



Original Article

Psychological effects of physical activity: A quasi-experiment in an indigenous community



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ABSTRACT

Objectives: In addition to physical health benefits, being physically active or exercising can also have psychological benefits. We explored the psychological effects of an exercise intervention in this quasi-experiment.

Materials and Methods: Residents in Ma-Yuan village in Wan Rung township in Hualien county, Taiwan were recruited to participate in a fitness program ($n = 31$). Residents from the same village but geographically segregated areas served as a control group ($n = 44$). Participants from both groups filled out a pretest questionnaire at the beginning of the intervention, and a post-test questionnaire 1 week after the conclusion of the intervention.

Results: Analysis of the pre- and post-test survey data showed that after the intervention, participants in the intervention group, but not those in the control group, experienced less negative affect. In addition, participants in the intervention group had more positive attitudes toward some aspects of exercising.

Conclusion: Future intervention promoting exercise or physical activity targeting indigenous people could stress the emotional benefits of exercising, as it may be more congruent with indigenous cultural values.

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1. Introduction

Being physically active has always been one of the main foci in public health. The benefits of physical activity are well documented. Nevertheless, the focus is disproportionately on physical health and from the medical standpoint (e.g., reducing the risk of metabolic syndrome or cardiac vascular disease). Consequently, health professionals often stress this aspect of the benefits when educating or encouraging the general public to make exercise a part of daily life. However, another benefit of staying physically active is mental health [1]. Evidence from clinical observation has shown that being physically active is related to a higher quality of life [2]. Research evidence has also shown that physical activity in leisure time is positively associated with quality of life in females [3]. More specifically, sedentary behavior is a risk factor for depression among college students [4]. Although another study found that being

physically active or sedentary was unrelated to negative affect, people who were very active or moderately active experienced more positive affect than those with a sedentary lifestyle [5]. Although the evidence is somewhat mixed, these results show that being physically active is related to affective experiences. People are generally more perceptive of changes in their affective experiences than of their metabolic status; therefore, focusing on the psychological benefits might be a more persuasive reason for the general public to be physically active or start exercising.

In addition to affective experiences, we believed that being physically active can also change people's attitudes toward being active or exercising. According to the theory of cognitive dissonance [6], people change attitudes to maintain consistency between their own attitudes and behavior. Therefore, we expected that once people started and continued exercising, their attitudes toward exercising would become more positive.

In this paper, we reported the results of a quasi-experiment on the psychological effects of exercising conducted in Ma-Yuan village in Wan Rung township in Hualien county, Taiwan. In this quasi-experiment, we implemented an exercise intervention, and conducted a pretest and a post-test to evaluate the psychological effects of this intervention. This intervention was, on one hand, an

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answer to a need (losing weight) voiced by residents in Ma-Yuan village and, on the other hand, to echo one of the health promotion policies of the Health Department in Taiwan.

2. Materials and methods

2.1. Study design

To examine the psychological effects of exercising, a fitness program (intervention) was set up with the help of staff from the Wan Rung Health Station. A control group was also formed for comparison purposes. To avoid contamination between the intervention and control groups, we recruited participants in the intervention group from the Ma-Yuan tribal area, which is one of the four areas in Ma-Yuan village, and participants in the control group from the other three areas (i.e., Dee-Bon, Da-Ma-Yuan, and Dong-Guan), which are geographically segregated from Ma-Yuan and from each other. Specifically, these four areas are located within the same mountain region, with a mountain road as their connection to each other and to the outside world. Ma-Yuan is 7 km, 8 km, and 11 km from the other three areas, respectively.

The psychological effect of the intervention was evaluated through survey data. Participants in the intervention group filled out questionnaires in the first couple of weeks of the fitness program (pretest) and 1 week after the program was concluded (posttest). Participants in the control group also filled out the same questionnaires during the same periods.

2.2. Intervention

The intervention was a 3-month fitness program (from September 2003 to December 2003), which included physical activities such as indigenous traditional dancing, folk dancing, and stretching as exercise. Participants met three times a week for 1.5 hours in the evening to exercise under the supervision of a professional fitness instructor. Participants in the control group were unaware of this fitness program, but were offered an opportunity to participate in a similar one upon completion of this study.

2.3. Participants

All participants were Bunun residents in Ma-Yuan village. Participants in the intervention group were recruited during local gatherings or church activities. Participants in the control group were matched in age (in the range of 10 years) to those in the intervention group. Eligible candidates were invited to participate in the study and filled out the pretest and posttest questionnaires.

2.4. Survey questionnaire

The survey questionnaire was designed to evaluate the effects of the intervention and to be filled out by participants in the intervention and control groups in September 2003 and December 2003. In addition to demographic information, subjective physical health, affective experiences, and attitudes toward exercising were also included in the questionnaire.

In subjective physical health, participants were asked to rate their bodily flexibility, energy level, change in appetite, quality of sleep, health in general, and health compared to others of the same sex and similar age. Because the Cronbach's α of these six items was 0.85, we averaged them, with a higher average score indicating better subjective physical health.

A Positive Affect and Negative Affect scale [7] was used to assess participants' positive and negative affect during the previous week. The internal consistency of the positive affect subscale and negative

affect subscale was 0.86 and 0.90, respectively. Therefore, we used the average score to represent participants' affective experiences, with a higher average score indicating a higher positive or negative affect.

We assessed participants' attitudes toward exercise from five aspects. Fourteen exercise-related statements were designed for this purpose. Participants indicated the extent to which they agreed with these statements on 5-point scale (from "strongly disagree" to "strongly agree"). Among these, three statements assessed whether exercise is for certain people (e.g., exercising is for people who want to lose weight; Cronbach's $\alpha = 0.80$), three statements assessed preferences for other activities over exercising (e.g., I would rather watch TV than exercise; Cronbach's $\alpha = 0.83$), three statements assessed passive attitudes toward exercising (e.g., Exercising is a waste of time; Cronbach's $\alpha = 0.75$), three statements assessed the perceived annoying consequences of exercising (e.g., Exercising is tiresome; Cronbach's $\alpha = 0.74$), and one statement assessed the degree to which participants liked friends and family to start exercising regularly. With good internal consistency, average scores were computed to represent participants' attitudes toward exercising on the four aspects that included more than one statement. All responses were coded, so that lower average scores indicated more positive attitudes. That is, a lower average score indicated less agreement that exercise is for certain people, less preference for other activities over exercising, less passiveness about exercising, and less perception that exercise is annoying. However, a higher score indicated participants would like friends and family to start exercising regularly.

2.5. Procedure

All questions in the questionnaire were translated into the Bunun language for participants who were more comfortable using it. Two interviewers (one local volunteer and one of the authors of this article (MNH)) who speak the language took part in the data collection. Prior to the data collection, they met twice to seek consistency in translating the questions. During the survey, participants were interviewed after acknowledging the purpose of the survey and signing the informed consent.

2.6. Statistical analyses

To evaluate the psychological effects of the intervention, the data collected were analyzed with repeated analysis of variance (ANOVA). The independent variable (i.e., intervention vs. control) was the between-subjects variable and the dependent variable (i.e., pretest and posttest) was the within-subjects variable. This analysis procedure allowed us not only to test the intervention effect (to test the difference between the intervention and control groups by examining the main effect on the between-subjects variable) and the time effect (to test the difference between pretest and posttest by examining the main effect on the within-subjects variable), but also to examine the interaction between the intervention effect and time effect. That is, the interaction allowed us to examine whether the change pattern of the dependent variables (i.e., subjective physical health, affective experiences, and attitudes toward exercise) from pretest to posttest was different for the intervention and control groups.

When there was a significant main effect for the between-group variable, we also performed analysis of covariance (with the pretest as a covariate) to examine the differences between the intervention and control groups in the posttest to clarify the effects of the intervention. When an interaction effect was present, we performed paired *t* tests (one for the intervention group and one for the control group) to clarify the nature of the interaction.

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