

Alcohol Use-Related Problems in Women

A. Ender ALTINTOPRAK, Serap ANNETTE AKGÜR, Zeki YÜNCÜ, Özen Önen SERTÖZ,
Hakan ÇOŞKUNOL

Abstract

It is well known that the prevalence of alcohol use disorders is increasing and represents an important health problem worldwide. Nonetheless, there are an insufficient number of population-based prevalence studies on alcohol use disorders among the general population and women in Turkey. Among the studies performed in Turkey, it has been reported that alcohol use disorders are more common among males and that alcohol use among females is increasing, as in other countries. The alcohol use among females differs from males' in many respects. The purpose of this article was to review the physical differences between males and females relevant to the metabolism of alcohol, and to organic and mental problems caused by alcohol use. In addition we sought to draw attention to the necessity for effective preventative and treatment methods for women.

Key Words: Alcohol, gender, women, risk factors, alcohol-related disorders

INTRODUCTION

The prevalence of alcohol use disorders is increasing and represents an important health problem worldwide. It has been reported that alcohol use and related problems differ between the genders in many respects (Walter et al., 2003; Nolen-Hoeksema, 2004). The number of studies performed in Turkey that have investigated the prevalence of alcohol use disorders in women and the general population are inadequate. Some of these studies have suggested that although alcohol use disorders are more prevalent among males, the consumption of alcoholic beverages by young women in Turkey is increasing (Akvardar et al., 2001). The aim of this article was to review the differences between males and females, in terms of the physiological alterations in metabolism, and organic and psychological problems related to alcohol use in light of the literature findings. We also sought to provide a perspective specific to Turkey, to highlight the related studies performed in Turkey, and to call attention to the necessity for effective prevention and treatment programs targeting females.

In this review of the gender differences associated with alcohol consumption, we searched the PubMed, Science Direct, and Google Scholar databases for relevant and interrelated articles published between 1980 and 2007 using the keywords alcohol, alcoholism, women, gender differences, genetics, risk factors, hormones, psychiatric disorders, and health problems, as well as various combinations of these words. Since there are a limited number of studies conducted in Turkey, we searched for dissertations in ULAKBİM, Turkish Medical Index, Turkish Psychiatric Index, and various other databases using keywords such as alcoholism, alcohol dependence, women, and prevalence.

Prevalence of Alcohol Use among Women in Turkey

According to data supplied by the World Health Organization (WHO), alcohol consumption in Turkey is increasing. Though sound data concerning the prevalence of alcohol use among the adult population is lacking, alcohol production and consumption reportedly have increased over the past 20 years (TÜBİTAK, 2003). Data

from the Turkish Institution of Statistics (TÜİK) also support these findings. In Turkey, consumption of alcoholic beverages in 1997 was 867.9 million liters, while it jumped up to 968.9 million liters in 2006. Among the consumed alcoholic beverages (wine, rakı [Turkish anisette-flavored liquor], and beer), the increase in the consumption of beer deserves special attention (TÜİK, 2007). Adolescents and young adults are known to prefer beer to other alcoholic beverages (Kuntsche et al., 2006); therefore, the increase in the consumption of beer can be considered to indicative of an escalation of alcohol use among the adolescents and young adults.

In Turkey most studies on alcohol/substance use and dependence were conducted with secondary and high school students (Çifter and Karaboncuk, 1976; Tümerdem et al., 1986; Özer, 1991; Okan et al., 1993; Yazman, 1995; Akın, 1997; Herken et al., 1998; Ögel et al., 2004), and others were conducted with university students (Bilir and Mağden, 1984; Ekşi, 1986; Göktepe et al., 1985; Tümerdem et al., 1986; Yüksel et al., 1994; Kırkpınar et al., 1997; Herken et al., 1998; Akvardar et al., 2003). Methodological and practical differences in these studies complicate comparative evaluations concerning the determination of the prevalence of alcohol dependence and abuse, thus making access to information about the prevalence of alcohol use among young females, as well as alcohol use disorders in Turkey difficult to reach. However, the risk of alcohol, volatile and illicit drug use was found to be higher among males in most of the studies. A recent study performed by the Turkish Ministry of Health reported a prevalence of alcohol use and regular alcohol use in adolescents and young adults as 42.6% and 20.5%, respectively (TÜBİTAK, 2003).

On the other hand, when the outcomes of two similarly designed studies performed with medical students in 1985 and 2001 were compared, the prevalence of alcohol use among female university students rose from 16.4% (Göktepe et al., 1985) to 45.7% (Akvardar et al., 2001).

Despite earlier studies that found males started drinking alcoholic beverages at a much earlier age than females, recent studies have revealed that the onset age of alcohol use does not differ between two sexes (Gordis, 1999). It has been reported that both males and females started alcohol use at an earlier age than those reported for the previous years, and that alcohol use-related problems are emerging earlier than ever (Nelson et al. 1998).

In a survey of high school students conducted between 1975 and 2001, it was found that difference be-

tween the prevalence of one time binge drinking (≥ 5 alcoholic beverages) in males and females decreased from 22.6% to 12.3% (Wallace et al., 2003). A study conducted in Turkey among male and female university students did not find a statistically significant difference in terms of alcohol use prevalence among male and female students (49.3% vs. 45.7%) (Akvardar et al., 2001).

It has been reported that 40% of people who start to consume alcoholic beverages below 15 years of age are likely to develop alcohol dependence at some point in their lives, whereas the lifetime risk of alcohol dependence is approximately 10% among people who first consume alcoholic beverages after 21 years of age (Bradley and Miller, 1998). These findings demonstrate that for the prevention of alcohol dependence, specifically adolescents must be the target of attention.

Only a limited number of Turkish studies have investigated the prevalence of alcohol/substance use among adults or the distribution of these disorders between sexes (Türkcan, 1999). According to the only large-scale study performed on this subject (Türkiye Ruh Sağlığı Profili Projesi [The Mental Health Profile in Turkey Project]), the prevalence of alcohol dependence in 1997 among the ≥ 18 -year-old population was 0.8%. The prevalence in males and females was 1.7% and 0.1%, respectively (Kılıç, 1998). In other studies different methods and populations were used (Malkoç et al., 1972; Özel and Güleç, 1987; Altınöz et al., 1990; Yemez et al., 1994; Arıkan et al., 1996; Sevinçok et al., 1997; Türkcan et al., 1997; Turan et al., 1999; Karaer et al., 2003; Ünşalan et al., 2004). Methodological differences between studies complicate the evaluation of the prevalence of alcohol use among adults. On the other hand, the fact that most of the studies have included male-dominant populations (military personnel, tradesman, and factory workers) determining the prevalence of alcohol use disorders among women is difficult. Among the studies in which alcohol use disorders among women have been taken into account, the results also show differences. In an investigation conducted with 500 hospitalized patients who were chosen from internal medicine and surgical units and randomly chosen 500 teachers, the prevalence of social alcohol use and alcohol dependence in females were found 3.4% and 0.3%, respectively. In the same study, the prevalence of alcohol dependence in males was reported to be 7 times higher than in females (Özel and Güleç, 1987). Arıkan et al. (1996) reported that in a semi-urban region of Ankara, the community-wide prevalence of alcohol dependence was 0.9%, and 3.1% of women regularly used alcohol without any in-

cidence of alcohol dependence. A study conducted in Sivas among the general population 53.3% of which were females, reported no cases of alcohol dependence or abuse in women (Karaer et al., 2003).

In Turkey comprehensive epidemiological studies investigating the prevalence of alcohol/substance use among adults, and the distribution of these disorders between age groups and gender groups are needed.

Differences in Expectations from Alcohol and Drinking Patterns of Women Compared to Men

It has been reported that expectancy from alcohol use in men and women differ widely. Previous studies have established that men prefer to use alcohol to be more assertive, to induce sexual arousal, and to reduce anxiety, while women opt to drink alcohol to become more socially attractive and to reduce social anxiety (Mooney et al., 1987). However as time passed, alcohol expectancy has changed. Recent studies show that alcohol consumption for social reasons (improved recreation, mood enhancement, to make new friends, etc.) is gaining importance (Borjesson and Dunn, 2001).

Drinking behaviors of women are closely related to their social role, marital status, and age. Changes in the social roles and gained economic independency of women have been held responsible for the rapid increase in the incidence of alcohol dependence among women. In contrast, Wilsnack and Cheloha (1987) suggest that alcohol use disorders among women have not escalated due to the expansion of women's social roles (e.g. married women who work outside the home), but to sudden alterations in their established social roles (e.g. loss of role as wife, mother, or worker). Intensive alcohol use is frequently reported in women who have never been married, divorced or separated and those living together with men without marriage (Gordis, 1990). A Turkish study found that among women referred for the treatment of alcohol dependence, divorced and single women constituted the majority (Evren et al., 2003).

Generally, women have drinking behaviors that are similar to their partners', siblings', or intimate friends' (Wilsnack et al., 1984). Among married women with alcohol dependence, the number of women with alcoholic spouses is much higher than non-alcoholic married women (Jacob and Bremer, 1986).

Age stratification studies of women with alcohol use disorders have reported that alcohol-related problems among young women (between 18-34 years of age) are

seen more frequently, while alcohol dependence is much more prevalent in women aged 35-49 years (Wilsnack et al., 1984; Hilton, 1987; Williams et al., 1987).

While working with women with alcohol use disorders, it might be helpful to gather data about their partners with alcohol-related problems, their alcohol consumption patterns, and their social support network in order to formulate a more effective management program.

The Impact of Genetic Factors on Alcohol Dependence in Women

The most widely known studies of the genetic and environmental factors associated with disease states like alcohol dependence, in which these factors are thought to be influential, are twin and adoption studies. Studies of twins have reported that the incidence of alcohol dependence and abuse is higher among monozygotic male and female twins than among dizygotic twins (Prescott et al., 1999), and that the characteristics of alcohol consumption among monozygotic female twins were more similar than among dizygotic twins (Prescott and Kendler, 1996). Although these findings are considered as an evidence of the genetic transference of alcohol dependence traits, whether or not the genetic impact differs between two sexes is still the subject of much debate. Some twin studies have stated that the impact of genetic factors in the development of alcohol dependence in women is very low, while others have reported that genetic factors are not as influential as they are in men (Caldwell and Gottesman, 1991; McGue, 1999; McGue et al., 1992; Pickens et al., 1991). On the other hand, some authors have asserted that the impact of genetic factors on the development of alcohol dependence is of similar magnitude for both sexes (Heath et al., 1997). A number of studies have even suggested that genetic factors are slightly more influential in women (Prescott and Kendler, 1999).

Adoption studies have attempted to estimate the incidence of alcohol dependence in children that were removed from their alcohol dependent parents immediately after birth and raised by healthy families. Some of these studies have reported that among adopted female children whose biological parents were alcohol dependent, the incidence of alcohol dependence was higher, while some authors (Bohman et al., 1981; Cadoret et al., 1995; McGue, 1999) asserted that the correlation between the development of alcohol dependence in adopted female children and the presence of alcohol de-

pendence in their biological parents is insignificant.

Studies reporting similar magnitudes of effect of genetic factors in both sexes (Heath et al., 1994) and those stating that genetic factors are more influential in women exist (Cadoret et al., 1995; Prescott and Kendler, 1999); however, many twin and adoption studies indicate that in the development of alcohol dependence genetic predisposition in women is not as prominent as in men (Cloninger et al., 1985; Pickens et al., 1991; McGue et al., 1992; McGue, 1999).

Up to recent years it has been noted that genetic studies were conducted mostly in males. On the other hand, the number of female subjects was too scarce to make sound comparisons in the studies included females. Some studies were based on hospital records; however it has been emphasized that the majority of antisocial alcohol-dependent individuals and excessive alcohol users requiring treatment consist of males and statistical inadequacies arising from these issues might complicate the accurate and precise evaluation of the impact of genetic factors on alcohol-related problems (Nolen-Hoeksema, 2004). In Turkey well-designed and extensive research into the genetic and environmental factors leading to alcohol dependence is needed.

The Physiological Effects of Alcohol on Women

Daily consumption of ≤ 2 alcoholic beverages is considered moderate drinking for men, whereas weekly consumption of ≥ 14 alcoholic beverages or binge drinking ≥ 4 alcoholic beverages at once is considered risky drinking. In contrast, daily consumption of ≥ 1 alcoholic beverage is considered moderate drinking for women and consuming ≥ 7 alcoholic beverages weekly or binge drinking 3 alcoholic beverages at one time is considered risky drinking (Nolen-Hoeksema, 2004).

Studies of alcohol-dependent women have demonstrated that women physically deteriorate earlier than men, even if they use much lower quantities of alcohol than men. The emergence of signs of physical damage earlier in women than in men is termed as the telescopic phenomenon (Piazza et al., 1989).

The main component of the difference in alcohol use habits between women and men is the gender differences in the physiological effects and metabolism of alcohol. Even among men and women of similar weight that consume equivalent amounts of alcohol, women are affected more severely (Bongers et al., 1998). This phenomenon can be explained by three mechanisms.

Firstly, the body fat to water ratio of women differs from that of men. Alcohol distributes evenly between intra and intercellular compartments. Even when body weight is equal, the fluid content of the female body is relatively lower than the male's; therefore, despite equal amounts of alcohol intake, the blood alcohol concentration in women increases by more than 30% when compared to men (Ely et al., 1999).

Secondly, enzymatic activity of gastric alcohol dehydrogenase (ADH), which plays an important role in the metabolization of alcohol, is two times lower in women than in men. Thus, first pass metabolism provided by gastric ADH is lower in women (Frezza et al., 1990); therefore, women are more readily exposed to the toxic effects of alcohol, and the physically harmful effects of alcohol appear earlier and more severely. The hormone estrogen is reported to be responsible for this phenomenon (Saunders and Paton, 1981). However, increasing age decreases gastric ADH activity in both sexes, especially in men. So, gender differences in ADH enzymatic activity predominantly emerge in younger ages. (Seitz and Poschl, 1997).

Thirdly, hormone levels in women vary with the menstrual cycle and thus may be held responsible for fluctuations in the metabolic rates of alcohol. As reported, blood alcohol concentrations vary during different stages of the menstrual cycle (Marshall et al., 1983; Devaud et al., 2006).

Effects of Alcohol on Female Sex Hormones

The reproductive system in women consists of the HPG axis, on which the hypothalamus, hypophysis, and gonads (ovarium) work in collaboration. Communication through this axis is accomplished via secreted hormones. Women's complex and continuously changing hormonal system is quite sensitive to external interventions at every age. This characteristic, which is peculiar to women, is considered one of the important reasons for the variable responses to alcohol and for a higher susceptibility to physical impairment due to alcohol use.

Puberty in females begins with activation of the HPG axis and the induction of many hormonal systems (Witt, 2007). The endogenous opioid system has important effects on the female reproductive system. Researchers have found that hypothalamic beta-endorphin, which is an endogenous opioid, restricts the secretion of hypothalamic luteinizing hormone-releasing hormone (LHRH) and suppresses the HPG axis. On the other hand, studies performed with adult rats demonstrated that alco-

hol enhances cerebral opioid activity (Emanuele et al., 2002). In rats given alcohol puberty was delayed and opioid receptor blockage by naltrexone prevented this delay. Based on these findings, pubertal delay is thought, at least partially, to arise from increased opioid system activation related to alcohol use (Emanuele et al., 2002). In studies performed with rhesus monkeys given alcohol during their maturation period, age at menarche did not change, while their menstrual cycle was found to be impaired (Dees et al., 2000).

Some studies have shown that the highly unstable hormonal state of young women during puberty is affected by alcohol. It has been reported that pubertal estrogen levels of girls exposed for two weeks to moderate amounts of alcohol were suppressed, with probable adverse effects on the reproductive system and bone maturation (Block et al., 1993).

Reproductive dysfunction, such as menstrual cycle irregularities, anovulatory cycles, and early menopause, are reported in alcohol-dependent women of childbearing age. It is suggested that even in cases in which the amount of alcohol consumed is not sufficient to cause organ damage; these effects can emerge independent of the amount of alcohol consumed and cause transient infertility secondary to the effects of alcohol on hormonal balance (Emanuele et al., 2002).

In animal models the effects of acute and chronic alcohol use on the reproductive system have been investigated. It has been reported that acute alcohol use caused menstrual cycle disorders (LaPaglia et al., 1997), whereas during periods of abstinence from alcohol the menstrual cycle is normalized (Alfonso et al., 1993), and that irregular ovulation rather than anovulation could be the issue (Krueger et al., 1983; Emanuele et al., 2001). In numerous animal models and human studies, alcohol affected many hormone levels, predominantly sex hormones. Alcohol use is reported to increase estrogen transiently, which exerts stimulatory (Tang et al., 1982) or occasionally suppressive effects on the hypothalamo-hypophyseal axis (Emanuele et al., 2001; Emanuele et al., 2002). On the other hand, the testosterone level, which acts as a suppressor on the hypothalamo-hypophyseal axis, increases transiently during alcohol intake (Sarkola et al., 2001).

Insulin-like growth factor (IGF-1) reinforces the effects of growth hormone on growth and reproduction. It has been established that acute and chronic alcohol use decreases IGF-1 release (Mauras et al., 1996). Animal studies and histological examinations have indicated that

IGF-1 stimulates the release of LHRH (Hiney and Dees, 1991; Hiney et al., 1991, 1996), and that alcohol use suppresses the impact of IGF-1 on the release of luteinizing hormone (Hiney et al., 1998).

In postmenopausal women, the absence or presence of hormone replacement therapy (HRT) alters the effect of alcohol on hormone levels. It was reported that acute alcohol use in women receiving HRT caused transient increases in estradiol levels, while the same effect was not seen in women that did not receive HRT (Purohit, 1998; Longnecker and Tseng, 1998). This condition is thought to be the result of estradiol not being transformed into estrone (Purohit, 2000). Additionally, a correlation between the levels of testosterone and androstenedione, and alcohol intake in menopausal women has not been established (Gavaler et al., 1993). Some studies have emphasized that methodological issues that might alter outcomes (the amount and duration of drinking, nutritional status, associated organic disorders, and medications used) complicate the evaluation of alcohol's effect on the transformation of androgens into estrogens in postmenopausal women; therefore, the effects of moderate and high doses of alcohol should be investigated (Purohit, 2000).

Physical Health Issues Caused by Alcohol Use in Women

Differences in the rate of alcohol metabolism make women more susceptible to the physically harmful effects of alcohol, even when they consume equal amounts of alcohol with men. The risk of mortality for women with heavy drinking (> 6 alcoholic beverages per day) was reportedly 160% times higher than those that consume < 1 alcoholic beverage daily; however, the risk for alcohol-dependent men increases by only 40% (Klatsky et al., 1992). When male and female alcohol-dependent subjects were compared, the mortality rate in women was 50%-100% higher than in men. The most important causes of mortality were suicide, accidents, circulatory disorders, and liver cirrhosis related to alcohol use (Frezza et al., 1990; Hanna et al., 1992; Urbano-Marquez et al., 1995).

When compared to men, it was reported that even lower amounts of alcohol consumption and intensive drinking of shorter duration led to rapid development of various liver diseases in women, mostly alcoholic cirrhosis and alcoholic hepatitis (Szabo, 2007). Although the cause of hepatic damage is not completely known, it is thought that in addition to the above-mentioned

metabolic differences, the cumulative effects of alcohol and estrogen augment hepatic damage (Johnson and Williams, 1985).

Intensive alcohol use increases the incidence of cardiac diseases, such as cardiomyopathy, dysrhythmia, and hypertension (Moushmoush and Abi-Mansour, 1991; Klatsky et al., 1992). It was reported that the risk of developing cardiac disease increases in women that consume > 2 and in men that consume >5 alcoholic beverages per day for a period of 1 year (Hanna et al., 1997). In contrast, some studies reported that consuming a moderate amount of alcohol decreases the rate of mortality from myocardial infarction and cardiac diseases. Nevertheless, in individuals without any risk factors for cardiac disease and in young women, low-moderate amounts of alcohol reportedly do not offer any protective effect (Gordon and Kannel, 1983; Stampfer et al., 1988; Garg et al., 1993; Fuchs et al., 1995).

The correlation between alcohol use and breast cancer has been and continues to be extensively investigated; however, relevant findings are controversial. Although some studies have reported that low-level alcohol use does not increase the risk of breast cancer, (Zhang et al., 1999), a substantial number of studies report that moderate and excessive alcohol use does increase the risk of breast cancer (Hiatt and Bawol, 1984; Willett et al., 1987; Fuchs et al., 1995; Longnecker, 1999; Singletary and Gapstur, 2001; Dumitrescu and Cotarla, 2005). Some investigators have advocated that low-level alcohol consumption during pregnancy increases breast density and the risk of breast cancer in newborn females (Stevens and Hilakivi-Clarke, 2001). One meta-analysis reported a dose-response relationship between the amount of alcohol consumed daily and breast cancer. In that study the relative risk was reported to be 1.0, 1.24, and 1.38 in women consuming 1, 2, and 3 alcoholic beverages daily, respectively (Longnecker, 1994). On the other hand, it was reported that 1 in 25 women die because of breast cancer and that reducing alcohol intake could decrease this risk among women between 35 and 64 years of age that have an increased risk of breast cancer (Longnecker, 1999). It was pointed out that the correlation between alcohol use and breast cancer could be due to fluctuations in level of gonadal hormones, in particular estradiol (Smith-Warner et al., 1998; Gill, 2000; Singletary and Gapstur, 2001).

In older women and men that moderately consume alcoholic beverages, lower rates of bone fractures have been reported (Hoidrup et al., 1999), and it was sug-

gested that consuming wine protected bone integrity more so than other alcoholic beverages (Burger et al., 1998). However, others have reported that excessive alcohol consumption impairs vitamin D metabolism, decreases calcium absorption, and leads to the development of osteoporosis at an earlier age. In contrast, it is recognized that high-level alcohol consumption results in parathyroid hormone insufficiency, resulting in hypercalciuria. In such cases excessive alcohol consumption contributes to the development of osteoporosis (Walter et al., 2005).

The toxic effects of alcohol on the central nervous system (CNS) have been investigated extensively. Early-phase studies have established that alcohol stimulates the hypothalamo-hypophyseal-adrenal axis more strongly in women than in men, leading to an increase in cortisol, which is the end product of this cascade system. Chronic hypercortisolemia leads to cerebral damage (Walter et al., 2003). Yet, despite inconclusive results reported by isolated brain imaging techniques, they generally suggest that the female CNS is more susceptible to the harmful effects of alcohol (Jacobson, 1986; Mann et al., 1992; Hommer et al., 2001; Pfefferbaum et al., 2001). Even low-level alcohol consumption is more toxic to female brains than to those of males (Ammendola et al., 2000; Schweinsburg et al., 2003; Hommer, 2003). The results of comparative studies of cerebral gray and white matter demonstrated gender differences. In a study in which the brain volume of alcohol-dependent men and women were compared to that of a control group, the amount of cerebral gray and white matter of alcohol-dependent subjects was lower than that of the healthy controls; however, it was reported that this difference was significant between alcoholic and healthy women (Hommer et al., 2001). In a comparative study of heavy (HD) and light drinkers (LD), it was found that HD have less cortical gray matter, with quantitatively similar reductions in the temporal, parietal and occipital lobes, but not the frontal lobe and they also reported that reductions of gray matter due to heavy drinking were not statistically greater in women than men, although all women had more gray matter (and less white matter and cerebrospinal fluid) than men. (Cardenas et al., 2005). Some studies focused on hippocampal volume of alcoholic subjects. One of these studies reported that the adolescents and young adults with adolescent-onset alcohol use disorders had smaller left and right hippocampal volumes than did the healthy controls (DeBellis et al., 2000). One study reported that although both the right and left hippocampal volume of alcohol-dependent women were smaller

than in the healthy women, only the right hippocampal volume in alcohol-dependent men were smaller than in the healthy controls (Agartz et al., 1999). Brain imaging studies are relatively new, but they will contribute significantly to our understanding of the etiopathogenesis of alcohol dependence and the gender differences. It must also be considered that malnutrition, vitamin deficiency, head trauma, and infections that might affect the infrastructure of the brain frequently accompany chronic alcohol use. In order to claim confidently that alcohol use affects female brains more severely and results in structural cerebral abnormalities, gender differences, and the level and duration of alcohol use should be taken into account (Rosenbloom et al., 1995, 2003). It is noted that studies that treat alcohol-dependent men and women as separate groups and then compare them to healthy male and female control groups will provide more accurate results (Hommer, 2003).

Correlations between Alcohol use Disorders and other Psychiatric Diseases in Women

Additional psychiatric disorders, mostly affective disorders, are associated with alcohol-related problems in women (Peindl et al., 1998; Rudolf and Priebe 2002). Alcohol-related problems in women become apparent after the onset of depressive symptoms, while in men depressive symptoms follow the onset of alcohol-related problems (Limosin 2002). It was also reported that in women with premenstrual syndrome (PMS), the incidence of regular alcohol use was higher (39.5%) than in the control group (14.8%), and alcohol abuse is more frequently seen among women in the general population that seek treatment for PMS (Nyberg et al., 2004).

It was also revealed that in addition to affective disorders, posttraumatic stress syndrome (PSS) frequently accompanies alcohol-related problems (Stewart et al., 1998; Reynolds et al., 2005). A bi-directional correlation exists between alcohol-related problems and exposure to trauma. It was reported that alcohol use in women increases their exposure to sexual assault (Hurley et al., 2006), whereas it was reported that in healthy women exposed to sexual assault the risk of developing alcohol-related problems increases (Burnam et al., 1988). Among women exposed to sexual abuse during childhood, it was found that the incidence of alcohol use increased as a self-medicating way to ameliorate the effects of posttraumatic stress syndrome (Epstein et al., 1998). In addition, studies have reported notable relationship between alcohol/substance use and antisocial personality disorder (Evren et al., 2006). When compared to men,

it is known that women demonstrate a lesser degree of antisocial behavior, are less likely to engage in criminal activity, and are less frequently diagnosed with antisocial personality disorders or behavioral dysfunction. Nonetheless, an association between antisocial behaviors and a tendency toward alcohol-related disorders was also observed in women (Ullman, 2003).

Recent studies of eating disorders (which are prevalent among young women), alcohol and substance abuse, and their comorbidities are noteworthy (Redgrave et al., 2007; Conason and Sher, 2006; Franko et al., 2005). Substance dependence among bulimic adolescents is considered a high-risk behavior, along with suicidal attempts, sexual promiscuity, and theft, and a dependent personality is said to be the possible cause of eating disorders and the tendency for alcohol abuse (Conason and Sher, 2006). In one of these studies it was reported that 27% of the cases with eating disorders that were followed-up for more than 8 years initially had an alcohol-use disorder, while 10% developed an alcohol-use disorder during the follow-up period (Franko et al., 2005).

Higher rates of alcohol use disorders and psychiatric comorbidity among women should not be disregarded when working with this group of patients. Not identifying comorbid psychiatric diseases in women with an alcohol-use disorder can aggravate manifestations of the disease, and the natural course of both disorders can induce suicidal attempts and complicate the treatment (Boyd, 2000).

Differences in Treating Alcohol Dependent Women and Men

Social attitudes are more negative towards female intoxication and problem drinking than towards male intoxication and their drinking problems. (Gomberg 1988). Women that prefer alcoholic beverages to soft drinks are perceived as easily seducible (Davis et al., 2006). This social stress makes women avoid alcohol consumption, but it can also prevent them from seeking medical help for an alcohol-related problem. In western countries 25% of alcohol-dependent people seeking treatment are women (Beckman, 1994).

Among individuals seeking medical help for the treatment of alcohol dependence in Turkey, the number of women is markedly lower than men. In Istanbul in 1996, the majority (91.5%) of a group of 248 patients referred for the treatment of alcohol dependence were reported to be males (Kalyoncu et al., 1997). A more recent study performed in Istanbul also reported a simi-

lar finding. At one alcohol-dependence treatment center between 1998 and 2002, 2.9% (n=111) of 3851 cases referred for treatment were women, while men constituted the majority (n = 3729; 97.1%) (Evren et al., 2003). In the eastern part of Turkey a similar picture can be observed. In a study performed in Gaziantep in 2006 it was reported that among those referred for the treatment of alcohol dependence, 96.8% (n = 122) were male and 3.2% (n = 4) were female (Bulut et al., 2006). These numbers indicate that alcohol-related problems are still more prevalent among men and they also suggest that fewer females seek medical help. Research into how to eliminate the barriers that prevent women from seeking treatment in Turkey is required to reach this group.

CONCLUSION

Very few Turkish studies have examined alcohol use and dependence. Additionally, methodological variability complicates accurate assessment of the prevalence of alcohol use and dependence among women, and complicates longitudinal comparisons. However, those Turkish studies that do exist have shown that alcohol/substance use is more prevalent among men and that alcohol consumption among women in Turkey is rapidly increasing, as it is worldwide. In order to formulate effective prevention and treatment programs in Turkey, it is mandatory to estimate the prevalence of alcohol-related problems, the distribution of these problems with respect to gender, age groups, educational status, and employment status, and to conduct widespread epidemiological studies.

Genetic predisposition to alcohol use disorders is reportedly more prominent in men than in women; however, studies evaluating the precise impact of genetic factors in women are lacking.

Studies in western countries have shown that alcohol

expectancy in women changed with time, and sudden changes in their social roles increases their risk of alcohol dependence and abuse. Since expectancy from alcohol consumption varies by culture, relevant research about expectations in Turkey can provide a framework for the formulation of effective prevention programs.

The physiological effects and metabolism of alcohol in women are different than in men. Even in cases of short-term and low-level alcohol use, these differences increase the risk of the development of gastrointestinal system, cardiovascular system, central nervous system, and reproductive system disorders, as well as bone and breast diseases much earlier than expected. The most common causes of mortality among women with an alcohol-use disorder are suicide, accidents caused by drunk driving, circulatory disease, and alcoholic cirrhosis.

Globally, the number of alcohol-dependent women seeking medical help is lower than that of men. Barriers to treatment can vary culturally. Identifying the barriers in Turkey that prevent women from obtaining treatment for alcohol-related problems is the necessary first step in removing them.

A secondary psychiatric disease usually accompanies most alcohol use-related problems in women; therefore, it is very important to identify the underlying psychiatric disorder in women with alcohol-related problems, and to identify alcohol use disorders in women with a distinct psychiatric diagnosis.

Future research into alcohol use disorders must take into account gender differences, and prevention and treatment strategies should be formulated. With such an approach, the success rate of prevention and treatment programs will increase, while the rate of organic disorders arising from alcohol use will decrease.

REFERENCES

- Agartz I, Momenan R, Rawlings RR, Kerich MJ, Hommer DW (1999) Hippocampal volume in patients with alcohol dependence. *Arch Gen Psychiatry*, 56: 356-63.
- Akın M (1997) Lise öğrencilerinin madde kullanımının zararlarına ilişkin sağlık eğitim gereksinimleri. 33. Ulusal Psikiyatri Kongresi Bildiri Tam Metin Kitabı, Antalya, s. 381.
- Akvardar Y, Aslan B, Ekinci B et al. (2001) Dokuz Eylül Üniversitesi Tıp Fakültesi dönem II öğrencilerinde sigara, alkol, madde kullanımı. *Bağımlılık Dergisi*, 2: 49-52.
- Akvardar Y, Demiral Y, Ergör G et al. (2003) Substance use in a sample of Turkish medical students. *Drug Alcohol Depend*, 72: 117-121.
- Alfonso M, Duran R, Marco J (1993) Ethanol-induced alterations in gonadotrophins secretion during the estrous cycle of rats. *Alcohol Alcohol*, 28: 667-674.
- Altınöz F, Erkoç Ş, Özmen E et al. (1990) Alkol fabrikasında çalışanlarda alkol kullanımı. 26. Ulusal Psikiyatri ve Nörolojik Bilimler Kongresi Bildiri Özet Kitabı, İzmir, s. 55.
- Ammendola A, Gemini D, Iannaccone S et al. (2000) Gender and peripheral neuropathy in chronic alcoholism: A clinical-electroneurographic study. *Alcohol Alcohol*, 35: 368-71.
- Anıkan Z, Coşar B, Işık A et al. (1996) Yarı kentsel bir bölgede alkolizm prevalansı. *Kriz Dergisi*, 4: 93-100.
- Beckman LJ (1994) Treatment needs of women with alcohol problems. *Alcohol Health Res World*, 18: 206-218.
- Bilir Ş, Mağden D (1984) Hacettepe Üniversitesi öğrencilerinin sigara-

alkol-ilaç alma ve diğer maddeleri kullanma alışkanlığının araştırılması. Sağlık Dergisi, (SSYB), 58; 4-6: 15-30.

Block GD, Yamamoto ME, Mallick A ve ark. (1993) Effects on pubertal hormones by ethanol abuse in adolescents. *Alcohol Clin Exp Res*, 17: 505-506.

Bohman M, Sigvardsson S, Cloninger CR (1981) Maternal inheritance of alcohol abuse: Cross-fostering analysis of adopted women. *Arch Gen Psychiatry*, 38: 965-969.

Bongers IMB, Van De Goor LAM, Van Oers JAM ve ark. (1998) Gender differences in alcohol-related problems: Controlling for drinking behavior. *Addiction*, 93: 411-421.

Borjesson WI, Dunn ME (2001) Alcohol expectancies of women and men in relation to alcohol use and perceptions of the effects of alcohol on the opposite sex. *Addict Behav*, 26: 707-719.

Boyd MR (2000) Predicting substance abuse and comorbidity in rural women. *Arch Psychiatr Nurs*, 14: 64-72.

Bradley A, Miller D (1998) Age of drinking onset predicts future alcohol abuse and dependence. 12.07.2007 tarihinde <http://www.niaaa.nih.gov/NewsEvents/NewsReleases/aging.htm> adresinden indirilmiştir.

Bulut M, Savaş HA, Cansel N ve ark. (2006) Gaziantep Üniversitesi Alkol Ve Madde Kullanım Bozuklukları Birimine Başvuran Hastaların Sosyodemografik Özellikleri. *Bağımlılık Dergisi*, 7: 65-70.

Burger H, de Laet CE, van Daele PL ve ark. (1998) Risk factors for increased bone loss in an elderly population: the Rotterdam Study. *Am J Epidemiol*, 147: 871-879.

Burnam MA, Stein JA, Golding JM ve ark. (1988) Sexual assault and mental disorders in a community population. *J Consult Clin Psychol*, 56: 843-850.

Cadore RJ, Yates WR, Troughton E ve ark. (1995) Adoption study demonstrating two genetic pathways to drug abuse. *Arch Gen Psychiatry*, 52: 42-52.

Caldwell CB, Gottesman II (1991) Sex differences in the risk for alcoholism: A twin study. *Behavior Genetics*, 21, 563.

Cardenas VA, Studholme C, Meyerhoff DJ ve ark. (2005) Chronic active heavy drinking and family history of problem drinking modulate regional brain tissue volumes. *Psychiatry Res*, 138: 115-130.

Cloninger CR, Bohman M, Sigvardsson S ve ark. (1985) Psychopathology in adopted-out children of alcoholics. The Stockholm Adoption Study. *Recent Dev Alcohol*, 3: 37-51.

Conason AH, Sher L (2006) Alcohol use in adolescents with eating disorders. *Int J Adolesc Med Health*, 18: 31-36.

Çifter İ, Karaboncuk F (1976) Lise öğrencilerinin ilaç ve tıbbi amaçlar dışında ilaç ve diğer maddeleri kullanma alışkanlıkları. 12. Ulusal Psikiyatri ve Nörolojik Bilimler Kongresi, Bilimsel Çalışmalar, İstanbul, s. 529-553.

Davis KC, Norris J, George WH ve ark. (2006) Men's likelihood of sexual aggression: The influence of alcohol, sexual arousal, and violent pornography. *Aggress Behav*, 32: 581-589.

Debellis MD, Clark DB, Beers SR ve ark. (2000) Hippocampal volume in adolescent-onset alcohol use disorders. *Am J Psychiatry*, 157: 737-744.

Dees WL, Dissen GA, Hiney JK ve ark. (2000) Alcohol ingestion inhibits the increased secretion of puberty-related hormones in the developing female Rhesus monkey. *Endocrinology*, 141: 1325-1331.

Devaud LL, Risinger FO, Selva D (2006) Impact of the hormonal milieu on the neurobiology of alcohol dependence and withdrawal. *J Gen Psychol*, 133: 337-356.

Dumitrescu RG, Cotarlar I (2005) Understanding breast cancer risk-where do we stand in 2005? *J Cell Mol Med*, 9: 208-21.

Ekşi A (1986) Üniversiteli gençler. İ.Ü. Yayınları, No: 3430, İ.Ü. Çocuk Sağlığı Enstitüsü Yayınları, No: 2, İstanbul, s. 169-549.

Ely M, Hardy R, Longford NT, Wadsworth ME (1999) Gender

differences in the relationship between alcohol consumption and drink problems are largely accounted for by body water. *Alcohol Alcohol*, 34: 894-902.

Emanuele NV, LaPaglia N, Steiner J ve ark. (2001) Effect of chronic ethanol exposure on female rat reproductive cyclicity and hormone secretion. *Alcohol Clin Exp Res*, 25: 1025-1029.

Emanuele MA, Wezeman F, Emanuele NV (2002) Alcohol's effects on female reproductive function. *Alcohol Res Health*, 26: 274-281.

Emanuele N, Ren J, LaPaglia N ve ark. (2002) EtOH disrupts female mammalian puberty: age and opiate dependence. *Endocrine*, 18: 247-254.

Epstein JN, Saunders BE, Kilpatrick D ve ark. (1998) PTSD as a mediator between childhood rape and alcohol use in adult women. *Child Abuse Negl*, 22: 223-234.

Evren CE, Saatçioğlu Ö, Evren B ve ark. (2003) Alkol kullanım bozukluğunda cinsiyet farklılığı: Yatan hasta verilerinin incelenmesi. *Bağımlılık Dergisi*, 4: 96-100.

Evren C, Kural S, Erkiran M (2006) Antisocial personality disorder in Turkish substance dependent patients and its relationship with anxiety, depression and a history of childhood abuse. *Isr J Psychiatry Relat Sci*, 43: 40-46.

Franko DL, Dorer DJ, Keel PK ve ark. (2005) How do eating disorders and alcohol use disorder influence each other? *Int J Eat Disord*, 38: 200-207.

Frezza M, DiPadova C, Pozzato G ve ark. (1990) High blood alcohol levels in women: the role of decreased gastric alcohol dehydrogenase activity and first-pass metabolism. *New Engl J Med*, 322: 95-99.

Fuchs CS, Stampfer MJ, Colditz GA ve ark. (1995) Alcohol consumption and mortality among women. *N Engl J Med*, 332: 1245-1250.

Garg R, Wagener DK, Madans JH (1993) Alcohol consumption and risk of ischemic heart disease in women. *Arch Intern Med*, 153: 1211-1216.

Gavaler J, Deal S, Van Thiel D ve ark. (1993) Alcohol and estrogen levels in postmenopausal women: The spectrum of the effect. *Alcohol Clin Exp Res*, 17: 786-790.

Gomberg ES (1988) Alcoholic women in treatment: the question of stigma and age. *Alcohol Alcohol*, 23: 507-14.

Gordis E (1990) Alcohol and women. 12.07.2007 tarihinde <http://pubs.niaaa.nih.gov/publications/aa10.htm> adresinden indirilmiştir.

Gordis E (1999) Are women more vulnerable to alcohol's effects? 12.07.2007 tarihinde <http://pubs.niaaa.nih.gov/publications/aa46.htm> adresinden indirildi.

Gordon T, Kannel WB (1983) Drinking habits and cardiovascular disease: the Framingham Study. *Am Heart J*, 105: 667-673.

Göktepe EO, Şenveli B, Kargı N (1985) Trakya Tıp Fakültesi öğrencileri üzerine bir araştırma. 21. Ulusal Psikiyatri ve Nörolojik Bilimler Kongresi Bilimsel Çalışmaları, Adana-Mersin, s. 95-97.

Hanna E, Dufour MC, Elliott S ve ark. (1992) Dying to be equal: women, alcohol, and cardiovascular disease. *Br J Addict*, 87: 1593-1597.

Hanna EZ, Chou SP, Grant BF (1997) The relationship between drinking and heart disease morbidity in the United States: results from the National Health Interview Survey. *Alcohol Clin Exp Res*, 21: 111-118.

Heath AC, Slutske WS, Madden PA ve ark. (1994) Genetic effects on alcohol consumption patterns and problems in women. *Alcohol Alcohol (Suppl)*, 2: 53-57.

Heath AC, Bucholz KK, Madden PAF ve ark. (1997) Genetic and environmental contributions to alcohol dependence risk in a national twin sample: Consistency of findings in women and men. *Psychol Med*, 27: 1381-1396.

Herken H, Özkan İ, Çilli A ve ark. (1998) Orta ve yüksek öğrenim

alcohol consumption among female twins: Contributions of genetics. *Dev Psychopathol*, 8: 849-866.

Prescott CA, Aggen SH, Kendler KS (1999) Sex differences in the sources of genetic liability to alcohol abuse and dependence in a population-based sample of U.S. twins. *Alcohol Clin Exp Res*, 23: 1136-1144.

Prescott CA, Kendler KS (1999) Genetic and environmental contributions to alcohol abuse and dependence in a population-based sample of male twins. *Am J Psychiatry*, 156: 34-40.

Purohit V (1998) Moderate alcohol consumption and estrogen levels in postmenopausal women. *Alcohol Clin Exp Res*, 22: 994-997.

Purohit V (2000) Can alcohol promote aromatization of androgens to estrogens? A review. *Alcohol*, 22: 123-127.

Redgrave GW, Coughlin JW, Heinberg LJ et al. (2007) First-degree relative history of alcoholism in eating disorder inpatients: relationship to eating and substance use psychopathology. *Eat Behav*, 8: 15-22.

Reynolds M, Mezey G, Chapman M et al. (2005) Co-morbid post-traumatic stress disorder in a substance misusing clinical population. *Drug Alcohol Depend*, 77: 251-258.

Rosenbloom MJ, Pfefferbaum A, Sullivan EV (1995) Structural brain alterations associated with alcoholism. *Alcohol Health Res World*, 19: 266-272.

Rosenbloom MJ, Sullivan EV, Pfefferbaum A (2003) Using magnetic resonance imaging and diffusion tensor imaging to assess brain damage in alcoholics. *Alcohol Research and Health*, 27: 146-152.

Rudolf H, Priebe S (2002) Subjective quality of life and depressive symptoms in women with alcoholism during detoxification treatment. *Drug Alcohol Depend*, 66: 71-6.

Sarkola T, Adlercreutz H, Heinonen S et al. (2001) The role of the liver in the acute effect of alcohol on androgens in women. *J Clin Endocrinol Metab*, 86: 1981-1985.

Saunders JB, Paton A (1981) ABC of alcohol. *Alcohol in the body*. *Br Med J*, 283: 1380-1381.

Schweinsburg BC, Alhassoon OM, Taylor MJ et al. (2003) Effects of alcoholism and gender on brain metabolism. *Am J Psychiatry*, 160: 1180-1183.

Seitz HK, Poschl G (1997) The role of gastrointestinal factors in alcohol metabolism. *Alcohol Alcohol*, 32: 543-549.

Sevinçok L, Küçükardalı Y, Dereboy Ç et al. (1997) Askerlik çağındaki gençlerde madde kullanım bozuklukları. 33. Ulusal Psikiyatri Kongresi Bildiri Özet Kitabı, Antalya, s. 75.

Singletary KW, Gapstur SM (2001) Alcohol and breast cancer: review of epidemiologic and experimental evidence and potential mechanisms. *JAMA*, 286: 2143-2151.

Smith-Warner S, Spiegelman D, Yaun S-S et al. (1998) Alcohol and breast cancer in women-a pooled analysis of cohort studies. *JAMA*, 279: 535-540.

Stampfer MJ, Colditz GA, Willett WC et al. (1988) A prospective study of moderate alcohol consumption and the risk of coronary disease and stroke in women. *N Engl J Med*, 319: 267-273.

Stevens RG, Hilakivi-Clarke L (2001) Alcohol exposure in utero and breast cancer risk later in life. *Alcohol Alcohol*, 36: 276-277.

Stewart SH, Pihl RO, Conrod PJ et al. (1998) Functional associations among trauma, PTSD, and substance-related disorders. *Addictive Behav*, 23: 797-812.

Szabo G (2007) Moderate Drinking, Inflammation, and Liver Disease. *Ann Epidemiol*, 17(Suppl 1): 49-54.

Tang LK, Martellock AC, Tang FY (1982) Estradiol stimulation of pituitary cAMP production and cAMP binding. *Am J Physiol*, 243: 109-113.

TUBITAK, Vizyon 2023, Sağlık ve İlaç Paneli Sonuç Raporu

(2003) Ek 17, Ankara. http://www.tubitak.gov.tr/tubitak_content_files/vizyon2023/si/EK-17.pdf adresinden 30.07.2007 tarihinde indirilmiştir.

Turan M, Çilli AS, Aşkın R et al. (1999) CAGE testi ile alkol kullanımı üzerine epidemiyolojik bir çalışma. *Klinik Psikiyatri*, 2: 217-221.

TÜİK (Türkiye İstatistik Kurumu) (2007) Talep üzerine 25/07/2007 tarihinde gönderilen "Türkiye'deki alkol üretim ve tüketim miktarları" verileri.

Tümerdem Y, Ayhan B, Özsüt H et al. (1986) Orta ve yüksek öğrenim gençleri ve alkol kullanımı. 22. Ulusal Psikiyatri ve Nörolojik Bilimler Kongresi, Bilimsel Çalışmalar Kitabı, Marmaris, s. 22-27.

Türkcan A, Akvardar Y, Aytaçlar S et al. (1997) İstanbul'da alkol kullanım yaygınlığı. 33. Ulusal Psikiyatri Kongresi, Bildiri Özet Kitabı, Antalya, s. 14.

Türkcan A (1999) Türkiye'de Alkol kullanımı ve bağımlılığının yaygınlığı üzerine bir gözden geçirme. *Türk Psikiyatri Derg*, 10: 310-318.

Ullman SE (2003) A critical review of field studies on the link of alcohol and adult sexual assault in women. *Aggression and Violent Behavior*, 8: 471-486.

Urbano-Marquez A, Estruch R, Fernandez-Sola J et al. (1995) The greater risk of alcoholic cardiomyopathy and myopathy in women compared with men. *JAMA*, 274: 149-54.

Ünsalan N, Kalyoncu A, Pektaş et al. (2004) Yatarak tedavi gören madde bağımlılığı (alkol ve alkol dışı) tanısı konan hekimlerin özellikleri. *Anadolu Psikiyatri Dergisi*, 5: 148-153.

Wallace JM, Bachman JG, O'Malley PM et al. (2003) Gender and ethnic differences in smoking, drinking, and illicit drug use among American 8th, 10th, and 12th grade students, 1976-2000. *Addiction*, 98: 225-234.

Walter H, Gutierrez K, Ramskogler K et al. (2003) Gender-specific differences in alcoholism: Implications for treatment. *Arch Womens Ment Health*, 6: 253-258.

Walter H, Dvorak A, Gutierrez K et al. (2005) Gender differences: does alcohol affect females more than males? *Neuropsychopharmacol Hung*, 7: 78-82.

Willett WC, Stampfer MJ, Colditz GA et al. (1987) Moderate alcohol consumption and the risk of breast cancer. *N Engl J Med*, 316: 1174-1180.

Williams GD, Stinson FS, Parker DA et al. (1987) Demographic trends, alcohol abuse and alcoholism, 1985-1995. *Alcohol Health Res World*, 11: 80-83.

Wilsnack RW, Wilsnack SC, Klassen AD (1984) Women's drinking and drinking problems: patterns from a 1981 national survey. *Am J Public Health*, 74: 1231-1238.

Wilsnack RW, Cheloha R (1987) Women's roles and problem drinking across the lifespan. *Social Problems*, 34: 231-248.

Witt ED (2007) Puberty, hormones, and sex differences in alcohol abuse and dependence. *Neurotoxicol Teratol*, 29: 81-95.

Yazman Ü (1995) Lise gençliğinin psikoaktif maddelere bakışı ve kullanım oranlarının Türkiye-İstanbul örneği ile incelenmesi. Yayınlanmamış Uzmanlık Tezi. Bakırköy Ruh ve Sinir Hastalıkları Hastanesi, İstanbul.

Yemez B, Uçku R, Tunca Z et al. (1994) Alkol kullanım bozukluğu belirleme testi ile alkol kullanım bozukluğunun yaygınlığının araştırılması. 30. Ulusal Psikiyatri Kongresi, Bilimsel Çalışmalar Kitabı, Kayseri, s. 181-185.

Yüksel N, Dereboy Ç, Çifter İ (1994) Üniversite öğrencileri arasında madde kullanımı. *Türk Psikiyatri Derg*, 5: 283-286.

Zhang Y, Kreger BE, Dorgan JF et al. (1999) Alcohol consumption and risk of breast cancer: the Framingham Study revisited. *Am J Epidemiol*, 149: 93-101.