

Impact of Healthy Lifestyle Program: An Intervention Study among Rural and Regional Communities in Australia

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Abstract— It is generally accepted that physical activity (PA) is beneficial -especially for families living in low socioeconomic circumstances. Accordingly the Healthy Lifestyles Program (HLP) was designed to increase knowledge and skills of participants to better adopt healthy PA behaviors; and to increase parents' ability to establish healthy PA behaviors in their children. Methods: A field intervention with quasi-experimental design. The follow up was conducted on two phases immediate and after 3 months of the program. Results: After participation in the program, 94% of participants stated the need for regular exercise; 72% stated they would do similar amount of PA and 80% in 3 month survey. They also stated that children aged between 5 to 12 years should have PA from 1 to 2 hours/ day. More than 80% of participants were confident in getting enough PA for them and guiding their children to improve or maintain good health. The results indicated that HLS program has improved knowledge and lifestyle skills of the participants; improved their ability to adopt healthy PA behavior and increased parent ability to establish PA/exercise patterns among their children. Conclusion: Participants are now able to access healthy lifestyle choices for themselves and their children including regular PA. Keywords — healthy lifestyle, knowledge, physical activity, skills

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I. INTRODUCTION

General health benefits for adults in relation to physical activity are based on 30 minutes of moderate intensity physical activity on five or more days per week¹⁻⁴. Recommendations differ for children, adolescents, adults and older adults. For example in Australia it is recommended that adults undertake an additional vigorous activity for a minimum of around 30 minutes, three to four days a week to achieve greater health and fitness benefits⁵. In a study on the effects of age and sex on physical activity levels among 11-15 year old and the relationship between meeting physical activity guidelines and socioeconomic status (SES) and sedentary behavior⁶, older children were less active than younger children and girls less active than boys. Similarly, overseas birth of parents or child, sex (female), low SES, and residence are all major factors associated with lower comparable physical activity⁷. The Standing Committee on Recreation and Sport⁸ reported that Indigenous Australians over 15 years of age were 1.6 % more likely to report sedentary levels of physical activity compared to the general population. The trend for sedentary or low levels of exercise increased from 68% to 75% from 2001-2005 whilst exercising at moderate/high levels had dropped from 32% to 24%. Age and sex effects are also seen with rates of little or no physical activity increasing with age from 67% of people aged 15-24 years to 85% of those aged 55 years and over. Inactivity is higher among females than males (82% vs. 67%). Sedentary Indigenous Australians are more likely to report poor health, to smoke, to be overweight and have chronic health conditions⁸. Poor nutrition and sedentary lifestyle contribute to the statistics of 7.4 million overweight Australian adults with over a third of those being obese⁹. Middle aged (45-64 years) Australians have the highest combined rates of overweight and obesity compared to other aged groups¹⁰. Data collected from 14,000 adults throughout Australia on National Blood Pressure Screening Day in June 2007 showed that around 35% of middle aged women and 50% of middle aged men were overweight (defined as having a BMI in the 25-30 range) and 30% of each sex are obese (BMI > 30)¹¹. It is estimated that over the next 20 years 700,000 hospital admissions and 123,000 deaths will be a direct consequence of overweight in middle aged Australians¹⁰. Lack of physical activity is reported to account for 6.6% of the burden of disease and is the fourth highest after tobacco, high blood pressure and obesity¹². The direct health care cost is estimated to be \$1.5 billion per year¹³ which equates to 0.15% of



GDP¹⁴. Health costs were lower for overweight active women than for healthy-weight sedentary women. At the population level these data suggest that there would be significant cost savings if sedentary mid-age women could achieve at least 'low' levels of physical activity (60-150 minutes a week).

A review of epidemiological data from 2000–2003, shows that physical activity confers a positive benefit on health and reduces risks of ill health¹⁵. Results of that study reinforced the existing conclusions that physical activity does reduce the risks of cardiovascular disease and diabetes and can reduce the incidence of some cancers, most notably colon and breast.

The literature thus reveals the benefit of physical activity, especially for low socioeconomic families. The HLP initiated various physical activity programs for low socio economic families and young people in rural communities through local community service providers. Interventions were based on the Department of Health & Aging recommendations for physical activity including 30 minutes of moderate physical activity on five or more days per week.⁹⁻¹³ Recommendations differ for children, adolescents, and older adults (60-120 minutes for children 5-12 years old; 60 minutes for adolescents 12-18 years old; 30 minutes for older adults)¹⁴. Physical activity interventions for the HLP included using free public spaces (outdoor gym equipment, beach, park, walking/bike tracks), low cost physical activities and an emphasis on incidental physical activity to achieve recommendations. Group activities were organized as per discussion with client groups- e.g. aqua-aerobics, dancing with friends, walking groups, team building games for adolescents and developmental focused activities for children. An emphasis was also placed on less time in front of the TV and using electronic equipment (computers, games, etc). All interventions of the HLP were designed to be extremely practical, visually engaging, social, and informal, and were implemented through collaboration with local community service providers whose clients were in the stated target group. The program design was a collaborative effort by community service providers who had existing relationships with target groups. Program materials were developed and service providers were trained to run the program with their client groups. In relation to physical activity, the aims of the project were to:

- a) Increase knowledge and skills of participants to better adopt healthy physical activity behaviors,
- b) Increase parents' ability to establish healthy physical activity behaviors in their children,
- c) Identify any barriers to healthy choices adoption by participants in relation to physical activity.

II. METHODS

Ethics approval was obtained from the University of Southern Queensland (reference number H12REA030).

A. Study design

This is a field intervention with a quasi-experimental design in a pre-post assessment approach. Convenience sampling was utilized to access a cross sectional sample of approximately 200 participants with a final total of 176 people completing program. The program implementation began in August 2012 and continued until March 2013. Families and young people

from low-socio-economic and disadvantaged groups in Fraser Coast, Australia were engaged as participants. Surveys were administered by the program facilitators at entry and exit points of individual activities in relation to amount of physical activity.

B. Data collection

Based on the project objectives and literature review the survey questionnaires were developed and piloted with 10 similar groups of participants. The research team has reviewed the questionnaire thoroughly and modified as per the pilot results and comments of the two researchers in this field. The five point Likert scale, e.g.,: 1= strongly disagree, 2= disagree, 3= neither, 4= agree, 5=strongly agree was used to measure the views of participants. Data were collected from the participants during August 2012 to March 2013. The follow up was conducted on two phases immediate and after three months. During the implementation phase 176 participants completed the survey questionnaires.

C. Data analysis

The programs where a majority of participants did not complete the questionnaires were not included in the data analysis. Data were entered and analyzed using the statistical package SPSS version 21.0. The missing data were excluded from the analysis. The frequency counts and percentages as well as means, standard deviations, were calculated. One-way ANOVA, independent-samples t-test and chi-square were calculated to determine whether there were significant differences in opinions of the participants with regards to their knowledge, confidence, and behavior changes in physical activity, based on their time of participation in the survey. The differences in physical activity were tested for significance at .05 level of probability. Results are presented as de-identified and aggregated data.

RESULTS

A. Demographic Characteristics of Participants

More than four-fifths (81%) of the participants were female and 19% male. The ages ranged from 14 to 77 years; the average age was 31.4 years. The highest proportions (45%) of participants were 21 to 40 years of age, compared to 31% below 21 years; 24 % was above 40 years of age. Almost one-fifth (19%) of the participants were Aboriginal and Torres Strait Islander and /or both. The majority (81%) of participants were born in Australia compared to 19% born in another country. Most of the participants (81%) spoke English at home and 19 % spoke other languages. More than two-fifths (44%) of the participants were married or had partners with children compared to 22% single with children. The numbers of children of single parents ranged from 1 to 9 and from 1 to 7 for those who were married, or have a partner and children.

B. Physical Activity

Before participation in the program 88% of participants either agreed or strongly agreed that '*exercise doesn't have to be done all at one time- 3 blocks of 10 minutes per day*' are okay; 94% stated the same after their participation and 78% of 3 month survey. Further, the participants in all three surveys either agreed or strongly agreed that *regular moderate physical activity that makes you breathe more heavily can improve your*



health. The differences were tested using F-test. Data in Table 1 shown that there was a difference in mean ratings in the statements about physical activity for improvement of health between before & after and after & 3 month of survey of the participants in this program. The F-values for both the statements were 14.35 (P=.001) and 6.33 (P=.002) respectively, indicating highly significant differences within the three times of survey. To identify which group or groups differed significantly from the others, a Tukey test was performed. As shown in Table 1, the mean rating of the participants after their participation on *For adults, exercise doesn't have to be done all at one time – 3 blocks of 10 minutes per day are okay* differed significantly from their before participation. They had higher mean rating in after participation, indicating that they had strong agreement with this statement. However, the mean rating of the participants in 3 month survey decreased to 3.80 which differed significantly from their after participation.

TABLE [1] Perception of Physical Activity and health among Austrians adults.

Physical activity for healthy life		Mean ¹ SD	Variance	Sum of Squares	F test and P value
For adults, exercise doesn't have to be done all at one time – 3 blocks of 10 minutes per day are okay	Before	4.04 (0.71)	Between group	14.24	14.35 0.001
	After	4.42 (0.63)	Within group	163.23	
	3 month	3.80 (1.3)	Total	177.47	
For adults, exercise doesn't have to be done all at one time – 3 blocks of 10 minutes per day are okay	Before	3.98 (0.71)	Between group	8.23	6.33 0.002
	After	4.31 (0.82)	Within group	210.57	
	3 month	4.13 (1.35)	Total	218.80	

SD= standard deviation, Means¹ were calculated using a five point scale: 1= strongly disagree, 2= disagree, 3= neither, 4= agree, 5=strongly agree.

Similarly, the mean rating of the participants after their participation on *Regular moderate physical activity that makes you breathe more heavily can improve your health* differed significantly from their before participation in the program. They had higher mean rating (4.31) in after participation (Table 1).

C. Amount of Physical Activity Needed Daily for Children

Data in Table 2 show that there were varieties of responses on the amount of physical activity for children. Before the participation in this program 35% indicated the children should have an hour physical activity each day, compared to 28%, 30

minutes and 21%, 2 hours; whereas after participation 40% indicated an hour in time to do physical activity compared to 22%, 30 minutes and 33%, 2 hours. Similarly, after 3 month survey, 37% responded that the children should have physical activity for 1 hour, compared to 27%, in 30 minutes and 18% for 2 hours. As there were insufficient data in 3 month survey, a Chi-square test was computed with only before and after survey data of the participants. Chi-square (14.247, P=.02) results showed there was a significant differences in opinion between before and after participation. After participation in the program the participants stated that the children –age between 5 to 12 years should have physical activity from 1 to 2 hours each day.

TABLE [2] AMOUNT OF PHYSICAL ACTIVITY FOR CHILDREN

Children's physical activity-age between 5 and 12 years need each	No. (%)		
	Before	After	3 months
30 minutes	42 (28)	29(22)	3(27)
1 hour	53(35)	53(40)	4(37)
2 hours	31(21)	44(33)	2(18)
Don't know	24(16)	7(5)	2(18)
Total	150(100)	133(100)	11(100)

D. Willingness to Do Physical Activity

Before the participation more than three-fifths (63%) of the participants stated they would do physical activity 4 to 7 times a week a total of 30 minutes or more, 72% stated after their of participation they would do similar amount of physical activity, and 80% in 3 month survey.

TABLE [3] DIFFERENCE IN PHYSICAL ACTIVITY

How often		Mean ¹ SD	Variance	Sum of df Squares	F test P value
Would you do a total of 30 mins or more physical activity in a day?	Before	2.19 (1.05)	Between group	3.87	2 1.94 0.14
	After	2.01 (0.91)	Within group	328.24	
	3 month	1.80 (1.08)	Total	332.11	
Would your children do 60 mins or more physical activity in a day?	Before	2.10 (1.35)	Between group	18.41	2 6.88* 0.001
	After	1.49 (0.87)	Within group	315.55	
	3 month	1.70 (1.16)	Total	333.96	

SD= standard deviation, Means¹ were calculated on a five point scale: 1=6-7 times a week, 2=4-5 times a week, 3=2-3 times a week, 4=Once a week, 5=Less than once a week.

E. Difficulties in Maintaining Physical Activity

Before their participation, one-half (50%) of the participants stated some difficulties they had to be physically active; it decreased to 40 % in after participation and 33% in 3 month survey. They also stated some difficulties and the most



stated difficulties were *I don't feel motivated to exercise, not enough time, and lack of support from family* (Table 4). Before their participation 28% of the participants stated they had some difficulties to make their children to be physically active; it decreased to 23% after participation and 20% in 3 month survey. The main difficulties were *children watch TV or playing computer games, don't have enough time and too expensive*.

TABLE [4] WEEKLY PHYSICAL ACTIVITY

What things make it difficult	No. (%)		
	Before	After	3 month
<i>for you to be physically active over any given week?</i>			
Nothing, I am very active	79 (50)	87(60)	10(67)
Too expensive	3(2)	3(2)	--
I don't feel motivated to exercise	33(21)	30(20)	2(13)
Lack of support from family	6(4)	4(3)	--
Nowhere safe or private to do it	1(1)	3(2)	--
Not enough time	23(15)	14(10)	2(13)
Other	12(7)	4(4)	1(7)
Total	157(100)	145(145)	15(100)
<i>for your children to be physically active over any given week?</i>			
Nothing, they are very active	88(72)	82(77)	8(80)
Too expensive	2(2)	3(3)	--
Don't have enough time	3(2)	2(2)	--
They don't like exercise	--	2(2)	--
Watch TV or playing computer games	11(9)	9(8)	--
Nowhere safe to do it	--	2(2)	--
Others	19(15)	7(6)	2(20)
Total	123(100)	107(100)	10(100)

F. Confidence in Physical Activity After Participation in the Program

Data in Table 5 show, more than 80% of participants were more confident in getting enough physical activity to improve good health and guiding children to get enough physical activity to improve or maintain good health. Data from the 3 month survey show that participants are sustaining their

physical activity to maintain good health (53%), and also guiding their children to maintain good health through physical activity (64%).Independent t-test result ($t=-1.79$, $p=.07$) shows there is an insignificant differences in confidence between after and 3 month of participation in the program.

TABLE [5] CONFIDENCE IN PHYSICAL ACTIVITY

ACTIVITY TIME	YES, A LOT MORE CONFIDENT (%)	YES, A LITTLE MORE CONFIDENT (%)	ABOUT THE SAME (%)	NO, A LITTLE LESS CONFIDENT (%)	NO A LOT LESS CONFIDENT (%)	MEAN ¹ SD	T-TEST P VALUE
GETTING ENOUGH PHYSICAL ACTIVITY TO IMPROVE OR MAINTAIN GOOD HEALTH							
AFTER	59	28	13	0	0	1.54 (0.72)	-1.79 0.07
3 MONTH	53	20	20	0	7	1.93 (1.73)	
GUIDING YOUR CHILDREN TO GET ENOUGH PHYSICAL ACTIVITY TO IMPROVE OR MAINTAIN GOOD HEALTH							
AFTER	65	20	14	1	0	1.51 (0.76)	.24 0.80
3 MONTH	64	27	9	0	0	1.45 (0.68)	

Means¹ were calculated on a five point scale: 1=yes, a lot more confident, 2=yes, a little more confident, 3=about the same, 4=no, a little less confident, 5=no a lot less confident.

III. DISCUSSION

The main notion to emerge from the findings is that participants now appear to better understand the benefits of participating in regular physical activity. The main outcomes of the program are discussed below

A.Changes Knowledge in Physical Activity

Understanding about the importance of physical exercise increased. The results showed that there was significant improvement in knowledge levels about the importance of exercise and level of physical activity. The mean rating of participants after their participation on *'For an adult, exercise doesn't have to be done all at one time-3 blocks of 10 minutes per day are okay'* differed significantly from their before participation responses. There was a higher mean rating (4.52) after participation, indicating strong agreement with this statement. Similarly, the mean rating of participants after participation (4.31) on *'Regular moderate physical activity that makes you breathe more heavily can improve your health'* differed significantly from their before participation response



(3.98) in the program. This validated responses of service providers who stated that participants' activity levels increased and participants in some cases initiated continuous activity with various community groups. This data confirms a positive benefit on health and reducing the risk of illness as identified by other researchers¹⁶ who likewise have concluded that physical activity reduces the risk of cardiovascular disease and diabetes and may reduce the incidence of some cancers, most notably colon and breast cancers.

The highest proportion of participants indicated that 1 hour to 2 hours of physical activity are necessary for a child per day. This finding supports the Department of Health and Aging report¹⁷ that stated that every child needs at least 60 minutes of moderate to vigorous intensity physical activity per day and should not spend more than two hours using electronic media for entertainment during daylight hours¹⁷.

B. Changes in Behaviour Relating to Physical Activity

Before participation in the program, more than three-fifths (63%) of the participants stated they would do physical activity 4 to 7 times (a week a total of 30 minutes or more), 72% stated after their participation they would do similar amount of physical activity, as did 80% in the 3 month post survey. This incremental result shows the program changed the behavior of participants to do more physical activity. Similarly participants have said that before participation in the program children should do physical activity 4-5 times a week, however after participation they stated that the children should do physical activity 6-7 times a week. This amount of physical activity is necessary for the children to maintain their healthy lifestyle. Lack of physical activity is reported to account for 6.6% of the burden of disease and is the fourth highest after tobacco, high blood pressure and obesity^{17, 18}.

C. Confidence in Doing Physical Activity

A. Participants are now more confident about doing enough physical activity to improve their health and encourage their children in exercise programs to improve and maintain good health. These confidence levels sustained 3 months after participation. This result signifies the positive impact of the program on participants in maintaining healthy lifestyle. Results support findings by Jarrett et al. (2011) who revealed seven caregiver management strategies that promoted child physical activity, despite multiple neighborhood barriers. These included kin-based play groups, collective supervision, local resource brokering, and extra-local resource brokering. These findings provide important substantive and theoretical insights on the relationship between caregiver practices, neighborhood social context, and child physical activity¹⁹. Many of these principles were embedded in this HLP: running local programs, using local resources, such as public space and public exercise equipment, encouraging informal support networks, and incorporating the program in a parenting/child care program in one instance.

D. Difficulties Associated with Physical Activity

Most cited difficulties in relation to physical activity were: no motivation to exercise, lack of support from family, and not enough time to participate in physical activity. These factors influence behavior and choice of the low socio-economic families; however, this should not be a barrier to participate in

physical activity²⁰. Commonly stated difficulties for the children were: they watch too much TV and/or play games in computer and thus they don't have enough time to do physical activity. This is congruent with findings of Chang and his associate^{21, 22}. They stated the lack of personal time is an acute barrier to undertake physical activity. Few participants stated that the physical activity for the children is too expensive and this statement is similar to Harrison et al.²³. Harrison and associates indicated that cost and availability are barriers for rural and remote communities.

IV. CONCLUSIONS

The findings indicated that the program has had a positive effect on the quality of life of participants and they are now able to access healthy lifestyle choice for themselves and their children including regular physical activity. The self-reported benefits to participants are as follows:

- Improved knowledge, lifestyle skills and confidence about doing physical activity
- Improved ability to adopt healthy physical activity behaviour
- Increased parent ability to establish physical activity/exercise patterns among children early in life.

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