Citation:

Raynor DA, Phelan S, Hill JO, Wing RR. Television viewing and long-term weight maintenance: results from the National Weight Control Registry. Obesity (Silver Spring). 2006 Oct;14(10):1816-24.

PubMed ID: 17062812

Study Design:

Prospective Cohort Study

Class:

B - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To examine the role of television (TV) viewing in long-term maintenance of weight loss.

Inclusion Criteria:

- Participants from the National Weight Control Registry.
- ≥18 years
- 13.6 kg weight loss for 1 year
- completed questions regarding television viewing and weight loss
- denied pregnancy

Exclusion Criteria:

- ≤18 years
- Participants who did not complete the TV viewing and weight questions at baseline and at the 1-year follow-up.
- participants who were pregnant

Description of Study Protocol:

Recruitment

Participants in the National Weight Control Registry (NWCR) who have lost 30 lbs(13.6 kg) and maintained that weight loss for at least 1 year.

Design

Prospective observational study.

Blinding used (if applicable)

none

Intervention (if applicable)

none

Statistical Analysis

- One-way ANOVA
- X^2
- Pearson correlation

Data Collection Summary:

Timing of Measurements

- Baseline
- 1 year follow-up

Dependent Variables

- Variable 1: weight loss (self-reported weight)

Independent Variables

- **TV viewing: 1=0 to 1/wk, 2=2 to 5h/wk, 3=6 to 10h/wk,4=11 to 20h/wk, 5=21 to 40h/wk, 6=41 to 60 h/wk, 7=≥61h/wk**
- **Physical Activity: # of city blocks walked, # of flights of stairs climbed, and time engaged in a myriad of light,moderate and heavy exercise.**

- **Dietary Intake: total energy intake(kcal), and percentage of total calories from fat and sweets.**

Control Variables

- **age**
- **sex**
- **ethnicity**
- **education level**
- **employment**
- **marital status**

Description of Actual Data Sample:

Initial N: 1884

Attrition (final N): 1422

Age: 47.9 $\pm$ 12.7 yrs

Ethnicity: white (95%)

Other relevant demographics:

- women (77%)
- married (65%)
- highly educated (57%) college or higher degree
- currently employed *74%)

Anthropometrics (e.g., were groups same or different on important measures)

- weight 70.7 $\pm$ 15.3 kg
- BMI 24.8 $\pm$ 4.6 kg/m^2
- The groups were different. Individuals with completed data had lower BMI at baseline and lower maximum lifetime weight. They lost less weight from their lifetime maximum weight. They maintained their weight loss for a longer duration.

Location:

National Registry

Summary of Results:

Key Findings

High TV/VCR viewers(>10h/wk) were :

- older($p<0.05$)
- less educated
- unemployed
- married
- less total, moderate, and heavy intensity weekly physical activity.
- consumed greater percentage of their calories from fat.

Table 1: Demographic, weight history, physical activity, and dietary indices by category of television (TV) viewing

Characteristics	TV Viewers Low ($\leq$ 10 hours/wk)	TV Viewers High (> 10 hours/wk)	Statistical Significance of Group Difference p value
Mean age in years (SD)	45.9(11.8)	51.3(13.4)	0.00
% completed high school	7.7%	13.6%	0.00
% completed graduate or professional school	31.9%	26.0%	0.02
% currently employed	82.3%	62.2%	0.00
% currently married	62.9%	69.0%	0.00
current weight	70.1(14.7)	71.6(16.2)	0.07
total activity (kcal)(SD)	2742(2387)	2166(1907)	0.00
moderate activity(kcal)	683(1246)	553(1057)	0.04
heavy activity	985(1568)	711(1373)	0.00
% calories from fat	26%(10)	28%(11)	0.01
% calories from sweets	5%(6)	6%(7)	0.05

Key Findings:

- marginally significant decreases in physical activity, p=0.056
- significant increases in percentage of calories from fats p=0.001
- significant increases in percentage of calories from sweets p=0.001
- increases in TV/VCR viewing were significantly correlated with increases in percent calories from fats (r=.0.09, p<0.01)
- associations with weight regain were correlated with:
- increases in TV/VCR viewing, (r=0.09,p<0.01)
- decreases in physical activity, (r=-0.10,p<0.001)
- increases in percentage of calories from fat (r=0.10, p<0.01)
- *increases in percentage of calories from sweets (r=0.07,p=0.02)*

Table 2: Changes in TV viewing, physical activity, diet, and weight from baseline to 1-year assessment

					Correlation	**with**	**weight**	**change**
Behavior	Baseline	1 - year	Mean change	p value	Baseline value	p value	Change in behavior	p value
TV viewing	3.08 ± 1.2	3.07 ± 1.3	-0.01		0.04		0.09	p<0.01
physical activity (kcal/wk)	2523.7+2239.7	2398.4 +2841.0	-125.4	p=0.056	0.00		-0.10	p<0.001
total calories	1440.8± 648.5	1428.7 ± 627.6	-12.1		0.10	p<0.01	0.06	p<0.04
% kcals from sweets	5.3 ± 6.2	6.2 ± 6.8	0.9	p=0.001	0.01		0.07	p<0.04*(p=0.02)
% kcals from fats	26.4±10.2	27.3 ±10.0	0.9	p=0.001	0.07	p<0.04	0.10	p<0.001
Weight(kg)	70.7± 15.3	72.9 ± 16.6	2.2	p<0.001	0.07	p<0.01	----	

* different from table value

Key Findings:

1-year weight regain significantly associated with:

- Higher baseline TV viewing
- Increases in TV viewing
- Decreases in physical activity
- higher baseline caloric intake
- increases in caloric intake
- higher baseline percentage of calories from fat
- increases in percentage of calories from sweets

The association between TV viewing and weight regain was independent of changes in both physical activity and dietary intake.

Table 3 Results of regressing baseline and one-year changes in physical activity, dietary behaviors, and television viewing on one-year weight change.

Variable	Standardized β	t	p value
Model 1: F(9,1054)10,94,p,0.001			
change in physical activity	-0.080	-2.646	0.008
Baseline caloric intake	0.145	4.415	0.000
Change in caloric intake	0.112	3.396	0.001
Baseline TV	0.085	2.677	0.008
Change in TV time	0.111	3.504	0.000
Model 2: F(9,1054)=10,41,p<0.001			
Change in physical activity	-0.071	-2.350	0.019
Baseline % calories from fat	0.099	3.084	0.002
Change in % calories from fat	0.119	3.755	0.000
Change in TV time	0.108	3.396	0.001
Model 3: F(9,1054)=9,25,p<0.001			
Change in physical activity	-0.074	-2.415	0.016
Change in % calories from sweets	0.088	2.808	0.005
Change in TV time	0.123	3.885	0.000

Models 1-3 controlled for the following covariates: Maximum BMI, duration of weight loss maintenance, and magnitude of weight loss.

Other Findings

- The combination of decreasing physical activity and increasing TV viewing resulted in a 4.08+ 6.2 kg weight regain
- Individuals who increased physical activity and decreased TV viewing gained only 1.61 + 7.4 kg.

Author Conclusion:

Individuals who are succesful at maintaining a long-term weight loss, are likely to spend a relatively minimal amount of time watching TV. In addition to engaging in high levels of physical activity and modifying dietary intake, reducing common sedentary behaviors, such as watching TV, may help to promote long-term weight loss maintenance.

Reviewer Comments:

The author included the study's limitations in the discussion. The author did acknowledge that the study did not use an experimental design therefore, one cannot conclude that reducing TV time will not result in weight loss maintenance.

Some of the author's results in the article and in the table were confusing. In the results section of the article, the author stated that the correlation with weight change and change in %kcals from sweets was significantly associated with weight regain at a p value = 0.02, however, Table 2 shows p<0.04.

At times the p values were difficult to follow.

Figure 2 and figure 3 were difficult to interpret and were not included in the article's analysis.

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions		
1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	Yes
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	Yes

Validity Questions		
1.	**Was the research question clearly stated?**	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	**Was the selection of study subjects/patients free from bias?**	Yes
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	No
3.	**Were study groups comparable?**	Yes
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	Yes
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	Yes
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	No

3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	Yes
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	Yes
4.1.	Were follow-up methods described and the same for all groups?	Yes
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	Yes
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	N/A
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	No
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	N/A
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	No
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	Yes
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	Yes
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes
7.7.	Were the measurements conducted consistently across groups?	Yes

8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**		Yes
	8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
	8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
	8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
	8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	Yes
	8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
	8.6.	Was clinical significance as well as statistical significance reported?	Yes
	8.7.	If negative findings, was a power calculation reported to address type 2 error?	N/A
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**		Yes
	9.1.	Is there a discussion of findings?	Yes
	9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**		Yes
	10.1.	Were sources of funding and investigators' affiliations described?	Yes
	10.2.	Was the study free from apparent conflict of interest?	Yes