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Title page

Gender differences in characteristics and outcomes of smokers diagnosed with psychosis participating in a smoking cessation intervention.

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Abstract

While research has identified gender differences in characteristics and outcomes of smokers in the general population, no studies have examined this among smokers with psychosis. This study aimed to explore gender differences among 298 smokers with psychosis (schizophrenia, schizoaffective and bipolar affective disorder) participating in a smoking intervention study. Results revealed a general lack of gender differences on a range of variables for smokers with psychosis including reasons for smoking/quitting; readiness and motivation to quit; use of nicotine replacement therapy; and smoking outcomes including point prevalence or continuous abstinence; and there were no significant predictors of smoking reduction status according to gender at any of the follow-up time-points. The current study did find that female smokers with psychosis were significantly more likely than males to report that they smoked to prevent weight gain. Furthermore, the females reported significantly more reasons for quitting smoking and were more likely to be driven by extrinsic motivators to quit such as immediate reinforcement and social influence, compared to the male smokers with psychosis. Clinical implications include specifically focussing on weight issues and enhancing intrinsic motivation to quit smoking for female smokers with psychosis; and strengthening reasons for quitting among males with psychosis.

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Main text word count = 4710

1. Introduction

There are differences between smokers diagnosed with psychotic disorders (e.g. schizophrenia, bipolar affective disorder and schizoaffective disorder) and smokers not experiencing mental illness in the general population. The prevalence of smoking is significantly increased in people diagnosed with psychosis compared to those without (up to 90% vs 16%) (deLeon and Diaz, 2005; AIHW, 2010). Smokers diagnosed with psychosis smoke more cigarettes and illegally grown tobacco ("chop chop" tobacco), smoke for longer periods and have higher levels of nicotine dependence than people in the general population (Compton, 2005; Kumari and Postma, 2005; Moeller-Saxone et al., 2005; Williams et al., 2011). Smokers diagnosed with psychosis are motivated to quit (Siru et al., 2009), but their success rates are more modest than those of people without mental illness (el Guebaly et al., 2002; Banham and Gilbody, 2010). Every effort needs to be given to enhancing smoking cessation outcomes for people diagnosed with severe mental illness such as psychosis, as their smoking behaviour is directly contributing to the significantly increased morbidity and mortality related to cardiovascular disease evident in this population (Osby et al., 2000; Cohn et al., 2004; Hennekans et al., 2005).

Research examining gender differences in smoking variables and outcomes in the general population have found clear differences between males and females. While females are more likely to seek assistance to quit smoking and engage in more quitting strategies, they tend to have more difficulty quitting (Perkins, 2001; Reid et al., 2009) and poorer smoking cessation treatment outcomes than males (Blake et al., 1989; Perkins, 2001). Female smokers in the general population are less likely to use nicotine replacement therapy (NRT), and are more likely to report subjective distress related to nicotine withdrawal symptoms than male

smokers (Perkins, 2001). Research has indicated that females are less interested, committed and confident in relation to quitting smoking (Blake et al., 1989; Perkins, 2001).

There are also gender differences in reasons for smoking and quitting in the general population. Females were more likely than males to say they smoked to suppress their appetite, to cope with daily life, because other family members smoke, and because they enjoy smoking (Reid et al., 2009). Research has found that females, rather than males, use cigarettes to cope with negative emotions, and are more vulnerable to developing negative affective states (e.g. depression and stress) during a quit attempt (Borelli et al., 1996). Females also reported significantly lower motivation to quit smoking for reasons related to health concerns and higher motivation to quit smoking for reasons related to immediate reinforcement (e.g. save money on cigarettes, won't smell) than males (Curry et al., 1997). Research suggests that attempts to quit smoking by females are likely to be promoted by extrinsic motivators like concern for the health of others, social influences and the cost of smoking (Reid et al., 2009).

While there has been no research reported to date that describes potential gender differences in smoking behaviour, motives, experiences or cessation outcomes among people specifically diagnosed with psychosis, some literature is emerging examining such gender differences in people with mental illness more broadly, usually combining participants with mood and anxiety disorders together with those with psychosis (Johnson et al., 2010; Torchalla et al., 2011; Okoli et al., 2011). One study found no significant differences between male and female smokers diagnosed with mental illness in number of cigarettes per day, level of nicotine dependence and readiness to change (Torchalla et al., 2011). Predictors of smoking in males with severe mental illness included being less educated, separated or divorced or aged 50-59 years and in females being younger (17-29 years) and living in residential facilities (Johnson et al., 2010). Predictors of smoking cessation among both males and females with a substance use disorder and/or mental illness were baseline carbon monoxide level and greater attendance at the smoking clinic, and a history of alcohol dependence (Okoli et al., 2011). Heroin and marijuana use were predictive of unsuccessful smoking cessation only in males (Okoli et al., 2011).

Identifying potential gender differences in smokers diagnosed with psychosis is important to ensure that smoking cessation interventions are gender sensitive to enhance smoking outcomes in this population. The current study is the first to examine gender differences on a range of smoking variables among people specifically diagnosed with psychosis. The current study aims to:

- Examine gender differences in smoking variables for people diagnosed with psychosis before and after they participate in a smoking cessation treatment
- Determine what factors are predictive of smoking reduction and cessation in people diagnosed with psychosis, according to gender

2. Methods

2.1. Sample

A total of 298 people diagnosed with psychosis (including schizophrenia, schizoaffective disorder, bipolar affective disorder, severe depression with psychosis and other psychotic disorders) were recruited from Sydney and the Newcastle region of NSW, Australia to participate in a randomised controlled trial of a smoking intervention among individuals diagnosed with psychosis (see Baker et al., 2006; 2007). This paper presents the results of a gender analysis of these data. Inclusion criteria included: aged \geq 18 years; smoking at least 15 cigarettes per day; and an ICD-10 diagnosis of psychosis as described above (International Classification of Diseases, 10th Revision). Exclusion criteria included: having a medical condition that would preclude the use of NRT; being currently acutely psychotic (if this was the case, these potential participants were screened 1 month later to reassess study suitability); and having an acquired cognitive impairment.

2.2. Procedure

All participants were in a non-acute phase of psychosis when they commenced in this study, and provided written informed consent. A baseline assessment was completed and then participants were randomly allocated to either: 1) treatment group: received eight individual sessions of 1 hour duration consisting of motivational interviewing and cognitive behavioural therapy (CBT) plus NRT and smoking cessation self-help booklets or 2) comparison group: received the same smoking cessation self-help booklets together with treatment as usual. Further information about the procedure and therapeutic interventions delivered in this study are described in Baker et al., (2006), but briefly, participants in the treatment group received NRT as follows: 21mg nicotine patches for 6 weeks; 14mg nicotine patches for 2 weeks and 7mg nicotine patches for 2 weeks. All participants completed follow-up assessments at 3 months (15 weeks after baseline), 6 months and 12 months. These follow-up assessments were conducted by a researcher blinded to the treatment condition. The research was approved by relevant regional and university ethics committees.

2.3. Measures

2.3.1. Demographic and clinical variables

The Diagnostic Interview for Psychosis (DIP) (Castle et al., 2006) provided a psychiatric diagnosis according to ICD-10. The DIP also provided information regarding

demographics, illness course and service use. Current symptoms of psychosis were assessed using the 24-item Brief Psychiatric Rating Scale (BPRS-24) (Ventura et al., 1993), a clinician administered and rated tool that is scored based on a semi-structured interview, with higher scores indicating greater severity of symptoms (range: 24-68). Current symptoms of depression were assessed using the self-report Beck Depression Inventory II (BDI-II) (Beck et al., 1998) with higher scores indicating more severe depression (range: 0-63). Anxiety symptoms were measured using the State-Trait Anxiety Inventory (STAI) (Spielberger, 1983), with higher scores indicating more severe anxiety (range: 20-80). The STAI differentiates anxiety as a state, based on responses to 20 statements about how the person feels "right at this moment" and as a trait, based on responses to statements about how they feel "in general." The 12-item Short Form Survey (SF-12) (Ware et al., 1996) was used to assess general health functioning, producing a physical health component score and a mental health component score with lower scores indicating greater disability. Substance use over the previous month was assessed using the Drug Use domain of the Opiate Treatment Index (OTI) (Darke et al., 1992), and this was specifically completed for cannabis and alcohol use.

2.3.2. Smoking variables

The number of cigarettes smoked per day was calculated using the Drug Use domain of the OTI. Participants were asked when their 3 most recent days of smoking occurred and how many cigarettes they smoked on each occasion. A simple calculation then provided an average daily number of cigarettes smoked based over a 28 day period. Nicotine dependence was assessed using the Fagerstrom Test for Nicotine Dependence (Fagerstrom et al., 1996), with higher scores indicative of greater nicotine dependence (range: 0-10). A Micro 11 Smokerlyser was used to assess breath levels of carbon monoxide. A carbon monoxide reading of <10 suggests that the person was unlikely to have smoked in the previous 8 hours. Participants were asked about changes to their smoking in the previous 12 months, any changes to their mental state with prior quit attempts and what advice they had received about their smoking from health professionals. The raw data in Table 2 for the following smoking variables: age first cigarette; cigarettes per day; level of nicotine dependence; has been previously reported in Baker et al., (2007) and has been reproduced here for completeness.

Participants completed the Reasons for Smoking Questionnaire (RSQ) (Pederson et al., 1996), by responding "yes" or "no" to statements providing reasons for smoking. Five subscale scores were then calculated: addiction (habit, craving; range 0-2); stress reduction (relaxation, to take a break, reduce stress; range 0-3); arousal (peps me up, weight control, enjoyment, to help concentration; range 0-4); mental illness (symptoms of mental illness, medication side-effects; range 0-2) and partner smoking (range 0-1).

Motivations to quit smoking were captured using the Reasons for Quitting scale (RFQ) (Curry et al., 1990). The RFQ scale includes 10 intrinsic motivation items (five items each relating to health concerns and self-control) and 10 extrinsic motivation items (five items each relating to immediate reinforcement and social influence). Participants responded to each reason for quitting according to 0=not at all; 1=slightly true; 2=somewhat true; 3=mostly true; and 4=extremely true. The raw data in Table 2 relating to gender differences in RFQ has been reported previously (Baker et al., 2007) and has been reproduced here for completeness.

Level of motivation to quit smoking was evaluated using the 11-item Readiness and Motivation to Quit Smoking Questionnaire (RMQ) (Crittenden et al., 1994). Participants responded to a series of statements by selecting yes or no for some questions (e.g. Are you thinking of quitting smoking?) and by selecting 1=not at all determined; 2=a little determined; 3=somewhat determined and 4=very determined for other questions (e.g. How much do you want to quit smoking?). A scoring algorithm was applied and participants were categorised into the following groups based on their final scores: Precontemplation (PC) defines those not contemplating quitting or cutting down smoking in the near future; Contemplation (C) defines those who plan to quit in the next 6 months, but with no plans to quit in the next month or those planning to quit in the next month who have not quit for at least 24 hours in the past year; Preparation for Action (PA) describes those who plan on quitting in the next month and have tried quitting for 24 hours in the past year.

Smoking outcome measures were defined as continuous abstinence, point-prevalence abstinence and smoking reduction status. Continuous abstinence describes the situation where a person does not smoke at all from their nominated quit date to the assessment point (i.e. 3, 6 or 12 months). Point-prevalence abstinence defines those who do not smoke for the 7 days before the assessment point. Smoking abstinence was determined based on participants responses to the Tobacco Index of the OTI regarding their daily cigarette consumption and this was further biochemically validated by a CO reading of <10ppm. Smoking reduction status was based on whether or not the participant had reduced their daily consumption of cigarettes by 50% or greater (including abstinence) compared to baseline.

2.4. Statistical analysis

Gender differences in demographic, clinical and general smoking variables at baseline were analysed using the χ^2 test of independence for categorical responses and one-way Analysis of Variance (ANOVA) for continuous variables. Age, marital status and education served as covariates in the subsequent analyses (ANCOVAS) used to examine gender differences in the remaining smoking variables. A series of logistic regression analyses were performed to explore the relationship between smoking outcome variables, treatment group and gender at each assessment time-point. As there were no significant gender by treatment differences over time, subsequent analysis in this study did not separate the sample by treatment group. A two-step model building procedure was used to determine which variables to include in a logistic model assessing predictors of smoking reduction status (<50% reduction or \geq 50% reduction including abstinence) at the three assessment points (3, 6 and 12 months). Smoking reduction status was chosen as the dependent variable rather than continuous or point-prevalence abstinence alone to allow sufficient cases per cell. In the first step, bivariate correlations were calculated between smoking reduction status and a range of demographic and smoking related variables, psychiatric diagnosis, current psychopathology, and substance use. In the second step, only those variables significantly correlated with smoking reduction status at *p*<0.05 were included in the final multivariate model. The final logistic regression analysis was stratified by sex to explore gender differences in smoking reduction status. The threshold for statistical significance for all analyses was set at *p*<0.01 as a partial control for the number of statistical tests.

3. Results

3.1. Gender differences in demographic and clinical variables at baseline

Table 1 presents demographic and clinical variables according to gender. There were 156 males (52.3%) and 142 females (47.7%). Male smokers diagnosed with psychosis were significantly younger, more likely to be single, unemployed, living with their parents or friends and to have left school and completed a trade, than female smokers. Female smokers diagnosed with psychosis were significantly older when their psychiatric condition developed, and had more psychiatric hospitalisations and visits to the GP in the previous 12 months than male smokers. There were no gender differences in primary psychiatric diagnosis, recent substance use or level of current psychopathology or functioning.

Insert Table 1 about here

3.2. Gender differences in smoking variables at baseline

3.2.1. General smoking variables

There were no significant gender differences on a range of smoking related variables at baseline (see Table 2). Both male and female smokers experiencing psychosis started smoking in their early teens and were currently heavy smokers. Females had higher ratings of nicotine dependence than males, a difference that was approaching statistical significance [F(1,293)=5.77, p=0.017]. The majority of smokers diagnosed with psychosis had tried to quit smoking in the previous year, and some were able to quit for at least a month. Most of these smokers had been advised to quit by a health professional, mainly their GP. Few smokers diagnosed with psychosis were advised to quit by their mental health workers, such as their case manager or psychiatrist.

3.2.2. Reasons for smoking

Generally male and female smokers with psychosis did not differ in their reasons for smoking. However, as can be seen in Table 2, females were more likely to report that they smoked to increase arousal (weight control, enjoyment, to help concentration and to pep them up), a difference that was approaching statistical significance [F(1,293)=6.14, p=0.014]. Responses to the individual scale items revealed that females were significantly more likely than males to report that they smoked to prevent weight gain [F(1,293)=14.1, p<0.001].

3.2.3. Reasons for quitting

As previously reported (Baker et al., 2007), female smokers diagnosed with psychosis reported significantly more reasons for quitting than males. While males and females reported quitting for health concerns and self-control equally, females were significantly more likely to say that they want to quit for reasons related to immediate reinforcement (e.g. won't smell; won't burn holes; won't have to clean as often) and social influence (e.g. people are upset with me). There were no significant gender differences in readiness and motivation to quit smoking (Precontemplation: 15.4% males/10.6% females; Contemplation: 43.6% males/56.3% females; Preparation for Action: 41.0% males/33.1% females).

Insert Table 2 about here

3.3. Gender differences in smoking outcome variables

There were no significant gender or gender by treatment differences over time on a range of smoking outcome variables, including point prevalence or continuous abstinence (see Table 3). Male and female smokers diagnosed with psychosis did not differ in their use of NRT, quit attempts or number of treatment sessions attended. Males smoked significantly stronger cigarettes than females at 6 [F(1,201)=18.62, p<0.001] and 12 months [F(1,209)=16.01, p<0.001], while females smoked significantly more cigarettes at 6 months than males [F(1,219)=9.02, p=0.003].

Insert Table 3 about here

3.4. Predictors of smoking reduction status by gender

Variables that were significantly correlated with smoking reduction status at p<0.05 at the three assessment time-points (3, 6 and 12 months) are presented in Table 4 and these were entered into the logistic regression analyses. There were no significant predictors of smoking reduction status according to gender at any of the follow-up time-points at the p<0.01 level. However, trends were emerging at the 3 month assessment time-point for females that were predictive of unsuccessful smoking reduction status: having a DSM-IV diagnosis of schizophrenia (p=0.014), an ICD-10 diagnosis of other psychosis (p=0.011) and smoking in order to handle stress (p=0.014).

Insert Table 4 about here

4. Discussion

This study explored gender differences on a range of smoking variables in the largest published study to date of a randomised controlled trial of a smoking intervention among people diagnosed with psychosis. Although important gender differences were evident among smokers with psychosis, there were fewer differences compared to previously conducted research examining gender differences among smokers in the general population (Blake et al., 1989; Perkins, 2001; Reid et al., 2009). The application of tailored smoking cessation interventions for people experiencing psychosis is crucial in order to address the significant morbidity and mortality they experience as a consequence of their smoking. The results of the current study have important clinical application as they may enable smoking cessation interventions for people with psychosis to be gender sensitive and potentially improve smoking outcomes.

It is puzzling why our study found fewer gender differences in smokers with psychosis compared to those in the general population. People experiencing psychosis have significantly higher rates of smoking and nicotine dependence than smokers in the general population, and will as a consequence experience greater nicotine withdrawal symptoms during cessation attempts. For example, mean FTND scores for smokers in the general population range from 3.0 - 4.3 (Fagerstrom et al., 1996), compared to 7.72 for males and 8.43 for females in the current study of smokers with psychosis. This may make smokers with psychosis a more homogenous group, whereby the level of nicotine dependence is elevated to the point that it could possibly serve to override the effects of gender. Similarly, the influence that stress has on smoking behaviour among people with psychosis may obliterate the effects of gender. A potent relationship between smoking and stress exists for people with psychosis. In line with previous studies among smokers with mental illness, male and female smokers with psychosis in this study nominated stress reduction as a reason for smoking (Gurpegui et al., 2007; Barr et al., 2008; Filia et al., 2011). People experiencing psychosis often perceive that smoking has a positive impact on their stress levels, a view that is also often held and reinforced by mental health professionals (Lawn and Pols, 2005). However, the most plausible explanation is that people experiencing psychosis continue to smoke in order to avoid the discomfort of nicotine withdrawal symptoms such as stress and anxiety that are associated with their significant levels of nicotine dependence. Finally, there are other additional barriers to quitting smoking that people with psychosis experience compared to smokers in the general population, which may account for the different pattern of smoking outcome results. These include low levels of confidence and self-efficacy in relation to quitting among smokers with psychosis (Filia et al., 2011); smokers with psychosis not being routinely offered smoking cessation interventions (Baker et al., 2010); the reinforcement of smoking among their social and treatment networks (Lawn and Pols, 2005);

the reduced impact of anti-smoking campaigns for people with psychosis (Thornton et al., 2011); and that nicotine can transiently improve some of the cognitive deficits evident in psychosis (Dolan et al., 2004).

Some of the gender differences identified in this study are consistent with those previously identified among smokers in the general population. Female smokers diagnosed with psychosis were more likely than males to report they smoked to prevent weight gain, a finding also reported in the general population (Reid et al., 2009). For female smokers with psychosis, issues around weight need to be specifically targeted to improve smoking cessation outcomes for this group, as we know from the general population that smokers concerned about weight gain are less motivated to quit, have poorer abstinence outcomes and are more likely to drop out of treatment (Perkins, 2001). Cognitive-behavioural therapy (CBT) has been successfully applied to reduce weight concerns in female smokers, consequently improving their smoking cessation outcomes (Perkins, 2001). Research indicates that interventions combining smoking cessation and weight control treatment, compared to smoking cessation alone, enhanced abstinence and reduced weight gain following quitting (Spring et al., 2004). Furthermore, the best outcomes were achieved for female smokers using a sequential approach, where smoking cessation was addressed before weight control treatment. If interventions are designed to minimize weight gain, this may increase the appeal of smoking cessation treatments, particularly for female smokers with psychosis. We have found the sequential approach useful for a female smoker with bipolar disorder whereby smoking was tackled first, and then issues around weight, diet and exercise were targeted (Filia et al., 2012).

Male and female smokers with psychosis were equally concerned about the health implications of being a smoker, and this was one of their main reasons for quitting, a finding consistent with smokers in the general population (Curry et al., 1997; Reid et al., 2009). Additionally, we found that female smokers with psychosis reported more reasons for quitting smoking and were more likely to be driven by extrinsic motivators to quit (immediate reinforcement and social influence), which is consistent with results from smokers in the general population (Curry et al., 1997; Reid et al., 2009). Higher levels of extrinsic motivation have been associated with failure to quit smoking in smokers in the general population (Curry et al., 1990). Smoking interventions for people with psychosis should attempt to strengthen reasons for quitting, especially for males, and enhance intrinsic motivators for quitting (e.g. health concerns and self-control), especially for females, via motivational interviewing. However, as suggested by Lynagh et al.,(2011), certain populations may not be as responsive to efforts at increasing intrinsic motivation, and in this case, extrinsic motivators such as the use of financial incentives (e.g. contingency management) to promote behaviour change may be particularly useful, especially for female smokers with psychosis.

There are other findings that are inconsistent with those in smokers in the general population but consistent with findings among people with mental illness. As recently reported among a sample of smokers experiencing mental illness more broadly (Torchalla et al., 2011), there was no difference in readiness and motivation to quit smoking according to gender in the current sample. In the general population it has more usually been found that women are less interested in or committed to quitting (Blake et al., 1989; Perkins, 2001; McKee et al., 2005; Reid et al., 2009). Again, this lack of difference among smokers with

psychosis compared to those in the general population may be due to the overriding impact of the higher levels of nicotine dependence seen among people with psychosis.

Furthermore, in the general population, female smokers are more likely than males to smoke to cope with stress and negative emotions (Borelli et al., 1996; Reid et al., 2009), a result not replicated here among smokers with psychosis. Interesting though, an association between female smokers with psychosis in this study who reported that they smoked in order to handle stress and unsuccessful smoking reduction status at 3 months was emerging. Generally though, as previously mentioned, smokers with psychosis in this study nominated stress reduction as a reason for smoking, consistent with other studies among smokers with mental illness. Smoking cessation interventions for people experiencing psychosis must acknowledge and address the role smoking has in stress management. Patients may require assistance to develop and implement alternative coping strategies for stress management apart from smoking (Filia et al., 2011). Assisting patients to try strategies such as progressive muscle relaxation, deep breathing, positive imagery, distraction and emotion regulation will be useful (Prochaska, 2010). If smokers with psychosis are armed with effective stress management strategies, together with effective pharmacotherapy that serves to reduce their level of nicotine dependence, they will have a better chance of success when they attempt to quit smoking.

An interesting finding is the absence of significant gender differences in smoking cessation treatment outcomes in people diagnosed with psychosis in the current study. This finding is inconsistent with results from smokers in the general population where female smokers typically do more poorly than males (Blake et al., 1989; Perkins, 2001; McKee et al., 2005; Reid et al., 2009). However, these results are consistent with the only other published study that examined smoking cessation outcomes by gender in people with a substance use and/or mental illness (Okoli et al., 2011). Efforts aimed at assessing and treating nicotine dependence in all smokers with mental illness need to be maximised to improve smoking cessation outcomes for this population as a whole.

Finally, we have some unique results that are neither consistent with those among smokers in the general population nor those with mental illness based on research to date. We found no significant predictors of smoking reduction status, including abstinence, according to gender in the current study, a finding inconsistent with that of Okoli et al., (2011) in smokers with substance use and/or mental illness, and a range of studies as reported by Perkins (2001) among the general population. However, for females only, having a DSM-IV diagnosis of schizophrenia; an ICD-10 diagnosis of other psychosis; and smoking in order to handle stress were emerging as trends that predicted unsuccessful smoking reduction status at 3 months. This pattern of results needs to be replicated in future research before any conclusions can be made.

There are some limitations to the present study. This was a gender analysis of a smoking intervention study for people experiencing psychosis. Consequently, the results relate to a group of people diagnosed with psychosis from Australia, in a non-acute phase of the illness, who expressed some interest in quitting smoking. This may limit the generalisability of the results to all smokers diagnosed with psychosis. We have made qualitative comparisons between our pattern of results among smokers with psychosis to those in the general population without mental illness, but acknowledge that we have not controlled for potential differences between these two groups of smokers that may otherwise account for the pattern of results. Future research is required to further explore potential gender

differences in smokers with mental illness and to replicate and extend the pattern of results in other smokers experiencing psychosis. Specific research comparing smoking variables and outcomes between smokers with psychosis and those without is needed in an attempt to understand the aetiology of differences between the groups.

In conclusion, the findings of the present study significantly add to the growing research examining gender differences in smoking among people experiencing mental illness. Our findings offer useful information that will contribute to understanding differences and similarities in smoking behaviour, motives and cessation outcomes among males and females with psychosis, and those in the general population. Smoking needs to be tackled as a matter of urgency for all smokers experiencing mental illness to prevent medical co-morbidity and premature death. Smoking cessation interventions for people diagnosed with psychosis need to be more intensive and longer term than for smokers in the general population, and the gender sensitive modifications suggested in this paper will hopefully improve smoking cessation outcomes for people experiencing psychosis.

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TABLES

Table 1: Demographic and clinical variables at baseline by gender

	N / 1		1
	Males	Females	<i>p</i> value
	n=156	n=142	
Age mean (SD, range)	35.15 (9.65,18-60)	40.01 (12.08, 18-64)	< 0.001
Australian born (%)	82.7	87.3	NS
Marital status (%)			< 0.001
Single, never married	78.2	52.1	
Married	7.1	7.0	
Defacto	6.4	8.5	
Separated/Divorced	8.3	28.9	
Widowed	0	3.5	
Education (%)			< 0.001
Some high school	34.6	23.9	
Completed high school	23.1	17.6	
Trade/apprenticeship	17.9	1.4	
Diploma certificate	18.6	36.6	
Completed tertiary	5.8	20.4	
Receiving welfare support	91.0	84.5	NS
Employment (%)	71.0	01.5	<0.05
No work at present	75.0	60.6	<0.05
Work part- or full-time	20.5	26.1	
Student	3.9	9.2	
Living arrangements %	5.7).2	<0.05
Alone	37.2	30 /	<0.05
Derents	10.0	16 7	
Family (partner, other relatives)	19.9	10.2	
Friends	14.7	19.0	
Children without partner	15.4	0.5	
Other	2.0	12.7	
	10.5	0.5	
Drive and discussion (9(1))			NIC
Primary diagnosis (%)	100	27.2	NS
Schizophrenia	46.8	37.3	
Schizoaffective disorder	12.2	16.9	
Bipolar disorder	9.6	8.5	
Severe dep with psychosis	6.4	6.3	
Other psychosis	25.0	31.0	0.01
Age illness onset m (SD,range)	21.51 (5.90,5-42)	24.40 (8.46,9-50)	< 0.01
Substance use in past month			
Alcohol OTI mean (SD,range)	0.71 (1.47,0-10)	0.73 (3.02,0-29)	NS
Cannabis OTI mean (SD,range)	0.71 (4.30,0-40)	0.44 (2.09,0-15)	NS
Service use over past 12 months			
mean (SD,range)			
No. psychiatric hospitalisations	0.58 (0.86,0-4)	0.82 (1.14,0-5)	$<\!\!0.05$
Visits to GP	10.14 (13.40,0-100)	14.51 (19.06,0-104)	< 0.05
Visits to CMHT	15.04 (40.74,0-365)	19.50 (38.68,0-365)	NS
Current psychopathology and			
functioning mean (SD,range)			

B	PRS	33 32 (8 75 24-74)	34 87 (11 11 24-94)	NS
D D		15 21 (11 07 0 52)	17.20 (15.20.0 (0))	NG
В	SDI-II	15.31 (11.87,0-53)	17.28 (15.28,0-60)	NS
S	TAI State	40.64 (11.94,20-72)	42.22 (12.75,20-74)	NS
S	TAI Trait	46.82 (11.89,20-79)	48.74 (12.55,20-74)	NS
S	F 12 (PCS)	47.63 (7.45,27-61)	46.40 (7.58,27-59)	NS
S	F 12 (MCS)	46.78 (8.51,22-62)	45.49 (8.11,26-62)	NS

SD=standard deviation; NS=no significant difference; Defacto=a relationship where two people who are not married live together as a couple; OTI=Opiate Treatment Index; GP=General Practitioner; CMHT=Community Mental Health Team; BPRS=Brief Psychiatric Rating Scale; BDI=Beck Depression Inventory; STAI=State-Trait Anxiety Inventory; SF-12 (PCS)=12-item Short Form Survey Physical health Component Score; SF-12 (MCS)=12-item Short Form Survey Mental health Component Score

	Males	Females	<i>p</i> value
	n=156 n=142		r
Age first cigarette m (SD,range) ^a	14.54 (4.78,3-40)	15.45 (5.65,4-47)	NS
Cigarettes per day m (SD,range) ^a	29.03 (11.50,10-80)	32.05 (14.79;10-120)	NS
Level nicotine dependence	7.72 (2.16,2-10)	8.43 (1.94,4-10)	0.017
m (SD,range) ^a			
Carbon monoxide reading	21.92 (11.28,0-68)	21.35 (13.09,0-82)	NS
m (SD,range)			
Smoking behaviour past year (%)			
Quit for at least one month	14.7	9.9	NS
Tried to quit	59.6	57.8	NS
Cutback amount smoked	46.8	40.1	NS
Psychiatric symptoms on past			
quit attempts (%)	4.3	7.8	NS
Hallucinations	34.8	31.3	NS
Depression	50.4	48.4	NS
Anxiety			
Quit advice (%)			
Advised to quit by health	71.2	69.0	NS
professional	85.6	91.8	NS
Advised to quit by GP	21.6	18.4	NS
Advised quit mental health CM	33.3	43.9	NS
Advised to quit by psychiatrist			
Reasons for smoking m (SD)			
Stress reduction (0-3)	2.51 (0.81)	2.61 (0.69)	NS
Arousal (0-4)	1.85 (1.05)	2.19 (1.15)	0.014
Addiction (0-2)	1.85 (0.41)	1.91 (0.33)	NS
Mental illness (0-2)	0.33 (0.55)	0.39 (0.59)	NS
Partner smoking (0-1)	0.08 (0.28)	0.14 (0.35)	NS
Reasons for quitting m (SD) ^a			
Intrinsic			
Health concerns (0-4)	2.50 (1.18)	2.74 (1.08)	NS
Self-control (0-4)	2.45 (1.29)	2.85 (0.99)	NS
Extrinsic			
Immediate reinforcement (0-4)	2.08 (1.18)	2.71 (1.05)	< 0.001
Social influence (0-4)	0.95 (0.97)	1.30 (1.10)	< 0.01
Intrinsic minus extrinsic	0.96 (0.93)	0.80 (0.88)	NS
Overall scale score (0-4)	1.99 (0.85)	2.40 (0.78)	< 0.001

Table 2: Smoking variables at baseline by gender

m=mean; SD=standard deviation; NS=no significant difference; GP=General Practitioner; CM=case manager

^aThese variables have been previously reported in Baker et al., (2007) and have been reproduced here for completeness

Table 3:	Smoking	outcome	variables	by	gender
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3 months		6 m	onths	12 months	
Male	Female	Male	Female	Male	Female
19.43 (13.00)	23.29 (18.19)	20.30 (12.31)	24.64** (17.78)	21.26 (13.93)	23.94 (16.35)
6.4	8.5	3.2	4.2	1.9	2.1
9.0	12.0	5.1	8.5	7.7	9.2
30.8	28.9	24.3	23.9	23.7	24.6
-9.60	-8.76	-8.73 -7.41		-7.77	-8.11
	3 mo Male 19.43 (13.00) 6.4 9.0 30.8 -9.60	3 months Male Female 19.43 23.29 (13.00) (18.19) 6.4 8.5 9.0 12.0 30.8 28.9 -9.60 -8.76	3 months 6 monometry Male Female Male 19.43 23.29 20.30 (13.00) (18.19) (12.31) 6.4 8.5 3.2 9.0 12.0 5.1 30.8 28.9 24.3 -9.60 -8.76 -8.73	3 months 6 months Male Female Male Female 19.43 23.29 20.30 24.64** (13.00) (18.19) (12.31) (17.78) 6.4 8.5 3.2 4.2 9.0 12.0 5.1 8.5 30.8 28.9 24.3 23.9 -9.60 -8.76 -8.73 -7.41	3 months 6 months 12 m Male Female Male Female Male 19.43 23.29 20.30 24.64** 21.26 (13.00) (18.19) (12.31) (17.78) (13.93) 6.4 8.5 3.2 4.2 1.9 9.0 12.0 5.1 8.5 7.7 30.8 28.9 24.3 23.9 23.7 -9.60 -8.76 -8.73 -7.41 -7.77

SD=standard deviation; ** significant difference at p<0.01; CPD=cigarettes per day.

	2 months		6 months		10 m on th o		
	3 months		0 months		12 months		
	Correlation		Correlation		Correlation		
	coefficient		coen	coefficient		coefficient	
	Male	Female	Male	Female	Male	Female	
Experimental group	0.26**	0.34**	0.02	0.26**	0.07	0.24**	
No. sessions attended	0.33**	0.42**	0.09	0.33**	0.16*	0.34**	
Clinical/demographic variables:							
DSM schizophrenia	-0.18*	0.09	0.02	0.05	-0.12	0.000	
ICD-10 BPAD	-0.06	0.14	0.03	0.13	0.04	0.24**	
ICD-10 other psychosis	0.13	-0.19*	0.04	-0.10	0.08	-0.07	
Qualifications	0.12	-0.11	-0.004	-0.01	0.16*	0.01	
STAI trait score	-0.14	-0.05	-0.05	-0.22*	0.08	-0.09	
No. hospital admissions	0.00	0.07	-0.11	0.07	-0.17*	0.03	
OTI cannabis	-0.002	-0.06	0.20*	-0.02	-0.07	-0.01	
Cups coffee day	-0.05	-0.06	0.13	-0.17	-0.10	-0.19*	
Nurse advised to quit	-0.02	0.10	-0.22*	0.05	-0.14	0.13	
Health professional OK to smoke	-0.05	0.04	-0.03	-0.19*	0.04	0.04	
Smoking dependency:							
FTND	-0.09	-0.18*	0.05	-0.18*	0.04	-0.04	
CO reading	-0.05	-0.13	-0.06	-0.23*	-0.09	-0.12	
Reasons for Smoking:							
Smoking helps symptoms mental	0.16*	-0.05	0.10	0.03	-0.02	0.03	
illness							
Smoking helps you to handle	0.02	-0.22**	0.05	-0.20*	0.14	-0.12	
stress							
Smoking is a habit	0.03	-0.02	-0.008	-0.05	0.16*	-0.05	
Reasons for Ouitting:							
Like vourself better	0.18*	-0.003	0.08	-0.05	0.24**	-0.04	
Want people to stop nagging	0.19*	-0.03	0.05	-0.03	0.12	-0.06	
Will get a financial reward	0.04	0.06	0.18*	0.05	0.18*	-0.06	
Prove not addicted	0.04	0.11	-0.01	0.17*	0.23**	0.10	
Received an ultimatum	-0.02	0.16	-0.12	0.21*	-0.01	0.19*	
Show can quit	0.12	0.05	0.03	0.06	0.19*	0.04	
Accomplish other things	0.10	0.03	0.05	0.12	0.19*	0.07	
Will save money	0.08	-0.09	0.02	-0.15	0.087	-0.18*	
Self-control	0.00	0.07	0.02	0.10	0.007	0.10	
Social influence	0.09	0.09	0.05	0.10	0.25	-0.003	
Motivation:	0.07	0.07	0.05	0.00	0.10	0.005	
Current plan to quit smoking	0.07	0 22**	0.10	0.15	0.13	0.13	
Five stages of motivation	0.07	0.22	-0.002	0.15	0.15	0.13	
Stage of change	0.05	0.19*	0.002	0.10	0.00	0.08	
Stage of change	0.05	0.19*	0.03	0.06	0.03	0.08	

Table 4: Correlations with smoking reduction status across time by gender

*significant difference at p < 0.05; ** significant difference at p < 0.01; STAI=State-Trait Anxiety Inventory; OTI=Opiate Treatment Index; FTND=Fagerstrom Test of Nicotine Dependence; CO=Carbon Monoxide