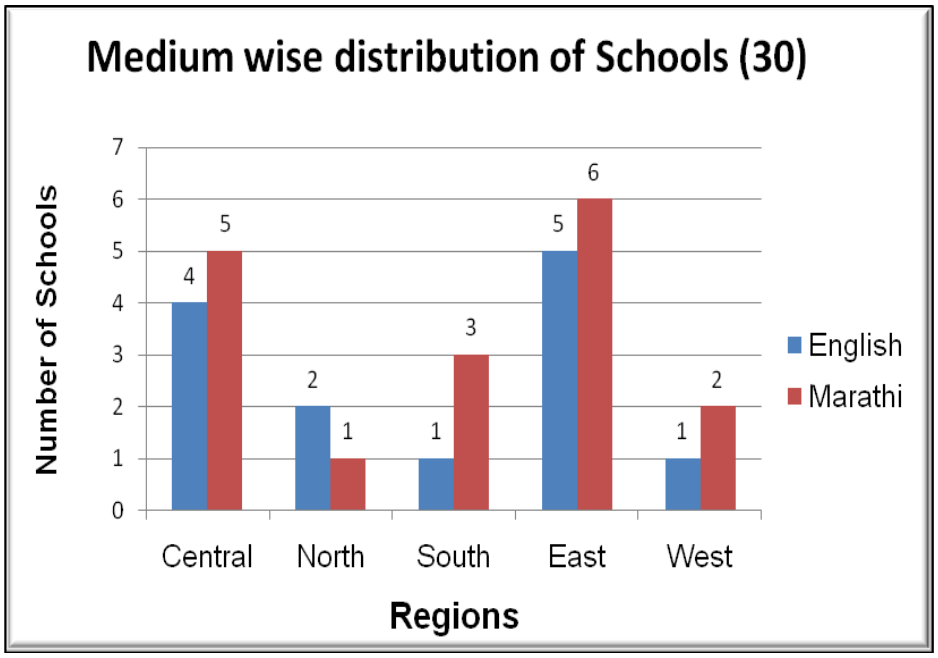


Table 4.4

Detailed breakup of Schools

	Maharashtra Board		C.B.S.E	I.C.S.E	TOTAL		TOTAL
	English	Marathi	English	English	English	Marathi	
CENTRAL	3	5	1	-	4	5	9
NORTH	1	1	1	-	2	1	3
SOUTH	1	3	-	-	1	3	4
EAST	3	6	1	1	5	6	11
WEST	1	2	-	-	1	2	3
TOTAL	9	17	3	1	13	17	30

4.14. Population under study

According to Talbot, ‘A population is a portion of the population that has been selected to represent the population of interest. By observing the characteristics of the sample, one can draw inferences about the characteristics of the population from which it is drawn. In a statistical investigation the interest usually lies in the assessment of general magnitude and the study of variation with respect to one or more characteristics relating to individuals belonging to a group. This group of individuals under study is called population.

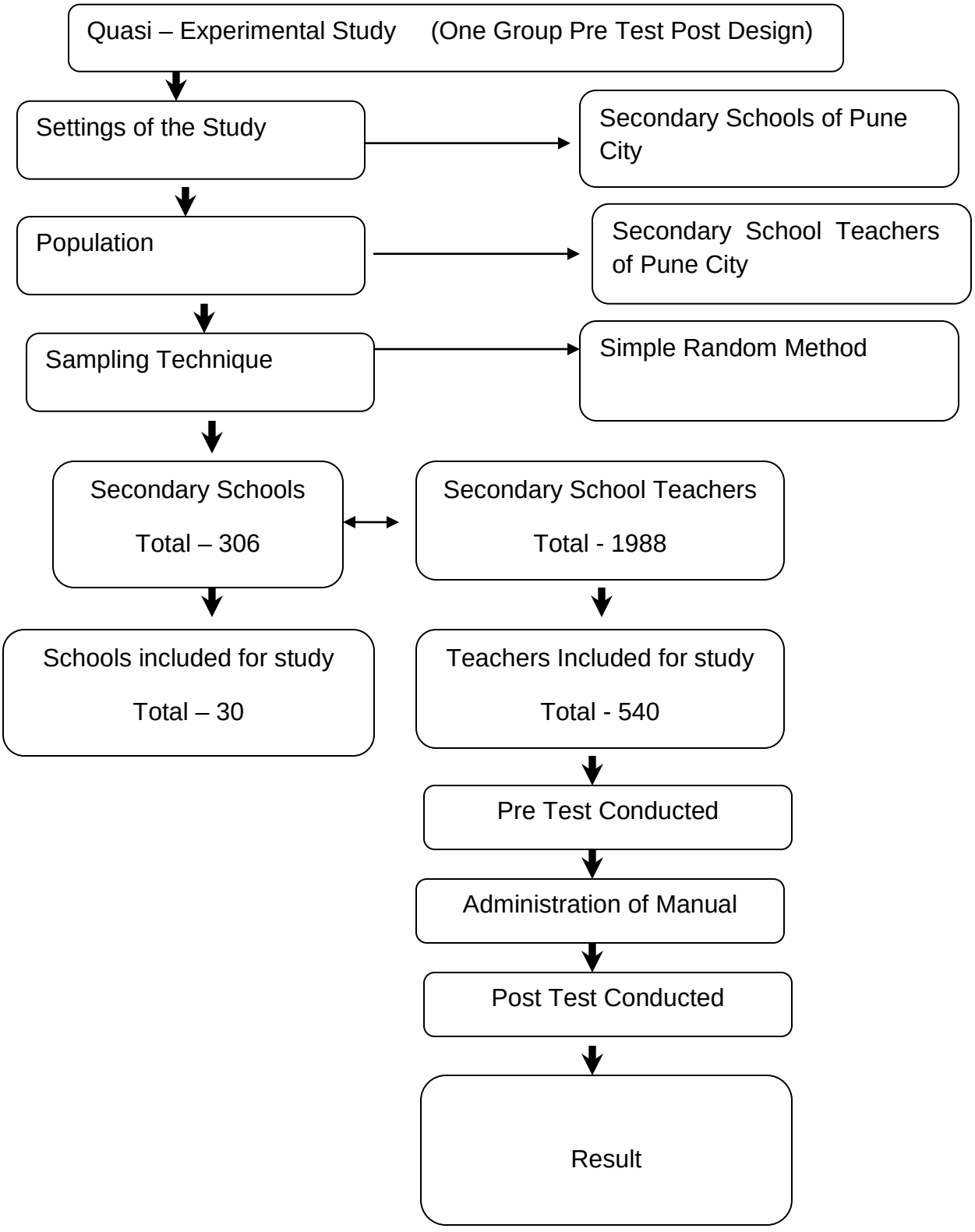
According to guidelines issued by NCERT, study of disaster management is made mandatory to students of secondary school i.e. up to 10^{th} class. The universe or population under study consists of all secondary school teachers teaching from standard VIII to standard X irrespective of their medium of teaching, type of school etc.

Economics & Statistics Bureau of Govt. of Maharashtra, publishes statistical information on various subjects. According to this official source, there were 1988 Secondary School Teachers in Pune City in the year 2008 – 09. Also according to Zilla Parishad, Pune Zilla – another local body of Govt. of Maharashtra - there were 306 Secondary Schools, during the same period, in the jurisdiction of Pune Municipal Area(PMC).

This basic information was collected from above mentioned official sources. The information was then compiled to yield meaningful classes useful for further selection .This data, therefore, was compiled for various parameters such as geographical location of Pune, medium of instructions and examining body.. viz., Maharashtra Board for Secondary Schools, CBSE and ICSE.

As the whole population cannot be studied for lot of practical difficulties, a small group representing the population, is studied which is popularly known as ‘sample’. According to ‘Talbot’ larger the sample more representative of population and smaller is the sampling error. As mentioned in earlier paragraphs, Researcher focused his attention to school teachers of schools falling under Pune Municipal Corporation limits.

Figure 4.6
FLOW CHART OF STUDY DESIGN



4.15. Sampling Technique

100% inspection of population is practically not possible due to administrative, financial implications and time factor and hence we take the help of ‘sampling’. A finite subset of individuals in a population is called a sample and the no. of individuals in a sample is called ‘sample size’. The sample size for the research was 540. The individuals in the sample are observed.

Types of sampling: Some of commonly known and frequently used types of sampling are:

- Purposive sampling
- Random Sampling
- Stratified Sampling
- Systematic Sampling
- Stratified Sampling: Here the entire heterogeneous population is divided into a number of homogeneous groups usually termed as ‘strata’ which differ from each of these groups is homogeneous within itself.

Then units are sampled at random from each of these stratum, the sample size in each stratum varies according to the relative importance of the stratum in the population. The sample which is

aggregate of sampled units of each of the stratum is called ‘stratified sample’ and the technique is known as ‘stratified sampling’.

Such a sample is by and large is the best and can safely be considered as the representative of the population from which it has been drawn.

Researcher has given justice to all five regions. 18 teachers from each school were selected in the study by simple random method. While selecting the schools researcher ensured that equal percentage was maintained between English and Marathi medium schools. The state board schools, CBSE schools and ICSE schools were also given equal representation. Total 540 teachers across the city from 30 schools (on an average 18 teachers from each school by simple random method) were included in the study. In order to collect the necessary data to assess the effectiveness of the training manual on disaster management,

4.16. Design of Questionnaire

Questionnaires are the most frequently used ‘data collection method’ in educational and evaluation research. Questionnaires help to gather information on knowledge. Attributes, opinions, behavior, facts and other information. Development of a valid and reliable questionnaire is

a must to reduce 'measurement error'. Groves (1987) defines measurement error as the "discrepancy between respondents' attributes and their survey responses"

Development of a valid and reliable questionnaire involves several steps consuming considerable time. Each step depends on fine tunning and testing of previous steps that must be completed before the next step., The major steps involved in development a questionnaire as under :

Step – 1 - Background

Step – 2 - Questionnaire Conceptualization

Step – 3 - Format and Data Analysis

Step - 4 - Establishing validity

Step – 5 - Establishing Reliability

4.16.1. Description of The Tool -

The structured questionnaire was prepared for assessing the knowledge regarding disaster management, for the secondary school teachers in Pune city.

Structured Questionnaire

The structured questionnaire included three sections,

Section I consisted items on demographic data such as age, education, experience

Section II comprised of items to assess knowledge of teachers about disaster management. It comprises questions on following broad aspects

- Basic concepts of disaster management
- Various Do's and do not's during disasters
- First Aid skills

Section III includes checklist to assess self expressed practices of the teachers in relation to the disasters and its management

4.16.2. Grading Section II of the questionnaire, written response of the teacher was taken in the form of multiple choice, correct answer carries one mark and wrong answer carries zero mark.

4.16.3. For assessment of the self expressed practices checklist was prepared of each statement is scored in terms of 'yes', 'no' and 'do not know' correct statement carries one mark other responses were given no marks Negative statements have reverse scoring. There are 45 items in the final tool. (30 items on knowledge and 15 items on self expressed practices)

4.16.4. Training Manual (Copy enclosed in Appendix)

The researcher developed training manual which was aimed to provide better understanding about various aspects of disasters and its management. This training manual is designed specially for school teachers. Training Manual was prepared in English and Marathi version. The language of the manual was kept as simple as possible. Factors taken into consideration while preparing the manual were interest building, attractiveness, attention span and age of the samples. Opinions and suggestions of experts in the field and the exposure of investigator in the area of research were considered.are

The objectives of the training manual

1. To create awareness on hazards pertaining to the locality.
2. To impart knowledge on disaster risk reduction
3. To understand disaster management plan for school
4. To make the teachers capable of training the students
5. To spread the culture of disaster preparedness

While preparing the manual expert's opinion was sought. The manual prepared was based on questionnaire prepared for data collection. Chapters of the manual was kept follows

1. Basic Concept of Disasters and its Management
2. Various Do's and Donot's
3. First Aid Skills and School Disaster Management Plan

4.17. Establishing Validity and Reliability

As a result of steps 1-3 above, a draft questionnaire is ready for establishing validity. Basically validity is the amount of systematic or built-in error in measurement (Norland, 1990). Validity is established using a panel of experts and field tests. Which type of validity to use depends upon the objectives of the study. The following questions are addressed in 'Establishing Validity'.

- Is the questionnaire measuring what it intended to measure?
- Does it represent the content?
- Is it appropriate for the sample?
- Is the questionnaire comprehensive enough to collect all the information needed to address the purpose and goals of the study?
- Does the instrument look like a Questionnaire?

  The validity of the instrument is determined by expert in the field of Management, Disaster management, Education and social sciences. Researcher ensured that the expert identified were Ph D qualified.

4.17.1. Establishing Reliability

Reliability is defined as “Yielding the same or compatible results in different trials “. In normal language, we use the word reliable to mean that something is dependable and it will give same outcome every time. The use of reliability types (test-retest, Split-half, alternate form, internal consistency) depends on the nature of data. To assess reliability of knowledge questions, test-retest or split – half is appropriate.

Reliability is established using a pilot test by collecting data from 60 subjects which were not included in the study . Data collected form pilot test is analyzed using a computer software package such as SPSS (Statistical Package for Social Sciences). Reliability and validity of tests are ‘Twin Pillars” which support the entire testing procedure. It must be noted that Reliability is ‘Not calculated’ but ‘Estimated’. The reliability coefficient calculated was 0.8430 (84 %) which indicated that instrument designed for data collection was highly reliable.

4.18. Pilot Study

Pilot study is an exploratory study done preliminarily, to help in refining the problem, develop or refine hypothesis, or test and refine the data collecting methods. According to William (2002), a pilot study is one that tests procedures or tools. The tool is tested in a pilot study, which is an important step in the development of a new tool or making the necessary changes in the same tool and increase its reliability and validity. After permission was sought, a pilot study was undertaken. A pilot study was conducted by the investigator in secondary schools in June 2010 to test the practicability of this tool.

Pilot study was conducted on 60 school Teachers to test the feasibility of the study.

Objectives of the pilot study were

- To assess the feasibility of the tool
- To test the tool for content and language
- To assess the time taken for the study
- To identify the problems faced during the date collection.

Sixty teachers were selected according to the criteria laid down for the sample selection. They were explained about the purpose of the study and the procedure of data collection. Data was collected as per the respondents' availability and convenience, and their responses were

recorded. They were assured about the confidentiality of the information collected. Training manual was given post-test was administered on 7th day.

4.19. Data Collection

Data was collected by using the tool.

- Questionnaire was introduced to identify responses.
- Identify the level of knowledge and practices of school teachers
- Training Manual was Provided to the school teachers in relation to the disaster management
- Evaluated the difference between knowledge of school teachers before and after administration of manual
- Administrative permission was procured formally from the school authorities
- The actual data collection started from the July 2010 and ended on 20th November 2010, on all days, except public holiday. They were explained about the purpose of the study and assured about the confidentiality of the information between the investigator and the respondent only. Their willingness was sought for.
- The respondents were all very interested and enthusiastic to answer. A short discussion was held with the respondents to converse and ask if there were any queries concerning to topic.

4.20. Data Analysis

The data collected was interpreted using tables and figures. The data was analyzed using statistical tools. Differential and inferential statistics will be used to interpret the data. The investigator decided to analyze the data using descriptive and inferential statistics and presented them in tables, graphs and figures. The following plan of analysis was made with consultation of statistical expert.

1. The items in the demographic data variables will be computed in the terms of frequency and percentage.
2. Bar graphs will be plotted to compare the distribution of pre-test and post-test knowledge score.
3. Mean, standard deviation of pre-test and post-test knowledge score will be calculated and compared.
4. 't' test will be applied to determine the significance of mean difference between mean pre-test and mean post-test knowledge score.

4.21. Data Dissemination And Utility

The findings of the study will be presented in conferences and group meetings and a copy will be circulated to all the schools, administrators, educators and education authorities for their commitment and improvement and standardization can be undertaken.

CHAPTER – 5

RESEARCH FINDINGS

5.1. Introduction.

This chapter deals with findings of the study, analysis and interpretation of the data collected from the samples of 540 secondary school teachers from 30 secondary schools of Pune city. The data collected was analyzed on the basis of objectives of the study.

5.2. Objectives of the study:

1. To assess the knowledge of the secondary school teachers regarding disaster management before administration of training manual.
2. To assess self expressed practices of secondary school teachers regarding disaster management before administration of training manual.
3. To find out effectiveness of training manual among the secondary school teachers regarding disaster management.
4. To associate the knowledge of secondary school teachers regarding disaster management with self expressed practices
5. To co-relate the findings with selected demographic variables.

5.3. Organization of study findings –

Analysis of data is organized and presented under the following headings:

5.3.1. Description of selection of secondary schools

5.3.2. Distribution of Teachers selected for study

5.3.3. Analysis of the Pre test Knowledge scores

5.3.4. Break up of Knowledge Score

5.3.5. Analysis of the Pre test SEP scores

5.3.6. Break up of SEP Score

5.3.7. Comparison of Pre test scores with Post Test scores

5.3.7.1. Knowledge

5.3.7.2. Self Expressed Practices

5.3.8. Special observations of the researcher

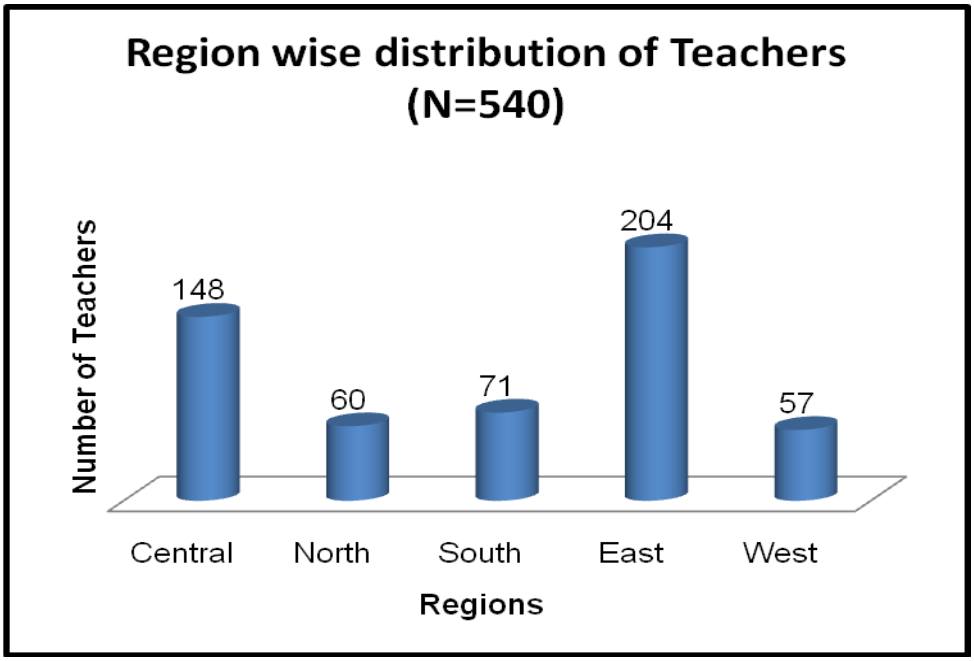
5.4. Description of selection of Secondary Schools

Researcher could manage successful contacts with all the selected schools for the study according to their convenience, a total of 30 schools covering all regions of Pune city were selected. Detail break up of 30 schools is already discussed in chapter 4

5.5. Distribution of secondary school teachers selected for study

Figure 5.1

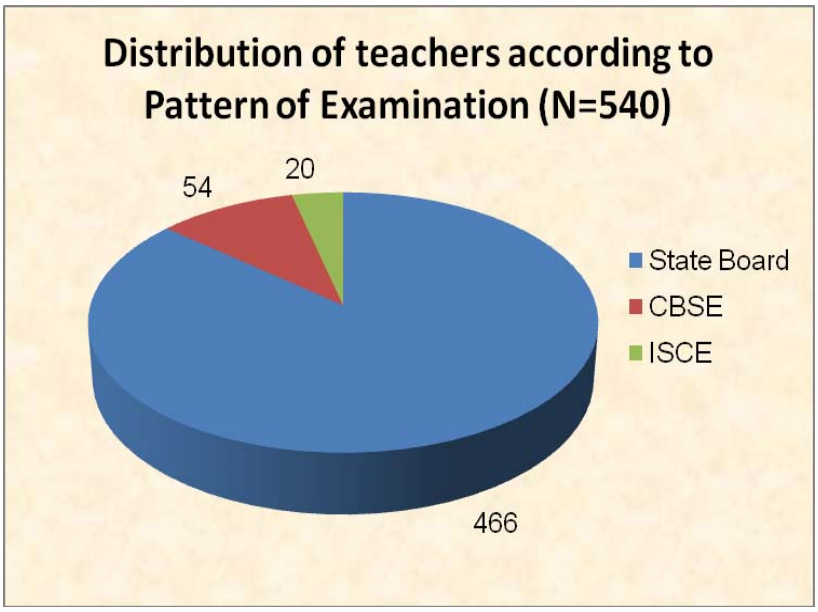
Region wise distribution of secondary school Teachers



5.5.1 It is seen from the above figure 5.1, that, there were 148 (27%) secondary school teachers from in Central part of Pune and 204 (37.7%) secondary schools teachers from eastern part of Pune participated in the study. It indicates that Eastern Pune – is developing part of Pune is at the top in regards to number of schools and school teachers, followed by Central Pune. It is interpreted that Northern and Western side of Pune still has a lot of scope to establish new educational institutions. As geographically Pune is spreading horizontally as development takes place, educational sector is not an exception.

Figure 5.2

Distribution of Teachers according to pattern of examination



The above figure shows that the number of teachers in state boards appears to be in majority followed by CBSE and ISCE as majority of the students opt for state board schools.

5.5.2. Age group wise distribution of teachers

The average age of school-Teachers is found to be 38.2 Years . The age-wise distribution of all teachers is as shown below :

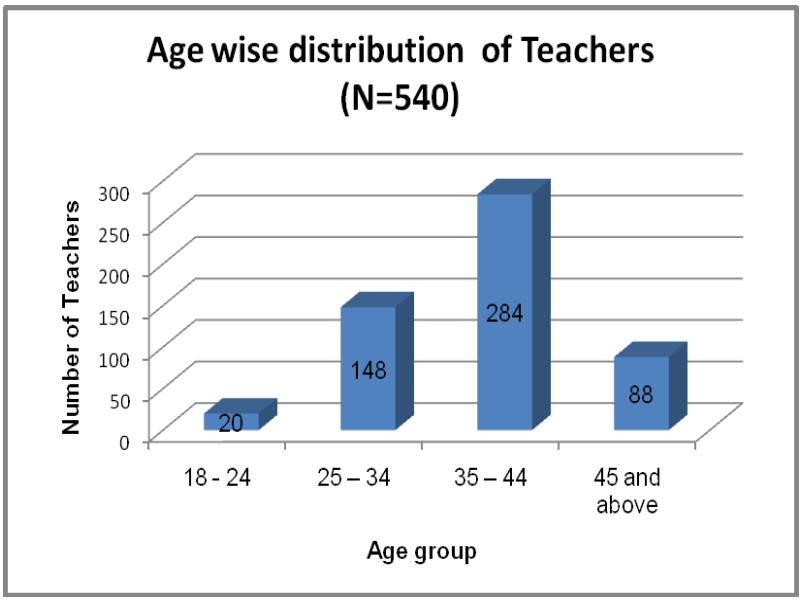
Table 5.1

Age group wise distribution of teachers

Age Group	No. of Teachers	% to Total
18 - 24	20	3.70
25 – 34	148	27.40
35 – 44	284	52.60
45 and above	88	16.30
Total	540	100

Figure 5.3

Age wise break-up of teachers



It is clear from the above break-up that majority of the teachers are in the range of 35-44 years, followed by young group of 25-34 years. The average ages of male-teachers and female teachers are observed to be 37.06 years and 38.65 years respectively. The study revealed a dominance of female teachers showing a majority of 73% against males.

5.5.3. The age and sex wise break-up of teachers is shown below :

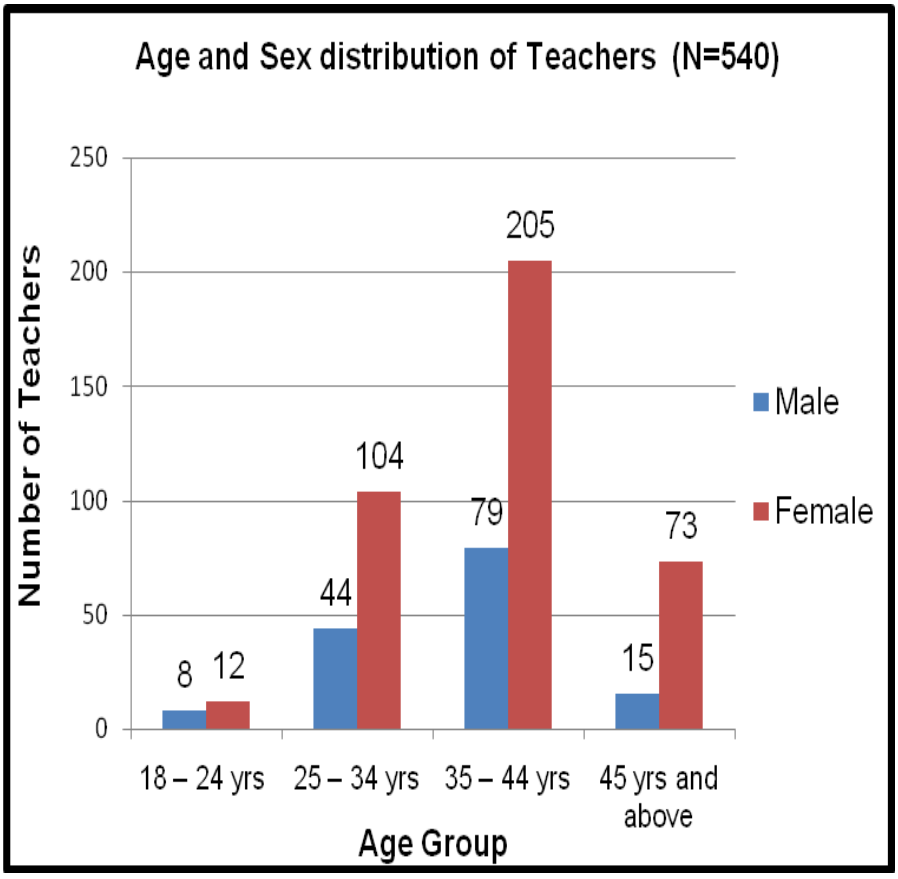
Table 5.2

Age and sex wise break-up of teachers

Age Group	No. of Teachers		% of Total	
	Male	Female	Male	Female
18 – 24 yrs	8	12	05.48	03.04
25 – 34 yrs	44	104	30.14	26.39
35 – 44 yrs	79	205	54.10	52.04
45 yrs and above	15	73	10.28	18.53
Total	**146**	**394**	**100.00**	**100.00**

Figure 5.4

Age and sex wise break-up of teachers



5.5.4. Education of Teachers

All teachers are either graduates or post-graduates. Though dominated by Post Graduate teachers – about 47.4% - graduate teachers are recording a score of 45.9%.With a minor exception of about 6.7% of total teachers surveyed, Researcher made on attempt to investigate about dominance of a particular sex in education. It is revealed that opting higher education is preferred by females since females with PG qualifications are nearly 4 times to that of males, where as Graduate females are found to be double those male graduates. It could be a fact of coincidence that in undergraduate category ratio of males & females is 1:1. Sex-wise & education wise break-up of teachers is shown below :

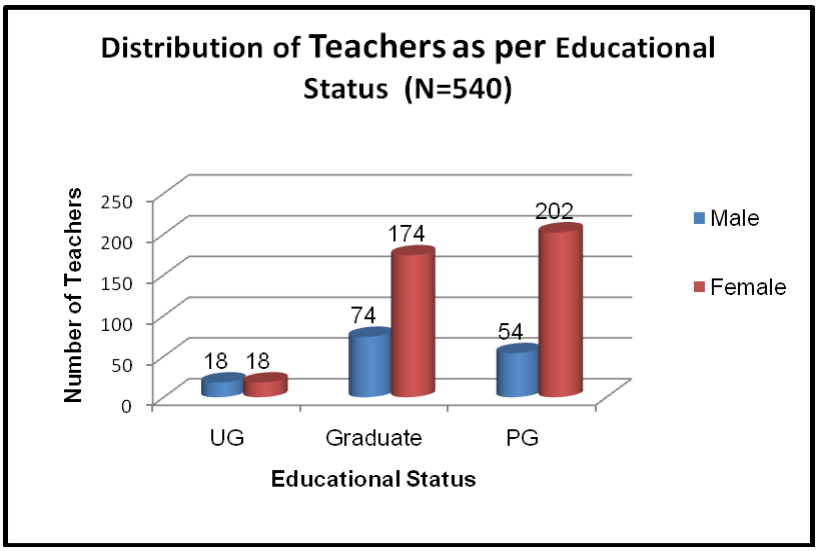
Table 5.3

Education wise break-up of teachers

Sex	No. of Teachers				Percentage
	UG	Graduate	PG	Total	
Male	18	74	54	146	27 %
Female	18	174	202	394	73 %
Total	**36**	**248**	**256**	**540**	**100 %**
Percentage	**6.7**	**45.9**	**47.4**	**100**	

Figure 5.5

Educational Status of the Teachers



5.5.5 Teaching Experience

Secondary School Teachers in Pune City are found to be well experienced in their job. About 54% of teachers have acquired more than 10 years experience, whereas about 23% teachers have over 15 years experience at their credit. The detailed break-up is as shown below :

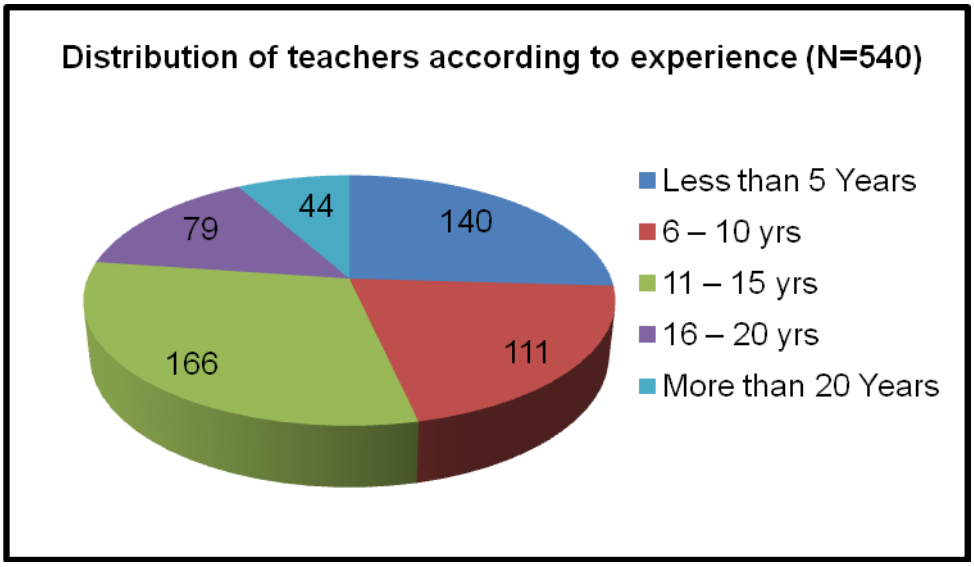
Table 5.4

Teaching experience and Number of Teachers

Teaching Experience	No. of Teachers	Percentage (%)
Less than 5 Years	140	25.93
6 – 10	111	20.55
11 – 15	166	30.74
16 – 20	79	14.63
More than 20 Years	44	08.15
Total	**540**	**100.00**

Figure 5.6

Experience of the teachers



5.5.6. Medium and Sex of Teacher

Frequency distribution of teachers according to sex and their medium of teaching is as shown below:

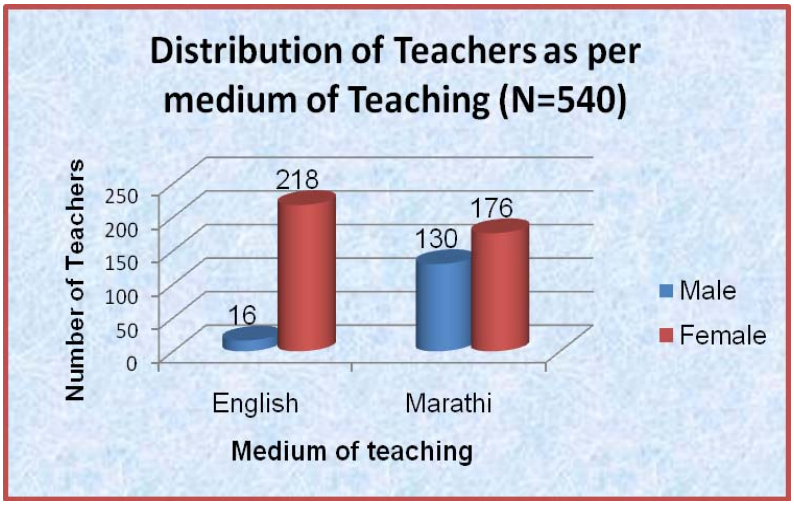
Table 5.5

Distribution of teachers according to medium of teaching

Sex	No. of Teachers teaching in medium		
	English	Marathi	Total
Male	16	130	146
Female	218	176	394
Total	234	306	540
Percentage	43	57	100

Figure 5.7

No. of Teachers and Medium of Teaching



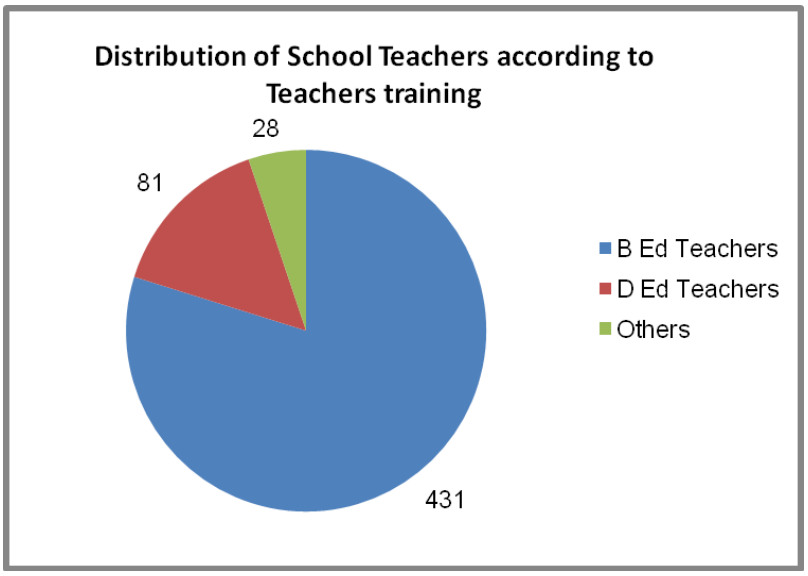
It is clear from the above table 5.5 and Figure 5.7 that Pune city is dominated by Marathi medium Secondary School teachers. 57 % teachers are from Marathi Medium School whereas 43 % teachers are from English medium school. Male teachers in English medium schools are very less 16 (6.8 %) and Male teachers in Marathi medium School are 130 (42.4 %)

5.5.7 Teachers Training wise distribution of schools

B. Ed. trained teachers were 431 (80 %) whereas D. Ed. trained teachers were 81 (15 %) and others were 28 (5 %)

Figure 5.8

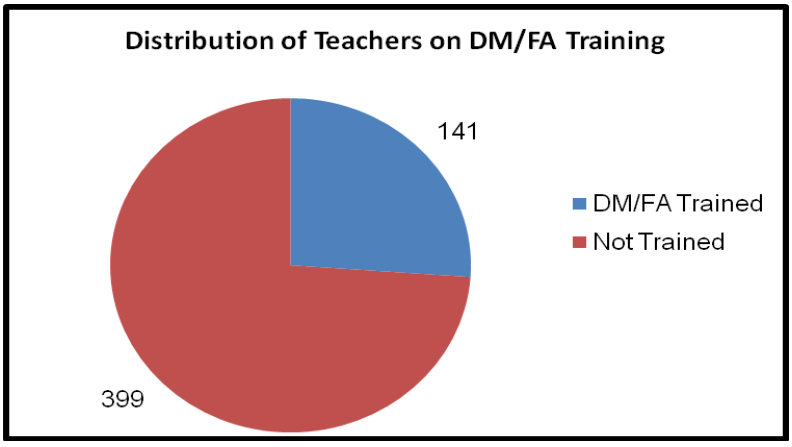
Distribution of teachers according to Teachers Training



5.5.8. Training of First Aid and Disaster Management

There were only 141 (26 %) teachers had participated in some of the first aid training programme, while 399 (74 %) of them had not exposed to any type of training.

Figure 5.9



5.6. Pre-Test Results

Analysis of data related to knowledge of School Teachers

5.6.1. Assessment of overall knowledge of DM

The Researcher, through Questionnaire, had asked 30 questions covering various aspects of DM. An ideal teacher, if all questions are answered correctly, should get 30 marks i.e. 100% score.

In the Pre-Test, survey revealed that, overall score of all teachers is observed to be 15.9 i.e. 53%. The maximum score is observed to be 25 against 30 i.e. 81.3% which is achieved by 0.5% of respondents only. Researcher also observed nearly 4.5% of respondents with their score less than 10 i.e. below 33%, also 65.6% respondents could achieve their score above 50% while distinction (70% +) is achieved by 7.1 % of respondents.

Researcher has planned to test knowledge in three levels. The level of knowledge has been classified as Poor (0 – 10), Average (11 – 20) and Good (21 – 30). The number of teachers falling in each of the category is presented in the table and table below:

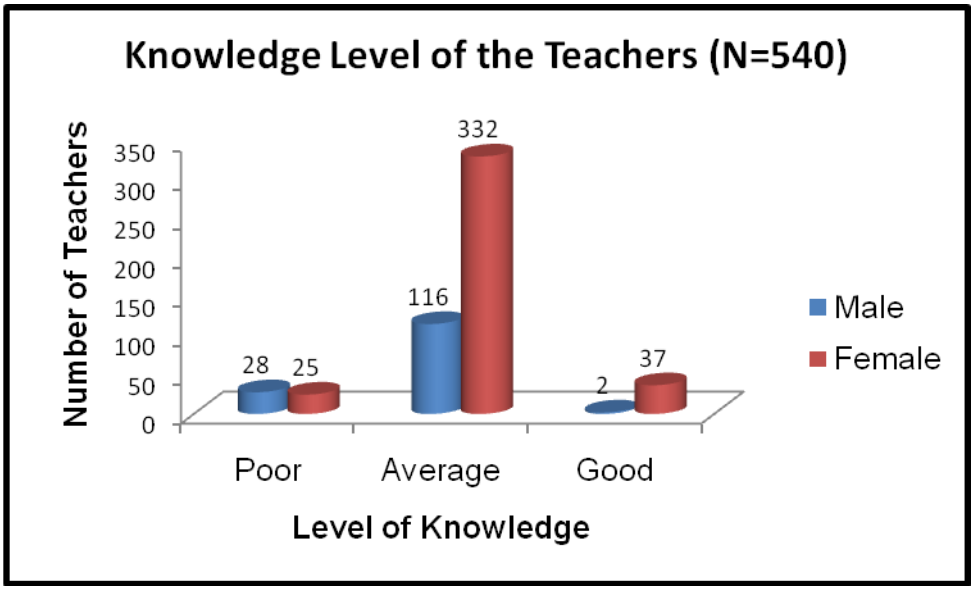
Table 5.6

Overall Level of Knowledge among School Teachers

	Number of Teachers in the category		
	Poor	**Average**	**Good**
Male	28	116	2
Female	25	332	37
Total	**53**	**448**	**39**
Percentage	4.26 %	82.96 %	7.22 %

Figure 5.10

Overall Level of Knowledge among School Teachers



The above table shows that 53 (9.82%) respondents fall in poor category and only 39 (7.22%) respondents fall in good category. Since 448 (82.96%)

respondents fall in average category which shows the average level of knowledge regarding Disaster Management among the secondary school teachers. It is observed that females are comparatively more knowledgeable than male counterpart. Though majority falls in average category (11-20) this level does not show satisfactory performance.

5.6.2. Age wise distribution of knowledge score is appended below

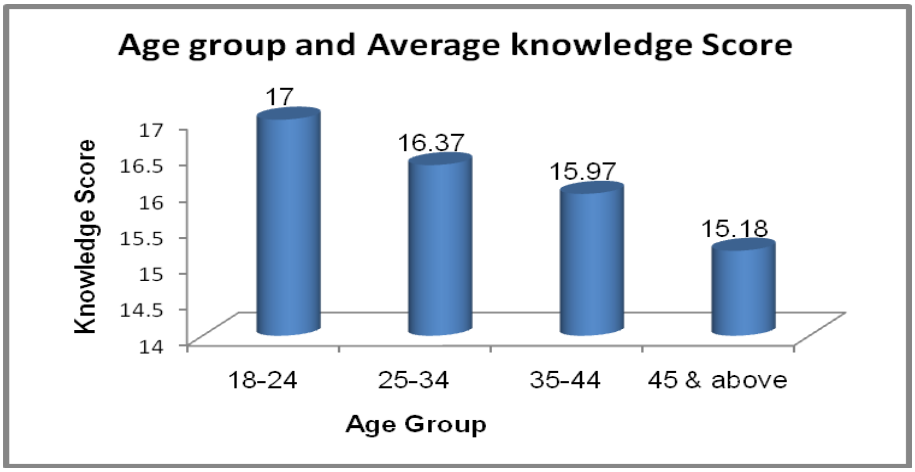
Table 5.7

Age group and average knowledge score

Age group (in years)	Number	Average Score	percentage
18-24	20	17.00	56.66
25-34	148	16.37	54.56
35-44	284	15.97	53.23
45 & above	88	15.18	50.60

Figure 5.11

Age group wise distribution of average knowledge score



The above table and figure indicates that as age advances average knowledge score decreases it shows that very young teachers are more knowledgeable.

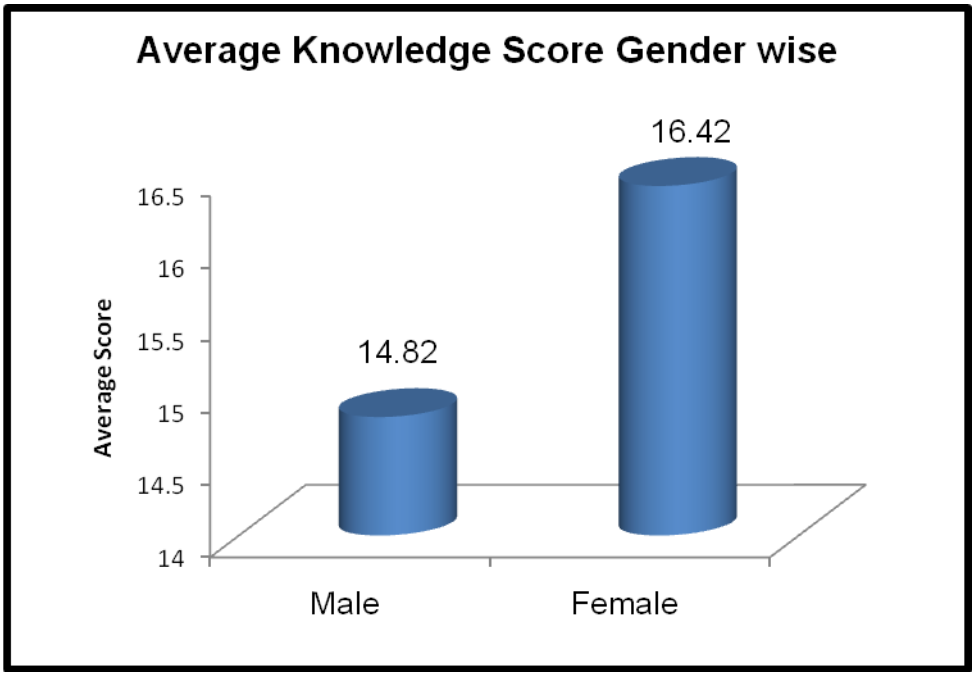
5.6.3. Gender wise distribution of knowledge score indicates that females are more knowledgeable than males which is expressed in following table and figure.

Table 5.8

Average Knowledge Score Gender wise

Sex	Number	Average Score	Percentage
Male	146	14.82	49.40
Female	394	16.42	56.06

Figure 5.12



5.6.4 Researcher also made an attempt to correlate the scores with the educational qualification of the respondents. It is found that average scores (out of 30) of UG, Graduates and Post-Graduates are 17.39, 14.99 and 16.82 respectively. This clearly indicates that educational qualification is not necessarily associated with the knowledge of Disaster Management. The details are given below:

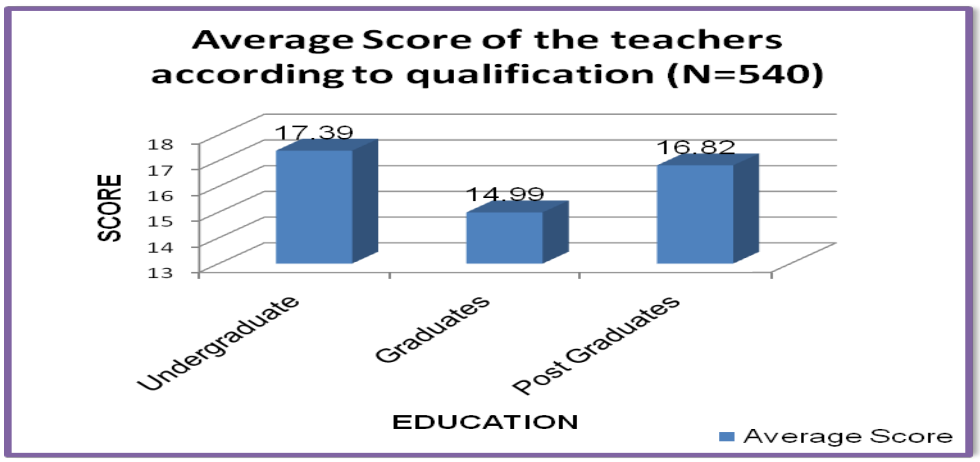
Table 5.9

Educational Qualification and Knowledge Score

Level of Education	Average Score	Score in Percentage
Undergraduate	17.39	57.96
Graduates	14.99	49.97
Post Graduates	16.82	56.07

Figure 5.13

Educational Qualification and Knowledge Score



5.6.5 Similarly, Researcher, tried to find out association of teaching experience and that of DM knowledge. The observed scenario is presented below

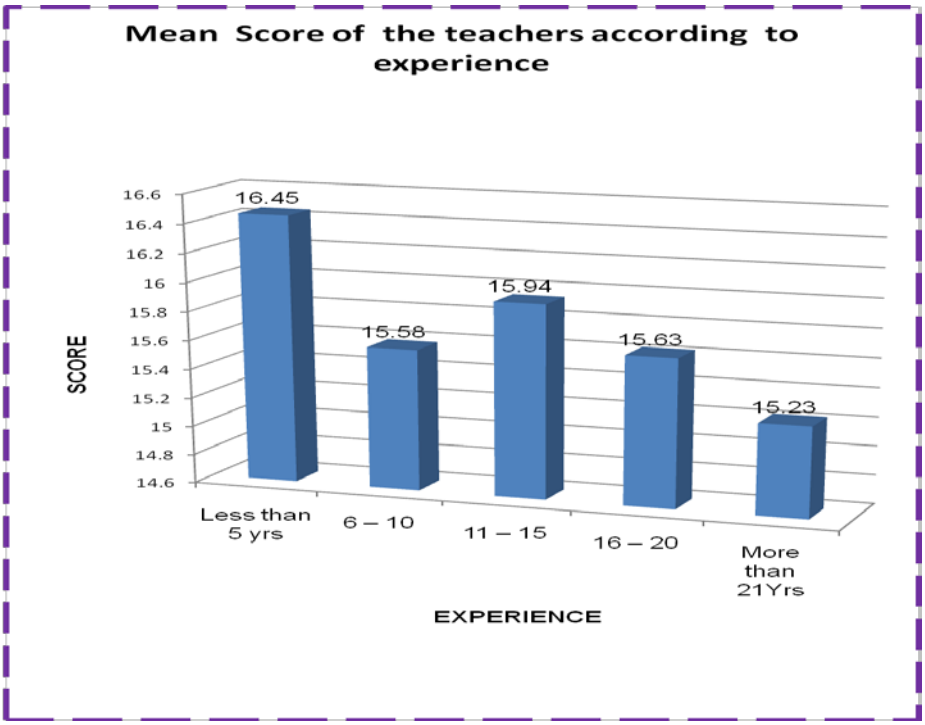
Table 5.10

Mean Score and experience of the teacher

Experience in Years	Average Score	Score in Percentage
Less than 5 yrs	16.45	54.83
6 – 10	15.58	51.93
11 – 15	15.94	53.13
16 – 20	15.63	52.10
More than 21Yrs	15.23	50.77

Figure 5.14

Mean knowledge Score and experience of the teacher



As no trend in above figures is observed, it can be concluded that, increase in teaching experience does not increase knowledge of DM. Also after serving more than five years, knowledge of DM has not altered to a significant level.

5.6.6 Researcher also made an attempt to find out any kind of association attached with the score and that of previous training of DM/FA. It was observed that, previous training in DM and / or FA definitely adds to the knowledge but not to a large extent. This is so, because average score of Teachers who were trained in DM is found to be 16.94 against 15.69 who had not received any kind of training on DM/FA.

5.6.7 'Marathi' is the regional language of the state of Maharashtra. Therefore majority of schools are teaching in Marathi. Researcher made an attempt, to see whether 'Medium of teaching' affects the overall knowledge of teacher regarding DM. Survey revealed that on an average, knowledge of teachers from Marathi medium (15.56) schools is comparatively lower than those from English medium (16.54) schools.

5.6.8 Region wise effect on knowledge (Pre-Test)

Researcher tried to see whether working as a teacher in a particular part of Pune city affects the knowledge of the teacher.

Overall knowledge of teachers working in a particular part of Pune city is observed as under :

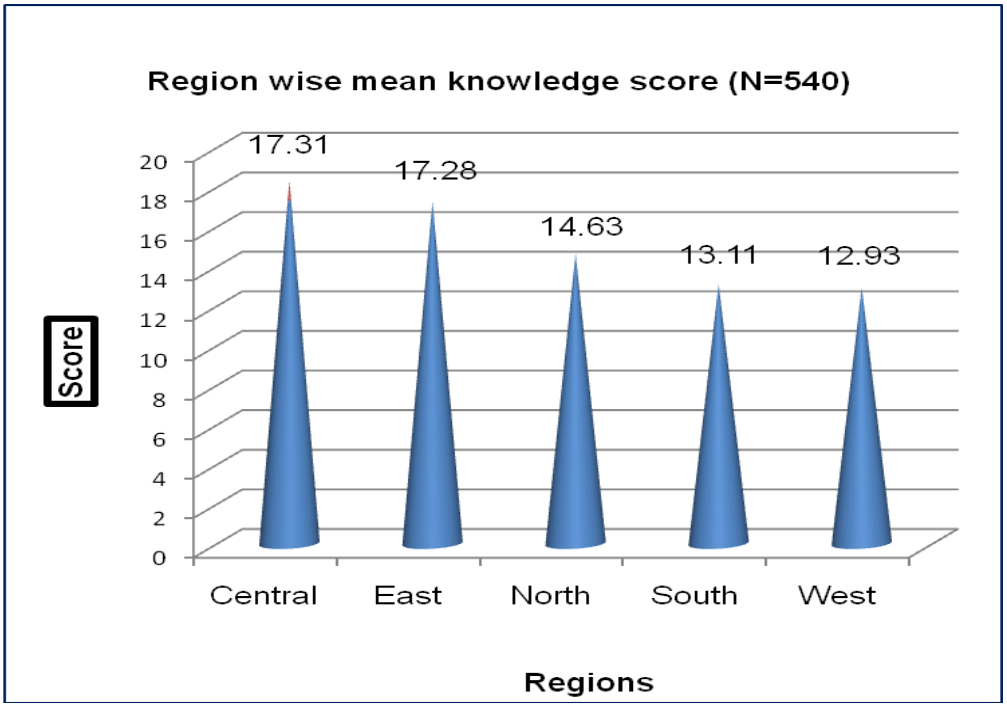
Table 5.11

Region wise Mean Knowledge Score of Teachers

Part of Pune City	Mean Knowledge Score	
	Out of 30	Percentage
Central	17.31	57.70
East	17.28	57.60
North	14.63	53.00
South	13.11	48.77
West	12.93	43.10

Figure 5.15

Region wise Mean Knowledge score of the Teachers



The above figures are self-explanatory to say that teachers working in Central Pune are more knowledgeable than their counter-parts working in rest of locations around Pune scoring top at 57.7%. The teachers working in Southern and Western part of Pune have shown comparatively poor performance recording their score less than 50%.

It is worth noting at this place that Central Pune records no. two position in number of schools but, quality-wise, it is at number one position. In the similar analogy, Southern and Western part of Pune has proved its lower position both in quantity of schools as well as quality of teachers in regards to knowledge of D.M.

5.7 Assessment of Break-up of knowledge

Break-up of Questionnaire

The Questionnaire designed for assessment of knowledge was broken into 30 questions. These 30 questions were grouped into 3 major categories as under

- Question No. 1 to 11 – Concept regarding Disasters and Its management.
- Question No. 12 to 18 – Various Do's and Do Not's
- Question No. 19 to 30 – First Aid Skill and safety.

5.7.1. Assessment of Concept regarding Disasters and its management.

As mentioned in earlier paragraphs the average score of all teachers is observed, for all 30 questions, to be 15.9 i.e. 53%. However the scores obtained in sub groups as mentioned in previous paras, are as under :

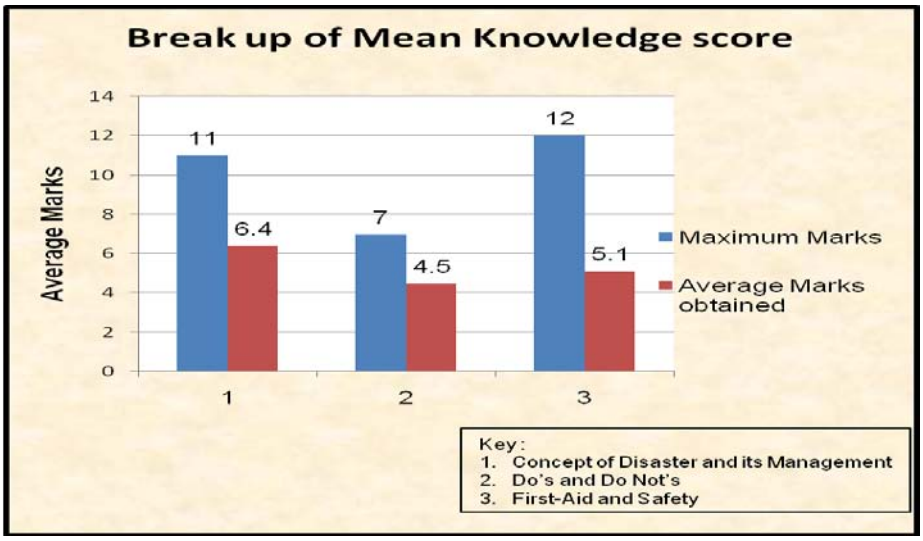
Table 5.12

Break up of Knowledge Score

Category of Break-up	Out of	Marks obtained	Percentage
Concept of Disaster and its Management	11	6.4	58.18
Do's and Do Not's	7	4.5	64.28
First-Aid and Safety	12	5.1	42.5

Figure 5.16

Average Marks obtained by Teachers



It is clear from the above scores that teachers are well-aware about what 'should be done and should not be done' during 'Disaster'. Also their knowledge and its management is comparatively better but they are lacking in First-Aid and Safety.

These were the trends observed on overall basis. The Researcher probed to find out any kind of relation, if it exists, among these trends and sex, education and experience of the teacher. These are discussed in the ensuing paragraphs.

5.7.2 Break-up of knowledge and Demographical parameters.

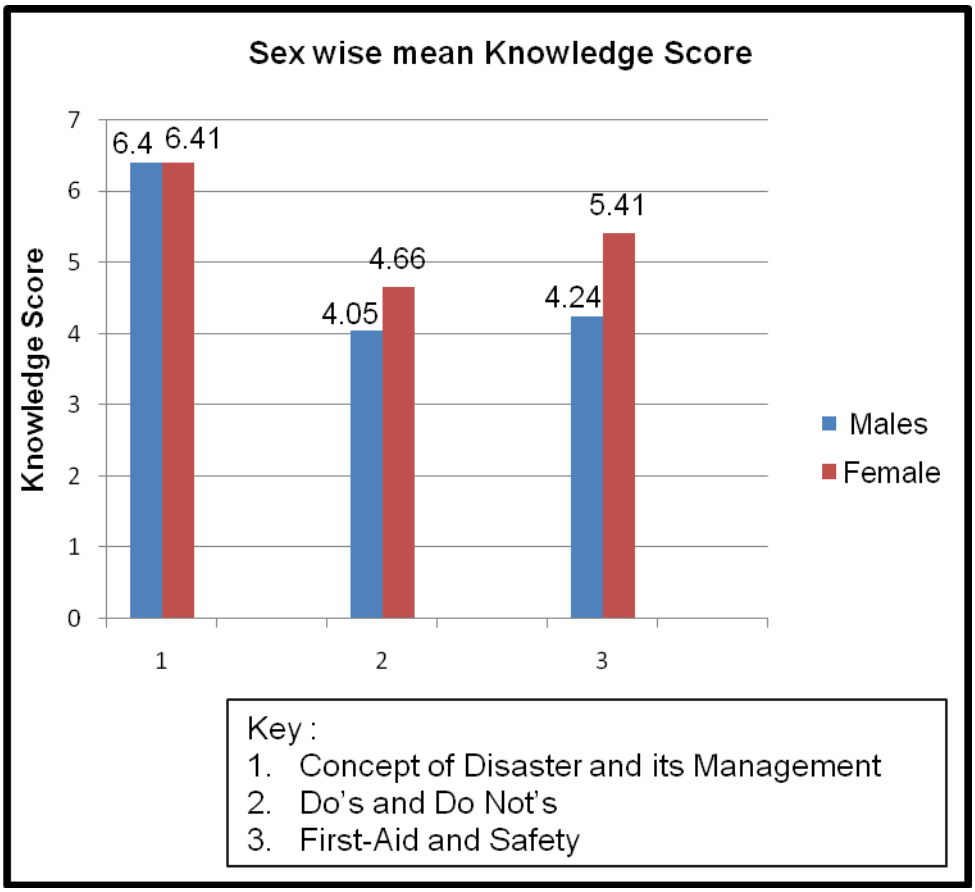
Researcher analyzed the data to see any kind of relation between sex of the teacher and parameters of the knowledge. The following picture was seen :

Table 5.13

Gender wise break-up of Knowledge

Parameter	Out of %	Overall Score	Score of Males	Score of Females
Concept of Disaster and its Management	11	6.40 (58.18%)	6.40 (58.18%)	6.41 (58.27%)
Do's and Do Not's	7	4.50 (64.28%)	4.05 (57.86%)	4.66 (66.57%)
First-Aid and Safety	12	5.10 (42.50%)	4.24 (35.33%)	5.41 (45.08%)

Figure 5.17



5.7.3 It is seen from the above figures that 'knowledge of Disaster and its Management' is not altered drastically with the sex of the teacher. However Females are more careful than men about 'Do's and Don'ts' about the Disaster. Also Females are more alert than men when First Aid and Safety is concerned.

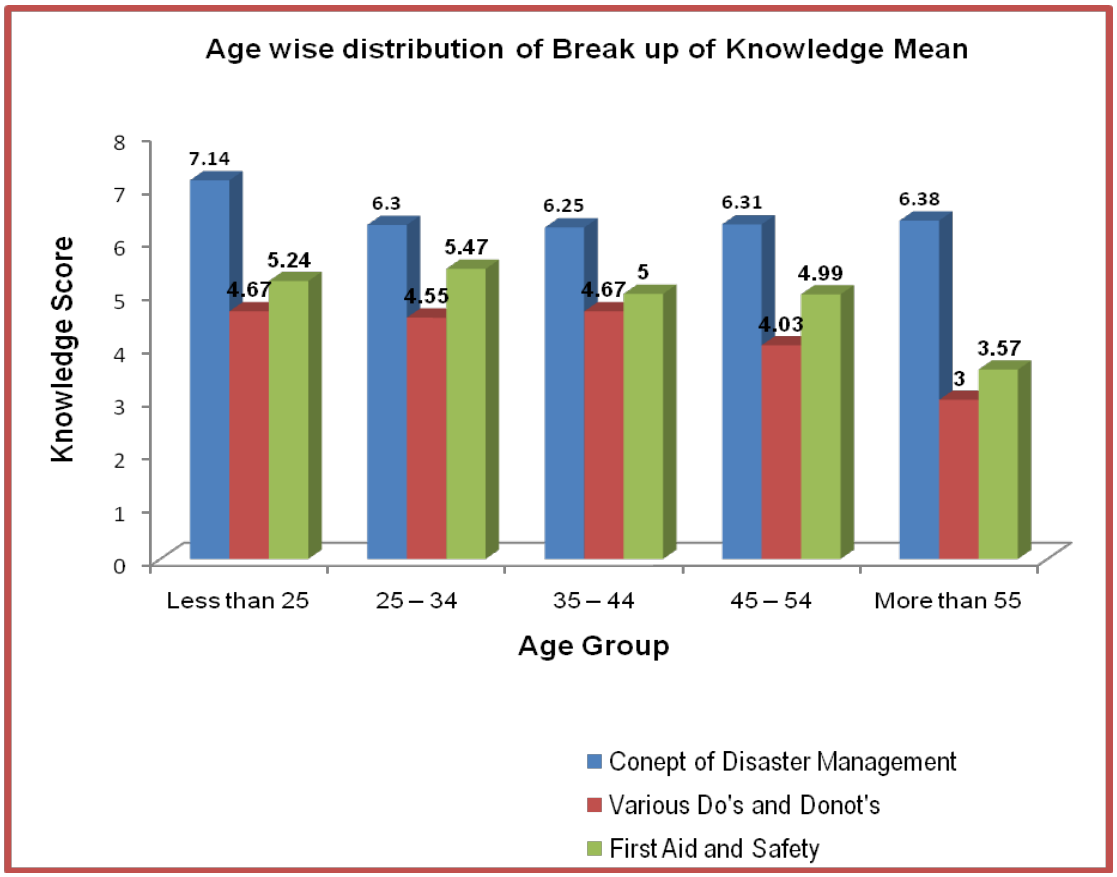
5.7.4 Similarly data was also analyzed for scores and various age-groups of respondents. The following picture was revealed:

Table 5.14

Age group wise Break-up of Knowledge

Age-Group (Yrs.)	No. of Teachers (%)	Score for Qn. Nos.		
		1 - 11	12 - 18	19 - 30
Less than 25	03.80	7.14	4.67	5.24
25 – 34	27.12	6.30	4.55	5.47
35 – 44	51.72	6.25	4.67	5.00
45 – 54	13.56	6.31	4.03	4.99
More than 55	03.80	6.38	3.00	3.57

Figure 5.18



5.7.5 It is seem from the above figures that, knowledge of school teachers regarding 'Disaster and its Management' does not fluctuate much more due to age factor after attaining the age 25 years. There appears to be a small declining trend over the age for various Do's and Do Not's. Similar trend is also observed for First-Aid Skill and Safety. Thus it is confirmed that knowledge of School-Teachers regarding Disaster and its Management does not vary to a large extent as far as Age and Sex of a Teacher is concerned.

5.7.6 Break-up of knowledge based on region of the school.

As already mentioned in previous paras, the questionnaire was broken into three parts covering aspects of knowledge, do's and don'ts and first aid skill safety. Average scores on each of these aspects were calculated by the Researcher and are presented below :

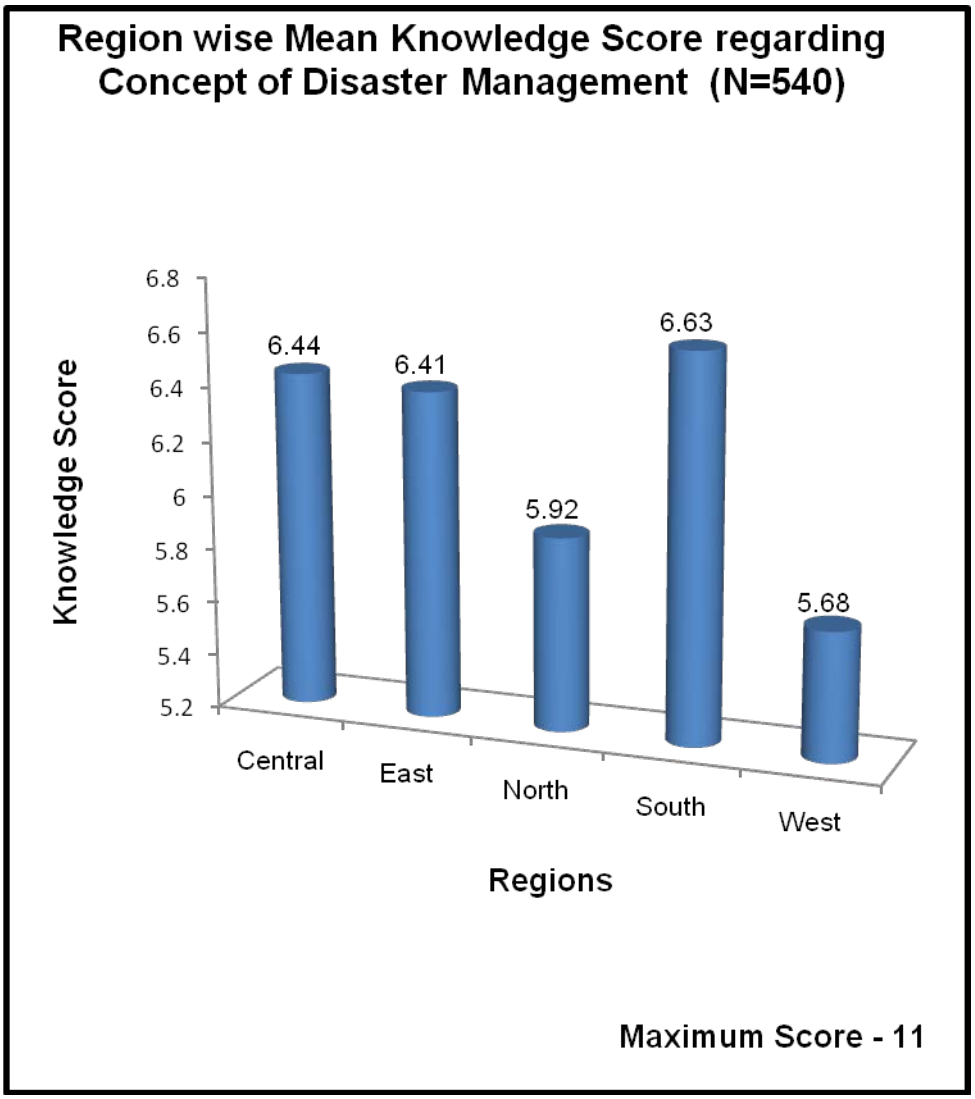
Table 5. 15

Region wise Knowledge Score regarding Concept of Disaster Management

Concept (Q1 - Q11)	Central	East	North	South	West
Scores out of 11	6.44	6.41	5.92	6.63	5.68
%	58.53	58.27	53.82	60.27	51.64

Figure 5.19

Region wise mean knowledge score of teachers regarding concept of DM



5.7.7 The above figures indicate that teachers working in the Southern Pune have kept themselves at top position recording a score of 60.27% followed by teachers from Central Pune, who recorded a score of 58.53% and teachers of Eastern Pune who recorded a similar score of 58.27%. Teachers working in Northern and Western Pune need to take

some efforts to push themselves up, as they have recorded 53.82% and 51.64% scores respectively.

5.7.8 It has been proved in the earlier paragraphs that knowledge is not altered drastically with the sex of the teacher. However, it is proved from the above discussion that knowledge is being affected from working location/environment.

5.7.9 Similar to knowledge, Researcher compiled data on Do's and Don'ts in Disaster Management. The observations are as under :

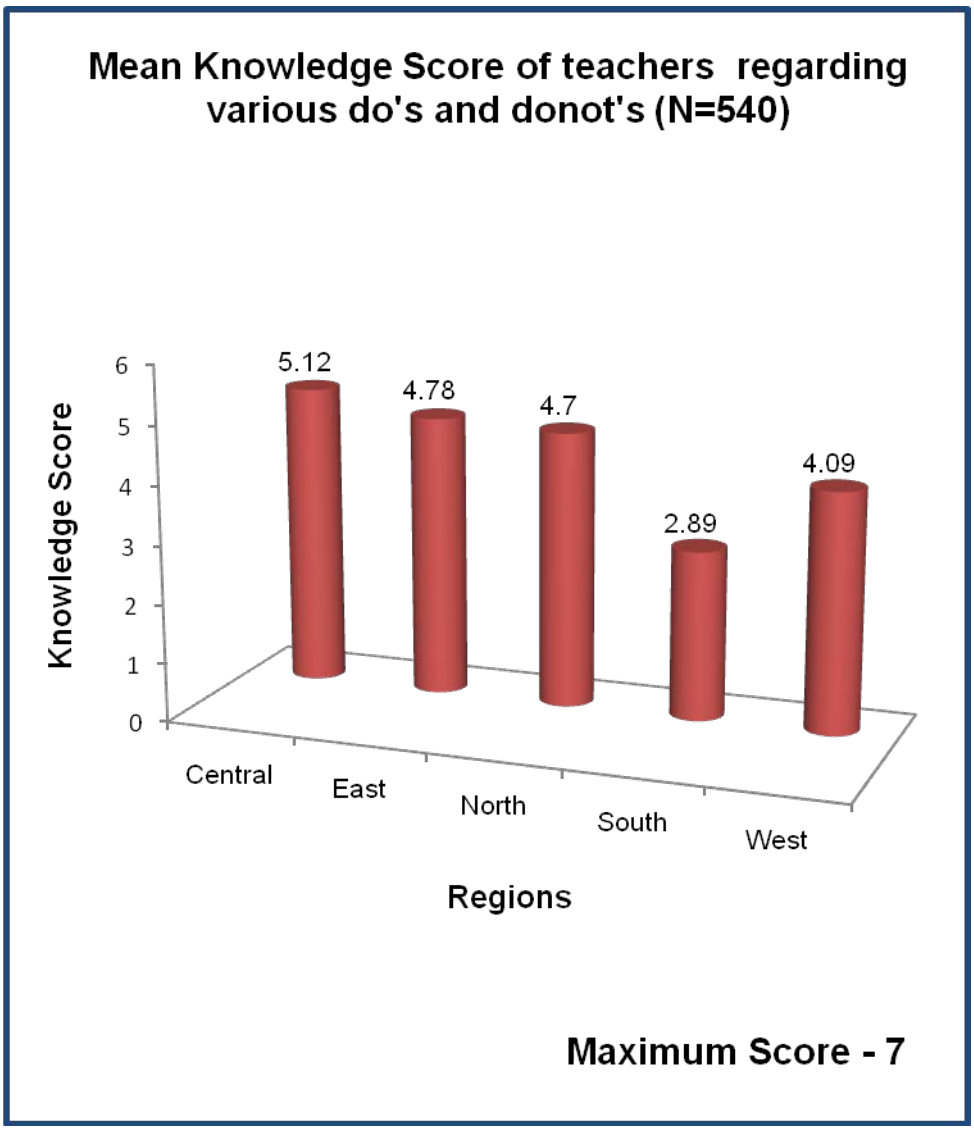
Table 5.16

Region wise mean knowledge score of the teachers regarding various do' and do not's

Do's and Don'ts Q12-Q18	Central	East	North	South	West
Scores out of 7	5.12	4.78	4.70	2.89	4.09
%	73.1	68.3	67.1	41.3	58.4

Figure 5.20

Mean knowledge score of teachers regarding various do's and do not's



5.7.10 Figures clearly indicate that teachers working in Central Pune have proven their alertness followed by Eastern and Northern Pune respectively. Western and Southern

Pune teachers need an additional training to prove their performance.

5.7.11 Researcher also made an attempt to see the effect of regions on First Aid Skill and Safety Skill of teachers working in various parts of Pune. The compiled data shows following numbers:

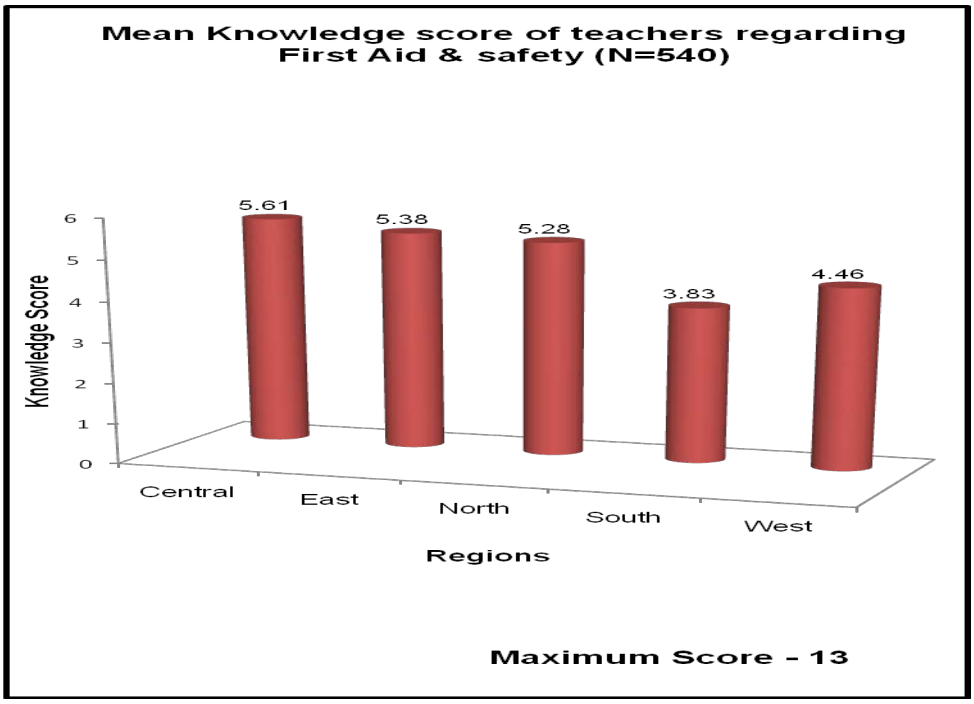
Table 5.17

Region wise mean knowledge score of teachers regarding first aid and safety

First Aid and Safety Q19 - Q30	Central	East	North	South	West
Score out of 13	5.61	5.38	5.28	3.83	4.46
%	46.75	44.83	44.00	31.92	37.17

Figure 5.21

Mean knowledge score of teachers regarding first aid and safety



5.7.12 Teachers working in Central Pune have acquired better skill on First Aid & Safety Skill as compared to their colleagues working in Eastern & Northern Pune whose scores are comparatively equal level viz., 44%. Both Southern and Western Pune teachers need a vigorous training as their performances are less than 38%. However, an important feature of this analysis shows that, on cross-sectional analysis performance of all teachers is less than 50% which is certainly not a healthy score.

5.8 Analysis of data related to Self Expressed Practices of School teachers

5.8.1 Researcher tried to analyze the overall practices of the teacher regarding disaster management for which researcher used self expressed practice checklist (15 items) following results were found. Researcher identified three level as Poor (0-5) Average (6-10) and Good (11-15) the number of teacher included in each of the category is presented in the following table

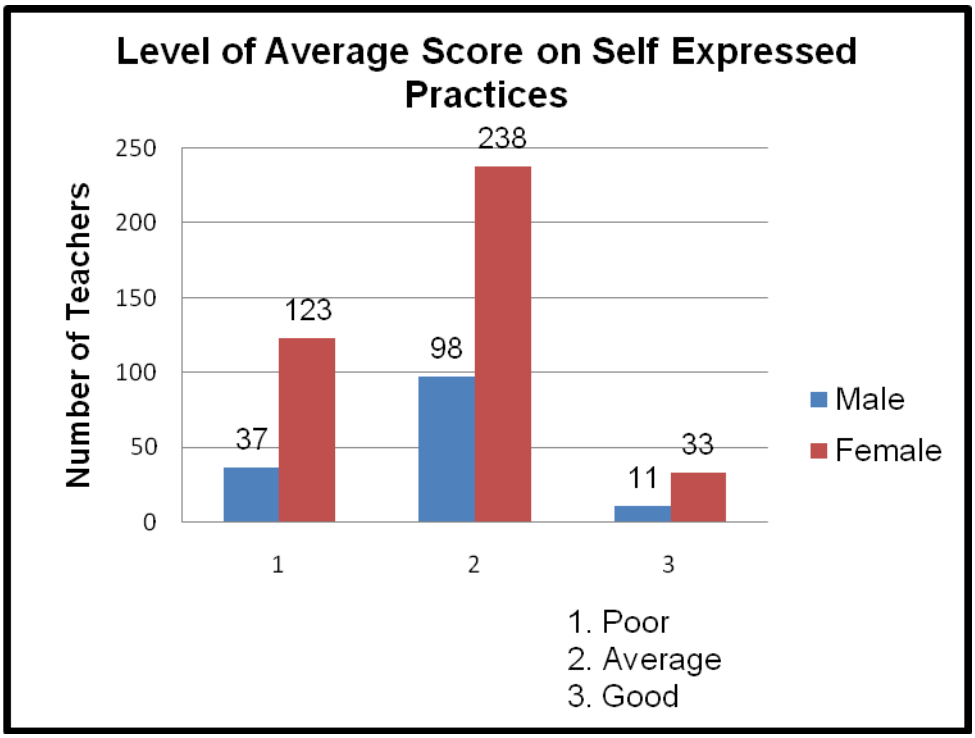
Table 5.18

Overall self expressed practice

	Number of teachers in the category		
	Poor	Average	Good
Male	37	98	11
Female	123	238	33
Total	160	336	44

Figure 5.22

Level of Self Expressed Practices of Teachers



5.8.2 Researcher also tried to analyse the data of self expressed practices of the teachers on various demographic parameters the following results were found.

5.8.3. Break-up of evaluation of practices adapted.

Overall correct score

Similar to knowledge of DM, an ideal teacher is supposed to score 15 marks to the 15 questions about the evaluation of practices. In the analysis, it is observed that the average score received by all the teachers is 7.0 against 15, i.e nearly 50%. It is also observed that this score is not altered

for female and male teachers significantly as their respective scores are found to be 7.03 and 7.10 respectively.

Table 5.19

Mean score of self expressed practices with demographic variables

S.N	Demographic Parameters		Mean Score	Percentage
1	Sex	Male	7.08	47.2
2		Female	7.03	46.8
3	Medium of Teaching	English	7.03	46.8
4		Marathi	7.06	47.06
5	Educational Status	Undergraduates	6.83	45.5
6		Graduates	7.08	47.2
7		Post Graduates	7.05	47.0
8	Examining Body	CBSE Board	6.50	43.3
9		State Board	7.16	47.7
10		ICSE board	5.90	39.3
11	Teachers Training	D.Ed Teachers	7.14	47.6
12		B.Ed Teachers	7.04	46.9
13		Others	6.89	45.9
14	Experience	0-5 years experience	6.72	44.8
15		6-10 years	7.09	47.2
16		11-15 years	7.35	49.0
17		16-20 years	6.93	46.2
18		21 years & ab	7.04	46.9
19	DM / FA training	Yes	8.40	53.6
20		No	6.57	43.8

5.9 Break up of Practices Adapted

Similar to the knowledge if DM, Researcher asked the teachers 15 questions on various aspects which are grouped in three major categories as under :-

- Personal Safety (Qn 1 & 5)
- Students' Safety (Qn 7, 8, 11, 12, 13, 14 and 15)
- School's Safety (Qn 2, 3, 4, 6, 9 and 10)

Personal Safety

5.9.1 The Researcher observed a very sad picture about the personal safety of teachers. Around 17.35% of teachers do not know about the questions asked to them, while 52.25% of teachers have answered negatively. Balance 30.4% of teachers appear to be careful about their personal safety. These results are also depicted in the table 5.19.

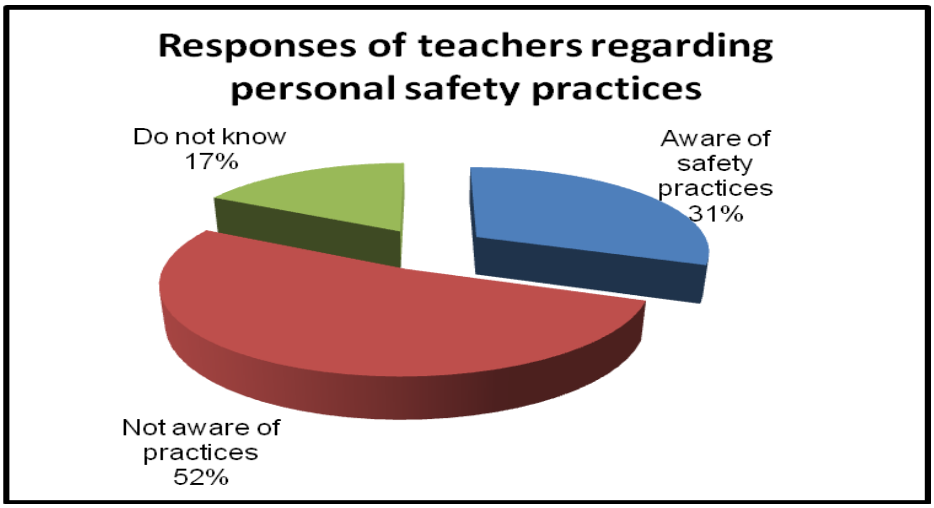
Table 5.20

Responses of the teachers regarding personal safety practices

S.N	Responses	Percentage of responses
1	Aware of safety practices	30.4
2	Not aware of practices	52.2
3	Do not know	17.4
	Total	100

Figure 5.23

Responses of the teachers regarding personal safety practices



5.9.2 Students' Safety

Seven questions were asked to the teachers to take care about the safety of students in the schools. It is revealed from the survey that about 2/3 of teachers – precisely 62.26% - claim positively and are aware of their responsibilities about the practices to be adopted for the safety of the students. One out of 4 teachers (25.36%) is not aware about what should be done about the safety of students, whereas one out of 8 teachers (12.53%) could not answer the questions in positive or negative sense.

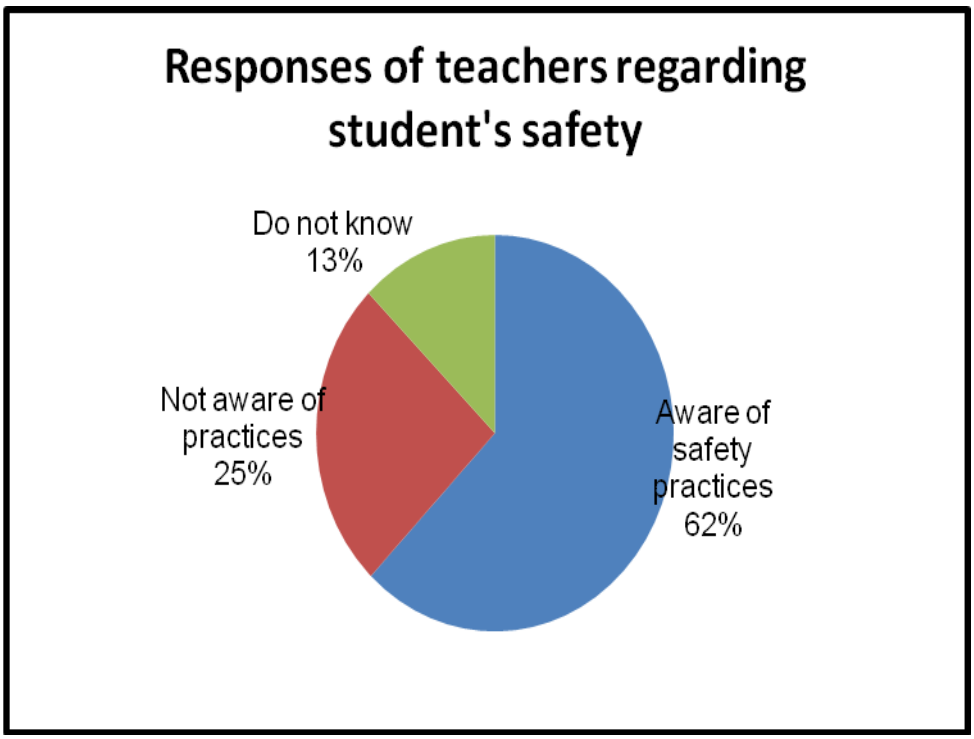
Table 5.21

Responses regarding safety of the students

S.N	Responses	Percentage of responses
1	Aware of safety practices	62.2
2	Not aware of practices	25.3
3	Do not know	12.5
	Total	100

Figure 5.24

Responses of teachers regarding student's safety



5.9.3 Safety of the School

The Researcher had asked six questions to teachers pertaining to practices adopted by the school management for safety of school vis-à-vis safety of students. Half of the teachers (50.22%) have given their opinion in positive, over one-third of teachers (36.63%) have opined in negative while balance 13.15% teachers have not given their opinions saying that 'They Do Not Know'. These opinions are presented in

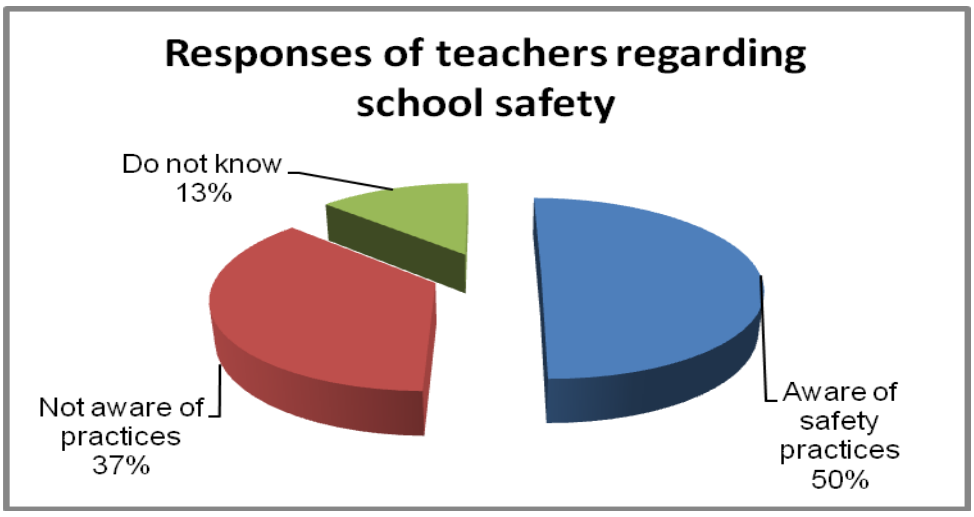
Table 5.22

Responses of teachers regarding school safety

S.N	Responses	Percentage of responses
1	Aware of safety practices	50.2
2	Not aware of practices	36.6
3	Do not know	13.2
	Total	100

Figure 5.25

Responses of teachers regarding school safety



5.10 Pre test - Post-Test comparison

Analysis of data related to effectiveness of training Manual

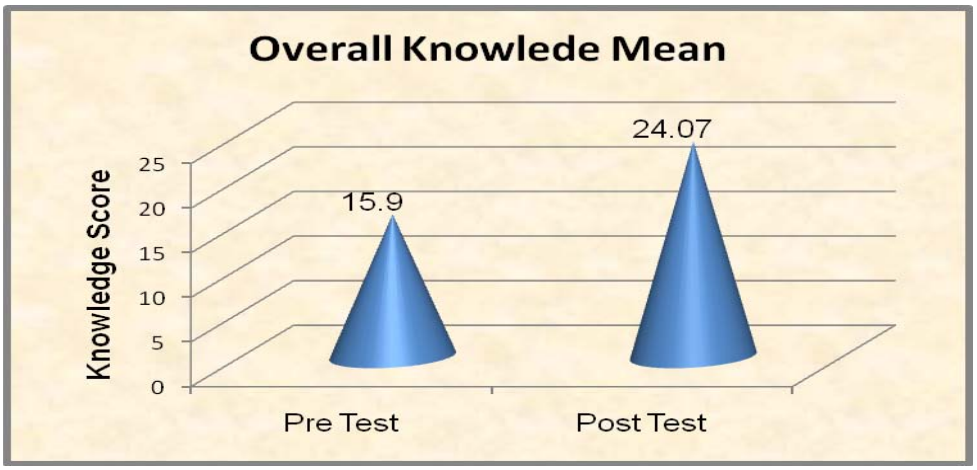
5.10.1 After first questionnaire was filled in and returned to the Researcher, teachers were given a manual designed by the Researcher and a minor introduction was given to study the manual. After receiving confirmation from the teachers regarding study of the manual, the Researcher gave each teacher same questionnaire to fill-in. The scores obtained by these questionnaires were noted as ‘Post-Test’ scores.

5.10.2 The effectiveness of the manual in increasing the performance of teachers is judged after comparing scores of ‘Pre-Test’ and ‘Post-Test’ in subsequent sections.

Overall changes by Demography

Figure 5. 26

Comparison of pre test and post test knowledge mean of the teachers



5.10.3 'Post-Test' score in all schools and by all the respondents was found quite satisfactory which is an indicator of success of the manual designed by the Researcher. The average scores observed in Pre-Test and Post-Test corresponding to various demographic parameters of respondent are tabulated below.

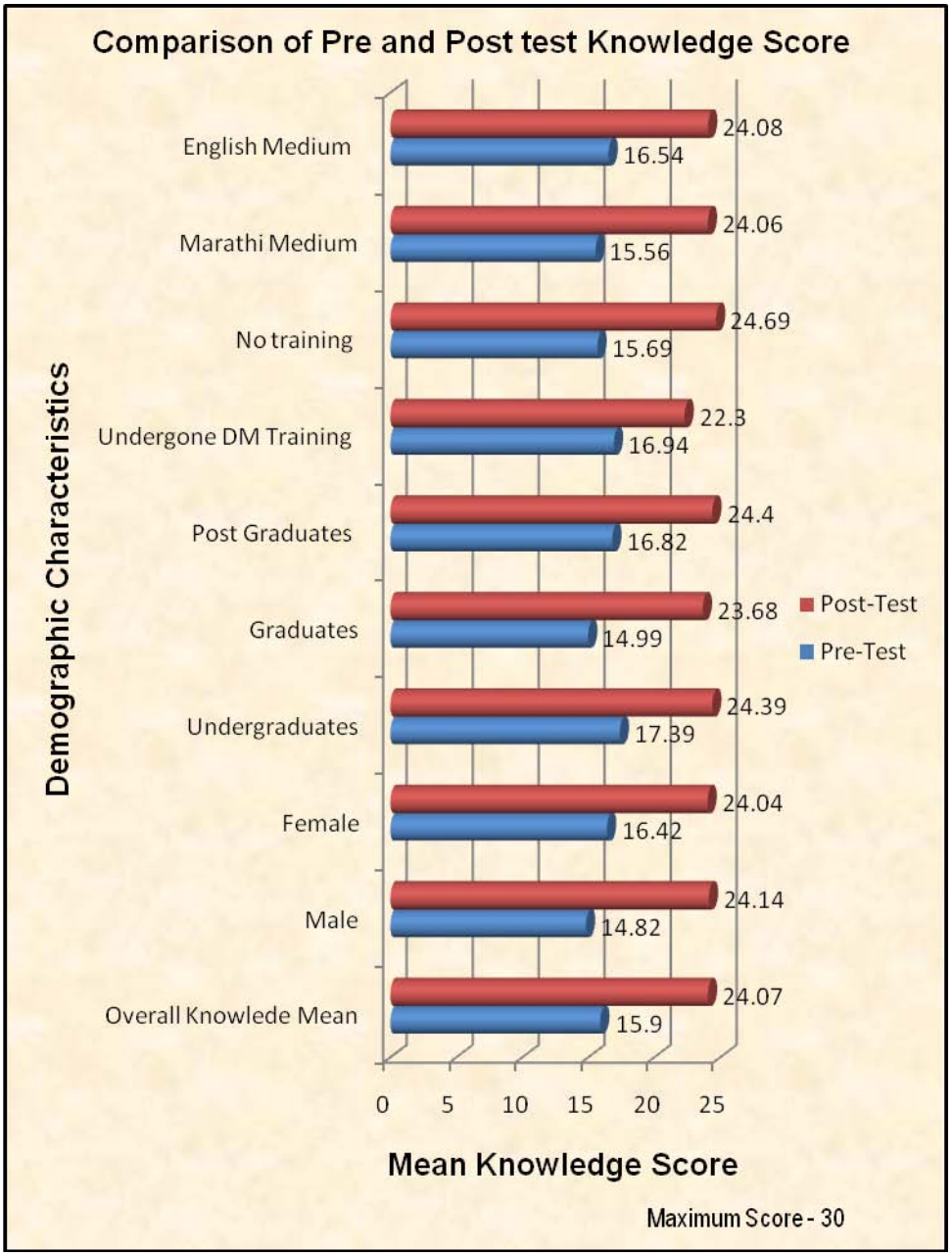
Table 5.23

Comparison of Mean pre test and post test knowledge score in various demographic parameters

Sr.No	Parameter	Average Scores		% Change
		Pre-Test	Post-Test	
00	Overall	15.9	24.07	51.38
01	Sex – M Sex – F	14.82 16.42	24.14 24.04	47.01 64.77
02	Education – UG G PG	17.39 14.99 16.82	24.39 23.68 24.40	40.17 59.35 46.02
03	DM/FA Training YES NO	16.94 15.69	22.30 24.69	63.49 94.72
04	Medium of teaching – Marathi English	15.56 16.54	24.06 24.08	69.67 39.59

Figure 5.27

Comparison of pre and post test knowledge mean score



5.10.4 The above table clearly indicates overall increase in knowledge of teachers after administration of manual designed by the Researcher. The overall increase in knowledge from

Pre-Test to Post-Test is recorded as 51.38%, however increase in female teachers is quite higher than of male teachers i.e. 64.77% for females against 47.01% for males. In other words, this means that the female teachers have absorbed the manual more thoroughly than the male teachers.

5.10.5 The growth in performance of graduate teachers due to the manual is seen to be more than Post-Graduate teachers with their respective growth percentages as 59.35% and 46.02% respectively. The post-test performance of teachers who have not taken any kind of DM/FA training is found to be increased by 94.72% against those teachers having undergone such training. (63.49%)

5.10.6 Following tables depict the comparison of scores in Pre-Test and Post-Test on various demographic and other parameters:

Table 5.24

Comparison of Pre and Post test score with Age Group

Age Group	Pre-Test Score	Post-Test Score	% Increase
18-24	17.00	24.55	44.41
25-34	16.37	24.30	48.44
35-44	15.97	24.28	52.03
45+	15.18	22.86	50.59
Total(Overall)	15.9	24.07	51.38

Figure 5.28

Comparison of knowledge score according to Age.

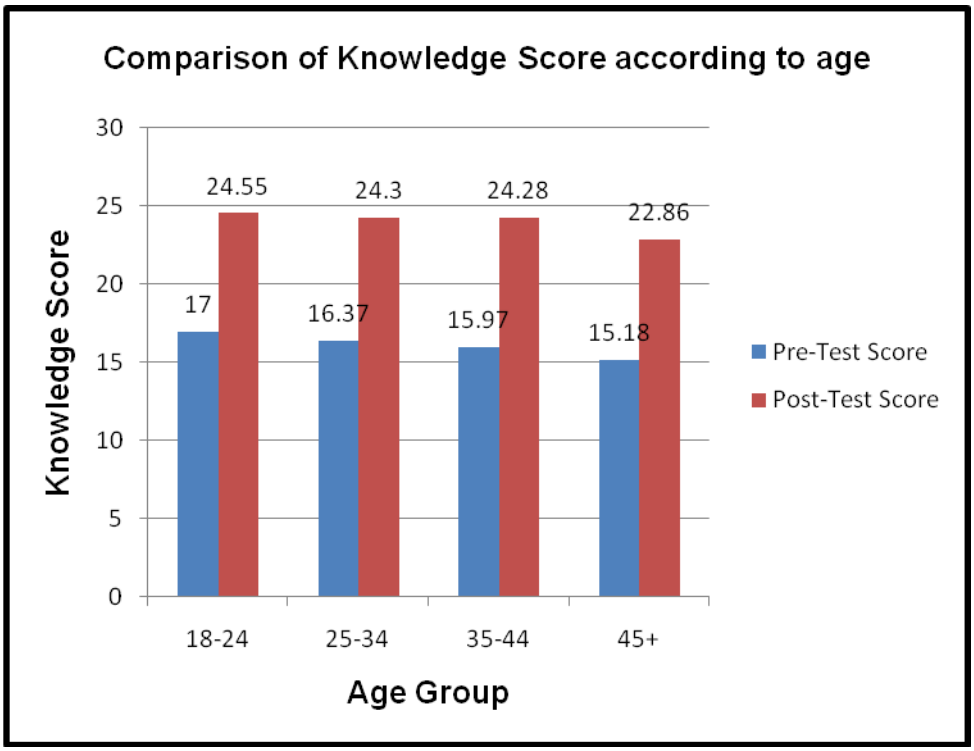


Table 5.25

Gender wise Comparison of Pre test and Post Test mean knowledge score

Gender	Pre-Test Score	Post-Test Score	% Increase
Males	14.82	24.14	62.89
Females	16.42	24.01	46.22
Total(Overall)	15.9	24.07	51.38

Figure 5.29

Comparison of knowledge score according to Gender

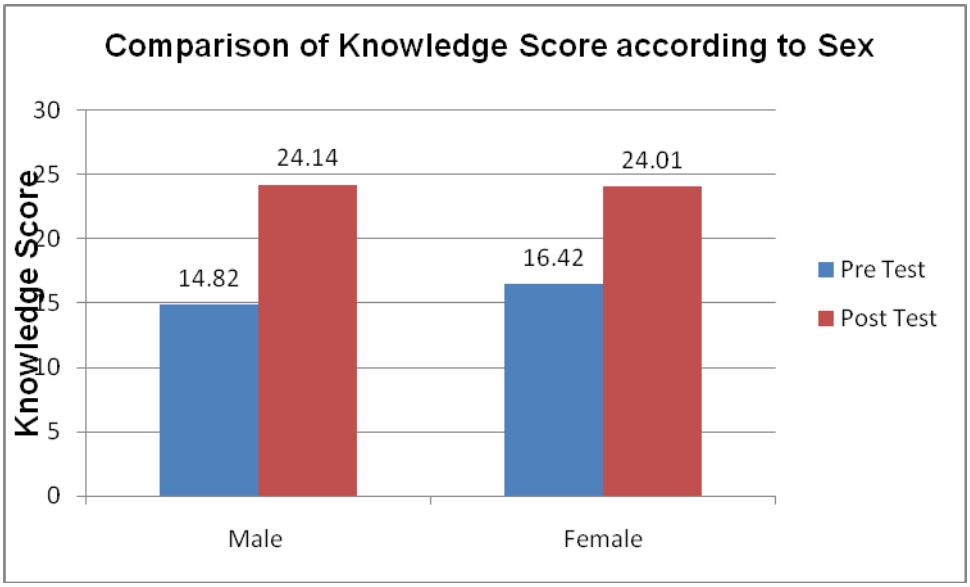


Table 5.26

Comparison of Pre test and post test knowledge score according to Medium of Teaching

Medium	Pre-Test Score	Post-Test Score	% Increase
Marathi	15.56	24.17	54.34
English	16.54	23.94	44.74
Total(Overall)	15.9	24.07	51.38

Figure 5.30

Comparison of Knowledge score according to medium of teaching

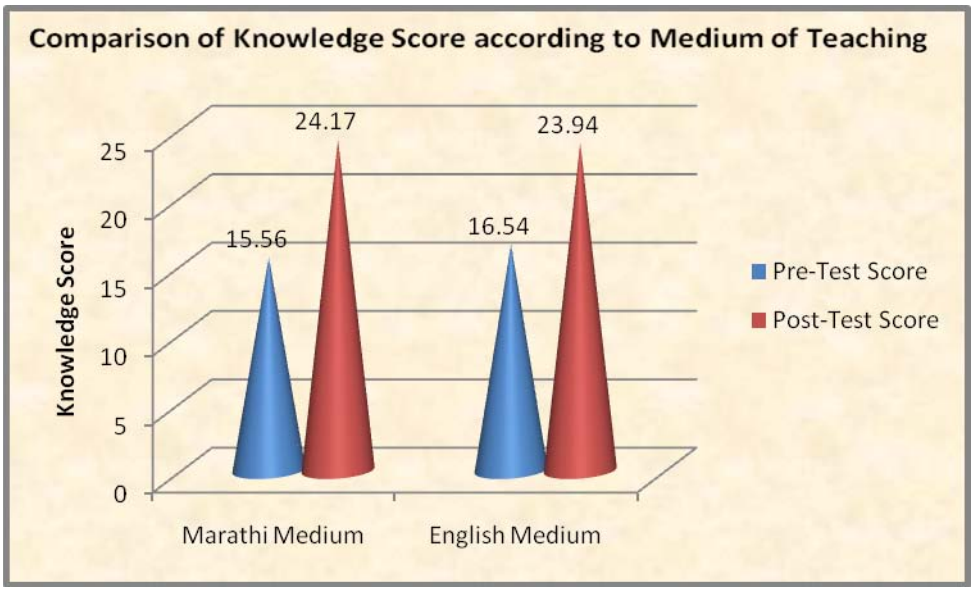


Table 5.27

Comparison of Pre test and Post test knowledge score according to Educational Level

Educational Level	Pre-Test Score	Post-Test Score	% Increase
Under Graduate	17.39	24.89	43.13
Graduate	14.99	21.01	40.16
Post Graduate	16.82	24.02	42.72
Total(Overall)	15.9	24.07	51.38

Table 5.28

Comparison of Pre test and post test knowledge score according to Teachers' Training

Type of Training	Pre-Test Score	Post-Test Score	% Increase
D.Ed.	17.09	25.88	51.43
B.Ed.	15.85	23.82	50.28
Others	15.46	22.61	46.25
Total(Overall)	15.9	24.07	51.38

Table 5.29

Pre test and post test knowledge score according to Pattern of Examination

Pattern of Exam	Pre-Test Score	Post-Test Score	% Increase
State Board	16.01	24.24	51.40
CBSE	15.67	23.28	48.56
ISCE	17.10	22.25	30.12
Total(Overall)	15.9	24.07	51.38

Table 5.30

Comparison of Pre test and Post test knowledge score according to Teaching Experience

Experience(Yrs.)	Pre-Test Score	Post-Test Score	% Increase
Up to 5	16.54	23.75	43.59
6-10	15.62	24.58	57.36
11-15	16.02	24.31	51.75
16-20	15.87	23.63	48.90
21 & Above	15.59	23.66	51.76
Total(Overall)	15.9	24.07	51.38

Table 5.31

Comparison of Pre test and Post test knowledge score according to D.M. / F.A. Training

Training	Pre-Test Score	Post-Test Score	% Increase
Received	16.94	25.40	49.94
Not Received	15.69	23.60	50.41
Total(Overall)	15.9	24.07	51.38

5.10.7 Effect on regional parameters

Table 5.32

Region wise comparison of Pre test and post test knowledge score

Region	Pre-Test Score	Post-Test Score	% Increase
Central	17.31	25.67	48.29
East	17.28	23.30	34.84
North	14.63	23.93	63.57
South	13.11	22.59	72.31
West	12.93	24.65	90.61
Total(Overall)	15.9	24.07	51.38

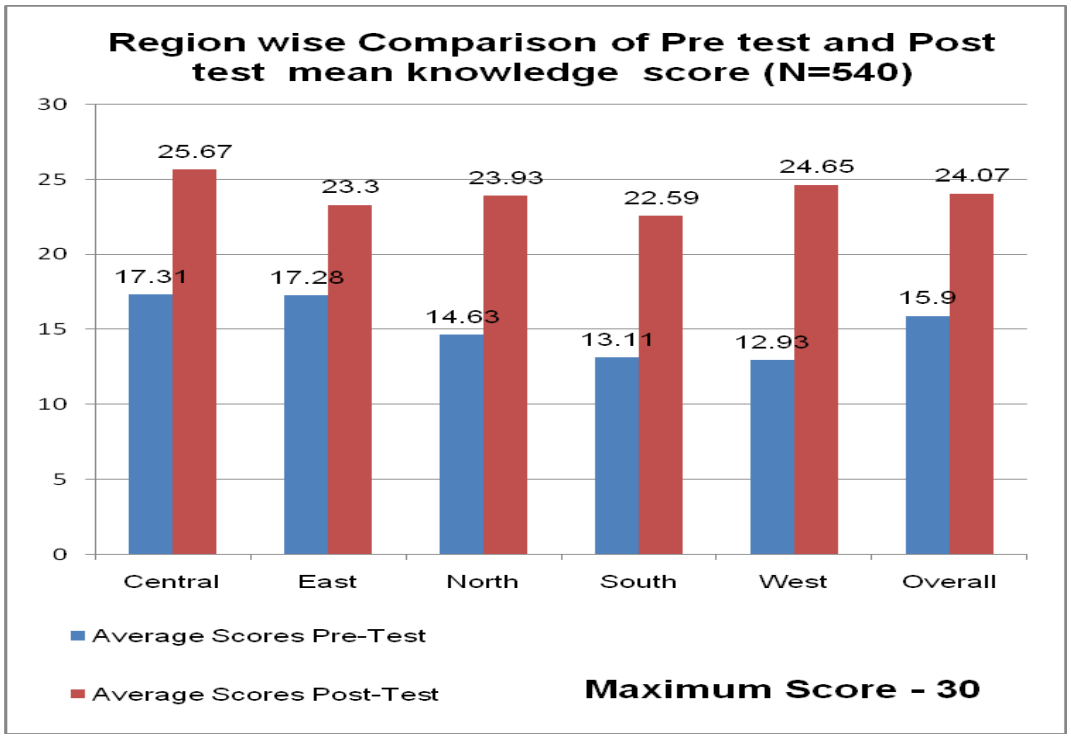
5.10.8 To acquire any kind of knowledge medium of language should not be a barrier. This is proved by way of this manual as well. The manual is prepared in English. However, the increase in performance after the manual is observed more in teachers of Marathi medium whose growth in performance was recorded as 69.67% against

that of teachers in English medium schools who recorded a growth of 39.59% only. All these facts and figures indicate that the manual designed by the Researcher is effective in increasing the overall performance of the teachers in DM.

Similar to overall changes by demographical parameters, the Researcher noted the following observations on Pre-Test and Post-Test scores of teachers from various regions of Pune City.

Figure 5.31

Region wise comparison of pre test and post test mean knowledge score



5.10.9 It is clear from the above data that increase in performance of teachers after introduction of the manual is quite more from locations of Southern and Western part of Pune as compared to Central, Eastern and Northern parts. However, this “more increase” appears to be due to low average score in Pre-Test by Southern and Western regions.

5.10.10 However, increase in growth ranges from 34% to 90% is once again a sign of effectiveness of the manual in delivering the contents in such a manner that any teacher of average intelligence will understand, digest and implement the same.

5.11 Evaluation of Practices Adapted

5.11.1 The introduction of DM manual is observed to be effective in increasing the knowledge of teachers about DM. Researcher also made an attempt to assess the same on Practices Adapted by the teachers. The following table shows the average scores recorded to the replies of questions of Evaluation of Practices.

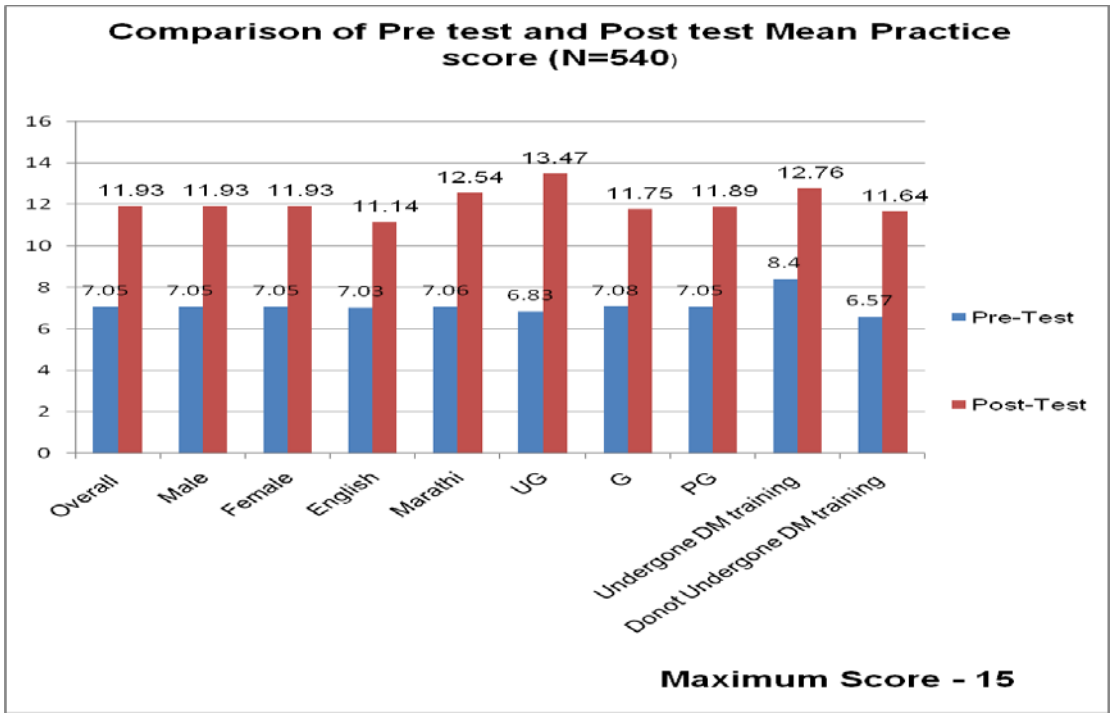
Table 5.33

Comparison of pre test post test Mean practice score

Sr. No	Parameter	Average Score		% increase
		Pre-Test	Post-Test	
01	Overall	7.05	11.93	69.92
02	Sex :– Male Female	 7.05 7.05	 11.93 11.93	 69.92 69.92
03	Medium of Teaching English Marathi	 7.03 7.06	 11.14 12.54	 58.42 77.62
04	Education :- UG G PG	 6.83 7.08 7.05	 13.47 11.75 11.89	 97.22 65.96 68.65
05	DM/FA Training YES NO	 8.40 6.57	 12.76 11.64	 51.90 77.17

Figure 5.32

Comparison of pre test and post test mean practice score

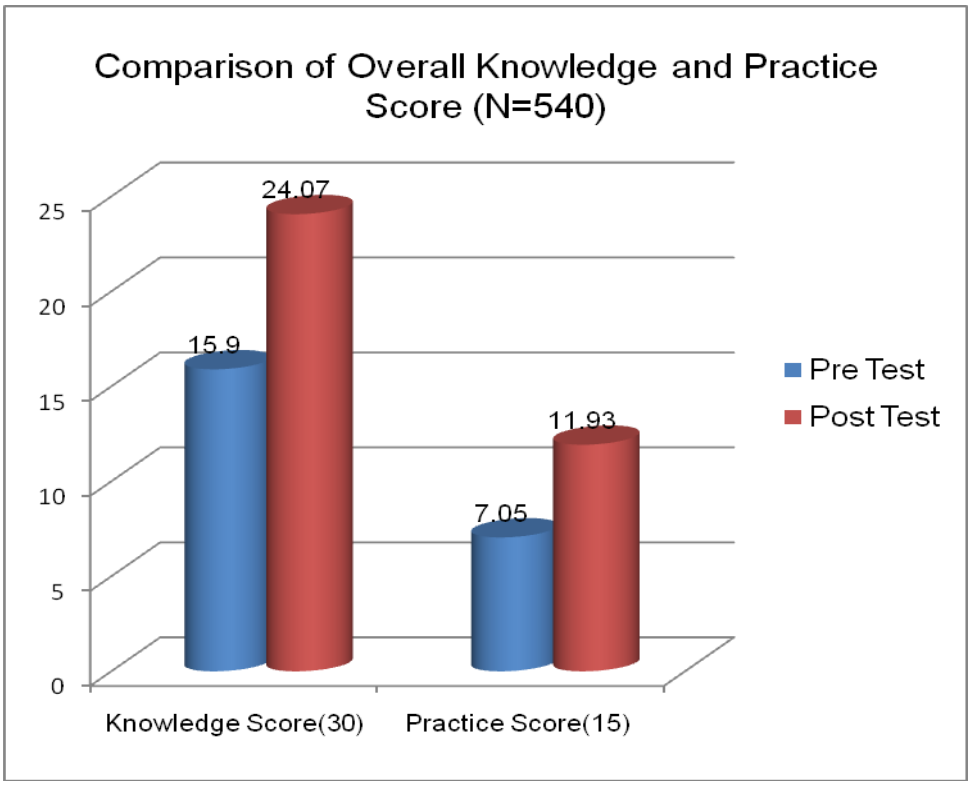


5.11.2 The above table clearly indicates that overall practices are Independent of sex of the teacher. In other words, it

also can be interpreted as male and female teachers being equally competent in implementing self-expressed practices i.e there is no dominance of gender in self-expressed practices for a secondary school teacher.

Figure 5.33

Comparison of overall knowledge and practice score



5.11.3 The Researcher has prepared the manual in English and Marathi for the teachers of respective teaching medium. It is seen from the average scores of medium of teaching that teachers from Marathi medium have digested the manual thoroughly than their co-workers from English medium as they have recorded an increase in performance to 77.62% against 58.42%. The increase in

performance, as recorded from scores of Post-Test of teachers who have not completed their graduation is quite remarkable (97.22%) than teachers with graduate and post-graduate qualifications. (65.96%, 68.65%)

5.11.4 Similar to knowledge, the increase in performance of teachers who have undergone the previous training of DM and First Aid is quite lower (51.90%) than of the teachers who have not been imparted any kind of such training.

5.12. Question wise Break up of Knowledge by percentage

1. Correct definition of disaster management was given by 27% respondents, while correct meaning given by 78% respondents.
2. It was observed that about 85% respondents could identify types of disasters.
3. Researcher asked question regarding phases of disasters only 42 % respondents could give correct answer.
4. Drop, cover and hold method is very simple way to save life during earthquake, unfortunately only 18% respondents could answer correctly.
5. Among the total respondents majority of them (96 %) knows to move higher level during floods to save life,

while only 62% identified cause of death during floods is drowning.

6. Road traffic accident is biggest killer in Pune city is, fortunately 72 % teachers are aware of safe way of driving the vehicle but in practice scenario is different
7. Fire accident is common and fatal disaster in school, 73% respondents knows common cause of fire in schools.
8. 74% teachers knows best place to keep first aid box in schools.
9. Only 48 % respondents could able to give correct definition of first aid.
10. CPR is sure way of saving life when in cardiac arrest, 72% teachers could not know even full form of CPR.
11. Pouring water is only immediate treatment for burns, only 49% responded correctly.
12. Activation of EMS is only way to tackle road accident and other emergencies 41% responded correct toll free number of EMS.
13. Evacuation drill and school disaster management plan is safety initiative of the school, only 40% teachers were aware of school disaster management plan (SDMP).
14. Researcher asked fire emergency telephone number, 70% responded correctly.

5.12.2 Question wise break up of self expressed practices by percentage

1. Cell phone is nowadays become important electronic gadget carries by everyone, in case of emergency (ICE) number may be stored in phones e.g. ICE1,ICE2 etc Unfortunately only 33% respondents expressed correctly.
2. Display of emergency telephone numbers were not done in 80% of schools.
3. Only 41% of teachers undergone first aid training organized by school authorities.
4. Using mobile phone even by hands free mode is dangerous during driving a vehicle, 39% respondents not operating phones while driving.
5. Only 22% respondents expressed about recovery position.
6. Only 33% expressed need of school disaster management plan
7. Treatment of bleeding, burns and fractures correctly expressed by only 53% of respondents

5.13 Interpretation of the findings

Thus, the manual designed by the Researcher has proved to be effective in increasing knowledge and self-expressed practices among school teachers of Pune city.

CHAPTER - 6

STATISTICAL ANALYSIS

6.1 Introduction

This chapter discusses inferential statistics, which use sample data to make decisions or inferences about population. Populations are group of interest when inferential statistics are used, even though data are analyzed from samples

6.1.1 Statistics is the science which deals with collection, classification and tabulation of numerical facts as the basis of explanation, description and comparison of phenomenon.

6.1.2 It is also the science which deals with collection, compilation, analysis and interpretation of numerical data.

6.1.3 Statistical methods are generally adopted to describe the characteristics of a group or to find out underlying facts (Generally known as descriptive statistics)

6.1.4 This method is also used to analyze data and draw conclusion. (known as Analytical Statistics) There exist two separate techniques of analysis. One is called as Analytical technique in which averages, variability, correlation, regression, trends, rates and ratios etc. are used. The other side uses probability concepts in which estimation,

testing of Hypothesis and deterministic and stochastic models etc. are involved.

6.1.5 However it should be noted with concern that, these statistical methods have following certain limitations:

a) Statistics cannot deal with individuals

b) Statistical tools are weak in understanding the qualitative phenomenon

c) Statistical laws are not exact.

6.2 Testing of Hypothesis

6.2.1. Hypothesis testing is one of the key statistical techniques that are used in business decision making. The key purpose of hypothesis testing is to analyze the difference between the value of the sample statistic and the hypothesized population parameter. Hypothesis testing enables a research to decide whether sample data will provide support to a particular hypothesis based on which it can be generalized to the overall population.

6.2.2. The next step is to decide upon the appropriate statistical test. There are three key criteria which a researcher has to keep in mind while selecting a statistical test. They are type of research questions formulated the number of variables involved in the hypothesis test and the type of measurement scale used.

a) Then we need to decide upon the level of significance to be fixed.

b) The next step is to calculate the sample statistic.

c) The next step is to determine the critical values. We need to compare the standardized sample statistic with the critical value.

We reject the null hypothesis if the value of standardized sample statistic falls in the rejection region and accept (not reject) the null hypothesis if the standardized sample statistic falls within the accepted region.

6.2.3. In Social science, direct knowledge of population parameter(s) is rare hence a hypothesis testing is often used as a strategy for deciding whether a sample data offer such support for a hypothesis can be made ‘ generalization ’. The hypothesis simply means a mere assumption or some supposition to be proved or disproved. The hypothesis may not be proved absolutely, but in practice it is accepted if it is critically tested. The null hypothesis is symbolized as H_0 and the alternative hypothesis is symbolized as H_1 . If we accept H_0, then we reject H_1 and vice-versa.

6.2.4. Taking into considerations tools of statistics with its limitations, formation of hypothesis can be done. Basically hypothesis is a

statement made concerning relationship between under study. It may please be kept in mind that, purely descriptive studies, lacking the strategy of comparison, do not require a hypothesis.

6.2.5 There are two types of hypothesis

- Null and Alternative hypothesis
- One – and – two sided hypothesis

6.3 Objectives of the study

6.3.1 As such, there are many aspects of Disaster Management which requires attention to be paid, however Researcher focused his attention to following few objectives only :

a. To assess the knowledge of the secondary school teachers regarding disaster management before administration of training manual.
b. To assess self expressed practices of secondary school teachers regarding disaster management before administration of training manual.
c. To find out effectiveness of training manual on disaster management among the secondary school teachers in terms of knowledge and practices.
d. To correlate the knowledge of secondary school teachers regarding disaster management with self expressed practices.
e. To associate the findings with selected demographic variables.

6.3.2 To study these focused objectives, the researcher reached to formulate following hypothesis guiding the direction of the study.

6.3 Hypotheses

6.4.1 The researcher confined himself to focus his attention to following hypothesis only.

a. There is no significant difference in the level of knowledge among the school teachers of Pune City before and after administration of disaster management training manual.
b. There is no significant difference in the self expressed practices among the school teachers of Pune City before and after administration of disater management training manual.
c. There is no correlation between knowledge and self expressed practices of Secondary School Teachers regarding disaster management.
d. There is no association of knowledge of secondary school teachers regarding disaster management with demographic variables.
e. There is no association of self expressed practices of secondary school teachers regarding disaster management with demographic variables.

6.5 Statistical Tests

6.5.1 Student's t-Test

The form of t-distribution (or the table values of t) which is due to "student" (a famous mathematical statistician), is like a symmetrically single humped curve and resembles in a normal curve, only it is more leptokurtic. To test the significance between two sample means the

value of ‘t’ is calculated by dividing difference of sample means by standard deviation of difference two groups.

Where x_1 and x_2 are the means of the samples, n_1 and n_2 are the number of items in the two samples and ‘S’ is the standard deviation of the difference between two sample means.

6.5.2 Hypothesis #1 : There is no significant difference in the level of knowledge among the school teachers of Pune City before and after administration of disaster management training manual.

6.5.3 To test this hypothesis researcher used paired ‘t’ test. The calculated ‘t’ value was 19.69 and is greater than table value (1.96) and was found highly significant at both 0.01 and 0.05 level of significance. Hence null hypothesis is rejected. Thus proving that manual on Disaster Management is useful in increasing the level of knowledge.

6.5.4 Hypothesis #2 : There is no significant difference in the self expressed practices among the school teachers of Pune City before and after administration of disaster management training manual.

6.5.5 To test this hypothesis researcher also used paired ‘t’ test. It was found that the ‘t’ value so obtained viz. 14.88 is greater than table value i.e.1.96 and was also found highly significant at both at 0.01 and 0.05 levels of significance. Hence null hypothesis is rejected. This clearly

indicates that training manual is effective in improving self expressed practices of the teachers.

6.5.6 Hypothesis - 3 : There is no correlation between knowledge and self expressed practices of Secondary School Teachers regarding disaster management:

a) That is to test Significance of coefficient of correlation between Knowledge and Practices.

b) The coefficient of correlation between Knowledge and Practices was calculated using excel Sheet and is observed as r=0.02517.

Since in case of large samples, the standard error(S.E.) of coefficient of correlation or 'r' is given by the formula

$$S.E. = (1-r^2)/ \sqrt{n}.$$

The value of 't' is calculated by finding out the ratio between coefficient of correlation and its standard error.

c) Thus 't' is calculated as:

$$t = \frac{r}{(1-r^2)/ \sqrt{n}}$$

Substituting the values of r=0.02517 and N=540, the value of t=0.58527.

For 538 (540-2) degrees of freedom at 5% level of significance the value of t= 1.465. Since the calculated value of' t' is quite less than the table value of t, the hypothesis is accepted implying that the coefficient of correlation between Knowledge and Practices is not significant.

6.5.7 Hypothesis - 4 : There is no association of knowledge of secondary school teachers regarding disaster management with demographic variables.

6.6 Chi-Square Test

6.6.1. The present study deals with only Null and Alternative hypothesis. A hypothesis of zero differences among groups (or no association between the predictor and outcome variables) that needs to be tested (presented as H_0)

A hypothesis that in some sense contradicts the null hypothesis is called Alternative hypothesis (Presented as H_1)

In alternative hypothesis, there is a difference among the groups or in another words there exists an association between the predictor and outcome variables. However H_1 cannot be tested directly. It is accepted by exclusion, if the test of significance rejects H_0.

6.6.2 In the present sample, the application of Chi-square Test is based on the following assumptions :

If the opinions of respondents on both the parameters under study are unbiased, then it must follow a normal distribution. In other words, 50% observations are expected to be below average and balance 50% should be above average.

For this purpose following steps were followed:

a) The scores of the teachers for the given parameter were studied and its average was calculated. The scores then were arranged in an increasing order. The number of respondents below the average was counted and noted. Similarly number of respondents equal and above average was also counted and noted.

b) The no. of observations below and above average was noted for each category / parameter.

c) The Researcher then arrived at the following 2 X 2 contingency table

Table 6.1

Contingency Table

Parameter Type	No. of Observations		
	Below Average	Above Average	Total
Type 1	(A)	(B)	(A + B)
Type 1	(C)	(D)	(C + D)
Total	(A + C)	(B + D)	(N = A + B + C + D)

d) Chi-square was then calculated using the standard formula

$$\chi^2 = \frac{N (AD - BC)^2}{(A+B) (C+D) (A+C) (B+D)}$$

e) Degrees of Freedom (d. f.)

= (R -1) (C – 1) Where R = No. of Rows

C = No. of columns

6.6.3 Out of various demographic parameters relation / association of following combinations were tried by the researcher and their results are as under:

(i) Knowledge and Age of the respondent.

Table 6.2

Association of Knowledge with age of the teachers

Parameter Type	No. of Observations		
	Below Average	Above Average	Total
Knowledge	217	323	540
Average Age	229	311	540
Total	446	634	1080
Calculated Value of $\chi^2 = 0.545$			
Hypothesis Accepted implying No Association of Age & Knowledge.			

(ii)) Knowledge and Sex of the respondent.

Table 6.3

Association of Knowledge with Sex of the teachers

Parameter Type	No. of Observations		
	Below Average	Above Average	Total
Male	73	73	146
Female	144	250	394
Total	217	323	540
Calculated Value of $\chi^2 = 8.019$			
Hypothesis Rejected implying Knowledge is associated with sex of the Respondent			

(iii) Knowledge and Medium of Teaching of the respondent.

Table 6.4

Association of Knowledge and Medium of teaching

Parameter / Type	No. of Observations		
	Below Average	Above Average	Total
English	56	178	234
Marathi	161	145	306
Total	217	323	540
Calculated Value of $\chi^2 = 45.38$			
Hypothesis Rejected implying Medium of Teaching and Knowledge is associated.			

(iv)) Knowledge and Educational Qualification of the respondent.

Table 6.5

Association of Knowledge with Educational Qualification

Parameter / Type	No. of Observations		
	Below Average	Above Average	Total
Non PG	136	148	284
PG	81	175	256
Total	217	323	540
Calculated Value of $\chi^2 = 14.78$			
Hypothesis Rejected implying Educational Qualification and Knowledge is associated.			

(iv)) Association of Knowledge with Experience of the respondent.

Table 6.6

Association of Knowledge and teaching experience

Parameter Type	No. of Observations		
	Below Average	Above Average	Total
< 15 Yrs	153	264	417
> Yrs	64	59	123
Total	217	323	540
Calculated Value of $\chi^2 = 9.30$			
Hypothesis Rejected implying Length of Service and Knowledge is associated.			

(vi)) Association of Knowledge and Examining Body of the respondent.

Table 6.7

Association of Knowledge with examining body

Parameter Type	No. of Observations		
	Below Average	Above Average	Total
State Board	193	273	466
Non State Boards	24	50	74
Total	217	323	540
Calculated Value of $\chi^2 = 2.144$			
Hypothesis Accepted implying No Association of Pattern of Examination & Knowledge.			

(vii) Association of Knowledge and Teachers Training of the respondent.

Table 6.8

Association of Knowledge and Teachers training

Parameter Type	No. of Observations		
	Below Average	Above Average	Total
B.Ed. Trained	185	246	431
Non B.Ed. Trained	24	57	81
Total	209	303	512
Calculated Value of $\chi^2 = 4.988$			
Hypothesis Rejected implying Professional Training and Knowledge is associated.			

(viii) Knowledge and Teachers attended Training in DM & FA.

Table 6.9

Association of Knowledge with teachers training in DM & FA

Parameter Type	No. of Observations		
	Below Average	Above Average	Total
DM & FA. Trained	51	90	141
Non . Trained	166	233	399
Total	217	323	540
Calculated Value of $\chi^2 = 1.279$			
Hypothesis Accepted implying No Association of Previous DM & FA Training & Knowledge.			

6.6.4 Comparing the calculated values of various Chi-Squres as seen in various tables, the Researcher rejected the hypothesis, when the calculated value was found to be more than the table value for 1 degree of freedom (1df) viz. 3.841. The interpretations based on acceptance and rejection of various demographic parameters are summarized as under:

Age, experience and previous training on disaster management and first aid is associated with improvement in knowledge and practices whereas other variables are non associated.

6.6.5 Hypothesis #5 There is no association of self expressed practices of secondary school teachers regarding disaster management with demographic variables

6.6.7 Similar to testing of D.M. Knowledge, Researcher followed the procedure of Chi-Square Testing for testing of association of self expressed practices and various demographic parameters. Out of various demographic parameters relation / association of following combinations were tried by the researcher and their results are as under:

(i) Practices and Sex of the respondent.

Table 6.10

Association of Practices with Sex of the teachers

Parameter Type	No. of Observations		
	Below Average	Above Average	Total
Male	60	86	146
Female	167	227	394
Total	227	313	540
Calculated Value of $\chi^2 = 0.0727$			
Hypothesis Accepted implying No Association of Age & Practices.			

(ii) Practices and Education of the respondent.

Table 6.11

Association of practice with education

Parameter Type	No. of Observations		
	Below Average	Above Average	Total
Non PG	120	164	284
PG	107	149	256
Total	227	313	540
Calculated Value of $\chi^2 = 0.0115$			
Hypothesis Accepted implying No Association of Educational Qualifications & Practices.			

(iii) Practices and Medium of Teaching of the respondent.

Table 6.12

Association of practice with medium of teaching

Parameter / Type	No. of Observations		
	Below Average	Above Average	Total
English	97	137	234
Marathi	130	176	306
Total	227	313	540
Calculated Value of $\chi^2 = 0.0578$			
Hypothesis Accepted implying No Association of Medium of Teaching & Practices.			

(iv) Practices and Pattern of Examination..

Table 6.13

Association of practices with pattern of examination

Parameter / Type	No. of Observations		
	Below Average	Above Average	Total
State Board	184	282	466
Non State Boards	43	31	74
Total	227	313	540
Calculated Value of $\chi^2 = 9.0896$			
Hypothesis Rejected implying Pattern of Examination & Practices are Associated.			

(v) Practices and Teaching Experience of the respondent.

Table 6.14

Association of practices with teaching experience

Parameter Type	No. of Observations		
	Below Average	Above Average	Total
≤ 15 Yrs.	166	251	417
> 15Yrs.	61	62	123
Total	227	313	540
Calculated Value of $\chi^2 = 3.7326$			
Hypothesis Accepted implying No Association of Teaching Experience & Practices.			

(vi) Practices and Professional Education of the respondent.

Table 6.15

Association of practices with professional education

Parameter Type	No. of Observations		
	Below Average	Above Average	Total
B.Ed.	176	255	431
Non B.Ed.	51	58	109
Total	227	313	540
Calculated Value of $\chi^2 = 1.2656$			
Hypothesis Accepted implying No Association of Professional Education & Practices.			

(vii) Practices and DM & FA Training of the respondent.

Table 6.16

Association of practices with DM training

Parameter / Type	No. of Observations		
	Below Average	Above Average	Total
Trained	32	109	141
Non Trained	195	204	399
Total	227	313	540
Calculated Value of $\chi^2 = 29.2994$			
Hypothesis Rejected implying Previous DM & FA Training & Practices are Associated.			

6.7 Regional Effect on Performance.

6.7.1 To test the variations among the groups of teachers located at various parts of Pune city. As mentioned in previous chapters, Pune city was classified into 5 locations viz. Central, East, North, South and West. An Analysis of Variance (ANOVA) technique was applied for this purpose. The results obtained using Excel Format are reproduced below:

Table 6.17

Results of ANOVA test

Anova: Single Factor						
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Central	148	2539	17.15541	8.7443924		
East	204	3382	16.57843	12.786922		
North	60	954	15.9	17.210169		
South	71	948	13.35211	11.688531		
West	57	811	14.22807	13.286341		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	943.1303	4	235.7826	19.530504	5.14E-15	2.388596
Within Groups	6458.803	535	12.07253			
Total	7401.933	539				

The high value of F indicates that there are significant variations among the various groups under study.

6.7.2 Researcher tried to assess the performance of teachers working in a particular region of Pune City. Though comparison of average scores is one of the methods, however comparing averages does not statistically

justify since deviations are not taken into account. Hence Coefficient of Variation (CV) which takes into account both averages and deviations is a right 'statistic'. Besides this being unit less measure and generally being expressed in percentages, is easy for comparison. The statistical facts of various regions of Pune City are as under:

Table 6.18

Cross Sectional performance of Pune City Teachers

Sr No.	Parameter	Central	East	North	South	West
1	No. of Teachers	148	204	60	71	57
2	No. of Schools	9	11	3	4	3
3	Average Score of (Knowledge) –Pre-Test	17.16	16.58	15.9	13.35	14.23
4	Standard Deviation	2.957	3.576	4.148	3.419	3.645
5	C.V. (%)	17.23	21.57	26.09	25.61	25.62
6	Average Score of (Practices) –Pre-Test	7.08	6.96	6.25	7.66	7.33
7	Standard Deviation	2.675	2.693	3.462	2.44	2.83
8	C.V. (%)	37.78	38.69	55.39	31.85	38.61

6.7.3 Based on the C.V.s it is clear that performance in knowledge of the teachers working in the schools of Central Region have topped followed by Eastern Region. Southern & Western regions are

practically equal in performance. Though Northern region is better in average score as compared to South and West, performance of teachers is not consistent i.e. it is with more variations.

6.7.4 In case of Practices picture is quite different. Southern part is leading while Central and Western parts are following. Eastern and Western regions are practically at equal standings with a very minor difference. However Northern part is comparatively far behind than its remaining four colleagues.

CHAPTER - 7

CONCLUSION AND RECOMMENDATION

7.1. Conclusions

7.1.1. The primary aim of this study was to determine the effectiveness of training manual on disaster management among secondary school teachers in Pune city. Semi structured questionnaire was administered.

7.1.2. A quasi-experimental study was undertaken by the researcher covering 540 teachers from 30 schools representing entire Pune city. For the study Pune city was divided into five regions namely central, south, east, west and north. While selecting the schools the researcher ensured the equal representation of all parameters. Among the 540 teachers 394 (73%) were female 146 (27%) were males. Teachers from state board 466, CBSE 54 and ISCE 20 were included.

7.1.3. Majority of the school teachers were in middle age group with an average age of 38.2 and are heavily dominated by females. Overall mean knowledge score was 15.9 (53%) and self expressed practice score was 7.05 (48%) indicated that teachers knowledge and self expressed practices are not at

satisfactory level. Young teachers (below 25) and female teachers found more knowledgeable than their counterparts. Knowledge was positively correlated with teaching experience and level of education of the teachers. Of the 540 respondents 26% had participated in first aid training programme but their knowledge level was not significantly more than those who have not undergone the training. Questionnaire was divided under three headings, concept of disasters, do's and don't related to disaster management and first aid and safety. Out of these three components first aid and safety knowledge among teachers was found very poor (42%)

7.1.4. The effectiveness of training manual was tested by pre test and post test scores. The mean knowledge score of pre test was 15.9 whereas mean post test knowledge score was 24.07 it indicates that there was 51% rise in the knowledge score cleraly reveals effectiveness of training in improving the knowledge level of the school teachers.

7.1.5. Similarly pre test self expressed practice score was 7.05 and post test self expressed practice score was 11.93 showing increase by 69.92% clearly indicative of effectiveness of manual which is also proved by statistically.

7.1.6. The effectiveness of the manual was tested statistically at 0.01 and 0.05 level of significance which indicated that training manual was effective in improving knowledge and practices of the teachers.

7.1.7. School safety is very important concern. Every school and community must take it seriously and strive continually to achieve highest safety in schools. Every school is unique by virtue of its teachers, students, location and culture. Teachers role is very important in mitigating the hazards and disasters in schools. The teacher who is aware of disasters and its management can improve the practices successfully.

7.2. Recommendations:

7.2.1. Use of Educational Material

The survey revealed a general lack of information among school teachers regarding disaster management. This highlights the need for disaster safety education. It is evident that disaster has significant impact on school children. Improvement in knowledge and practices of teachers equip the teachers with knowledge of how to react if an emergency situation arises. Teacher should take initiative to improve their knowledge and practices by using booklet, posters,

brochures, charts etc. The school authority should provide such material to the teachers.

7.2.2. Display of Information in Emergencies

School authority should display all the important telephone numbers at prominent places of the school as researcher found that teachers were ignorant about emergency medical services available in the city as well as important telephone numbers like ambulance, fire, disaster helpline, child helpline etc

7.2.3. In case of Emergency (ICE) Mobile Number

It should be made mandatory to each Mobile Phone manufacturer to incorporate Toll Free ICE number (user friendly) in the software of Mobile phone. Provision also should be made to include more than one such ICE numbers before activation of Cell phone.

7.2.4. School Disaster Management Plan (SDMP)

Researcher observed that majority of the schools have been given low priority to disaster education. No disaster plan was available in surveyed schools. School authorities, therefore should take initiative and sensitize the school community (students, teaching and non teaching staff, management

staff and parents) regarding disaster preparedness and management. It is therefore strongly recommended that each school must prepare their own school disaster management plan (SDMP) and same should be updated on regular basis. The SDMP should consists the following components namely viz. SDM committee, safety assessment, evacuation map, formation and training of DM team and establishment of task force.

7.2.5. Mock Drill

Periodical mock drill and evacuation drill should be exercised in all the schools at least urban schools of the state in collaboration with concerned authorities such as Police, Fire brigade etc.

7.2.6. Collaboration

Capacity building is one of the WHO strategies for improving disaster preparedness. Indian Red Cross is universally recognized institution for capacity building of the communities. School authorities should collaborate with such agencies to raise awareness among the school teachers and students and every teacher must undergo such training.

7.2.7. Road Safety around the School

In Pune city, schools are located in very crowded areas, the approach road was found very narrow and school children commute by auto rickshaw or motorbike. Since large number of vehicles are found parked on the way to school creating unsafe environment to children. Traffic authorities should ensure that if any mishap occurs there should be way to enter ambulance or fire engine. Researcher strongly recommends that at least schools located in city should have one way traffic control around the schools up to the main road so that vehicles will come in one direction traffic mishap will be avoided. In addition to this speed breaker at the entrance of the school should be constructed to control on the speed.

7.2.8. Colour Code for School Bus

Every school should ensure that children coming to school must use school bus facility. School bus should have unique color code system (currently color code adopted is yellow) and every school must adhere to this norm.

7.2.9. Government Initiative

Government launched Universal access to basic education. In the similar fashion safety initiative also must be worked by

expert committee and implemented in schools across the nation. In addition to above there should be comprehensive plan for disaster preparedness, strengthening capacities for disaster risk reduction and developing skills for making communities disaster resistant is need of an hour.

7.2.10. Disaster Management Training Programme

Disaster management education and awareness programme in the school should be designed and conducted for all the teachers in the country

7.2.11. Pocket Manual for Emergencies Every teacher must use pocket manual on disaster Management in emergency situation. School authority should prepare the pocket manual based on locational hazards in that area. The same manual can be used by teachers while teaching the subject of Disaster management.

7.2.12. Curriculum Modification

Subject of disaster management should be included in the curriculum from primary level onwards so that student will prepared for future disasters.

7.2.13. Adoption of Newer Methodologies

Various other means of creative educational interventions should be used to train the teachers on disaster management e.g. Video learning, on line learning, games, workshops etc.

7.2.14. Capacity building

Capacity building should not be limited to professionals and personnel involved in disaster management but should also focus on building the knowledge, attitude and skills of a entire community to cope with the effects of disasters. In view of this researcher strongly recommends to consider entire community for capacity building. The concern authority should make note of it.

7.2.15. Structure of the School Building

In India, many educational institutions have sprouted of late. The institutions are not constructed with emergencies in view. These have space considerations at the back of their planning. Fire in Kumbhakonam School is a glaring example of how faulty the structure was and how the facilities were ill conceived. It should be made obligatory for the educational institutions to follow the following guideline

- A disaster mitigation plan has to be drawn up before a every institution gets recognition.
- The disaster plan should reflect the organization and mitigation activities during all types of disasters.
- Safety index should be determined for each school. The school below safety standard may be identified and precautionary measures may be taken.

7.3. Recommended practices for Disaster school education

- First Aid Workshops, Training Programmes should be organized for the school teachers on regular basis simultaneously refresher training also to be conducted.
- Include community partners such as local government, Police Department, Fire Department and public health agencies in planning.
- Identify and address a range of events and hazards specific to the schools
- Develop multipurpose manuals with emergency management information that can be tailored to meet individual needs
- Utilization of existing outside developed resources: curriculum and educational material

- Preparedness efforts related to emergency drills and crisis exercises for staff, students and emergency responders
- Develop procedures for communicating with key stakeholders such as parents and students
- Conduct an assessment of vulnerabilities
- Conduct regular drills
- Identify and acquire equipment to mitigate and respond to emergencies
- Identify a storage location and replenish emergency supplies on a regular basis.

7.4. **Limitations** :

- Considering availability of time, financial component and availability of respondents following limitations were faced by the researcher.
- Only secondary schools were considered for the study.
- Knowledge and practices regarding disaster management is included in the study other components like attitude, culture and behavior were excluded.
- Instead of imparting actual training disaster management training manual was developed.
- Due to vast distribution of geographical area of Pune city sample size (540) and number of schools (30) were limited.

- Because of the language constraint of the researcher schools other than English and Marathi medium were excluded.
- In this study it was found that there is low level of knowledge among school teachers regarding disaster management with regional disproportinality. Therefore school based disaster education activities remains a phenomenon. The more researches are needed in this area

7.5. Area for further research:

7.5.1. This study covered component of knowledge and practices of disaster management. Other components such as behavior, attitude and culture is open for research.

7.5.2. Some studies can be conducted to assess the school safety and security, school building, grounds, in which fire extinguishers, unsafe parking area etc should be assessed.

7.5.3. Similar study can be conducted among school students, college students, and general public. Taking into account entire country

7.5.4. Similar study can be undertaken as comparative study between Rural and Urban teachers.

7.5.5. Similar study can be conducted by using advanced technology like simulation, online learning, virtual classrooms etc

7.5.6. There is urgent need for international data sets to provide sex-disaggregated data on disaster related mortality, morbidity and long term consequences.

7.5.7. Research is needed both at local and at national level on structural processes and factors that increase disaster vulnerability in women and men across different social groups.

7.5.8. Effects of funding, programming, training and the consequences of these for demographic variables in disaster situations is another important area that needs to be addressed by research studies.

BIBLIOGRAPHY

1. PK Dave et al 'Emergency Medical Services and Disaster Management' Jaypee Brothers, Medical Publishers (P)Ltd New Delhi 2007, Page 252-339
2. Oxford advanced learner's dictionary of current English, A S Horn by /4E/ Chief Editor A P Cowie – Acc No 9195 oxford University Press New York – 1992
3. Barbara J Brown. Disaster Preparedness and Advance Planning for Disaster Relief. 3rd Edition, Paragamon Press, 2005.
4. Park K. Preventive and Social Medicine, 20th Edition Banarasi Banot Publication 2009 Page 700 – 730
5. Bond, J. The Hazards of Life and All that. Institute of Disaster Management, Bristol, 2006
6. Gandhi P. J. Disaster Mitigation and management Deep & Deep Publication Pvt Ltd new Delhi 2007
7. Webster's English Dictionary 6th Edition 2006
8. B T Basavanthapa, 'Community Health, Jaypee brothers New Delhi 2005
9. International Strategy for Disaster Reduction – UNDP 3rd Edition 2006
10. Thomas Merrick,et. al., "World Population in Transition," Population Bulletin, Vol. 42, No.2 (1986).
11. Rajdeep Dasgupta, *Disaster* Management and Rehabilitation 1st Edition Mittal Publication, New Delhi 2007

12. CRED : Annual Disaster Statistical Review 2007
13. Steven Donohue, Disaster Management: Ch 24, Geneva, 2008
14. Dr. Priyaranjan Trivedi, Disaster Management, IIEE, New Delhi 2006
15. Debrati, Guha, Sapir, Michal F Lechat. Disaster Management: Report of Workshop organized by Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India. New Delhi,2004.
16. Disaster Management Act, The Gazette of India, Ministry of Law and Defense New Delhi 2005
17. Dr Satendra IFS, Sustainable rural development for disaster mitigation, Concept Publishing co.2004 New Delhi
18. Grant D. Murray, 'Emergency Care, Brady Co. New Jersey – 1992
19. Carter W Nick. A Disaster Management Handbook. Asian Development Bank, Manila, 1991.
20. Times Of India - Pune Edition April 24, 2009, News Reg Swine Flu
21. K park, Preventive and Social Medicine, 18th Edition Banarsidas Banot-Jabalpur
22. International Federation of Red Cross [IFRC], 2001
23. http://earthquake.usgs.gov/hazards
24. http://across.co.nz/WorldsWorstDisasters.html 22/3/2009 1843hrs
25. http://news.bbc.co.uk/2/hi/asia-pacific/7382298.stm 22/03/2009 1918hrs

26. Asia pacific disaster statistics 2009

27. http://earthquake.usgs.gov/hazards/

28. Suresh Ray, Disaster Management 1st Edition CBS Publishers and Distributors Pvt Ltd New Delhi 2010

29. Disaster statistics: international strategy for disaster reduction-2005

30. Health Action NOV 2007

31. TOI Mar 7,2007 Pune Edition

32. Madhavi Joshi et al, Understanding Disasters, Centre for Environmental Education 1st Edition Ahmadabad 2007

33. World health manual - April 1991

34. Indo-Asian News Service (IANS)

35. Girijakumari S.: Educating Industrial Workers on selected first aid measures. Nightingale Times, 2002.

36. International Federation of Red Cross and Red Crescent Societies. World Disasters Report 1996. New York: Oxford University Press.

37. http://sristi.org/dmis_cms

38. David Alexander. Natural Disaster. UCL Press. London, 2003

39. Lynn H Stephens, Stephen Green. Disaster Assistance, Appraisal, Reforms and New Approaches. MacMillan Press, 2000

40. Jani PC. Hood Mitigation Practices in India, Disaster Management. Indian Institute of Public Administration. New Delhi, 1984.

41. Pasricha UP. Natural Disaster Management in India. Disaster Management in Asia and Pacific. ADB, Manila,2001.

42. www.redcross.org.uk/firstaid.

43. Disaster Management : Development Perspective, Government of India -2008

44. Parmar NK. Disaster Management in Metropolis: AIIMS, New Delhi, 2004

45. Col (Retd) P.P.Marathe, Concepts & Practices In Disaster Management Diamond Publication Pune 1st Edition 2006

46. A case study : Gujrat Earthquake, National Centre for Disaster Management, 2002 New delhi

47. Savage PEA, Disaster Planning; A Manual for Doctors, Nurses and Administrators. Pargamon Press, London, 1979.

48. Sharma VK, Editor, Disaster Management. Indian Institute of Public Administration. New Delhi, 1994

49. School Safety Initiative, Gujrat State Disaster Management Authority, Government of Gujrat, May 2006

50. Smith and Maurer F., 'Community Health Nursing Theory and Practice', W.B.Saunder's Company, Toranto, 1995

51. Sheeby B. 'Emergency management' Mosby, Boston 1992

52. An overview of Disaster management, 2nd Edition UNDP 2009

53. Disaster Management Policy, Government of India – 2005

54. Gujrat State Revised Disaster Management Policy – 2008

55. Polit and Hungler, Nursing research, 6th edition Page – 2006

56. B T Basavanthapa, ‘Handbook of Nursing research’ Jaypee Brothers, New Delhi 2006

57. King’s Human Resource Development – 2009

58. Pat Cryer, The Research student’s guide to success, viva book private ltdnew Delhi, 2009

59. India Today June 2008 Mumbai Published by Living Media India Ltd

60. The Indian Express Pune Edition Jan 2009

61. Managing Disasters : Strategies and Policy Perspectives, Duke University Press London – 2006

62. Randolf Kent, Disaster Preparedness 2nd Edition UNDP 2008

63. Overview of Disaster Management UNDP 2008

64. Disaster Management and Preparedness (Occupational Safety & Health Guide Series) Larry R. Collins, CRC Press, 2006 Eastern Kentucky University, Richmond, USA **ISBN:** 9781566705240

65. Andrew Maskrey, Disaster Mitigation: A Community Based Approach

66. Environmental Health Management after Natural Disaster, Scientific Publication No 430, Pan Americal Health Organization 1982

67. Shelter After Disaster: Guideline for Assistance UNDRO, New York USA

68. Refugees Handbook for Emergencies, United Nations High Commission Field Operation Geneva 2009

69. Saundra Schneider, Flirting with Disasters : Public management in crisis, Armonk, New York -2009

70. Damon P Coppola , Introduction to International Disaster Management ebook DS:79 ISBN: 20110115

71. United Nations Disaster Relief Coordination. Disaster Prevention and Mitigation. Volume- l Public Information Aspect, UN, New York, 1979.

72. Munich Re Staff Writers Frankfurt (AFP) July 9, 2008

73. International Federation of Red Cross and Red Crescent Societies. World Disasters Report 2008. New York: Oxford University Press.

74. Disaster Research Center (DRC) Havidán Rodríguez, Director. Department of Sociology and Criminal Justice University of Delaware Press Release

75. Dr. Badrinarayan S Pawar, Theory building and hypothesis specification in organizational studies, Sage Publication CA, 2010

76. J M Scheuren, et al Annual Disaster Statistical Review, The numbers and Trends Centre for research on epidemiology of Disasters CRED – Belgium 2nd Edition - 2007

77. http:// www.unisdr.org 1. Conference on gender and disaster risk reduction in Beijing, China from 20-22 April 2009 21.4.09 – 1

78. Park, J.E. & Park, K., 'Park's Textbook of Preventive & Social Medicine 19th ed. Jabalpur M/s. Banarsidas Bhanot Publication. 2009

79. http://www.who.int/world-health-day/2009/en/ and

80. http://www.youtube.com/who. and the joint UNISDR WHO and World Bank

81. Progress of nation 2000, UNICEF 2000

82. Health for the millions, disaster management Feb – Mar 2006 Vol 30 No 6

83. UNCRD Project: Reducing vulnerability of school children to earthquake in Asia Pacific Region Shimal India

84. Press Information Bureau – (Govt of India) 27/11/2008

85. National Crime Records Bureau & Home Ministry 2007

86. Times of India Pune Edition – Lightning strikes

87. Times of India, Pune Edition Highways of Death – June 7, 2008

88. Times of India Pune Edition Rising Infection due to Climate change : Study April 23, 2009

89. Press Trust of India – TOI – 18 killed in bus-train collision – December 15, 2007

90. Pala I, Vankar GK, "Epilepsy and teachers: A survey Indian J Pediato" 1997 Mar Apr;64(2):211-4.

91. Rea S, Kuthubutheen, Burns Unit Royal Perth Hospital, Welligton Street, Perth 6000,WA,Australia, PMID 16308098[Pub Med- Index for Medline]

92. Assessment of physical education faculty student's knowledge about first aid, J Egypt Public Health Association 1993; 68(1-2):101-18.

93. Ransone J,"School of applied and educational psychology, Oklahoma" OKPMID 16558575

94. Newman L J and Crawford P J ,Journal of Dental Surgery Vol 3:14 Jan 2009

95. Cunningham A, 2002 and Tim McCarthy, “First Aid Step by Step” New Delhi

96. Anderson L, Al-Asfour and Al-Jame Q 2006, Emergency management Feb 2008

97. Mathew, “Bailliere’s Handbook of first aid**”,** 7th Edition, New Delhi, AITBS Publishers and Distributors

98. Samant, **“**First Aid Maunal –Accident and Emergency” 1st Edition,

99. Spranger C B et al “Physicians preparedness and response capacity to bioterrorism in major metropolitan area” Journal of Disaster Management Response, 2007:5:82-86

100. Bremer R. “Policy Development in disaster preparedness and management: A lesson learned from the January 2001 earthquake in Gujarat India Joint Medical Services”,Military

101. Sacco A,Ciavarella, “Educational and Training Issues In occupational First aid: the techniques for the teachers of the workers responsible for first aid”, Med.Lav. 2005 Sept Oct;96(5):403-8.

102. Microsoft Encarta reference Library 2003 – Encarta dictionary tool, Microsoft publications USA (11/11/2007)

103. Eric K Noji Public Health Consequences of Disasters, Mosby publication, USA pg 9

104. Talbot LA (2005) Principles and Practice of Research Mosby Publication 6/E Missouri pg 367-369

105. Neiswiadomy RM (2008) Foundation of Nursing Research 3/E Prentice Hall International Publisher London

106. Times Of India -MAR 7, 2007 Pune Edition

107. Contigency Action Plan for Natural Calamities, Ministry of Agriculture Co-operation, Govt of India

108. INDIAN NURSING YEAR BOOK : 2000-01

109. Nursing journal of India oct 1998,managing mass casualties Khalida Jabin vol l xxxix no.10, pg 225

110. Nursing Journal of India march 2001, disaster preparedness, vol lxxxxii no.3 pg 50

111. Medical Training and competence,Norway. Prehsopital Disaster Medicine 2003.Oct Dec;18(4): 372-84

112. Liz Tschoegl, An analytical review of selected data sets on Natural Disasters and impact, UNDP/ CRED workshop Report March 2006, Bangkok – Thailand

113. Roy N, Shah H, “Gujarat Earthquake (2001) experience in a seismically unprepared area: community hospital medical response”, Pre hospital Disaster Med. 2002 Oct – Dec;17(4):186-95

114. Uray, Oshsenhofer, “Emergency medicine University of Vienne,Vienna” ,Austria.Feasibility of Life supporting First Aid(LSFA) Training as a mandatory subject in primary schools

115. Dealing with disaster health, Health action , Nov 2007

116. Messege from Ban Ki-Moon The Secretary-General of United Nations

117. Across Pacific magazine – South Asia tsunami Report – 2005

118. Etsuko Tsunozaki capacity building and awareness raising for disaster reduction through formal education (Asian Disaster Risk Reduction Centre (ADRC) 2006

119. Suja Suresh “effectiveness of structured teaching programme on knowledge and practices of disaster management among school teachers” Nightingale Nursing Times, September 2010:6:6:44-57

120. Anilkumar parashar, Effective planned teaching programme on knowledge & practice of Basic Life Support among students in Manglore Nursing Journal of India Feb 2010:Vol.Cl No 2 pg 40-41

121. http://www.proventionconsortium.org/?pageid

122. http://www.sristi.org

123. http://www.flood2008.org/flood

124. http://earthquake.usgs.gov/hazards/ -Nov. 1, 2007

125. http://www.sristi.org/english/dmis/dmsmessage.html - Nov 4, 07

126. http://across.co.nz/WorldsWorstDisasters.html 22/3/2009 1843hrs

127. *http://www.em-dat.net, UCL - Brussels, Belgium – 22.4.09 -2 EM-DAT : The OFDA/CRED International Disaster Database*

128. Campaign ""Hospitals Safe From Disasters: Reduce Risk, Protect Health Facilities, Save Lives" consult: www.safehospitals.info

129. http://across.co.nz/WorldsWorstDisasters.html 22/3/2009 1843hrs

130. http://news.bbc.co.uk/2/hi/asia-pacific/7382298.stm 22/03/2009 1918hrs

131. National Earthquake Information Center, U.S. Geological Survey.*200824*.

132. National Crime Records Bureau 2007, Times of India dated 28 July 2008; India's Biggest Killers.

133. Afrasyub Khan Et al Knowledge Attitude and practices of UG students http://Medscape/Abstract/17719509

134. The Times of India, Thursday, April 23, 2009 – Times City

135. National Crime Records Bureau 2007, Times of India dated 28 July 2008; India's Biggest Killers.

136. *Encyclopaedia of Disaster Management* By Goel, S. L. Deep & Deep Publications Pvt Ltd

137. *Disaster Management* By G.K. Ghosh A.P.H. Publishing Corporation

138. *Disaster Management* By R.B. Singh Rawat Publications

139. *Disaster Management: Through the New Millennium* By Ayaz Ahmad Anmol Publications

140. *Disaster Management* By B Narayan A.P.H. Publishing Corporation

141. *Modern Encyclopaedia of Disaster and Hazard Management* By B C Bose Rajat Publications

142. *Disaster Management* By Nikuj Kumar Alfa Publications

143. *Disaster Management - Recent Approaches* By Arvind Kumar Anmol Publications

Abstract Publication – International

144. Coastal Studies and Digitization (2002) (G. V. Rajamanickam and Mohan, P.M.) Proc. Int. Conf. on Globalization and Sustainable Development Perspectives of Digital Revolution and Environmental Management, Vol. I, pp. 109-112

145. Globalization and Global Changes (2002) (G. V. Rajamanickam, Sathya, S., and Ramasamy, K), Proc. Int. Conf. on Globalization and Sustainable Development Perspectives of Digital Revolution and Environmental Management, pp. 307-337

146. Disaster Preparedness in hospital set up (2010) Prof Joshi S G International Conference on Qualitative Research Methods Chennai Jan 12, 2010

147. Journal of emergency management Taiwan Vol III 24 / Jan 2009

148. Koichi Shiwaku et al, Future perspective of school disaster education in Nepal Disaster Prevention and Management Vol 16/4 Emerald Group Publishing Ltd 2007

149. Times of India. June 7, 2010 Pune edition – Interview of PCM Commissioner

150. R. K. Singh –IAS, Jt Secretary Disaster Management, Ministry of Home affairs Govt of India – Together Towards Safer India – Published by NDM Division – New Delhi

151. D N Elhance Fundamentals of Statistics, Kitab Mahal, Allahabad Publication, Chapter 29, pg 757, 1971

152. Ken Black Business Statistics for Contemporary Decision Making Fourth Edition, Wiley India Edition(4th Edition)2004

153. Guilford J.P. Fundamental statistics in Psychology and education 4th Edition new York Mc Graw Hill Book Co

154. Prof Kardile Vasantrao, Use of Statistics in analysis of result in research, St Printin 2001, Pg 126

155. Times Of India Pune Edition Feb 28, 2011, Wrap and weft of Good Research

156. Status Report – Disaster Management in India, Government of India August 2004

157. World Health Organization Disaster Report, Geneva 2008

158. International Federation of Red Cross (IFRC) World Disaster Report 1999.

159. Health Action, Floods and health, Vol 22, Dec 2009 pp 4-8, 12

160. Acharya, N. Double Victims of Latur Earthquake. Indian Journal of Social Work, 61(4) 2003:558-6

161. Ahmed, S. Gender, Vulnerability and disasters: Key concerns for policy and practice. Disaster and Development, 2006 (1) 165-11

162. Climate change and health: Resolution of the 61st World Health Assembly. Geneva, World Health Organization, 2008.42.6
163. Costello A. Managing the health effect of climate change: Lancet and University College London, Institute for Global Health Commission. The Lancet, 2009: 1693-1733
164. Synthesis report. Third assessment report on disasters, Cambridge University Press, 2001.1.30
165. Chakraborty, M, Disaster Management – A case of Latur Earthquake. The administrator, 42(4) 2007
166. Das B. Some Aspects of Disaster Management in India, Indian Journal of Public Administartion 48(2) 2002 183-196
167. Kulkarni M N, Where the sky is the roof Humanspace 8(4) 2001 11-2
168. Pareeda, P.k. Towards rebuilding a post disaster Society: A case Study of Super Cyclone Affected Coastal Orissa. Indian Journal of Social work, 63(2002)
169. Sahni P & Dhameja . A managing Disasters in New Millenium. Man and Development. 2001
170. Gandhi P.J. Disaster Mitigation and management, Post Tsunami Perspectives, New Delhi, Deep and Deep Publications Pvt Ltd, 2007