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**Title: Older Adults' Attitudes and Motivations towards Learning about Personal Dementia Risk and their Willingness to Make Changes to Improve their Health in Primary Care Settings**

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### ***Objective***

This study assessed older adults' preferences, attitudes, and motivations to understand and change their individual risk for developing dementia via screening in primary care settings.

### ***Method***

Eighty-six community-dwelling older adults (aged 60-91 years,  $M=74.03$ ,  $SD=6.83$ ) completed measures of behavioural intent to undergo dementia risk screening, response efficacy (i.e., belief that screening is useful), negative affective responses (e.g., risk screening results making individuals more scared about the future), motivation to change risk-related behaviours, level of social support, depression, and anxiety symptomatology.

### ***Results***

Overall, participants reported positive attitudes towards dementia risk screening and risk reduction. Two ordinal logistic regressions indicated that response efficacy was a significant predictor of behavioural intent to undergo dementia risk screening, whereas self-efficacy and family history of dementia were significant predictors of motivation to change risk-related behaviours. Barriers included lack of information, motivation, and self-control. Facilitators included access to formal and informal supports, and engagement with social and non-social activities.

### ***Conclusions***

Dementia risk screening and risk reduction in primary care may be more desirable for those with a family history of dementia, high response efficacy, and high self-efficacy. Addressing barriers such as lack of information, motivation, and self-control may improve older adults' engagement with dementia risk reduction.

Keywords: attitudes, dementia prevention, risk screening, motivation, older adults, primary care.

**Key Points**

*What is already known about this topic:*

1. Lifestyle factors can be modified to reduce dementia risk; however, an understanding of the role of motivation to change these behaviours is limited.
2. Age, sex, family history of dementia, and dementia carer experience have been linked to motivation to reduce dementia risk.
3. There is very limited understanding of people's behavioural intent to undergo dementia risk screening in primary care.

*What this topic adds:*

1. Overall, older adults had positive attitudes towards dementia risk screening and risk reduction in primary care settings, and screening results mostly did not induce fear about the future.
2. Response efficacy was a significant predictor of behavioural intent to undergo dementia risk screening, whereas self-efficacy and family history of dementia were significant predictors of motivation to change risk-related behaviours.
3. Barriers to behaviour change were lack of information, motivation, and self-control. Facilitators were formal and informal supports, and social and non-social activities.

Dementia is the second leading cause of death in Australia, and the leading cause of disease burden in Australians aged  $\geq 75$  years (Australian Institute of Health and Welfare, 2021).

Approximately 386,200-472,000 Australians are currently living with dementia, predicted to reach 849,300 by 2058. In 2018-2019, \$3 billion of health and aged care spending was directly spent on dementia in Australia (Australian Institute of Health and Welfare, 2021).

Reducing the risk of developing dementia can decrease dementia prevalence and associated healthcare costs.

Livingston et al.'s (2020) Lancet Commission paper indicated that modifying 12 lifestyle and environmental risk factors could prevent or delay up to 40% of dementias. These lifestyle risk factors vary at different life stages: early-life stage (<45 years, less education), midlife stage (45-65 years; hearing loss, traumatic brain injury, hypertension, alcohol overconsumption, obesity) or late-life stage (65+ years; smoking, depression, social isolation, physical inactivity, air pollution, diabetes). Little is known, however, about the most effective methods to identify and manage these risk factors to reduce the prevalence of dementia in these populations.

Dementia risk screening in primary care might be a feasible approach in older adults, as this age group frequently visit their general practitioner (Australian Bureau of Statistics, 2021), and could thus enable access to routine screening and risk reduction interventions. A number of programs are now being developed to test approaches to screening and risk reduction in primary care. For instance, the Body Brain Life program in General Practice trial (BBL-GP; Anstey et al., 2020) piloted tested a digital health, and a combination digital health and face-to-face intervention to address risk factors with promising initial outcomes in risk reduction. Currently, the Active Prevention in People at risk of dementia: Lifestyle, bEhaviour change and Technology to REducE cognitive and functional decline (APPLE-Tree programme) is being evaluated in a clinical trial, and uses personalised goal setting to target

behaviour change on key risk factors (e.g., exercise, alcohol consumption, social connection) delivered by supervised psychology assistants in collaboration with primary care (Cooper et al., 2020). These trials will provide important information about whether dementia risk reduction programs are effective and sustainable in primary care settings.

Successful risk modification requires both the identification of risks and the active engagement of patients and general practitioners to address indicated risks. However, some risk factors are less individually controllable (e.g., early education, air pollution) and/or are not routinely measured in primary care (e.g., social isolation). Further, it is already known that for some health conditions (e.g., genetic conditions) some people prefer not to undergo screening due to having different values and goals, needs and circumstances, or experiencing a state of stress and anxiety about learning about their risk (Sherman & Kilby, 2022). Moreover, Wang et al. (2021) found that providing personalised depression risk information to consumers increased access to self-help resources for depression in high-risk individuals, however receiving personalised depression risk information was less helpful for participants who reported inadequate social support. Genetic counselling provides a balanced and person-centred view including reasons for and against undergoing testing, to facilitate patient decision-making that best aligns with their values (Sherman & Kilby, 2022). Therefore, in considering the feasibility of applying screening and risk reduction actions to target dementia risk, a clear understanding is needed of both an individual's willingness to be informed of their personalised dementia risk, as well as any barriers or enablers to engagement in behaviour changes needed to reduce that risk.

The revised Health Behavioural Model (Janz, Champion, & Strecher, 2002) provides a framework to consider risk screening. This model asserts that health-promoting behaviour is more likely to occur when there is increased perceived threat (i.e., perceived susceptibility, perceived severity), when perceived benefits of behaviour change outweigh perceived

barriers, when there are internal/external cues to change behaviours (cues to action), and there is desire to achieve a positive health outcome (general health motivation) and confidence in being able to perform health-promoting behaviours (self-efficacy). Factors that modify motivation include age, sex, personality, and past experiences. This model forms the basis for the Motivation to Change Lifestyle and Health Behaviour for Dementia Risk Reduction (MCLHB-DRR) scale (Kim, Sargent-Cox, Cherbuin, & Anstey, 2014). In a Korean community sample aged 50-64, MCLHB-DRR general health motivation and self-efficacy significantly explained behavioural intention to change risk for dementia over and above other constructs measured by MCLHB-DRR, fear of dementia, and age (Choi & Seo, 2021). Further, in a Turkish primary care clinic sample aged 40-89 years, most participants (64.8%) indicated they were willing to know their own risk for dementia, and younger age, male sex, more years of education, subjective memory complaints, family history of dementia, dementia caregiver experiences, and participants' willingness to know their own risk were related to greater motivations towards dementia risk reduction on the MCLHB-DRR scale (Akyol et al., 2020). Research has found that depression and poorer social support (including network size and relationship quality) are associated with reduced uptake of preventative health behaviours such as blood pressure and cholesterol management in older adults (Stafford et al., 2018; Thorpe, Thorpe, Kennelty, & Chewning, 2012). Whilst not tested in relation to dementia risk, mental health and social support variables might also impact on motivation for preventative health behaviours.

Another theoretical model that has relevance is the common-sense model of self-regulation (Cameron, Fleszar-Pavlović, & Khachikian, 2020; Leventhal, Meyer, & Nerenz, 1980). This model asserts that representations of illness risk are activated by threat cues from tests of susceptibility (e.g., risk screening) and personal characteristics (e.g., family history of dementia). This activates two pathways including problem-solving to control the threat and

self-regulation to manage emotional distress. Problem-solving relates to behavioural intent (i.e., willingness to undergo risk screening for dementia) and response efficacy (i.e., belief that screening is useful). Emotion-focused self-regulation relates to negative affective responses (e.g., risk screening results making individuals more scared about the future). Fear can motivate adaptive problem-solving when individuals have high self-efficacy and response-efficacy, whereas low self-efficacy and response-efficacy can result in maladaptive responses including defensive avoidance or reactance (Witte & Allen, 2000). Risk-action link coherence involves a clear understanding of how protective actions control the threat of illness, motivating protective action (Cameron et al., 2020). Therefore, considering health behavioural models and previous research, in designing methods to screen and intervene in dementia risk it is important to understand the roles of demographic variables (age, sex, education), personal characteristics (family history of dementia, dementia carer experience, anxiety symptomatology, depression symptomatology, social isolation), and self-efficacy, response efficacy and negative affective responses on behavioural intent and motivation to change risk-related behaviours in primary care.

Finally, identifying key barriers and facilitators to dementia risk screening may also be helpful. Michie, van Stralen, and West's (2011) COM-B model proposes three essential conditions for changing behaviour (B). These include being physically and psychologically capable (C) (related to anxiety and depression symptomatology), having the social and physical opportunity (O) (related to social isolation), and motivation (M) to do the new behaviour more than competing other behaviours. As such the COM-B model provides a framework for informing key barriers and facilitators of behaviour change required to reduce risk for dementia through lifestyle changes.

Thus, the present study aimed to examine:



- 1) Older adults' behavioural intent, response efficacy, and negative affective responses related to undergoing dementia risk screening in primary care, and their motivation to change risk-related behaviours.
- 2) Individual differences that may facilitate or impede these variables including depression symptomatology, anxiety symptomatology, social isolation, family history of dementia, dementia carer experiences, age, sex, and education.
- 3) The predictive strength of these individual differences, response efficacy and negative affective responses on behavioural intent and motivation to change risk-related behaviours in primary care.
- 4) Barriers and facilitators of dementia risk screening and risk reduction in primary care.

## **Materials and Methods**

### ***Participants***

Participants were a convenience sample of 86 community-dwelling older adults aged 60-91 years ( $M=74.03$  years,  $SD=6.83$  years; 58.14% women). Participants were recruited from an existing database of older adults interested in participating in research and via social media advertising. Participants completed a survey and were offered the opportunity to go into a draw to win one of five AUD\$50 vouchers for their participation.

### ***Measures***

#### ***Demographics***

Participants reported age, sex, country of birth, English as a second language, marital status, number of children, living situation, level of education, income, experience as a caregiver for someone with dementia or without dementia, and whether they had a close friend or relative with dementia (Table 1). They also reported if they had: 1) a family history of dementia, and if so, 2) "How much do you believe your family history of dementia will cause you to

develop the disease?" on a 5-point ordinal scale: 0=*not at all*, 1=*a little bit*, 2=*moderately*, 3=*quite a lot*, 4=*very much so*.

[Table 1]

*Geriatric Anxiety Scale 10-item (GAS-10; Mueller et al., 2015)*

The GAS-10 is a 10-item self-report measure of anxiety symptomatology in older adults. Responses are provided on a 4-point Likert scale, ranging from 0 (*not at all*) to 3 (*all of the time*). A score of 0-9 indicates minimal/mild anxiety, 10-11 indicates moderate anxiety, and 12-30 indicates severe anxiety symptomatology. The GAS-10 has excellent reliability, convergent validity, and unidimensionality (Mueller et al., 2015). Internal consistency in the present sample was good ( $\alpha=.83$ ).

*Geriatric Depression Scale 15-item (GDS-15; Sheikh & Yesavage, 1986)*

The GDS-15 is a 15-item self-report measure of depressive symptoms in older adults. Responses are provided on a categorical no-yes scale (*no*=0, *yes*=1). A score of 0-5 is normal and 6-15 indicates clinical levels of depressive symptomatology. A meta-analysis (Krishnamoorthy, Rajaa, & Rehman, 2020) showed that the GDS-15 has a pooled sensitivity of 86% and a pooled specificity of 79%, with high diagnostic accuracy (AUC=0.90). Internal consistency in the current sample was acceptable ( $\alpha=.78$ ).

*Lubben Social Network Scale 6-item (LSNS-6; Lubben et al., 2006)*

The LSNS-6 is a 6-item self-report measure of the size of individual's social networks and social supports among their friendships and families. Items are rated on a 6-point scale, ranging from 0 (*none*) to 5 (*nine or more*) people. A score of <12/30 indicates social isolation, indicating that a participant has, on average, fewer than two people to perform the social integration functions assessed by the scale. The family and friends subscales demonstrate high levels of internal consistency and high correlations with criterion variables, with the clinical cut-point for social isolation showing good convergent validity (Lubben et

al., 2006). Internal consistency in the current sample was good ( $\alpha_{\text{family}}=.87$ ,  $\alpha_{\text{friends}}=.81$ ,  $\alpha_{\text{overall}}=.83$ ).

#### *MCLHB-DRR Scale (Kim et al., 2014)*

The MCLHB-DRR is a 27-item scale that measures the beliefs that underpin the lifestyle and health behavioural changes needed for dementia risk reduction on 7 subscales: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, general health motivation, and self-efficacy. Items are rated on a 5-point scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Scores are summed for each subscale. The scale has moderate to high internal consistency and test-retest reliability (Kim et al., 2014). All but one scale had acceptable internal consistency in the present study ( $\alpha_{\text{susceptibility}}=.88$ ,  $\alpha_{\text{severity}}=.71$ ,  $\alpha_{\text{benefits}}=.81$ ,  $\alpha_{\text{barriers}}=.78$ ,  $\alpha_{\text{cues}}=.79$ ,  $\alpha_{\text{general-health-motivation}}=.55$ ,  $\alpha_{\text{self-efficacy}}=.88$ ,  $\alpha_{\text{overall}}=.83$ ).

#### *Attitudes towards Dementia Risk Screening and Risk Reduction*

A purpose-built measure was developed to assess (1) attitudes and affective responses to dementia risk screening if conducted in a primary care setting and (2) motivation to enact behavioural changes after being informed about modifiable risk factors based on the most recent evidence.

**1. Attitudes towards Dementia Risk Screening.** Participants were given some background information:

*We aim to develop a screening tool that can be used by your General Practitioner (GP) to give you information about your risks for dementia. This screening tool would use the information that you provide to your GP about your lifestyle and health behaviours to calculate your personal risk profile for dementia. Your GP would then inform you about your personal risk and design a risk reduction plan with you. From*

*there, you can choose services in your local community to help you make any changes you would like to make.*

Participants then completed three questions: (1) “I am willing to undergo a risk screening for dementia”, (2) “I believe that dementia risk screening would be useful for me”, and (3) “I think that knowing my risk screening results would make me more scared about the future”, all rated on a 5-point ordinal scale: 0=*not at all*, 1=*a little bit*, 2=*moderately*, 3=*quite a lot*, 4=*very much so*.

**2. Motivation to Change Risk Factors for Dementia.** Participants were presented with a list of 12 risk factors for dementia from Livingston et al. (2020): (1) hearing loss, (2) falls and head injury risk, (3) high blood pressure, (4) high alcohol use, (5) obesity, (6) smoking, (7) depression, (8) social isolation, (9) physical inactivity, (10) exposure to air pollution, (11) diabetes, and (12) low education/mental stimulation. Participants were then informed: “Research suggests that making health changes on all of these 12 factors might reduce your modifiable risk of developing dementia by up to 40%. Based on this information, how motivated are you now to make changes on these 12 factors where needed?”<sup>1</sup> Responses were measured on a 5-point ordinal scale: 0=*not at all*, 1=*a little bit*, 2=*moderately*, 3=*quite a lot*, 4=*very much so*. An open-ended question also offered participants the option to comment on the reasons for their ratings on this question. Two coders (authors DM, MA) read the open-ended survey responses to independently identify the most common themes using thematic analysis (Clarke, Braun, & Hayfield, 2015). There was very high agreement on

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<sup>1</sup> The 40% estimate in reduced risk is based on global estimates of potential reduction in dementia prevalence if all 12 lifestyle and environmental factors were reduced in the population. Therefore, extending this logic, the questionnaire materials state that if a person eliminated all risk factors, the person could have the potential to reduce their risk by 40%. However, not all people have all the risk factors and some risk factors are more modifiable than others and so hence why participants were told that they could reduce their risk *by up to 40%*.

themes. To establish inter-rater reliability, both coders independently coded all data on the identified themes using agreed upon operational definitions. Responses were categorised with multiple themes when applicable. Accuracy was determined for each response by giving one point for correctly identifying the same theme (congruent=1) and one point for not identifying the same theme and/or identifying different themes (incongruent=1). Congruent and incongruent responses were summed for each qualitative question. Percentage of overlap in ratings for a question was calculated by dividing the sum of congruent responses by the sum of total responses (congruent and incongruent) and multiplying by 100. Frequency counts for each theme were averaged across the two coders' responses.

### *Barriers and Facilitators*

Eight barriers to behaviour change were measured including: 1) lack of information (Kim, Sargent-Cox, & Anstey, 2015), 2) lack of motivation to start despite wanting to change and 3) self-control issues after starting (Michie et al., 2011), lack of various kinds of social support including 4) emotional support, 5) support with self-confidence, 6) informational support, 7) action/tangible support (e.g., someone taking on participants' responsibilities; Cutrona & Suhr, 1992), and 8) conflicting social interests (e.g., reducing alcohol overconsumption in social settings could increase social isolation; Michie et al., 2011). An open-ended 'other' option was provided, as well as options to indicate no barriers or choosing not to make lifestyle changes. Open-ended questions asked about (1) any resources that participants had to help them make changes and (2) additional benefits of making changes that may be motivating. The same qualitative coding procedure was used as described above.

### *Procedure*

This study was approved by the Macquarie University Human Research Ethics Committee (52021985627820). After providing informed consent, participants completed the questionnaires online via Qualtrics software. Participants started with demographics, then

GAS-10, GDS-15, LSNS-6, caregiver history, two family history of dementia questions (skip logic on second question if no family history), MCLHB-DRR, attitudes towards dementia risk screening and risk reduction in primary care, and barriers and facilitators. Qualtrics anti-fraud features were used (CAPTCHA, bot detection, preventing multiple submissions, security scan monitor, relevantID, prevent indexing). Data collection occurred August-September 2021.

## **Results**

There was a small amount of missing data (1.4% averaged across measures). Little's missing-completely-at-random test indicated that data were missing completely at random,  $\chi^2(118, N=86)=123.45, p=.347$ . Thus, missing data were handled using pairwise deletion. There were high inter-rater overlap in thematic categorisation of the qualitative responses on motivation to change risk-related behaviours [sum congruent=48, sum incongruent=9,  $48/(48+9)\times 100=84\%$ ], resources to make changes (69/79; 87%), and additional benefits of making changes (63/74; 85%).

### ***Descriptive Statistics***

In general, the sample was born in Australia (72%), spoke English as their first language (91%), had greater than secondary school education (88%), were in married/de facto relationships (56%), and had children (84%; Table 1). Additionally, 30% had a family history of dementia, 32% were a previous/current carer for someone with dementia, 18% were above the clinical threshold for depressive symptomatology (GDS-15), 13% for moderate/severe anxiety symptomatology (GAS-10), and 21% reported social isolation (LNNS-6).

### ***Family History of Dementia***

Twenty-six participants (30%) reported a family history of dementia. Of those, 8% indicated they did not believe that their family history of dementia will cause them to develop the

disease (*not at all* on a 5-point ordinal scale), whereas 50% indicated *a little bit*, 27% *moderately*, and 15% *quite a lot*.

### ***Attitudes towards Dementia Risk Screening and Risk Reduction***

Participants reported being quite/very willing to undergo screening (61%), believed quite a lot/very much that screening would be useful for them (55%), feared the future a little (or not at all) due to screening results (60%), and were quite/very willing to make changes (63%; Figure 1).

Effect sizes for correlations are interpreted using Cohen's (1988) guidelines for small ( $r=.10$ ), medium ( $r=.30$ ), and large ( $r=.5$ ) effect sizes. Correlations between continuous measures of depressive symptomatology, anxiety symptomatology, and social isolation and the four ordinal primary care measures (Supplementary Table 1) indicated non-significant associations, apart from a small positive correlation between anxiety symptomatology and response efficacy,  $r_s(83)=.22$ ,  $p=.046$ . There were no significant differences for sex, dementia caregiving experience, or categorical classifications of anxiety symptomatology and social isolation on the four primary care measures (Supplementary Table 2). However, individuals with depressive symptoms had significantly lower behavioural intent compared to those without depressive symptoms,  $M_{rankNotDepressed}=44.49$ ,  $M_{rankDepressed}=30.70$ ,  $U(N_{NotDepressed}=68$ ,  $N_{Depressed}=15)=340.50$ ,  $p=.036$ . Scores on the depression scale,  $M_{Depressed}=7.87$  ( $SD=2.10$ , 95% CI: 6.70-9.03) vs.  $M_{NotDepressed}=1.93$  ( $SD=1.55$ , 95% CI: 1.56-2.30) indicate  $\geq 6.70$  may be a clinically useful cut-off for behavioural intent related to depressive symptomatology.

Additionally, compared to participants without a family history of dementia, participants with a family history reported significantly greater response efficacy,  $M_{rankNoHistory}=35.38$ ,  $M_{rankHistory}=48.24$ ,  $U(N_{noHistory}=53$ ,  $N_{history}=25)=881.00$ ,  $p=.016$ , and significantly more motivation to change risk-related behaviours,  $M_{rankNoHistory}=32.27$ ,  $M_{rankHistory}=44.96$ ,  $U(N_{noHistory}=48$ ,  $N_{history}=24)=779.00$ ,  $p=.012$  (Supplementary Table 2). Further, there was a

small negative correlation with age and response efficacy,  $r_s(83)=-.23, p=.037$ , and motivation to change risk-related behaviours,  $r_s(77)=-.23, p=.040$  (Supplementary Table 1). There was also a significant small negative correlation between higher levels of education and motivation to change risk-related behaviours,  $r_s(68)=-.24, p=.045$ . Qualitative data on participants' motivation to change risk-related behaviours indicated positive attitudes and motivations to dementia prevention in primary care, need for more scientific evidence or information, and that some already had high awareness of the risk factors and/or healthy lifestyles (Table 2).

[Table 2]

Additionally, two ordinal logistic regressions were conducted including demographic variables (age, sex, education dummy coded: 0=less than bachelor's degree, 1=bachelor's or higher degree), family history of dementia, dementia carer experience, continuous scores on anxiety symptomatology, depressive symptomatology, social isolation, and MCLHB-DRR self-efficacy, and response efficacy and negative affective responses (ordinal data dichotomised on  $\leq 1$  = 'a little bit' or lower vs.  $> 2$  = 'moderately' or higher, dummy coded 0 and 1, respectively) regressed on behavioural intent and motivation to change risk-related behaviours in two separate models. For the behavioural intent model, there was a significant improvement in fit of the final model over the null model,  $\chi^2(11)=42.10, p<.001$ , and the assumption of proportional odds was satisfied,  $\chi^2(33)=31.61, p=.537$ . Response efficacy was a significant predictor of behavioural intent that accounted for unique variance in the model over and above the other variables, 4.08 (95% CI: 2.30-5.86), Wald  $\chi^2(1)=20.13, p<.001$  (Table 3). For the model testing motivation to change risk-related behaviours, there was a significant improvement in fit of the final vs. null model,  $\chi^2(11)=27.56, p=.004$ , and the assumption of proportional odds was satisfied,  $\chi^2(22)=23.17, p=.392$ . Self-efficacy [.45 (95% CI: .10-.80), Wald  $\chi^2(1)=6.51, p=.011$ ] and family history of dementia [1.20 (95% CI: .03-



2.36), Wald  $\chi^2(1)=4.06, p=.044]$  were both significant predictors of motivation that uniquely predicted variance over and above the other variables in the model.

[Table 3]

### ***MCLHB-DRR Scale***

The MCLHB-DRR was highly correlated with attitudes towards dementia risk screening and risk reduction in primary care, particularly response efficacy and motivation to change risk-related behaviours displaying correlations of medium effect size with MCLHB-DRR

perceived susceptibility,  $r_{sResponseEfficacy,Susceptibility}(82)=.28, p=.009$ ,  $r_{sMotivation,Susceptibility}(77)=.27, p=.018$ , perceived benefits,  $r_{sResponseEfficacy,Benefits}(82)=.38, p<.001$ ,  $r_{sMotivation,Benefits}(77)=.37, p=.001$ , and cues to action,  $r_{sResponseEfficacy,Cues}(80)=.30, p=.006$ ,  $r_{sMotivation,Cues}(75)=.45, p<.001$

(Supplementary Table 1). There was a significant positive correlation of medium effect size between anxiety symptomatology and perceived severity,  $r(82)=.29, p=.008$ , a significant small positive correlation with perceived barriers,  $r(83)=.23, p=.038$ , and a small significant negative correlation with depressive symptomatology and self-efficacy,  $r(82)=-.24, p=.028$ .

There was a small significant negative correlation between social network and perceived severity,  $r(82)=-.22, p=.048$ . There were significant small and medium sized negative correlations between age and perceived severity,  $r(82)=-.47, p<.001$ , perceived benefits,  $r(83)=-.24, p=.030$ , and cues to action,  $r(81)=-.30, p=.006$  (Supplementary Table 3).

### ***Barriers and Facilitators***

Barriers to behaviour change were lack of information (36% of participants), lack of motivation (34%), and self-control (31%), while 34% reported no barriers. Lack of social support – emotional (14%), confidence (13%), informational (15%), action (8%), and conflicting interests (3%) were less frequently reported, as was choosing not to make changes (2%) or ‘other’ (7%). Participants’ qualitative responses indicated that resources that can help them make changes were formal supports (professional advice), informal supports

(friends/family), and social and non-social activities (Table 2). Other motivational factors for behaviour change were physical health benefits, and mental and social health benefits (Table 2).

### **Discussion**

This study aimed to examine older adults' attitudes and motivations to undergo dementia risk screening and risk reduction in primary care, and the factors associated with increased motivation. Findings replicated previous studies showing that respondents generally reported positive attitudes to risk screening and risk reduction in primary care and that more positive attitudes were associated with younger age and family history of dementia (Akyol et al., 2020). The finding that older age was significantly associated with fewer perceived benefits to dementia risk reduction, replicating Akyol et al. (2020), suggests that lower perceived benefits may be the reason older participants were less motivated to engage with dementia risk screening, however further longitudinal research is needed. The significant negative correlation between education and motivation to change risk-related behaviours was inconsistent with previous findings (Akyol et al., 2020) and may reflect different effects of education on attitudes towards risk reduction and motivation to make actual changes.

While there was some evidence that individuals with depressive symptoms had significantly lower behavioural intent compared to those without depressive symptoms, depression and anxiety symptoms, and social isolation were not significant unique predictors in the logistic regression model when controlling for the other factors. Further, while lack of social support (emotional, self-confidence, informational, action/tangible; Cutrona & Suhr, 1992) was not identified as a key barrier on quantitative measures, it was a facilitator of health-promoting behaviours in qualitative responses, consistent with Wang et al. (2021). The inverse correlation between social networks and social supports and perceived severity of dementia suggests that social support may reduce concerns about developing dementia.

Response efficacy was a significant unique predictor of behavioural intent over and above the other variables, whereas self-efficacy and family history of dementia were both significant unique predictors of motivation to change risk-related behaviours. These findings are consistent with the common-sense model of self-regulation with aspects of problem-solving being related including behavioural intent and response efficacy (Cameron et al., 2020; Leventhal et al., 1980), and higher self-efficacy motivating adaptive problem-solving (Witte & Allen, 2000). Findings indicate that promoting risk-action link coherence, through increasing response efficacy and self-efficacy, may motivate protective action. This might be achieved through psychoeducation (Cameron et al., 2020). Further, psychological interventions including cognitive behavioural therapy, mindfulness-based therapy, and motivational interviewing are effective for the treatment of alcohol abuse (Hettema, Steele, & Miller, 2004), smoking cessation (Vinci, 2020), weight loss (Roche, Kroska, & Denburg, 2019), and Type 2 diabetes management (West, DiLillo, Bursac, Gore, & Greene, 2007). Thus, there is great opportunity for psychological interventions to be used to help with reducing risk factors for dementia.

The most common barriers to risk reduction were lack of information (consistent with Kim et al., 2015), lack of motivation, and self-control, consistent with COM-B (Michie et al., 2011). The results also indicated that the prospect of dementia screening results mostly did not induce fear about the future. However, 17% of participants reported being quite/very scared, and these individuals may benefit from person-centred advice considering the pros and cons of screening and interventions to address these concerns (Sherman & Kilby, 2022). Moreover, in those with anxiety symptomatology who may be particularly susceptible to fearful responses to dementia risk screening, there was instead a significant positive correlation between anxiety symptomatology and response efficacy. Qualitative data indicated that motivational factors for behaviour change included more immediate benefits

related to physical health, mental and social health. The pattern of findings between MCLHB-DRR and reported attitudes towards dementia risk screening and risk reduction was consistent with predictions from the revised Health Behavioural Model (Janz et al., 2002) which propose that health-promoting behaviour is positively associated with perceived susceptibility, cues to action, and perceived benefits.

### ***Limitations***

Limitations include that participants had high levels of education, socioeconomic resources, were computer-literate and were predominantly born in Australia. Therefore, results might not be generalisable and replication in more culturally and socioeconomically diverse participants is needed. The measure of motivation to change risk-related behaviours is limited by some of the risk factors being less individually modifiable than others (e.g., air pollution). Further, intentions and motivations may not translate to actual or sustained behaviour change, self-efficacy was measured globally rather than specific to each individual risk factor, data were correlational with single items used to measure the primary care variables, there was no validation to demonstrate the purpose-built questions measured the constructs, and risk information was not personalised.

Additionally, this research was linked to primary care yet access can be limited for some older adults (e.g., rural/remote, culturally/socioeconomically diverse; van Gaans & Dent, 2018), general practitioners must be willing to provide this service, and reducing some risk factors (e.g., air pollution) might be difficult in general practice. It is also unclear if population-level screening for dementia risk factors is cost-effective and whether interventions applied in primary care are clinically and cost-effective.

### ***Conclusions***

These findings have implications for the implementation of dementia risk screening and risk reduction in primary care, indicating that, overall, while older adults were generally willing to

undergo risk screening, screening may be maximised by targeting those with a family history of dementia, addressing low response efficacy, low self-efficacy, lack of information, motivation, and self-control, and increasing access to formal and informal supports, and social and non-social activities. This could have significant benefits for caregiver burden, dementia prevalence, and associated healthcare costs.

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Table 1

*Sample Demographics*

	<i>N</i>	%
Sex		
Men	36	42
Women	50	58
Country of birth		
Australia	62	72
England	7	8
Other (mostly New Zealand, Ireland, India)	17	20
English second language		
No	78	91
Yes	8	9
Marital status		
Single	5	6
Married or De Facto	48	56
Divorced	19	22
Widowed	11	13
Other	3	3
Living children		
No	14	16
Yes	72	84
If yes, how many? <i>M (SD)</i>	2.44 (.97)	–
Living situation		
Living alone	28	33
Living with partner, with children	10	12
Living with partner, without children	38	44
Living without partner in household of different composition	3	4
Other:		
Living with adult child	4	5
Living with partner part-time	2	2
Flatmate	1	1
Level of Education		
Primary or secondary school	10	12
TAFE or technical college (or similar)	10	12
Bachelor's degree	29	34
Master's degree	18	21
Doctoral degree	10	12
Other	9	11
Gross income		
\$0 to \$25,999 per year	19	22
\$26,000 to \$41,599 per year	16	19
\$41,600 to \$62,399 per year	15	18
\$62,400 to \$83,199 per year	11	13
\$83,200 to \$103,999 per year	3	4
\$104,000 to \$208,000+ per year	12	14
Prefer not to say	8	10

Previous or current carer for someone with dementia		
No	58	68
Yes	27	32
Previous or current carer for someone without dementia		
No	60	71
Yes	25	29
Has a close friend or relative with dementia		
No	57	67
Yes	28	33
Family history of dementia		
No	53	62
Yes	26	30
Unsure/prefer not to say	7	8

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Table 2

*Themes, Frequencies, and Example Quotes for Qualitative Questions*

Themes and Qualitative Questions	Frequencies	Example Quotes
(1) Themes for motivation to make changes (N=41 responses)		
The participant believes dementia risk reduction information/knowledge is useful and/or is motivated to reduce dementia risk	15/41; 35% responses	“It is amazing a simple change to one's health can reduce the risk of developing dementia. It makes me think all the more of the 12 risk factors mentioned earlier.”
The participant presently has healthy lifestyle habits	4/41; 9%	“As a non-smoker/drinker who exercises and eats well I'm not sure that there is much I can change.”
The participant needs more scientific evidence to change beliefs or lifestyle factors	8/41; 18%	“How can beliefs change spending a short time reading risk factors without further research and knowing the significance of each factor?”
Low awareness of some risk factors and a need for information/education	8/41; 18%	“I do not know much about the causes of dementia. I thought it was mostly hereditary.”
High awareness of risk factors	15/41; 35%	“I already knew quite a bit about risk factors for dementia.”
(2) Themes for resources that can help participants make changes (N=61 responses)		
Formal supports (professional advice from practitioners and researchers)	15/61; 25%	“GP; Exercise physiologist.”
Informal supports (friends/family)	18/61; 29%	“Supportive friends.”
Activities (including social and non-social activities and hobbies)	21/61; 34%	“Seniors group activities, bridge, line dancing, further education.”
Participants did not have/want or could not think of resources	16/61; 26%	“I don't think I need any resources at present.”

(3) Themes for other motivational factors for behaviour change ( $N=65$  responses)

Physical health benefits (improved fitness and health, weight loss, reduced cardiovascular risk)	46/65; 71%	“Improved fitness, reduction of possibility of stroke, heart disease.”
Mental and social health benefits	13/65; 20%	“Elevation of mood”
Participants presently already have healthy lifestyle habits	4/65; 6%	“I feel that I already do my best to have a healthy lifestyle and to stay fit.”

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*Note.* Themes for qualitative questions asking about (1) participants’ motivation to make changes on current risk factors for dementia (2) any resources that participants had to help them make changes and (3) additional benefits of making changes that may be motivating. Themes were independently identified by two coders, consolidated, and then both coders independently coded all data on the identified themes using agreed upon operational definitions. There was high inter-rater overlap in thematic categorisation of the qualitative responses on motivation to make changes (84%), resources to make changes (87%) and additional benefits of making changes (85%).

Table 3.

*Ordinal Logistic Regressions on Behavioural Intent and Motivation to Change Risk-Related Behaviours*

	Estimate	S.E.	Wald statistic	df	p-value	95% CI lower limit	95% CI upper limit
<b>Behavioural intent to undergo dementia risk screening</b>							
Age	.00	.04	.00	1	.980	-.08	.08
Sex	.55	.53	1.07	1	.300	-.49	1.60
Education (dummy coded)	.63	.60	1.10	1	.294	-.55	1.81
Anxiety symptomatology (GAS-10)	.02	.09	.06	1	.805	-.16	.21
Depressive symptomatology (GDS-15)	.00	.13	.00	1	.998	-.25	.24
Social isolation (LSNS-6)	-.04	.05	.72	1	.395	-.13	.05
MCLHB-DRR self-efficacy	.05	.16	.11	1	.745	-.26	.37
Response efficacy (dummy coded)	4.08	.91	20.13	1	.000***	2.30	5.86
Negative affective response (dummy coded)	-.88	.50	3.15	1	.076	-1.86	.09
Family history of dementia	.51	.54	.89	1	.344	-.55	1.58
Dementia carer experience	-.20	.62	.10	1	.753	-1.41	1.02
<b>Motivation to change risk-related behaviours</b>							
Age	-.02	.04	.17	1	.683	-.10	.07
Sex	1.06	.58	3.32	1	.068	-.08	2.19
Education (dummy coded)	-.32	.66	.23	1	.630	-1.62	.98
Anxiety symptomatology (GAS-10)	.00	.09	.00	1	.994	-.19	.19
Depressive symptomatology (GDS-15)	-.10	.13	.63	1	.429	-.36	.15
Social isolation (LSNS-6)	-.05	.05	1.00	1	.317	-.15	.05



MCLHB-DRR self-efficacy	.45	.18	6.51	1	.011*	.10	.80
Response efficacy (dummy coded)	1.02	.65	2.50	1	.114	-.25	2.29
Negative affective response (dummy coded)	-.85	.52	2.65	1	.104	-1.88	.17
Family history of dementia	1.20	.59	4.06	1	.044*	.03	2.36
Dementia carer experience	.09	.65	.02	1	.892	-1.18	1.35

*Note:* Sex: Men=0, Women=1. Education dichotomised on completed bachelor's degree and dummy coded: 0=less than a Bachelor's degree, 1=Bachelor's degree or higher. GAS-10=Geriatric Anxiety Scale (10-item), GDS-15=Geriatric Depression Scale (15-item), LSNS-6=Lubben Social Network Scale (6-item). MCLHB-DRR=Motivation to Change Lifestyle and Health Behaviour for Dementia Risk Reduction scale. Response efficacy (belief that dementia risk screening would be useful) and negative affective responses (knowing screening results would make participants more scared about the future) dichotomised on  $\leq 1$  = 'a little bit' or lower vs.  $> 2$  'moderately' or higher and dummy coded 0 and 1, respectively. Family history of dementia: 0=absent, 1=present. Dementia carer experience: 0=absent, 1=present. Estimate=estimate of the predicted change in log odds of being in a higher/lower ordinal scale point on the dependent variable (controlling for the remaining independent variables) per unit increase on the independent variable. S.E.=standard error for the estimate. df=degrees of freedom. CI=confidence interval. \*=  $p \leq .05$ , \*\*=  $p \leq .01$ , \*\*\*=  $p \leq .001$

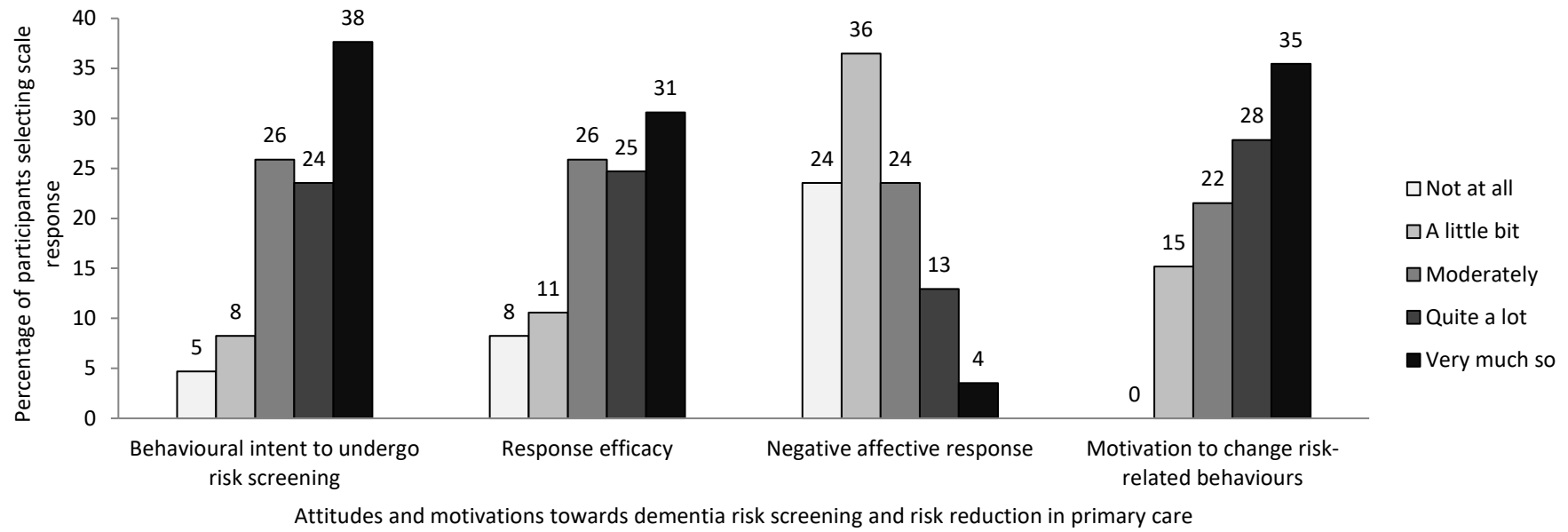


Figure 1. Participants' responses to measures of attitudes and motivations towards dementia risk screening and risk reduction in primary care.