Perceived fatigue in non-obese and obese females during exercise and the implications for weight loss recommendations: A multiple-case study

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Abstract

Background: Exercise and caloric restriction are often prescribed together for overweight and obese populations, and with obesity rates continuing to rise, our current intervention practices must be called into question. Fatigue levels during exercise when caloric restriction is potentially present may make exercise retention unattainable. This could begin to answer why the current practices of weight loss may not be working in decreasing obesity rates nationally.

Methods: Eight women on the college campus of the University of Northern Colorado, were assessed using Qualtrics surveys for fatigue levels pre-exercise and during exercise. Participants were also asked for a 24 dietary recall to compare intake levels with calculated estimated needs.

Results: Half the participants (n=4) saw increases in fatigue levels while the other half saw decreases. All but two of the eight participants were estimated to not be fully meeting caloric needs, and all but one of the participants (n=7) were deficient in at least one of the three macronutrient categories. Two of the eight participants were meeting hydration needs. Statistical analysis of just the participants not meeting caloric intake requirements, using a Paired *t*-test, did not show correlation or significance $t = 2.57$; $p = 0.88$.

Conclusions: Decreased fatigue with exercise is consistent with past research that exercise can be beneficial in decreasing fatigue. However, for the four participants experiencing increased fatigue, this could relate to past literature showing decreased performance with lower caloric intake, specifically carbohydrate and protein macronutrient intake.

Introduction and Background

- Despite public health efforts, rates of obesity continue to rise.[1]
- Current recommendations: restrict calories and increase exercise.[2] May not be sustainable if have not exercised before.
- Type of exercise and intensity is important.[3] Moderate intensity may not be necessary.
- Weight loss causes decrease in basal metabolic rate. May cause weight regain.[4,5]

Materials and Methods

- Eight women: one time assessment. Pre- and during fatigue levels obtained: scale of 1-10 (1 was "fully energized" and 10 "completely spent")
- 24-hour dietary recall collected. Basic anthropometric measurements obtained.
- Background Information collected: medical history, medication use, exercise history, and dieting history.

Results (Tables 1 and 2)

	BMI Category	Age (years)	Exercise Time (mins)	Exercise Type	Fatigue Level (Pre)	Fatigue Level (Post)	Fatigue Trend Direction	Estimated Exercise Level
Participant #1	Normal	21	60mins	Mix	9	6	Decreasing	30% - Very Light
Participant #2	Normal	UNK	60mins	Mix	7	5	Decreasing	30% - Very Light
Participant #3	Normal	44	60mins	Cardio	2	7	Increasing	75% - Very Heavy
Participant #4	Normal	UNK	60mins	Mix	5	4	Decreasing	40% - Moderately Heavy
Participant #5	Normal	UNK	45mins	Cardio	1	3	Increasing	30% - Very Light
Participant #6	Obese	23	90mins	Mix	7	2	Decreasing	50% - Heavy
Participant #7	Normal	UNK	60-90mins	Strength	5	7	Increasing	30% - Very Light
Participant #8	Overweight	UNK	60-120mins	Strength	2	5	Increasing	50% - Heavy

	Estimated Caloric Needs (kcals)	Actual Caloric Intake (kcals)	% Caloric Needs Met Estimated	Carb Needs (grams)	Carb Intake (grams)	% Carb Needs Met	Estimated Protein Needs (grams)	Protein Intake (grams)	% Protein Needs Met	Estimated Fat Needs (grams)	Fat Intake (grams)	% Fat Needs Met
Participant #1	1725	1213	70	272 (63%)	77	28	52	44	85	48 (25%)	41	85
Participant #2†	1808	1567	87	275 (61%)	187	68	62	68	110	50 (25%)	62	124
*Participant #3*Δ	2280	2820	124	370 (65%)	486	131	59	87	147	62 (24.6%)	78	126
Participant #4†	1937	1685	87	305 (63%)	261	86	62	43	69	52 (24.2%)	48	92
Participant #5†	1619	1536	95	255 (65%)	246	96	48	35	73	42 (23.1%)	50	119
*Participant #6*Δ	2037	2027	100	306 (60%)	280	92	102	81	79	45 (20%)	65	69
Participant #7†Δ	1934	1752	91	300 (62%)	173	58	71	101	142	50 (23.3%)	76	152
Participant #8†Δ	2021	1856	92	318 (63%)	227	71	70	87	124	52	68	131

†Indicates participants without ages were estimated using the high-end age of the DRI grouping (i.e. 19-30, calculated using 30), and for this table averaged between the bottom three ranges, 14-18, 19-30, and 31-50 age groups. ΔAll 24-Hour Dietary Recalls were averaged as "usual" intake between two days unless on day of assessment only ≤ 1 meal had been consumed. Those marked with symbol were one day averages.

Discussion and Conclusion

- Decreased fatigue with exercise is consistent with past research.[6]
- Half the participants experienced increased fatigue, which could relate to literature showing decreased performance with lower caloric intake.[7,8]
- Null hypothesis ($t = 2.57$; $p = 0.88$) for only calorically restricted (n=6) showed no correlation between caloric restriction and fatigue levels.
- For future studies control of exercise type, duration, caloric intakes, and testing conditions would allow for better correlative conclusions.

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