

Associations of awareness of physical activity recommendations for health and self-reported physical activity behaviours among adult South Australians

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Word count: 2976/3000

References: 28 /30

Tables and Figures: 3/3

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Abstract

Objectives: Despite widespread media campaigns to encourage physical activity (PA), participation is poor among Australian adults. This study aimed to explore the prevalence of and relationships between, awareness of PA recommendations and PA participation.

Design: Cross-sectional study of n=2402 South Australian adults (aged ≥ 18 years) via a computer assisted telephone interview.

Methods: PA recommendation awareness was determined by asking for the number of minutes of PA recommended for health benefits and whether PA needed to make you 'puff and pant' to confer a health benefit. Respondents were defined as sufficiently active if they reported ≥ 150 minutes/week of PA as measured by the Active Australia Survey.

Results: 43.0% correctly identified 30 minutes of PA is recommended per day (Recommendation 1) and 43.3% correctly disagreed/strongly disagreed that PA needed to make you 'puff and pant' (Recommendation 2). Overall, 60.6% of respondents were sufficiently active. Of those who correctly identified Recommendation 1, 53.2% reported participating in sufficient PA, significantly fewer than those who did not know Recommendation 1 (69.6%) ($\chi^2=64.74$ (4), $p<0.001$). There was no difference in levels of sufficient PA between those who correctly identified Recommendation 2 and those who did not.

Conclusions: There was relatively low awareness of PA recommendations among South Australian adults. More research is needed on how recommendations are promoted and how they impact PA behaviours. PA recommendations are based on the best available epidemiological evidence but largely fail to guide the choices people currently make about PA.

Keywords: physical activity, guidelines, awareness, exercise, physical fitness, adults

1 **Introduction**

2 Around the world participation in physical activity (PA) is encouraged as means of maintaining good
3 health. The World Health Organization recommends that “adults aged 18–64 years should do at least
4 150 minutes of moderate-intensity aerobic physical activity throughout the week or do at least 75
5 minutes of vigorous-intensity physical activity throughout the week or an equivalent combination of
6 moderate- and vigorous intensity activity”.¹ Many countries have adopted or adapted these
7 recommendations to help inform the public on appropriate PA participation to achieve health benefits.

8 In Australia prior to 2014, the recommendation for PA participation in adults was to undertake 30
9 minutes of moderate or higher intensity physical activity on most days of the week² (translating to
10 150 minutes of activity per week). The simplified message from this recommendation was to achieve
11 30 minutes of PA every day.

12 Both at the state level and nationally a range of social marketing techniques have been integrated into
13 public health campaigns over the last 15-20 years³ which have included mass media avenues,
14 including print, radio and television. In all campaigns the messages of finding 30 minutes and the
15 message of moderate activity on most, preferably all days of the week have been consistent.

16 Whilst mass media campaigns have high consumer recognition,⁴ PA participation remains low. In
17 2012, 70.3% of South Australian adults could recall the *Be Active* state-wide PA campaign when
18 prompted, (unpublished data from SA Health) however in the same year only 50.7% were considered
19 to be sufficiently active.⁵

20 Although there is a clear dose-response effect for the duration and intensity of PA on morbidity and
21 mortality,⁶ PA does not need to be vigorous in order to convey health benefits.⁷ Whilst current
22 recommendations and campaigns encourage participation in walking, moderate and vigorous activity,
23 there may be a perception in the community and amongst some fitness professionals that health
24 benefits from PA require a vigorous intensity due to the way exercise is portrayed in the media.^{8,9}

25 This study aimed to determine awareness among South Australian adults of the recommendation of 30
26 minutes of PA per day (Recommendation 1) and to investigate the proportion who could identify that

27 PA does not need to be of a vigorous intensity (i.e. make you ‘puff and pant’) to gain health benefits
28 (Recommendation 2). The study also aimed to determine whether knowledge of either of these
29 recommendations, or both, were associated with the achievement of PA recommendations. We
30 hypothesised that those who had a higher awareness of the recommendations would be more likely to
31 meet PA recommendations.

32 **Methods**

33 Data for this study were collected as part of the 2013 South Australian Physical Activity Survey
34 (SAPAS). The SAPAS has been conducted every three years since 1998 and is a Computer Assisted
35 Telephone Interview survey managed by Population Research and Outcome Studies at the University
36 of Adelaide, for the South Australian Department for Health and Ageing.

37 The survey content and methodology were approved by the South Australian Department for Health
38 and Ageing Human Research Ethics Committee (Protocol number: HREC/14/SAH/62) and
39 participants gave informed consent before participating in the survey. Trained interviewers conducted
40 the SAPAS between September and November 2013. The questionnaire was pilot tested (n=46) prior
41 to the commencement of the survey.

42 All households in South Australia with a telephone number listed were eligible for selection in the
43 sample. Telephone numbers were randomly selected from the Integrated Public Number Database
44 (IPND). Within each household, the person who had the most recent birthday, and was 18 years or
45 older, was selected for interview. There was no replacement for non-contactable persons.

46 At the time the 2013 SAPAS was in the field, Australia was revising its PA recommendations and
47 new recommendations have since been released. However, the recommendation of 30 minutes per day
48 on most days of the week (i.e. at least 150 minutes per week) of moderate and vigorous activity for
49 health benefits remains largely unchanged and this was used to define sufficient activity in this study.

50 In order to assess awareness of PA recommendations respondents were asked to report “*How many*
51 *minutes or hours per day do you think adults should be spending on physical activity to gain health*

52 *benefits?*” Data were categorised as less than 30 minutes, 30 minutes or more than 30 minutes. A
53 response was deemed to be correct if the respondents answered 30 minutes (Recommendation 1).
54 Participants were also asked to identify whether they agreed or disagreed with the statement “*For*
55 *physical activity to be good for health it must make you puff and pant*” using a question that has been
56 previously asked by Ferney and colleagues¹⁰. As the Active Australia Survey describes vigorous
57 activity as an “activity which made you breathe harder or puff and pant”¹¹ this question asked whether
58 respondents believed that PA needed to be vigorous in order to confer a health benefit. Responses
59 were categorised as strongly agree/agree, neither agree or disagree, or, disagree/strongly disagree.
60 Those who disagreed/strongly disagreed with this statement were considered to be correct
61 (Recommendation 2). In addition those who responded correctly to both questions were considered to
62 be ‘guideline aware’.

63 PA was self-reported using six items from the Active Australia Survey. The validity of the Active
64 Australia Survey was established in a sample of older (65+ years) Australians, comparing pedometer
65 steps with self-reported walking, moderate-to-vigorous physical activity (MVPA) and total PA (sum
66 of walking and MVPA). Fair to moderate correlations with daily steps were found for self-reported
67 walking ($\rho=0.42$), MVPA ($\rho=0.31$) and total PA ($\rho=0.42$). These observed correlations among
68 older Australians are similar in magnitude to validity coefficients reported for other widely used PA
69 self-reports in other age groups.¹² The test-retest reliability of the Active Australia Survey has also
70 been reported as acceptable for: total PA in minutes/week ($\rho=0.64$) in middle age women¹³; and
71 classification as active, insufficiently active or sedentary (66.1%) in a representative sample of
72 adults.¹⁴

73 These questions asked respondents to report the number of times and total time spent engaged in
74 walking, moderate and vigorous physical activity. Responses were summed in accordance with the
75 survey methodology¹¹ to establish whether sufficient PA was being performed in accordance with the
76 national PA recommendations.¹⁵

77 Demographic variables, including income, education, age, sex and area of residence (Rural South
78 Australia or Metropolitan Adelaide) were also collected.

79 Data were analysed using IBM SPSS for Windows version 22.0 (IBM, Armonk, NY, USA).

80 In order to be representative of the South Australian population, data were weighted by age, sex, area
81 (metro/rural) and probability of selection in the household using the 2011 Australian Bureau of
82 Statistics census data and the number of listings in the White Pages.

83 All variables were categorical and were described using frequency and proportions. Data were
84 stratified by sex and compared using chi square tests. Chi square tests were also used to analyse
85 guideline awareness (Recommendation 1, Recommendation 2, or both) by PA participation in the
86 whole sample and separately by sex. Differences were considered significant at $p \leq 0.05$.

87 **Results**

88 The overall participation rate in the SAPAS was 62.3%. A sample of 4910 was drawn; 388 were out
89 of scope (not eligible, disconnected phone numbers), 1117 refused to participate, 667 dwellings could
90 not be contacted, 118 did not speak English and a further 218 were unavailable or incapacitated
91 resulting in a total sample size of n=2402. Of all respondents, 48.4% were men, 28.8 % were aged
92 over 60 years, 26.1 % had a degree qualification or higher, 78.4 % were born in Australia and 72.4 %
93 lived in metropolitan Adelaide (Table 1).

94 Table 2 describes the proportion of respondents who could correctly identify the PA
95 recommendations. 43.0% of respondents correctly identified Recommendation 1, with a larger
96 proportion of women (49.0%) compared to men (36.5%) responding correctly. There was a larger
97 proportion of men (59.6%) compared to women (47.0%) who incorrectly reported that
98 Recommendation 1 was more than 30 minutes ($\chi^2=37.74$ (2), $p<0.001$). When asked about
99 Recommendation 2, 43.3% of respondents correctly disagreed/strongly disagreed and 50% incorrectly
100 agreed/strongly agreed. More women (47.1%) than men (39.3%) correctly answered this question
101 ($\chi^2=14.98$ (2), $p=0.001$).

102 When these two questions were considered together, 19.1% of respondents were 'guideline aware'
103 such that they correctly identified Recommendation 1 and Recommendation 2. A larger proportion of
104 women (22.9%) compared to men (15.0%) were 'guideline aware' ($\chi^2=48.55$ (2), $p<0.001$).

105 Overall, 60.6% of respondents were sufficiently active, with a larger proportion of men (64.6%) being
106 sufficiently active compared to women (56.9%) ($\chi^2=14.78$ (2), $p=0.001$).

107 There was a difference in the proportion of respondents who were sufficiently active and correctly
108 identified Recommendation 1, compared to those who did not know this recommendation ($\chi^2=64.74$
109 (4), $p<0.001$). Of those who correctly identified Recommendation 1, 53.2% were sufficiently active
110 compared to 69.9% of who believed that the recommendation specified more than 30 minutes and
111 52.3% of those who believed the recommendation was less than 30 minutes. A similar pattern was

112 seen for both men and women, with a larger proportion of those who believed Recommendation 1 was
113 more than 30 minutes being sufficiently active.

114 In addition, 14.3% of those who correctly identified Recommendation 1 reported engaging in no PA,
115 compared to 9.5% who believed Recommendation 1 was greater than 30 minutes and 14.8% of those
116 who believed Recommendation 1 was less than 30 minutes (Table 3).

117 There was no difference in levels of sufficient PA between those who correctly or incorrectly
118 identified Recommendation 2 (Table 3). There was however, a difference in minutes of vigorous PA
119 between those who correctly identified Recommendation 2 (64.2 ± 148.4 minutes) compared to those
120 who believed activity should be vigorous (103.9 ± 198.3 minutes) ($F=12.9$ (2), $p<0.001$). This
121 difference was observed in both men and women, with men who correctly identified
122 Recommendation 2 reporting 75.6 ± 176.9 minutes of vigorous activity compared to 118.7 ± 216.0
123 minutes among men who incorrectly identified Recommendation 2 ($F=6.123$ (2), $p=0.002$). Women
124 who correctly identified Recommendation 2 reported engaging in 54.3 ± 117.7 minutes of vigorous
125 activity compared to 87.0 ± 174.7 minutes for women who incorrectly identified Recommendation 2
126 ($F=59.82$ (2), $p=0.003$).

127 With regard to PA participation in those who were 'guideline aware' 49.7% of those who answered
128 both recommendations correctly participated in sufficient activity and this was significantly lower
129 than those who answered both recommendations incorrectly (66.6%), ($\chi^2=36.431$ (4), $p<0.001$). A
130 similar pattern was observed for both men and women.

131 In addition, of those who were 'guideline aware', 15.6% reported participating in no activity,
132 compared to 13.3% who answered at least one recommendation correctly and 11.9% of those who
133 answered neither recommendation correctly (Table 3).

134 **Discussion**

135 The purpose of this study was to describe current awareness of PA recommendations and to determine
136 if awareness was related to participation in sufficient levels of PA.

137 Previous public awareness campaigns have focussed on encouraging participation in 30 minutes of
138 walking, moderate or vigorous activity on most days of the week.^{3, 16-18} The results of this study
139 demonstrated that less than half of respondents were able to correctly identify Recommendation 1.
140 More women than men were able to recall the correct recommendation, while more men than women
141 believed that more than 30 minutes each day was recommended. This finding is comparable with
142 Heinrich and colleagues¹⁴ who found similar levels of awareness among Hawaiians, with 46.4 % of
143 participants correctly identifying 30 minutes per day as the recommendation for physical activity. Our
144 results indicate that less than half of the community is aware of the key messages from what has been
145 a fifteen year-long campaign in South Australia.

146 Recognising the well-established health benefits that can be achieved from vigorous activity⁶ the
147 importance of moderate PA is not as well publicised. Moderate PA may confer more moderate health
148 benefits but may have the added benefit of better long term adherence due to a positive affect and
149 therefore enjoyment of more moderate activities¹⁹ This study therefore aimed to identify the
150 proportion of respondents who believed that in order to achieve health benefits PA needs to be of a
151 vigorous intensity. Approximately half of respondents (and more men than women) believed this to be
152 the case. Bauman and colleagues¹⁷ surveyed 434 Australian adults who expressed high agreement that
153 three 20-minute vigorous exercise sessions were essential and this belief did not change during a PA
154 media campaign. Further, Fearney and colleagues¹⁰ surveyed allied health, exercise and sports
155 scientists asking whether “Exercise that is good for health must make you puff and pant”. Almost
156 three quarters of respondents agreed/strongly agreed with this statement, suggesting that lack of
157 awareness in the wider community may be at least partly attributable to inadequate training of health
158 professionals in these recommendations.

159 Recent research has also suggested that reality television programs that focus on rapid weight loss
160 among obese contestants may convey to audiences that only vigorous activity is beneficial.⁸ In fact in
161 a recent study by Smith and colleagues²⁰ a sample of respondents were asked to identify where they
162 had seen media coverage related to PA. In this study the most common cited coverage was television
163 with the most common coverage being reality TV programs and news and current affairs with

164 government sponsored campaigns being identified to a far less extent. Taken overall, the current and
165 other recent studies point to a long standing perception in the population that PA needs to be vigorous
166 and that public health campaigns have not been able to alter this perception.

167 Only 19% of respondents were able to correctly identify both Recommendation 1 and
168 Recommendation 2, with more women than men being categorised as ‘guideline aware’. This
169 suggests that the uptake of current public health campaigns is limited. After a two year media
170 campaign a recent study demonstrated that 37.6 % of males reported having never seen the campaign
171 compared to 23.6 % of females who had never seen or paid attention to the campaign.²¹ This clearly
172 demonstrates that the details and importance of PA recommendations are not being adequately
173 articulated in public health messages. Further research is required in this area to understand how the
174 socio-demographic factors affecting exposure to, and uptake of, public health messages relate to PA
175 behaviours.

176 Overall, almost two-thirds of respondents in this study reported being sufficiently active. This
177 proportion is higher than seen in other South Australian surveys,⁵ perhaps attributable to seasonal
178 variation in PA participation and differences in the timing of data collections.²²

179 Notably, being ‘guideline aware’ was associated with PA participation, but in unexpected directions.
180 Of those who could identify neither recommendation correctly, a higher proportion were sufficiently
181 active, compared to those who were ‘guideline aware’. Heinrich and colleagues²³ reported that
182 participants who believed they needed more activity than the recommendations engaged in walking or
183 moderate activity at levels equal to or above recommendations. The recommendation of 150 minutes
184 of moderate and vigorous activity relates to overall health and well-being. It is possible that those who
185 regularly engage in PA are participating for reasons other than just good overall health, such as for
186 fitness, weight loss and appearance.^{24, 25} Therefore respondents may be reflecting on their own
187 perceptions of what constitutes good health and thus report levels of PA engagement well beyond the
188 ‘minimum’ benchmarks of 30 minutes of moderate PA. It is well established that PA participation
189 over and above the current recommendations are needed for specific health related outcomes
190 including weight loss and as such current Australian PA recommendations now state that 300 minutes

191 per week is needed for prevention of weight gain.²⁶ It is also feasible that very active survey
192 respondents reflect on their own good health and use their current PA engagement as the ‘reference
193 point’ when responding to questions about sufficient levels of PA for health benefits.

194 Whilst a larger proportion of those who were sufficiently active (59.7%) over-estimated the minimum
195 requirement the reverse is not true of respondents who reported no activity. A high proportion of those
196 who reported no activity (52.4%) correctly identified Recommendation 1. In addition, there was no
197 difference between respondents who reported no activity and those who reported sufficient PA in their
198 responses to Recommendation 2.

199 This study utilized a valid and reliable tool for measuring self-reported PA at the population level,¹⁰
200 however self-reported PA is not without its limitations with a tendency for respondents to
201 overestimate their PA levels.^{27, 28} In addition, it is possible that the wording of the question regarding
202 the number of minutes required for health benefits did not unambiguously direct respondents to
203 consider the minimum duration of daily PA to elicit measurable health benefits, and that respondents
204 may have taken a view of ‘more is better’. In addition, knowledge of recommendations is likely to
205 increase at times of mass media campaigns¹⁷ and it is therefore important to acknowledge at the time
206 of the data collection phase of this study the *Be Active* campaign had not been in the media in South
207 Australia for seven months prior.

208 **Conclusions**

209 This study indicates that that previous public education programs are not adequately articulating the
210 PA recommendations to the public. Over half of the respondents reported believing that the current
211 PA recommendations are higher than they are (i.e. more than 30 minutes per day) and half of the
212 respondents also believed that activity needed to be of a vigorous intensity to benefit health. A higher
213 proportion of those who believed that activity should be more than the current recommendations or of
214 a vigorous intensity were sufficiently active.

215 The apparent association between low guideline awareness and a higher prevalence of sufficient
216 activity may be due to a cross section of respondents who are already highly active and are of good

217 health, reporting their own behaviour rather than knowledge of the recommendations. Independent of
218 role of guidelines for individual behaviour change, guidelines are important for monitoring population
219 level activity levels. Regardless, the results of this study suggest that awareness of PA guidelines
220 alone is unrelated to the achievement of sufficient PA, and that research into the barriers and enablers
221 associated with PA behaviour change is clearly warranted.

222 **Practical Implications**

- 223 • Only 19% of respondents to this study were able to correctly identify the number of minutes
224 and the intensity of PA to confer health benefits. This suggests that current public health
225 campaigns are not adequately articulating recommendations to the public.
- 226 • Half of respondents believe that PA needs to be of a vigorous intensity to confer health
227 benefits. Future public education campaigns need to focus on educating the public that PA
228 does not need to be vigorous to confer health benefits.
- 229 • Campaigns to raise awareness of guidelines for physical activity need to be supported by
230 community level strategies that address current barriers to PA behaviour change.

231

232 **Acknowledgements**

233 The authors wish to acknowledge the contribution of the members of the South Australian Physical
234 Activity survey advisory committee, Eleonora Dal Grande, Alicia Montgomery, Professor Kevin
235 Norton and Melanie Smith.

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Table 1. Demographic profile of the respondents to the survey

	n	%
Sex		
Male	1164	48.4
Female	1238	51.6
Age		
18 to 29 years	428	17.8
30 to 44 years	640	26.6
45 to 59 years	641	26.7
60 to 74 years	449	18.7
75 years and over	243	10.1
Education		
Secondary	962	40.1
Trade, certificate or diploma	811	33.8
Degree or higher	626	26.1
Income		
Up to \$20,000	156	6.5
\$20,001-\$40,000	284	11.8
\$40,001-\$60,000	277	11.5
\$60,0001-\$80,000	235	9.8
\$80,000-\$100,000	212	8.8
More than \$100,000	673	28.0
Don't know/Refused	565	23.5
Country of birth		
Australia	1883	78.4
Other	516	21.5
Area		
Metro	1738	72.4
Country	664	27.6
BMI		
Underweight (<18.5)	43	1.9
Normal (\geq 18.5 to < 25)	919	40.9
Overweight (\geq 25 to <30)	775	34.5
Obese (\geq 30)	510	22.7

The weighting of the data can result in rounding discrepancies or totals not adding

Table 2. Proportion of respondents to correctly identify physical activity recommendations.

Recommendation 1							
	Total		Men		Women		P
	n	%	n	%	n	%	
30 mins (correct response)	979	43.0	400	36.5	579	49.0	
less than 30 minutes (incorrect)	89	3.9	43	3.9	47	4.0	<0.001*
more than 30 minutes (incorrect)	1209	53.1	653	59.6	555	47.0	
Recommendation 2							
	Total		Men		Women		P
	n	%	n	%	n	%	
strongly agree/agree (incorrect)	1194	50.0	624	53.7	570	46.4	
neither agree or disagree (incorrect)	161	6.7	81	7.0	80	6.5	<0.001*
disagree/strongly disagree (correct)	1034	43.3	456	39.3	578	47.1	
Guideline Awareness							
	Total		Men		Women		P
	n	%	n	%	n	%	
No responses correct	833	34.9	479	41.3	354	28.9	
one response correct	110	46.0	508	43.8	592	48.2	<0.001*
both responses correct (guideline aware)	456	19.1	174	15.0	281	22.9	

Recommendation 1: How many minutes should adults be spending on PA to gain health benefits?

Recommendation 2: For physical activity to be good for health it must make you puff and pant.

Guideline aware: Recommendation 1 and Recommendation 2 both correctly answered

**Statistically significantly different between men and women ($p < 0.005$)*

Table 3. Proportion of respondents who were sufficiently active by recommendation awareness.

	Overall			P	Men			P	Women			P
	No activity % (n)	Not sufficiently active % (n)	Sufficient Activity % (n)		No activity % (n)	Not sufficiently active % (n)	Sufficient Activity % (n)		No activity % (n)	Not sufficiently active % (n)	Sufficient Activity % (n)	
Recommendation 1												
more than 30 minutes (incorrect)	9.5 (114)	21.0 (252)	69.6 (836)	<0.001	8.8 (57)	17.1 (111)	74.1 (481)	<0.001	10.3 (57)	25.5 (141)	64.2 (355)	0.002
30 mins (correct response)	14.3 (140)	32.5 (317)	53.2 (519)		13.3 (53)	33.0 (132)	53.8 (215)		15.1 (87)	32.2 (186)	52.7 (304)	
less than 30 minutes (incorrect)	14.8 (13)	33.0 (29)	52.3 (46)		14.3 (6)	33.3 (14)	52.4 (22)		15.6 (7)	33.3 (15)	51.1 (23)	
Recommendation 2												
strongly agree/agree (incorrect)	12.6 (150)	24.8 (294)	62.6 (743)	0.244	11.1 (69)	21.6 (134)	67.2 (416)	0.084	14.2 (81)	28.3 (161)	57.5 (327)	0.962
Neither agree or disagree (incorrect)	10.8 (17)	27.2 (43)	27.5 (283)		6.4 (5)	28.2 (22)	65.4 (51)		15.0 (12)	26.3 (21)	58.8 (47)	
disagree/strongly disagree (correct)	14.3 (147)	62.0 (98)	58.2 (598)		14.5 (66)	24.6 (112)	60.9 (277)		14.1 (81)	29.8 (171)	56.1 (322)	
Guideline Awareness												
No responses correct	11.9 (98)	21.5 (178)	66.6 (550)	<0.001	11.2 (53)	16.3 (77)	72.5 (342)	<0.001	13.0 (46)	28.5 (101)	58.6 (208)	0.006
One response correct	13.3 (145)	26.1 (285)	60.7 (663)		11.3 (57)	26.9 (136)	61.8 (312)		15.1 (89)	25.2 (148)	59.7 (251)	
both responses correct (guideline aware)	15.6 (71)	34.7 (158)	49.7 (226)		17.7 (31)	30.9 (54)	51.4 (90)		14.2 (40)	37.0 (104)	48.8 (137)	

Recommendation 1: How many minutes should adults be spending on PA to gain health benefits?

Recommendation 2: For physical activity to be good for health it must make you puff and pant.

Guideline aware: Recommendation 1 and Recommendation 2 both correctly answered

**Statistically significantly different between men and women ($p < 0.005$)*