Conclusions
CHAPTER - V

CONCLUSIONS

The present study aims at understanding the extrinsic as well as intrinsic factors associated with the causation of otitis media. It also aims at studying the incidence and prevalence of the disease in the collected sample. It also focuses on the socio-cultural and educational difficulties faced by the affected and their families. A cross section of the population was taken into account in order to analyze the above given objectives. For instance, the geographic factors effect the trend in which the defects are present, socio-cultural factors influence the way in which the anomaly is dealt with and also the socio-economic standards of the affected determine or influence the type of treatment etc. Apart from these, there are various other parameters involved in the causation of the disease like age, sex, ethnicity, frequent cold or upper respiratory tract infection, exposure to parental smoking, etc.

However, though it is generally believed that there is no role of genetic factors in determining the susceptibility to the infectious disease like otitis media an attempt has been made to show the possible link between genetics and susceptibility to the disease.

In the present study 2054 subjects affected with otitis media were taken. Among them Hindus constituted the largest number (1511) in the sample followed by Muslims (509). This may be attributed to the fact that Hubli city and its surroundings constitutes a larger number of Hindus followed by Muslims. Small proportions of Christians (22) and Jains (12)
were also analyzed in the sample. This size may also be attributed to the same reason but in an inverse way. That is, they are present in a small number in the present study area. However the Hindus are made up of various castes and sub-castes which were also considered in the present study. The study consisted of slightly larger number of children followed by adults and infants. Though it is normally believed that otitis media is the disease associated with childhood the present study shows that considerable amount of adults are also affected.

Age was the notable criteria in the susceptibility to the disease. That is, with the increase in the age the occurrence of the disease went on decreasing. Thus, the highest number of affected subjects fall under the age-group of 0-9 years (840) and lowest in the age group of 50-59 years (67). Oyeka (1995), Zakzouk (2002b), Mariniere (1998) and many others have also showed that the occurrence of the disease is more among the lower age-groups. Significantly larger number of males (1223) constituted the sample when compared with the females (831). However, the incidence of chronic OM was same among both males (0.5) and the females (0.5) but the incidence of acute OM was marginally more among the males (0.3) than the females (0.2). The study consisted of large number of urban people than the rural people. This may be accounted due to the accessibility for urban people to the hospital. But the incidence of chronic OM was found larger among the rural people (0.6) than the urbanites (0.4). The incidence of acute OM being larger in the urban dwellers (0.3) than the rural (0.1). Significantly more number of infants, children and adults belonged to the urban locality. Also both
males and females formed the larger number among the urbanites than the rural people.

Most of the subjects belonged to the lower socio-economic status since maximum number of parents/guardians of subjects had lower level of education with primary occupation and income below per capita income of the district, which shows that most of them lived below poverty line. Knishkowy (1991), Cambron (1965) and several others have also concluded that poor socio-economic status is one of the factors responsible for the causation of the disease. Hence, Bulkley et al. (1991) has rightly said that "otitis media is the heritage of the poor". Upper respiratory tract infections were present in higher percentage among the Jains, Muslims and Hindus in decreasing order. The intergroup difference between these groups being statistically insignificant. However it was noted that the disease associated with Upper Respiratory Tract Infection (URTI) was significantly more among the infants and children than the adults which shows that infants and children are more susceptible to infectious disease than do adults. The difference between males and females having upper respiratory tract infection was statistically significant. Marginally higher percentage (60%) of affected subjects had otitis media associated with URTI in the total sample. Hence it may be said that history of URTI may be the primary cause of the disease in these number of affected subjects.

Percentage of past history of otitis media was found more among the Jains and Christians but were almost same among the Hindus and
Muslims. Almost half of the subjects in the sample were having past history of otitis media which shows the extent of penetrance of the disease in the given population. Past history of OM was present more among the infants and almost similar among both children and adults. Both males and females were equally having past history of otitis media. 25.6 per cent of the affected subjects in the sample had recurrent OM. Here also again the rate of recurrent OM was statistically insignificant between Hindus and Muslims. Recurrent OM was found more among the children followed by adults and less among the infants. It was also found that 63.9 per cent of the subjects having recurrent OM had sibling history. Teele (1989) has also shown that patients with recurrent episodes of OM had siblings with histories of significant middle ear infection. Maximum number of subjects having recurrent OM had their first onset of the disease at the age of 1-2 years (65.9%) and 2-3 years (61%). Hence, it can be said from the above statement that earlier the onset of the disease, more number of subsequent or recurrent episodes of OM being experienced later in life by the affected individual. Bluestone and Klein (1996) have also arrived at the same conclusion from their study. Recurrent episodes of OM were found more among the males than among the females, the difference being statistically significant. This shows that males might be more susceptible to the disease than females. Daly (1996), Hardy (1993) and Klien (1979) have also demonstrated significant relation between male gender and recurrent OM.

Number of subjects suffering from Chronic Suppurative Otitis Media (CSOM) were highest in the sample collected. Acute Suppurative
Otitis Media (ASOM) formed the second largest group and very less cases of other categories were present. All the four religions had almost same percentage of ASOM and CSOM cases. The CSOM cases were more among the children and adults, the difference between them being insignificant which shows that the severity of the disease is same among both children and adults. While the rate of occurrence of the ASOM was highest among the infants which shows that the rate of onset of the disease is highest among this age group. Hence, it is generally believed that otitis media is the disease generally associated with infancy. The difference between male and female CSOM and ASOM cases was insignificant. This shows that the severity of the disease exists equally in both the sexes. The CSOM cases were higher among both rural and urban people which shows the severity of the disease is same in both the localities. Hence the larger number of CSOM cases in the total sample shows the severity of the disease in a given patient population. The higher percentage of ASOM cases in urban people shows that many other possible factors apart from unhygienic conditions operate in determining the onset of the disease among the urban people. CSOM associated with pain constitutes 67.9 per cent of the total CSOM cases. Normally CSOM is not associated with pain, its presence shows the extent or severity of the disease which may lead to dangerous complications like measles, mastoiditis, brain abscess etc. This severity may be seen almost in similar per cent in both the Hindus and Muslims with slightly higher percentage among the Christians. It was also found that this was more among both children and adults, their difference being statistically
insignificant. The frequency of ear discharge was almost same in all the three age groups viz., infants, children and adults. 86.3 per cent of the total sample had ear discharge 64.5 per cent of the total sample had ear discharge. Among them again all the three age groups had almost similar per cent of foul smell of ear discharge. This again shows the degree of severity of the disease because foul smell of the ear discharge indicates the bone destruction in the middle ear due to the prolonged presence of fluid in the middle ear. The percentage of bilateral cases, that is, both ears being affected were more among the infants, followed by children and adults. This again shows that infants and children are more susceptible to this infectious disease.

Out of the total sample, 44.4 per cent of the affected subjects had hearing loss. Among them subjects suffering from hearing loss at conversational level was marginally higher than the subjects having hearing loss at classroom level. Very few subjects had severe loss. Though hearing loss in otitis media is of conductive type (temporary), it may become permanent, leading to sensorineural hearing loss if the disease is left untreated. Pain, ear discharge and hearing loss caused by the disease lead the individuals to face various socio-cultural problems which ultimately lead to frustration and social isolation. Since ear is one of the important sense organs of the human body, any prolonged infection of the ear leads to the abnormality in the social interaction and individual’s overall development, especially among the children who are still developing their language skills and ability to interact.
A total of 204 X-rays of the affected subjects were studied in which all the X-rays revealed that the cellularity of the mastoid process was of acellular type that is, very few air cells were present in the mastoid. Hence, possessing acellular type of mastoid process may be one of the possible causes for the susceptibility to the disease. Daniel (1988) has opined that, because chronic infections occur most often in poorly pneumatized middle ears, a debate has focused on whether poor pneumatization is causal in otitis media or is the product of the disease itself. No relation between family size and the causation of otitis media was found in the study, though Zinkus (1980) has reported that family size increases the risk of otitis media. Again no relation between duration of breast feeding and otitis media was found. However larger number of affected children were breast fed for 1½ years to 2 years followed by 1 to 1½ year and 6 to 12 months. Very few affected children were breast fed for more than 2 years. Recurrent OM was found more among those who were breast fed for only 1 to 6 months. Shaaban (1993) has revealed that mean duration of the breast feeding was significantly shorter with high frequency of acute OM.

Among the data collected there were very few instances of subjects having mothers who smoked during pregnancy. Reason behind this was good number of mothers of the affected had the habit of chewing tobacco even during the pregnancy. So it might be one of the reasons which determine the susceptibility to the disease. Children who were exposed to parental smoking also constituted a large percentage in the study (55.7%). So this exposure to passive smoking may also be one of the risk
factors determining the causation of the disease. Iversen (1985), Hinton (1989) and Kraemer (1983) have also reported that, exposure to parental smoking increases the risk of otitis media. However, it was found that affected female children were exposed more (79.7%) to parental smoking than the affected male children (39.8%). It was also found that more number of affected children who were having past history of OM were exposed to parental smoking in the house. In the study good percentage (33.7%) of children having recurrent OM were exposed to parental smoking. Again the children who were having URTI were also more (76.2%) who were exposed to parental smoking. Hence, Hinton (1989) and the US Department of Health and Human Services (1986) have rightly said that passive smoke may damage nasopharyngeal, middle ear, or eustachian tube mucosa, increasing susceptibility to viral and bacterial invasion or to obstruction of the eustachian tube or may act indirectly by inflaming the small airways of the respiratory tract, leaving a child more susceptible to respiratory infection and subsequent OM. Hence from the above finding a causal relation between exposure to passive smoke and the disease may be drawn. In the present study no cases of children being exposed to day care centres were found.

However, from the above discussion it may be ascertained that, as far as the ethnic groups (religions) were concerned both Hindus and Muslims are almost equally susceptible to the disease, since the incidence and prevalence of CSOM and ASOM is almost same (0.5, 0.5 and 0.3, 0.2 respectively) but nothing can be said about Christian and Jain because their numbers were not large enough to draw any
conclusions. Incidence of CSOM was same among both children (0.5) and adults (0.5) while the incidence of ASOM was more among the infants (0.6). The total incidence and prevalence of CSOM in the sample was 0.5 and 0.3 respectively.

The results of the association between fathers and children and mothers and children with regard to otitis media were found to be statistically significant. This clearly indicates that otitis media has genetic basis. Further it was also observed that the data fit the dominant hypothesis better than the recessive hypothesis proposed by Meglioli (1965).

Large number of affected children as well as the adult students had to face a wide range of problems both in dealing with their education as well as in their socio-cultural interactions. It was shown that the affected subject had to face indifferent behaviour from their parents/guardians, siblings, neighbours, friends, other relatives as well as their spouses. This type of behaviour had a very negative effect on the mind of the affected who is already in stress due to the presence of the disease. This might be accounted for the poor health awareness among the people.

Based on the above given facts the preventive measures for the disease can be classified into those which work at the biological level and those at the community level, the first set of measures are,

- Current immunizations do not specifically prevent ear infections. However, immunizations prevent illnesses caused by organisms that are associated with ear infections. Such as *Haemophilus influenzae*
(Hib) and influenza. Children are at an increased risk for otitis media if they have their first Hib vaccine when they are older than 6 months. In a recent large study, Eskola et al. (2001) showed that a new pneumococcal vaccine called Prevnar prevented 34 per cent of ear infections caused by pneumococcal bacteria and 6 per cent of all ear infections.

- Regular hand-washing when you have a cold or are caring for a child who has an upper respiratory infection will help prevent the spread of infection.

- Ear infections are more common in children who are exposed to cigarette smoke in the home. Hence, if you cannot stop smoking, smoke outside the house.

- Children who are prone to recurrent bouts of otitis media or who have immune deficiencies may be prescribed tympanostomy tube by their doctor to prevent further infections and complications. Tympanostomy tube is inserted into the ear during surgery to permit fluid to drain from the middle ear.

- Uhari (1998) has demonstrated that an artificial sweetener (Xylitol) can be used to prevent recurrent ear infections in children in Finland. When the gum was chewed 5 times a day, the children had half as many ear infections as children who chewed gum that did not contain Xylitol. Xylitol may cause abdominal discomfort and all gum should be used with caution in young children because of the danger of choking.
• Since breast fed milk contains some protective nutrients which help to fight infection and develop immune system it is always suggested that the child should be breast fed for at least 18 to 24 months.

• Habits other than smoking that is, mothers chewing tobacco even during pregnancy should be stopped at least in this period.

• Parents have to take care of their child's health and try as much as possible to keep them and their surroundings clean to get rid of such infectious diseases.

Apart from the above mentioned measures, following set of initiatives can be suggested at three levels that is, patient as an individual, medical establishment as the forwarding machinery and finally the society as conscience keeper of the first two. Of all these three, the health delivery system which in this case are the doctors, hospitals, primary health care units and the para-medical personnel play a pivotal role in the whole system.

• Health awareness among the people should be developed so as to make them aware of the consequences of the disease which they assume it to be a common illness that clears spontaneously. As the symptoms of the disease get cleared by the first treatment they are under the wrong impression that the infection is cleared. Owing to such assumptions they cut-off themselves from the follow-ups, which the physicians have recommended. Thus, the infection which has been treated previously still persists in the ear which they are unaware of. Hence, the patient as an individual should exercise lot of
restraint by going to regular checkups and proper medication without blaming the system.

- As the disease is common among the infants and school going children the health machinery should use school curriculum, sports and other learning aids to spread awareness about the disease.

- The establishments should also make attempts to promote research regarding genetics of otitis media which helps in preparing the medicine that is much more useful and effective than the present ones.

- It is also the job of the health delivery system to help create awareness through intime intervention techniques, door to door campaigns, use of electronic and print media, poster and pamphlets, conducting free camps for ear checkups (as we have for eye checkups).

- Special attempts should be made for psychological counselling especially for children with the consent of their family. The language skills should also be given proper attention by employing anthropologists and linguists.

- As the social fall out of the disease is far more penetrative, the non affected sections of the society should also be made aware to take precautions.

- Since lot of variations among both the intrinsic as well as the extrinsic factors determining the disease is seen, more and more researches should be done by physical anthropologists among different ethnic
groups who are prone to the disease taking into account their ecological setup. It is this variation which is the subject matter for the study for physical anthropologists.

Thus, it looks almost imperative that the holistic approach of anthropology, which incorporates, physiological, psychological, administrative, familial and community aspects has to be employed which in effect is a multidisciplinary and inclusive in its application.