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Abstract

Results from the GAD-7 and PHQ-9 questionnaires taken before and after a 4-week intervention consisting of learning a new dance step every working day.

Title

Exploratory study on the effectiveness of learning one dance step per day in the workplace to improve subjective physical and mental well-being.

Purpose

Investigation of the power of minimal exercise involving a small cognitive challenge to change subjective physical and mental well-being.

Design

Responses to a well-being questionnaire were compared before and after 4 weeks of learning a new dance step a day.

Setting

Staff from a Faculty of Health Sciences at a Western Australian University were invited to learn a new dance step delivered in video format by email each working day.

Subjects

13.8% staff signed up, 2% male, 98% female, age range 24-69 (average 47.5).

Intervention

Before and after the intervention, subjects filled in the same online well-being questionnaire. Each morning Monday-Friday they received by e-mail a demonstration video lasting 2 minutes. Optional daily lunchtime practice sessions were available for 10-15 minutes in a meeting room.

Analysis

Of 100 volunteers, 44 filled in both pre- and post-study questionnaires; their data was compared using paired student's t-test.

Results

On a scale of 1-5, subjects evaluated their physical health at 3.00 before and 3.34 after the intervention (+11.3% p=0.0001), their mental health at 3.20 before and 3.50 after the intervention (+9.4%, p=0.0001). In an evaluation of 16 symptoms linked to anxiety and depression, the average score was significantly improved for 9; the remainder showed non-significant improvements).

Conclusion

Dance provides physical and mental stimulation such that minimal activity, i.e. learning one step/day, can significantly improve subjective physical and mental well-being. A device to monitor dance practice duration would enable finer analysis of the specificity of dance effects in a larger population.

Background

The continued decrease in physical activity in the workplace is behind a growing epidemic of chronic diseases such as metabolic syndrome, cardiovascular diseases, certain cancers [1, 2] and links are also being made with mental-health issues such as stress, anxiety and depression[3].

However workplace physical activity poses challenges concerning equipment, space, levels of exertion and motivation. A new approach was therefore conceived based on enjoyment and cognitive challenge with a view to induce short bouts of regular activity by providing daily two-minute videos demonstrating a new dance step to be learnt.

Indeed, we now know that short bursts of physical activity can have significant effects on health, (reducing postprandial glucose and insulin responses by 40% in overweight individuals[4]) and simply breaking up sitting time makes a difference to health in unfit individuals[5, 6]. This study investigated whether learning a daily dance move could induce enough physical activity to affect well-being.

Method

Recruitment

An information e-mail was sent in November 2016 to all staff in the Health Sciences Faculty of a Western Australian University inviting volunteers with no injuries and with access to video attachments via email to participate in the study. After signing consent forms and demonstrating understanding of the introductory information, participants were invited to fill in the pre-study questionnaire via a Qualtrics anonymous link.

The exercise intervention start date was fixed at 2^{nd}January 2017 and the end date at 27^{th} January 2017.

The exercise program provided coordination challenges that could be met by practicing for one-two minutes several times a day. Participants received a demonstration video every working day by email. The 5 videos delivered Monday to Friday made up a dance; week 1, Disco; week 2, Bollywood; week 3, Salsa; week 4, Cha-Cha-Cha.

A Project Coordinator normalized this activity by practising the moves with participants in their office. An optional meeting was organized to practice at 12pm from Monday to Friday for ten to fifteen minutes.

A questionnaire composed of questions previously used to evaluate well-being [7, 8] was filled in at the start and the end of the 4-week program for comparison.

The subjects accessed the questionnaires via an anonymous link to the Qualtrics website. The data was analysed using Graphpad Prism.

Ethics

Ethical approval was obtained from Curtin University's Human Ethics Committee (Approval number HRE2016-0348).

Results

Participation

One hundred subjects signed up; four withdrew. Thus 96 out of a potential number of 694 staff (13.8%) took part. Two of the 96 (2%) subjects were males in a faculty in which the percentage of male staff is 23.5%. Seventy-four participants filled in the pre-study survey and fifty-nine the post-study survey. Of these, 44 could be identified from both questionnaires using dates of birth or pseudonyms therefore the data reported here concerns these 44 participants and paired student's t-test was applied to determine significance of changes.

Demographics

Of the 44 subjects analysed, 2 were male, 35 earning over 60 000 AUS$/year, 37 in a relationship and 35 educated to bachelor's degree level or above.

The age range was 24-69 with an average of 47.5.

Subjective Well-being

"In general how would you say your physical health is at the moment?"

"In general, how would you say your mental health is at the moment?"

Participants responded to there questions on a scale of 1-5, where 1=Poor, 2=Fair, 3=Good, 4=Very Good, 5=Excellent.

Table 1 shows the responses. For both questions, there was a significant improvement in the average rating at the end of the program in comparison with that at the start.

Table 1

	Pre-intervention Mean	SD	SEM	Post – intervention Mean	SD	SEM	%age change	N Pre/post	CI
Physical health	3.00	0.99	0.15	3.34	0.94	0.14	+11.3	44/44	-0.49 to -0.20
Mental health	3.20	1.00	0.15	3.50	0.93	0.14	+9.4	44/44	-0.44 to -0.16

Symptoms linked to distress

The pre- and post-study questionnaires contained the combined PHQ-9 patient health questionnaire and GAD-7 general anxiety disorder questionnaire, jointly used to measure distress, using symptoms linked to depression and anxiety. [7, 8]

Table 2 shows the results. For all symptoms evaluated, there was an improvement in the average rating at the end of the study in comparison with ratings at the start. In 9 cases the change is statistically significant.

Table 2: Over the past two weeks, how much of the time have you been bothered by any of the following?

	Pre-intervention Mean	SD	SEM	Post – intervention Mean	SD	SEM	%age change	N Pre/post	CI
Feeling nervous	1.88	1.03	0.16	1.57	0.76	0.11	-19.7	43/44	-0.07 to 0.7
Uncontrollable worrying	1.59	0.95	0.14	1.45	0.63	0.09	-9.7	44/44	-0.00 to 0.28

	Pre-intervention Mean	SD	SEM	Post – intervention Mean	SD	SEM	%age change	N Pre/post	CI
Worrying too much about different things	1.89	0.95	0.14	1.52	0.7	0.11	-24.3	44/44	0.19 to 0.54
Trouble relaxing	1.86	0.98	0.15	1.59	0.69	0.10	-17.0	44/44	0.14 to 0.41
Being so restless that it is hard to sit still	1.30	0.63	0.10	1.25	0.61	0.09	-4.0	44/44	-0.02 to 0.11
Becoming easily annoyed or irritable	1.82	0.81	0.12	1.25	0.61	0.09	-45.6	44/44	0.42 to 0.72
Feeling something awful might happen	1.45	0.79	0.12	1.20	0.46	0.07	-20.8	44/44	0.10 to 0.40
Little interest or pleasure in doing things	1.52	0.79	0.12	1.25	0.58	0.09	-21.6	44/44	0.14 to 0.41
Feeling down, depressed, or hopeless	1.41	0.73	0.11	1.11	0.32	0.05	-27.0	44/44	0.13 to 0.46
Trouble staying or falling asleep	2.02	0.95	0.14	1.80	0.85	0.13	-12.2	44/44	0.10 to 0.36
Feeling tired	2.07	0.94	0.14	1.77	0.74	0.11	-16.9	43/44	0.06 to 0.66

	Pre-intervention Mean	SD	SEM	Post – intervention Mean	SD	SEM	%age change	N Pre/post	CI
Poor appetite or overeating	1.73	0.97	0.15	1.41	0.69	0.10	-22.7	44/44	0.17 to 0.46
Feeling a failure	1.45	0.90	0.14	1.20	0.46	0.07	-20.8	44/44	0.07 to 0.43
Trouble concentrating	1.48	0.79	0.12	1.41	0.76	0.11	-5.0	44/44	-0.01 to 0.15
Moving slowly	1.18	0.58	0.09	1.11	0.49	0.07	-6.3	44/44	-0.01 to 0.15
Better off dead	1.05	0.21	0.03	1.02	0.15	0.02	-2.9	43/43	-0.06 to 0.10

Discussion

Significant improvements in subjective health were seen in this study: 11.3% in physical and 9.4% in mental well-being and up to 45% in symptoms linked to depression and anxiety.

Moderate or light exercise can affect body and brain function through various mechanisms: modulation of intestinal hormones[9, 10], corticosteroids[11, 12] or sex steroids[13]; the growth of brain networks by stimulating neurotransmitters and growth factors[14-17] and by acting on the immune system, through levels of cytokines [18-20].

These molecules affect sleep[11, 21, 22], digestion[23, 24] and weight control as well as brain functions such as memory[25], attention[16], cognition[26] and stress control[27]. They also affect susceptibility to illness as well as tiredness, alertness and depression[28].

The moderate exercise prescribed in this study reduced symptoms of depression and anxiety; 24.3% improvement in "worrying too much", 17% in "trouble relaxing", 45.6% in "irritability", 27% in "feeling down, depressed or helpless". Other results that could be linked to modified hormonal environment were the 22.7% improvement in poor appetite or over-eating, the 21.6% improvement in anhedonia (little interest or pleasure in doing things) and the 12.2% improvement in sleep disturbances.

We conclude that providing dance videos to stimulate moderate-intensity activity with a cognitive challenge could be an inexpensive means to combat preventable chronic disease. This now requires validation by a large-scale study incorporating a control (non-dancing) and an experimental group with the means of measuring actual activity carried out throughout the day for a more accurate evaluation of the efficacy of this type of activity.

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