1. INTRODUCTION
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Oral cancer is one of the ten leading cancers in the world. In India, it is the most common cancer among males and third most common cancer in females (Mathew 2007). The primary cause of the very high incidence of oral cancer in South Asia is the widespread habit of chewing betel quid (or paan) and related areca nut use (Bedi 1996). There are reports that the risk profile of head and neck cancer is changing (Schantz 2002) and therefore pattern (incidence and sub-site predilection) of head and neck cancer is also is expected to change. Epidemiological studies have shown that the incidence of head and neck cancers is decreasing except in the young, for whom the etiology remains unresolved (Davis 1987). Because of the well-defined risk factors, long natural history with majority of cancers preceded by pre-cancer lesions and the mouth is easily accessible for visual examination, oral cancers have the vast potential for prevention. This is feasible only if there is increased awareness of the condition in the community, therefore there will be better compliance to preventive measures and risk reduction strategies.

The overall goal of this project is to define change in incidence trends of head and neck cancer, risk profile of the cancer and develop a strategy to improve awareness of oral cancer in the community. Four inter-related projects were undertaken to address this issue.

**Project 1:** To investigate the trends in head and neck cancers over a time period in India and compare with data from developed countries and to frame an etiological hypothesis for the change in trends if any.

**Project 2:** To determine the role of Human Papilloma Virus as a risk factor for oral cancer.

**Project 3:** To evaluate the status of awareness of oral cancer, its risk factors and to estimate the prevalence of risk factors in a high-risk semi-urban population in India.

**Project 4:** To assess the efficacy of oral self-examination as a potential tool to improve awareness and early detection of oral cancers in a high-risk rural population.
In order to determine the trends of head and neck cancers with special reference to oral cancers in India, cancer registry data was taken from an urban and a rural registry over a period of 13 years and analyzed. Since the data from developed countries report an increase of head and neck cancers particularly in the young adults, comparison of the incidence trends between developed countries was undertaken using the SEER data (1973-97) and data for similar time period from India’s first cancer registry –Mumbai. This has demonstrated that the incidence of head and neck cancer is declining in both developed nations and in India, except that of oral tongue cancer, for which the incidence is on the rise.

To investigate the risk factor profile, a retrospective study was carried out with data obtained from patients presenting with head and neck cancer at Amrita Hospital from January 2004 and December 2006. This has identified that over 50% of oral tongue cancer develop in subjects with no known risk factors. Attempts were made to delineate the role of HPV in oral tongue cancers.

Initially tobacco consumption in the form of chewing or smoking was proposed as the risk factor for oral cancers, later alcohol emerged as an independent risk factor for oral cancer though it has shown to have additive and synergistic effects with tobacco (Notani 1988; Sankaranarayanan 1989; Franceschi 1990). A study from India showed that 70% of the oral cancers were as the result of either smoking or chewing (Jayant 1977). Later, diet has also been implicated in the etiology of oral cancer (Winn 1984; Notani 1987; La Vecchia 1997). The association between Human Papilloma Virus (HPV) and head and neck cancers was observed as early as 1960. During the past two decades, the data supporting HPV as a causative agent in the development and progression of Head and Neck cancers, particularly that of oropharynx has accumulated. The true prevalence of HPV DNA in HNSCC is uncertain. Studies have estimated up to 60% positivity in HNSCC. The association of HPV with oropharynx was studied extensively, estimating that 45 to 100% tonsillar tumors are HPV positive (Mellin 2000; Gillison 2001; Mellin 2002; Dahlgren 2003; Mellin 2003). It is said that tonsillar crypts act as reservoir for the virus and hence the increase prevalence among tonsillar cancers and relatively decreased or negligible prevalence among other head and neck cancers. Recently it has been suggested that periodontal pockets act as reservoirs for human papilloma virus (Hormia 2005) and a study has shown the association between long-standing periodontitis and risk of tongue cancers (Tezal 2007). Only few studies have studied the role of HPV in oral
cavity cancers, particularly that of tongue. Since recent literature suggests the increased incidence of tongue cancers (Schantz 2002), we proposed to determine the prevalence of HPV in oral tongue cancers. This is the first study of its kind with multiple detection techniques employed in detecting the presence of HPV, integration status and further exploring the pathway involved in its pathogenesis. Since HPV 16 is reported to be associated with head and neck cancers, the cases were tested for the presence of the same. The mere presence of HPV does not indicate its role in the causation of cancer, hence detailed molecular studies were also planned to confirm its etiological role in cancer cases. If the role of HPV in these cancers is confirmed, the developmental vaccines – prophylactic and therapeutic would have impact on the incidence of oral cancer if specifically targeted to HPV16.

Though literature suggests that the incidence of oral cancers and the practice of risk habits are decreasing, there is poor public awareness of the signs and symptoms of oral malignant and premalignant lesions (Boyle 1993). Lack of public awareness of oral cancer has been linked to the poor compliance (25.7%) to attend for oral cancer screening following invitation (Jullien 1995). It has also been shown that oral cancer awareness was poor not only among the public but also among the dentists, dental hygienists, nurses, general practitioners. To our knowledge the level of public awareness of oral cancer and its risk factors in India is not known. Hence in order to assess the level of oral cancer awareness, a survey was done in a semi-urban population in Kerala.

Oral cancers have the vast potential for prevention because of its association with known risk factors, long natural history with majority of cancers preceded by precancers, possibility of identifying precancerous and early invasive lesions by visual examination. Strategies to improve awareness and early detection will vary in different geographic regions depending upon the life style and habits. Raising public awareness could contribute to achieving a significant reduction in its incidence. Hence an attempt was made to improve awareness and early detection by ‘oral self examination’. A brochure was developed which gives detailed information on oral cancer, its risk factors, and premalignant lesions illustrating the methods to perform oral self-examination. It was planned to educate the community through the health workers employed from the local community through self-examination brochures. Two Panchayats with a total population of around 57,000 (majority of them are fishermen with high risk habits) were selected to test this concept. Initially brochures were distributed, public was instructed to perform
oral visual examination and report to the local screening clinic if they have any suspicious lesions. Then the health workers performed house-to-house visit to collect information regarding the awareness of oral cancer and its risk factors using a validated questionnaire (the same questionnaire used in the awareness survey with little modification in the questions on risk habit awareness), provided health education, performed oral visual examination and referred the suspicious cases to the local screening clinic.