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Family carers: A role in addressing chronic disease risk behaviours for people with a mental illness?

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ABSTRACT

People with a mental illness experience greater chronic disease morbidity and mortality compared to those without mental illness. Family carers have the potential to promote the health behaviours of those they care for however factors which may influence the extent to which they do so have not been reported. An exploratory study was conducted to investigate carers': 1) promotion of fruit and vegetable consumption, physical activity, quitting smoking, and reducing alcohol consumption; 2) perceptions of their role and ability to promote such behaviours; 3) and the association between carer perceptions and the promotion of such behaviours. A cross-sectional survey was conducted with mental health carers ($N = 144$, 37.6% response rate) in New South Wales, Australia in 2013. Associations between current promotion of health behaviours and carer perceptions were explored through multivariate regression analysis in 2016. A majority of respondents promoted fruit and vegetable consumption (63.8%), physical activity (60.3%), quitting smoking (56.3%), and reducing alcohol consumption (56.2%) to the person they cared for. A perception that it was 'very important' to have a positive influence on these behaviours was positively related with promotion of each of the four behaviours, with those holding such a view being more likely to promote such behaviours, than those who did not (odds ratio: 9.47–24.13, $p < 0.001$). The majority (56.2%–63.8%) of carers reported promoting the health behaviours of those they cared for, demonstrating a need and opportunity to build the capacity of carers to contribute to reducing the health risk behaviours among people with a mental illness.

1. Introduction

In high income countries, people with a mental illness experience higher rates of preventable morbidity, mortality, and a life expectancy of 10 to 20 years less than those without such an illness; (Chang et al., 2011; Laursen et al., 2013; Wahlbeck et al., 2011; Lawrence et al., 2013; Brown et al., 2010) disparities largely attributable to a higher prevalence of chronic disease (Lawrence et al., 2013; Brown et al., 2010; Callaghan et al., 2014). Tobacco smoking, inadequate nutrition, harmful alcohol consumption and inadequate physical activity are the leading behavioural causes of the preventable chronic disease burden generally; (AIHW and O'Brien, 2005; Australian Bureau of Statistics, 2012; Australian Institute of Health and Welfare, 2012; Australian Institute of Health and Welfare, 2014) with the prevalence of such behaviours being consistently higher among people with a mental illness (Cook et al., 2015; Hahn et al., 2014; Kilbourne et al., 2009; Kilian et al., 2006; Morgan et al., 2014; Prochaska et al., 2014; Ussher et al., 2011; Bartlem et al., 2015).

Family carers play a critical role in the lives of the people they care for (Wood et al., 2013; Office of the Chief Psychiatrist, 2007; Aschbrenner et al., 2014) and are increasingly acknowledged as key partners in mental health service provision in clinical and practice guidelines (Office of the Chief Psychiatrist, 2007; NICE, 2010; Rooney and Worthington, 2015; Wilson et al., 2015; Bland and Foster, 2012; New South Wales Government, 2014; NSW Department of Health, 2007; National Mental Health Commission, 2014). A large proportion of people in high income countries have a caring role for a relative with a mental illness: (Collings, 2009; Sinha, 2013) approximately 9 million people in the United States (AARP, 2015), and 2.4 million people in Australia (15% of the population) (Pirkis et al., 2010). A potential exists for carers to promote health behaviours for those they care for, and hence reinforce public health and mental health programs promoting such behaviours (National Mental Health Commission, 2014).

A review of the literature identified two qualitative studies of the role of family carers of adults with a mental illness in promoting health

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behaviours of those they care for. Carers ($N = 13$) in the United States of older adults with serious mental illness reported actively assisting in weight loss through meal preparation, grocery shopping, and encouraging exercise (Aschbrenner et al., 2014). Similarly, an Australian study found that carers ($N = 12$) monitored and managed the smoking behaviours of the person with a mental illness. The study found some dissonance between carers' concerns for the negative impacts of smoking on physical health and their 'complicity' in the purchase of cigarettes (Lawn et al., 2015). One factor that may influence the care provided by carers with respect to such risk behaviours may be their own risk status: whilst not yet explored among carers, the health behaviour status of clinicians has been shown to be inversely associated with their provision of preventive care (Johnson et al., 2009).

The limited body of research suggests that family carers may require information and support from health services to better support the person they care for in changing their health behaviours (Aschbrenner et al., 2014; Sono et al., 2008; Missen et al., 2013). The United States qualitative study mentioned above found participants desired guidance from primary care clinicians in the form of strategies to support weight loss (Aschbrenner et al., 2014). A qualitative study in New Zealand ($N = 6$) found that family members reported receiving inadequate information from mental health services regarding the harms of tobacco, the benefits of available cessation treatments, and the impact of cessation on client mental distress (Missen et al., 2013). In a quantitative study of 152 Japanese family carers, 77% desired additional support from community services to help them promote the physical health of the person they cared for (Sono et al., 2008).

Given the limited research exploring the role of family carers in promoting health behaviours for adults with a mental illness, an exploratory study was undertaken to investigate:

1. The extent of carers' involvement in promoting: fruit and vegetable consumption; physical activity; quitting smoking; and decreasing alcohol consumption of the person they cared for
2. Carer health behaviours, attitudes and perceptions of their role and ability in addressing the health risk behaviours of the person they care for, and
3. Whether such carer health behaviours, attitudes and perceptions were associated with the promotion of such behaviours.

2. Methods

2.1. Design and setting

A cross sectional survey of 144 family carers of adults with a mental illness was undertaken in one non metropolitan region of New South Wales, Australia from July to November 2013. The study was approved by the Hunter New England Human Research Ethics Committee (No. 13/06/19/5.11) and the University of Newcastle's Human Research Ethics Committee (No. H-2013-0343).

2.2. Participants and recruitment

Participants were sourced through their membership of a non-government carer support organisation that provided free support services to carers and families of people with a mental illness (Schizophrenia Fellowship of NSW Inc., 2008). Participants were eligible if they were 18 years or older and identified themselves as a carer for someone with any mental illness who was over 18 years of age.

Participants were identified by the organisation based on previous consent to participate in research; and mailed an information statement, survey instrument and reply-paid envelope, and a web link for online completion if preferred. After one month, participants who had not responded were mailed a one page reminder letter. The request did not specify a date for survey completion and no questionnaires were excluded from analysis. Most surveys were returned within one month; the remainder were received over a four month period. Additional participants were approached by members of the research team through attendance at carer support group meetings organised by or affiliated with the carer support organisation.

2.3. Data collection procedures

Socio-demographic, clinical and risk behaviour items were adapted from previous research (Bartlem et al., 2013). Other items detailing the carer's current practice and perceptions regarding promotion of health behaviours were developed with input from mental health staff and carers. Participants could complete the questionnaire online or in paper form.

2.4. Measures

2.4.1. Socio-demographic and clinical characteristics

Six items addressed age, gender, employment status, marital status, highest level of education achieved, and Aboriginal or Torres Strait Islander status for both the carer and the person they cared for. Participants were asked their postcode of residence to determine geographic remoteness (major cities, regional, rural) (Department of Health and Aged Care, 2001) of the area they resided in and the socio economic index (disadvantaged, average/advantaged) (Australian Bureau of Statistics, 2011).

Participants were asked: the primary psychiatric diagnosis of the person they cared for (schizophrenia, depression, anxiety disorder, panic disorder, bipolar disorder, post-traumatic stress disorder, eating disorder, personality disorder, dementia, unsure, other); how many years they had been in a caring role (years: less than one year, 1 to 2, 3 to 10, 11 to 20, >20); if they lived in the same residence (yes, no, sometimes); and what their relationship was to that person (parent, partner, child, sibling, neighbour, friend, other).

2.4.2. Chronic disease risk behaviour status

Carers were asked 5–7 items adopted from previous research (Bartlem et al., 2013) assessing their: fruit and vegetable consumption; physical activity; tobacco smoking; and alcohol consumption.[1]

2.4.3. Current promotion of health behaviours

Participants were asked to what extent they currently sought to influence each behaviour (I don't try, I try sometimes, I try most of the time, I try all of the time, unsure, not applicable).

2.4.4. Carer perceptions of their role and ability in promoting health behaviours of the person they care for

Carers were asked for each behaviour: how important it was for them to have a positive influence for that behaviour for the person they cared for (not at all, a little, somewhat, very, unsure); if the person they cared for found it acceptable for them to talk about the health behaviour (strongly agree, agree, unsure, disagree, and strongly disagree);

[1] Items assessing behaviours were: the number of serves of fruit (0, 1, 2 or more, unsure) and vegetables (0, 1, 2, 3, 4, 5 or more, unsure) usually eaten each day; how many days a week they usually do at least 30 min of physical activity (0, 1, 2, 3, 4, 5, 6, 7, unsure); if they are a smoker of any tobacco products (yes–daily, yes–at least once a week, no–trying to quit, no–quit longer than 4 months ago, no–never smoked); how often they have an alcoholic drink (never–not drinking alcohol, monthly or less, 2–4 times a month, 2–3 times a week, 4 or more times a week, unsure); how many standard drinks they have on a typical drinking day (1–2, 3–4, 5–6, 7–9, 10 or more, unsure); and how often they have 4 or more standard drinks on one occasion (never, less than monthly, monthly, weekly, daily or almost daily, unsure). Risk status was subsequently determined based on Australian National clinical guidelines with risk defined as: consuming less than five serves of vegetables or two serves of fruit each day; (National Health and Medical Research Council, 2013) engaging in <30 min of physical activity on at least 5 days per week; (Department of Health and Aged Care, 1999) consuming more than two standard alcoholic drinks on a regular day (chronic consumption) or more than four standard drinks on any one occasion (binge consumption); (National Health and Medical Research Council, 2009) and any tobacco consumption (Ministerial Council on Drug Strategy, 2011).

if they felt encouraging the behaviour could harm their relationship (strongly agree, agree, unsure, disagree, strongly disagree); to what extent it was possible to positively influence that behaviour (not at all, sometimes, often, always, unsure); if they had the knowledge and skills to encourage behaviour change (strongly agree, agree, unsure, disagree, strongly disagree); and if they felt confident to discuss the behaviour with the person they cared for (strongly agree, agree, unsure, disagree, strongly disagree, not applicable).

2.4.5. Carer perceptions of the interest in changing health behaviours held by the person with a mental illness

Participants were asked whether, at any time in the last year, the person they cared for had expressed an interest in: improving fruit and vegetable consumption; improving physical activity; quitting smoking; and reducing alcohol consumption (yes, no, unsure, not applicable- does not smoke or drink alcohol).

2.5. Statistical analysis

SPSS version 22 (IBM, 2015) was used to analyse the data in 2016. Responses to socio-demographic, risk behaviour status, carer role and attitudinal items were collapsed into two or three categories (Tables 1 & 2). Not applicable responses were excluded from analysis.

Descriptive statistics were used to summarise the socio-demographic characteristics of carers and those they cared for, the current carer role across the four behaviours and attitudinal items. Chi-square analyses using Fisher's Exact test statistic were used to examine possible associations between all carer attitudinal and risk behaviour status variables (independent variables) with carers' current promotion for each of the four behaviours (dependent variable). Independent variables associated at $p < 0.25$ were subsequently entered into backward stepwise logistic regression models to examine independent associations ($p < 0.05$) with carers 'trying all or most of the time' to influence each of the four risk behaviours (four models total). Collinearity statistics were calculated for the final models to test for collinearity between attitudinal variables.

3. Results

3.1. Sample characteristics

Of 383 members invited (327 postal, 56 support group attendees), no response was received from 59.3% (227), 12 were ineligible (3.1%) (under 18 years, no longer a carer), and 144 completed the survey (37.6%; 97 postal, 46 support group attendees, 1 online). Participants who completed the survey during support groups were more likely to be 75 years or older (21.7% vs 7.1%, $p = 0.005$) and live in a major city (57.8% vs 18.6%, $p < 0.001$) than those who completed the survey by post. The majority of participants were female (81.0%), over the age of 54 (75.7%), the parent of the person they cared for (61.5%), and residing with that person (52.4%) (Table 1).

Table 1
Socio-demographic characteristics and chronic disease risk behaviour status.

Characteristic	Carer[a] % (n)		Person with mental illness[a] % (n)	
Carer age (Years)				
18–54	24.3	(35)		
55–74	63.9	(92)		
75 and over	11.8	(17)		
Person with mental illness age (Years)				
18–34			40.3	(58)
35–54			46.5	(67)
55 and over			13.2	(19)
Gender				
Male	19.0	(27)	66.7	(96)
Employment status				
In the workforce	31.9	(45)	20.3	(28)
Ethnicity				
Aboriginal and/or Torres Strait Islander origin	3.6	(5)	4.4	(6)
Marital status				
Married/living together in a relationship	73.4	(105)	25.9	(36)
Highest education level				
<4 years high school completed	19.6	(28)	22.6	(31)
4 years high school completed	21.0	(30)	21.2	(29)
>4 years high school completed	59.4	(85)	56.2	(77)
Socio-economic index				
Disadvantaged	54.9	(78)		
Average range/advantaged	45.1	(64)		
Geographic remoteness				
Major city	31.0	(44)		
Regional	54.2	(77)		
Rural	14.8	(21)		
Years spent caring for the person with mental illness				
20 years or less	70.4	(100)		
>20 years	29.6	(42)		
Carer and person with mental illness living in the same residence				
Yes	52.4	(75)		
Carer relationship to person with mental illness				
Parent	61.5	(88)		
Other relation	38.5	(55)		
Psychiatric diagnosis				
Schizophrenia			39.1	(56)
Bipolar disorder			21.8	(31)
Other diagnosis			39.1	(56)
Health risk behaviour status				
Fruit and vegetable consumption 'at risk'	74.8	(107)		
Physical activity 'at risk'	57.6	(76)		
Alcohol consumption 'at risk'	36.3	(49)		
Smoking 'at risk'	11.8	(17)		

Data collected in 2013 in New South Wales, Australia.
[a] Number of missing responses to items ranged between 1 and 8.

3.2. Current promotion of health behaviours

A majority of participants indicated they were trying 'most' or 'all of the time' to positively influence fruit and vegetable consumption (63.8%), physical activity (60.3%), alcohol consumption (56.2%) and smoking (56.3%) (Table 2). Between 8.5% and 13.5% indicated they were not trying to influence each risk behaviour at all.

3.3. Carer perceptions of their role and ability in promoting the health behaviours of the person they care for

The majority of participants reported it was very important to promote each of the health behaviours (75.5% to 79.3%). Similarly, the majority agreed the person they cared for found it acceptable to discuss fruit and vegetable consumption (67.9%) and physical activity (62.5%); but less so for alcohol consumption (46.1%) and smoking (44.0%). The majority agreed their relationship could be harmed by encouraging decreasing alcohol consumption (62.0%) and quitting smoking (67.0%); with fewer anticipating such a consequence for encouraging healthy fruit and vegetable consumption (44.3%) or physical activity (47.1%), (Table 2).

Approximately half the sample thought it was always or often possible to have a positive influence on fruit and vegetable consumption (51.1%), while fewer perceived it possible to do so for physical activity (41.5%); and one third or less thought it possible for alcohol consumption (33.0%) and smoking (29.5%). The majority of participants agreed they had the knowledge and skills to encourage health behaviours; most so for fruit and vegetable consumption (83.3%) and physical activity (76.8), and less so for alcohol (62.8%) and smoking (62.5%). Approximately three quarters of participants reported being confident to talk to the person they cared for about their fruit and vegetable consumption (76.9%) and physical activity (73.9%), whilst 56.3% and 51.7% reported being confident for alcohol and smoking respectively (Table 2).

Table 2
Carer promotion and perceptions of their role and ability in addressing the health behaviours.

Item	Behaviour	Responses[a,b] %(n)
Current promotion		
To what extent do you currently try to have a positive influence on the health behaviours of the person you care for?		I try all/most of the time
	Fruit and vegetable consumption	63.8 (90)
	Physical activity	60.3 (85)
	Alcohol	56.2 (50)
	Smoking	56.3 (49)
Carer perceptions of role and ability to address the health behaviours		
How important do you feel it is for you to try and have a positive influence on the health behaviours of the person you care for?		Very important
	Fruit and vegetable consumption	78.9 (112)
	Physical activity	77.3 (109)
	Alcohol	79.3 (73)
	Smoking	75.5 (71)
The person I care for finds it acceptable for me to talk with them about their health behaviours.		Strongly agree/agree
	Fruit and vegetable consumption	67.9 (93)
	Physical activity	62.5 (85)
	Alcohol	46.1 (41)
	Smoking	44.0 (37)
My encouraging healthy behaviours for the person I care for may harm our relationship.		Strongly agree/agree/unsure
	Fruit and vegetable consumption	44.3 (62)
	Physical activity	47.1 (66)
	Alcohol	62.0 (57)
	Smoking	67.0 (59)
To what extent do you think it's possible for you to have a positive influence on the health behaviours of the person you care for?		Often/always possible
	Fruit and vegetable consumption	51.1 (71)
	Physical activity	41.5 (59)
	Alcohol	33.0 (30)
	Smoking	29.5 (26)
I have the knowledge and skills to encourage healthy behaviours for the person I care for.		Strongly agree/agree
	Fruit and vegetable consumption	83.3 (115)
	Physical activity	76.8 (106)
	Alcohol	62.8 (59)
	Smoking	62.5 (55)
I feel confident to talk to the person I care for about their health behaviours.		Strongly agree/agree
	Fruit and vegetable consumption	76.6 (105)
	Physical activity	73.9 (102)
	Alcohol	56.3 (49)
	Smoking	51.7 (45)

Data collected in 2013 in New South Wales, Australia.
[a] Missing responses ranged from 0 to 9.
[b] Not applicable responses excluded and ranged from 0 to 5.

3.4. Carer perceptions of the interest in changing health behaviours held by the person with a mental illness

The majority of participants reported, over the last 12 months, that the person they cared for expressed an interest in improving their physical activity (58.7%); with fewer reporting such an expressed interest in improving fruit and vegetable consumption (45.7%), reducing alcohol consumption (18.4%), and quitting smoking (30.4%).

3.5. Factors associated with carer promotion of health behaviours

Factors associated at $p < 0.25$ with the carer's promotion of health behaviours 'all or most of the time' that were entered into the logistic regressions are presented in Table 3. For each of the behaviours, the regression analyses identified that participants who thought it was 'very important' to influence the behaviours of the person they cared for had significantly greater odds of trying to do so all or most of the time, compared to those who did not: fruit and vegetable consumption [Odds Ratio (OR: 9.47) 95% confidence interval (CI: 3.52–25.46)], physical activity (OR: 13.84, CI: 4.68–40.94), alcohol consumption (OR: 17.14, CI: 3.61–81.46), and smoking (OR: 24.13, CI:4.86–119.87) (Table 4). Additionally, for fruit and vegetable consumption, carers who agreed that the person they cared for found it acceptable to talk with them were approximately three times as likely to try all or most of the time to influence that behaviour (OR: 2.95, CI: 1.27–6.86),

Table 3
Chi-square results for variables associated with carer promotion of health behaviours.

Variable	N[a]	χ^2	*Df*	*p*
Fruit and vegetable consumption				
Importance of positively influencing health behaviour	141	27.069	1	<**0.001**[b]
Acceptable to talk about health behaviour	136	9.675	1	**0.002**[b]
Encouraging health behaviour may harm relationship	138	0.496	1	0.574
Extent to which it is possible to influence health behaviour	138	7.492	1	**0.008**[b]
Knowledge and skills to encourage health behaviour	137	3.239	1	0.095[b]
Carer confidence to talk about health behaviour	136	4.682	1	**0.035**[b]
Person with a mental illness interest in changing behaviour	133	0.773	1	0.443
Carer 'at risk' for behaviour	140	0.007	1	1.000
Physical activity				
Importance of positively influencing health behaviour	139	34.902	1	<**0.001**[b]
Acceptable to talk about health behaviour	135	8.411	1	**0.006**[b]
Encouraging health behaviour may harm relationship	138	1.140	1	0.348
Extent to which it is possible to influence health behaviour	139	7.820	1	**0.008**[b]
Knowledge and skills to encourage health behaviour	137	8.028	1	**0.006**[b]
Carer confidence to talk about health behaviour	136	7.718	1	**0.009**[b]
Person with a mental illness interest in changing behaviour	137	2.420	1	0.130[b]
Carer 'at risk' for behaviour	130	1.999	1	0.177[b]
Alcohol				
Importance of positively influencing health behaviour	86	18.446	1	<**0.001**[b]
Acceptable to talk about health behaviour	85	1.433	1	0.282
Encouraging health behaviour may harm relationship	86	0.006	1	1.000
Extent to which it is possible to influence health behaviour	86	3.381	1	0.101[b]
Knowledge and skills to encourage health behaviour	85	0.476	1	0.578
Carer confidence to talk about health behaviour	82	0.015	1	1.000
Person with a mental illness interest in changing behaviour	79	1.359	1	0.366
Carer 'at risk' for behaviour	83	0.057	1	1.000
Smoking				
Importance of positively influencing health behaviour	87	26.702	1	<**0.001**[b]
Acceptable to talk about health behaviour	83	1.121	1	0.422
Encouraging health behaviour may harm relationship	86	1.012	1	0.406
Extent to which it is possible to influence health behaviour	87	6.397	1	**0.017**[b]
Knowledge and skills to encourage health behaviour	84	4.927	1	**0.041**[b]
Carer confidence to talk about health behaviour	84	2.196	1	0.186[b]
Person with a mental illness interest in changing behaviour	83	2.566	1	0.129[b]
Carer 'at risk' for behaviour	87	0.523	1	0.485

Boldface indicates statistical significance ($p < 0.05$).
Data collected in 2013 in New South Wales, Australia.
[a] Sample size varies due to missing responses.
[b] Variables entered into logistic regression models.

Table 4
Final logistic regression models for variables associated with carer current promotion of health behaviours.

Variable	OR	95% CI		p
		Lower	Upper	
Fruit and vegetable consumption[a]				
Important to influence health behaviour				
Very important	9.470	3.523	25.456	<**0.001****
Somewhat, a little, not at all, unsure				reference
Acceptable to talk about health behaviour				
Strongly agree, agree	2.949	1.267	6.861	**0.012***
Disagree, strongly disagree, unsure				reference
Physical activity[a]				
Important to influence health behaviour				
Very important	13.838	4.678	40.939	<**0.001****
Somewhat, a little, not at all, unsure				reference
Possible to influence health behaviour				
Often, always possible	2.878	1.199	6.908	**0.018***
Not at all, sometimes, unsure				reference
Alcohol consumption				
Important to influence health behaviour				
Very important	17.143	3.608	81.462	<**0.001****
Somewhat, a little, not at all, unsure				reference
Smoking				
Important to influence health behaviour				
Very important	24.134	4.859	119.870	<**0.001****
Somewhat, a little, not at all, unsure				reference

Boldface indicates statistical significance.
Data collected in 2013 in New South Wales, Australia.
[a] Variance of inflation ranged from 1.02 to 1.04 for the fruit and vegetable consumption and physical activity regression models, respectively; indicating that collinearity was not present within the models.
* $p < 0.05$.
** $p < 0.01$.

compared to carers who did not agree. Finally, for physical activity, carers who perceived it was always or often possible to have an influence were approximately three times more likely to be trying all or most of the time to do so, compared to carers who did not (OR: 2.88, CI: 1.19–6.91).

4. Discussion

This is the first study to quantitatively explore both the extent to which family carers promote health behaviours for people with a mental illness that they care for, their perceptions towards this caring role and the association between carer characteristics and perceptions and their provision of such care. A majority of carers reported trying to promote all four health behaviours, perceived that trying to do so was very important, and reported having the knowledge and skills to do so. Carers were more likely to promote each behaviour if they perceived that doing so was very important, the person they cared for found it acceptable for them to do so, and that it was possible to influence the behaviour of the person they cared for.

The finding that most (56.2%–63.8%) carers were active in trying to positively influence the health behaviours of those they cared for reflects the findings of previous qualitative research; where a majority of family carers reported trying to support weight loss for the people they cared for (Aschbrenner et al., 2014). The consistent positive association identified between the perceived level of importance ascribed to trying to positively influence the health behaviours and the likelihood of currently trying all or most of the time to do so, suggests that perceived 'role congruency' may be an important influence on care provision. There is support from theory, such as the theory of planned behaviour, which identifies 'importance' as a significant determinant of undertaking a behaviour (Rimer and Glanz, 2005). Further support comes from previous research findings that mental health staff in both inpatient (Wye et al., 2010) and community mental health services (Johnson et al., 2009; Robson et al., 2013) were more likely to provide care for physical health risks when they perceived it as part of their role. This research included items relating to 'self-efficacy', a concept integral to a range of health behaviour theories (Rimer and Glanz, 2005); assessing carer confidence, perception of their knowledge and skills, and possibility to influence behaviours, finding that only the latter was (minimally) associated with care provision. The findings suggest that a number of carer attributes influence their promotion of positive health behaviours. These findings are supported by the literature regarding the role of 'influential others' (Rimer and Glanz, 2005). Future research assessing the utility of particular theoretical frameworks may be of value.

Despite a majority of carers expressing that they had the knowledge and skills to influence health behaviours, the study also found that no more than half of carers reported it was often or always possible to do so. Within the context of the general burden associated with the caregiver role, it may be speculated that this could reflect prioritisation of the mental health of the person being cared for over their physical health (Lawn et al., 2015). It is also possible the high proportion of carers reporting they had the knowledge, skills and confidence, to influence health behaviours- especially fruit and vegetable consumption and physical activity- could be an artefact of all participating carers having greater access to information and support through their support organisation membership than carers generally. This remains speculative and other possibilities could have led to this result.

With regards to smoking and alcohol consumption, family carers were approximately 20% less likely to report that: they had the knowledge and skills to encourage healthy behaviours; the person they cared for would find it acceptable to talk about their behaviours; and they felt confident to talk to the person they cared for about their health behaviours. Additionally, approximately 20% more carers reported that encouraging healthy smoking and alcohol consumption behaviours could harm their relationship, as compared to encouraging nutrition and physical activity. This suggests that future research is required to investigate how such concerns may vary across behaviours and to identify strategies for supporting carers to be effective in their promotion without harm to their relationships. Some carers may be concerned that family relationship tensions could result from their attempting to influence health behaviours, as suggested in one previous study exploring carers' management of tobacco use by people with a mental illness (Lawn et al., 2015). Alternatively, such results may also be explained by the findings that carers were between 15% and 40% less likely to report the person they cared for was interested in improving their smoking or alcohol consumption compared to nutrition and physical activity. The perceived lack of interest in improving risk behaviours on the part of the person being cared for could influence the carers perceived capacity to influence and support change as explained by the theory of planned behaviour; (Rimer and Glanz, 2005) resulting in concerns that influencing such behaviours could harm their relationship.

The findings that carers were more likely to try to influence fruit and vegetable consumption if they perceived the person they cared for found it acceptable, and more likely to try to positively influence physical activity if they perceived that it was 'possible' to do so may be explained by a greater likelihood of carers addressing some behaviours if they perceived the individual is receptive to carer input. Such an explanation accords with previous research on factors influencing mental health clinician care provision to address such behaviours (Wye et al., 2010; Price et al., 2007; Happell et al., 2012). While in the current study, few carers reported that the person they cared for had expressed interest in changing their behaviours (18.4%–58.7%), it may be of value to inform carers of research suggesting high proportions of people with a mental illness do have interest in changing their health behaviours (Prochaska et al., 2014; Bartlem et al., 2015; Buhagiar et al., 2011; Siru et al., 2009; Stockings et al., 2013; Ussher et al., 2007), and that offering their support for such change may act as a cue to action- as has been found when clinicians offer such assistance (Dixon et al., 2009; Hulse

and Tait, 2002). The finding that carer risk behaviour status was not associated with promotion of health behaviours suggests the potential for all carers to positively influence behaviour change regardless of their own risk status.

4.1. Study limitations and strengths

The present findings need to be interpreted in light of a number of study limitations. Firstly, as the sample involved carer members of a single support organisation, the extent to which responses are representative of all family carers of adults with a mental illness is not known; although the socio-economic and geographic characteristics of participants are largely consistent with the characteristics of carers in Australia (NSW Department of Health, 2007). Secondly, the low response rate and recruitment strategy may have resulted in selection bias suggesting caution in interpreting the findings as representative of the carer population from which they were recruited. It is unknown if the low response rate combined with participants' support organisation membership may have influenced the results. Thirdly, carers provided a proxy non-expert report of the psychiatric diagnosis of the person they cared for; and the accuracy of this report is unknown. Fourthly, self-reported survey data could be susceptible to recall and social desirability biases (Van de Mortel, 2008), however, older adults' recall of their health behaviours has been found to be reliable (Dal Grande et al., 2012). Finally, the multivariate analysis results should be interpreted with caution due to the small sample size and limited statistical power to detect differences. A larger sample size is required to confirm the results of this study.

Nevertheless, as the first to explore the extent to which family carers are trying to influence a range of chronic disease risk behaviours of people with a mental illness and attitudinal factors associated, the findings of this study are important. They suggest that carers try to have a role in influencing the health behaviours of those they care for yet their capacity to do so may be limited by several factors, and perhaps differentially so for different behaviours. As carers represent a potential means of extending and reinforcing public and clinical programs promoting health behaviours, further research is required to examine this potential and strategies for supporting carers to increase the effectiveness of such programs for those they care for.

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Conflicts of interest

None.

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