INTRODUCTION
Alcohol is widely used as a relaxant and a social lubricant which is frequently abused. It is a common course of a meal in many societies. Moderate alcohol consumption is reported to be beneficial as it exerts coronary protection and modulates beneficially several diseases (Gaziano et al., 2000; Ogge et al., 2006). However excessive chronic alcohol consumption leads to a broad spectrum of deleterious health effects resulting alcohol liver disease (ALD), coronary heart disease (CHD) and other diseases (Klatsky et al., 2003; Durazzo et al., 2004). Alcohol consumption is considered to be a social stigma in several societies as it impairs judgment and is a cause of several ill effects (Goldberg et al., 1999; Gaziano et al., 2000). Despite societal influences and knowledge that alcohol is addictive and injurious to health, more than 2 billion chronic alcoholics prevail throughout the world and the number is alarmingly increasing with the addition of new drinkers every year including teenaged boys and girls (Lieber, 2000; World Health Organization, 2004). India stands first in alcohol production and consumption. Thus India produces 4 million metric tonnes of alcohol out of which two thirds is consumed within the country (Alcohol Atlas of India, 2008). Andhra Pradesh State and Anantapur district are ranked top in alcohol consumption in India (Reddappa Reddy et al., 1999). Besides, unrecorded consumption of alcohol has been reported from India. The research contribution from India towards alcohol research is limited (Alcohol Atlas of India, 2008).

Till now alcoholism is considered to be a problem associated with males. There has been a marked increase of female alcoholics worldwide including India in recent years (Subramanian et al., 2005). Now almost half of the American women (Stein and Cyr, 1997) and a majority of the European women consume alcohol (Ely et al., 2001; White, et al., 2001). Though precise statistical data are not available from India related to female alcoholics, studies and surveys reveal an increase in the number of female alcoholics and the increase was reported to be more than 6-fold in 1995 compared to yester years, and is estimated to exceed 10-folds now (Naga Venkatesha Murthy et al., 2007). In view of current trends the roles of women have changed in modern world with economic freedom resulting in concomitant increase of alcohol use by women as alcohol is made available as a common commodity. Biochemical, physiological as well epidemiological studies reveal
that females respond differently to alcohol due to valid reasons among which the body composition, anatomy, physiology and endocrine influence play a role (Devaud et al., 1999; Hommer, 2003; Walter et al., 2005). Research on alcoholism involving humans as well as animals has been done predominantly on males. Though alcohol is consumed by the men and women in many societies, most of the studies carried out on alcoholism were on males. Female alcoholism was neglected and not studied thoroughly (Hallmann et al., 2001). Only recently, efforts have been increased to include women in study populations as well as in investigations of behavioral aspects and biochemical mechanisms especially in research pertaining to alcoholism. Now the need for a better understanding of biological/biochemical mechanisms underlying sex differences in ethanol consumption is being increasingly recognized as evident from the recent studies (Devaud et al., 1999; Hallman et al., 2001). Besides several researchers have emphasized the need for research on females (animals and humans) related to various aspects of alcoholism including biochemical, genetic and behavioral aspects. In view of dramatic hike in the number of female alcoholics in India and other countries and lack of information concerning female alcoholism (Nagavenkatesha murthy et al., 2007; Alcohol atlas of India 2008), the present study is designed with a view to evaluate the biochemical effects of chronic alcohol consumption in women and to compare them with that of males.

Research work that has been carried out for the past hundred years revealed that membranes are the chief targets of alcohol action, and alcohol-induced biophysical and biochemical changes associated with biomembranes are responsible for all the effects of alcohol. Interactions of alcohol with membrane components (specific proteins and lipids) are responsible for various effects of alcohol (Borochov et al., 1979; Stibler et al., 1991). It is well known that the characteristic effect of alcohol may occur either through specific lipids (lipid theory) or by the specific proteins (protein theory) which are present in membranes (Peoples et al., 1996; Harikumar and Chattopadhyay, 1998; Paramahamsa et al., 2002). Membranes are two dimensional viscous solutions made up of lipids and proteins. The biochemical composition of membranes, chiefly the individual lipid components and different specific lipids and proteins which are assembled and organized into specific membranes, is determined by its environment i.e., plasma or cytoplasm and other factors that control the physiological systems and the milieu.
It is well known that alcohol affects and influences the entire human body, organs and systems especially the brain and endocrine system (Hommer et al., 1996; 2001; Mann et al., 2005; Stampfer et al., 2005). As membranes play a major role in alcohol action and membranes in turn are influenced by milieu which is regulated chiefly by endocrine secretions in males and females, it is felt appropriate to understand the status of hormones in alcoholics of both the genders, before undertaking a detailed study. Recent studies demonstrated the involvement of nitric oxide in alcohol-induced events as well in normal physiology (Paramahamsa et al., 2002; 2004; Yuan et al., 2006; Venkatraman et al., 2003; Kavitha et al., 2008). Hence an attempt has been made to understand the role of nitric oxide (NO) in female alcoholics.

The precise mechanisms of alcohol-induced euphoric effect, tolerance, dependence and alcoholic damage are not understood fully. Alcohol consumption is associated with several endocrinologically related abnormalities including loss of sexual characteristics and function (Ahulwalia et al., 1992; Sarkola et al., 2000; 2001; Gill, 2000; Emanuele et al., 2002a; 2002b). The pathophysiological mechanisms of these clinical conditions are still unclear. In view of the above, present study is undertaken with the following objectives, in particular

- to evaluate the impact of gender on alcohol-induced biochemical changes/variations in established biomarkers of alcoholism such as gamma glutamyl transferase, plasma ethanol levels and other important blood parameters,
- to investigate the changes in plasma lipid and lipoprotein patterns as well as lipid peroxidation in alcohol consuming females to compare the same with males,
- to assess the role of NO in alcohol-induced alterations and membrane tolerance,
- to investigate the changes in membrane composition in alcoholic females, (cholesterol and protein content, and also erythrocyte protein/peptide profile), and
- to assess the influence of alcohol consumption on endocrine function.


consumption and mortality in the physicians’ health study enrollment cohort. *Journal of the American College of Cardiology* **35**:96-105.


