

DIFFERENCES IN DIET QUALITY AND SUPPLEMENT USE AMONGST INDIVIDUALS DIAGNOSED WITH CANCER OR MALIGNANCY

NHANES Cycles 1999-2002 and 2009-2012

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Background and Rationale

- Supplement use has become increasingly popular since the 1970's
 - Particularly in the cancer patient population—some studies showing approximately 50% of individuals with cancer utilizing dietary supplements
- Healthy, well balanced diet is essential during cancer treatment and recovery
 - Alleviating symptoms, optimizing immune health or treating comorbidities
- Not many studies have looked at the difference in diet quality amongst supplement users and non users in the cancer patient population

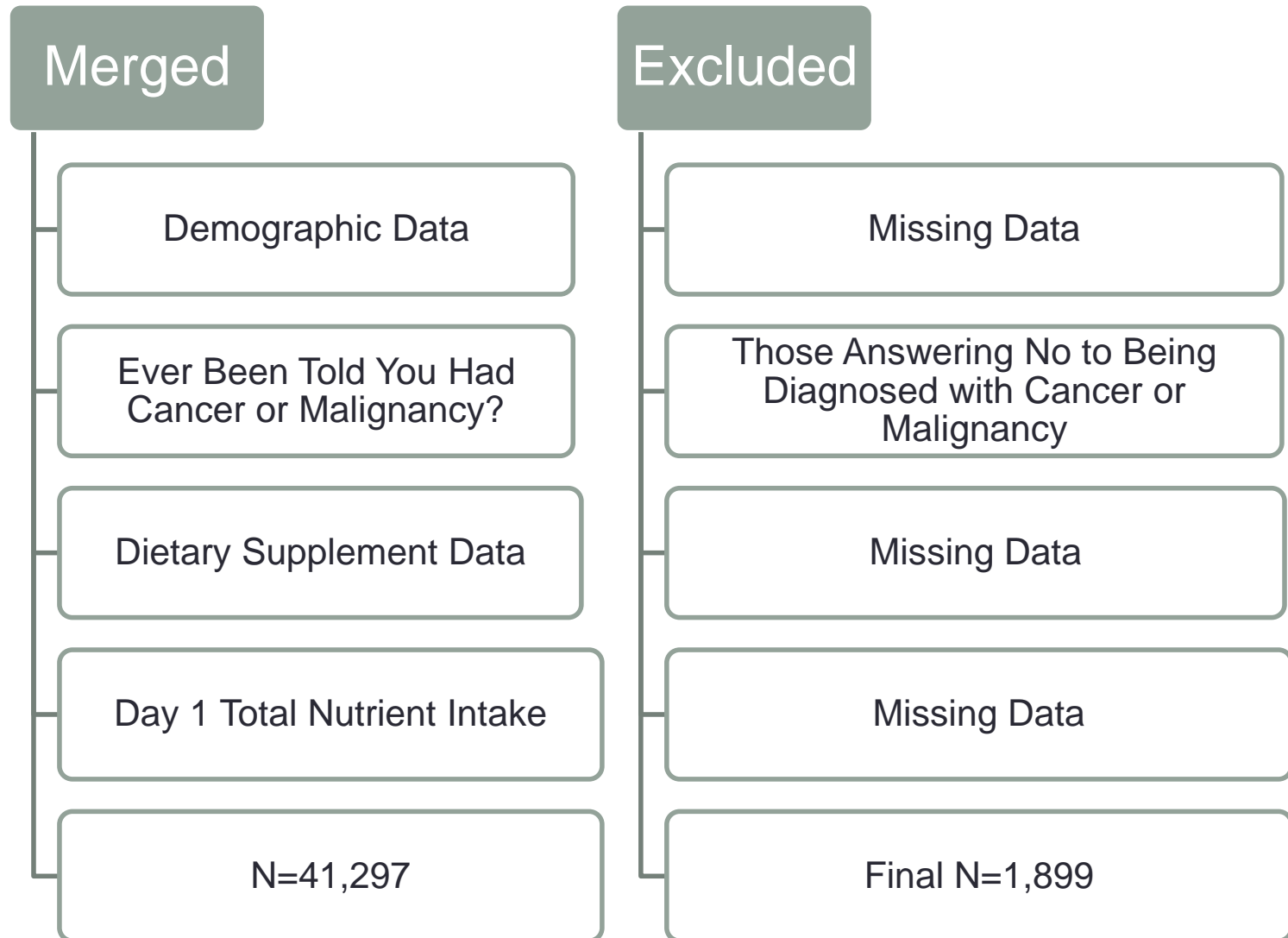
Research Question

What is the difference in diet quality between patients diagnosed with cancer or malignancy that do and do not take dietary supplements in the NHANES (National Health and Nutrition Examination Survey) cycles 1999-2000/2001-2002 and 2009-2010/2011-2012?

Objectives

- To determine the difference in diet quality between supplement users and non-users in the NHANES cycles 1999-2000/2001-2002.
- To determine the difference in diet quality between supplement users and non-users in the NHANES cycles 2009-2010/2011-2012.
- To determine the difference in diet quality between the NHANES cycles 1999-2000/2001-2002 and 2009-2010/2011-2012 amongst dietary supplement users.

Study Sample



Outcome Variables

- Demographics
 - Categorical: Gender, race, education, annual household income and marital status
 - Nominal scale using frequencies
 - Continuous: Age
 - Ratio scale using mean \pm SD
- Ever Been Told You Had Cancer or Malignancy (Yes/No)
 - Categorical
- Any Dietary Supplements Taken (Yes/No)
 - Categorical
- Diet Quality (0-9)
 - Utilizing DASH diet score
 - Continuous variable
 - Ordinal scale using median (IQR)
 - Higher score corresponds to better diet quality

DASH Diet Score

- Measure of diet quality utilizing 9 different dietary components
 - Saturated fat, total fat, protein, fiber, magnesium, calcium, potassium, sodium and cholesterol
- Target met score of 1 given for that nutrient.
- Target not met score of 0 given for that nutrient
- Intermediate target score of 0.5 given for that nutrient
- Mellen et al defines being accordant to DASH diet if score of ≥ 4.5 is met

Nutrient Targets for DASH Score

Nutrient	DASH Diet Nutrient Composition	DASH Score Target	Intermediate Target
Saturated fat	6% of energy	6% of energy	11% of energy
Total fat	27% of energy	27% of energy	32% of energy
Protein	18% of energy	18% of energy	16.5% of energy
Cholesterol	150 mg	71.4 mg/1000 kcal	107.1 mg/1000 kcal
Fiber	31 g	14.8 g/1000 kcal	9.5 g/1000 kcal
Magnesium	500 mg	238 mg/1000 kcal	158 mg/1000 kcal
Calcium	1240 mg	590 mg/1000 kcal	402 mg/1000 kcal
Potassium	4700 mg	2238 mg/1000 kcal	1534 mg/1000 kcal
Sodium	2400 mg	1143 mg/1000 kcal	1286 mg/1000 kcal

Data Analysis

- To determine the difference in diet quality between supplement users and non-users in the NHANES cycles 1999-2000/2001-2002.
 - DASH diet score (ordinal scale)
 - Mann Whitney U
- To determine the difference in diet quality between supplement users and non-users in the NHANES cycles 2009-2010/2011-2012.
 - DASH diet score (ordinal scale)
 - Mann Whitney U
- To determine the difference in diet quality between the NHANES cycles 1999-2000/2001-2002 and 2009-2010/2011-2012 amongst dietary supplement users.
 - DASH diet score (ordinal scale)
 - Mann Whitney U

Demographics of Participants That Have Been Diagnosed with Cancer or Malignancy and Do and Do Not Take Dietary Supplements in the NHANES Data Set for the Years 1999-2000 & 2001-2002

Variable	All (n=903)	Yes Dietary Supplements (n=569)	No Dietary Supplements (n=334)
Gender n(%)			
Female	49.1	45.7	45.5
Male	50.9	54.3	54.5
Age at Screening in years (mean ± SD)	67.44±15.0	67.37±15.1	67.48±15.0
Race n(%)			
Mexican American	9.4	7.4	12.6
Other Hispanic	3.1	3.0	3.3
Non-Hispanic White	74.4	80.0	65.3
Non-Hispanic Black	11.6	9.0	16.2
Other	1.5	0.7	2.7
Education n(%)			
Less Than 9 th Grade	14.7	9.	23.1
9-11 th Grade (or 12 th with no diploma)	13.9	12.8	15.6
High school Grad or GED	25.5	24.8	26.9
Some College or AA Degree	24.6	28.1	18.0
College Graduate or Above	21.0	24.3	15.6

Annual Household Income (n)%			
\$0 to \$4,999	1.9	1.4	2.7
\$5,000 to \$ 9,999	7.0	7.0	6.9
\$10,000 to \$14,999	9.6	9.0	10.8
\$15,000 to \$19,999	8.	6.9	11.1
\$20,000 to \$24,999	7.5	6.9	8.7
\$25,000 to \$34,999	13.5	14.6	11.7
\$35,000 to \$44,999	8.2	8.4	7.8
\$45,000 to \$54,999	7.0	8.1	5.1
\$55,000 to \$64,999	4.1	4.6	3.3
\$65,000 to \$74,999	3.0	2.8	3.3
\$75,000 and Over	15.8	17.8	12.6
Over \$20,000	1.	0.9	1.2
Under \$20,000	0.2	0.0	0.6
Marital status n(%)			
Married	57.3	58.9	54.8
Widowed	21.9	20.7	24.0
Divorced	8.2	8.8	7.2
Separated	2.3	1.8	3.3
Never married	4.5	4.9	3.9
Living with partner	2.3	1.8	3.3
Individuals who answered refused or don't know to demographics not included			

Demographics of Participants That Have Been Diagnosed with Cancer or Malignancy and Do and Do Not Take Dietary Supplements in the NHANES Data Set for the Years 2009-2010 & 2011-2012

Variable	All (n=996)	Yes Dietary Supplements (n=642)	No Dietary Supplements (n=354)
Gender n(%)			
Female	52.0	53.9	48.6
Male	48.0	46.1	51.4
Age at Screening in years (mean ± SD)	64.98±14.5	66.65±13.7	61.89±15.4
Race n(%)			
Mexican American	5.2	3.9	7.6
Other Hispanic	5.8	4.7	7.9
Non-Hispanic White	69.6	74.8	60.2
Non-Hispanic Black	15.3	12.0	21.2
Other	4.1	4.7	3.1
Education n(%)			
Less Than 9 th Grade	9.7	7.9	13.0
9-11 th Grade (or 12 th with no diploma)	15.1	11.8	20.9
High school Grad or GED			
Some College or AA Degree	20.1	19.2	21.8
College Graduate or Above	27.6	30.7	22.0
	27.5	30.4	22.3

Annual Household Income (n)%			
\$0 to \$4,999	2.2	0.9	1.7
\$5,000 to \$ 9,999	4.3	3.9	4.8
\$10,000 to \$14,999	7.8	7.5	11.0
\$15,000 to \$19,999	6.9	5.8	7.9
\$20,000 to \$24,999	7.7	6.4	7.6
\$25,000 to \$34,999	11.7	10.7	15.5
\$35,000 to \$44,999	9.3	9.3	9.9
\$45,000 to \$54,999	7.2	9.7	7.3
\$55,000 to \$64,999	5.3	7.0	3.4
\$65,000 to \$74,999	4.5	4.4	2.8
Over \$20,000	4.3	3.4	4.0
Under \$20,000	1.0	0.6	2.0
\$75,000 to \$99,999	8.8	10.7	5.9
\$100,000 and over	14.5	15.6	12.7
Marital status n(%)			
Married	57.1	58.6	54.5
Widowed	17.8	19.3	15.0
Divorced	12.6	12.6	12.4
Separated	2.0	1.9	2.3
Never married	6.1	4.4	9.3
Living with partner	4.2	3.0	6.5

Individuals who answered refused or don't know to demographics not included

Percentage of Supplement Users and Non Users in the NHANES Cycles 1999-2000/2001-2002 and 2009-2010/2011-2012

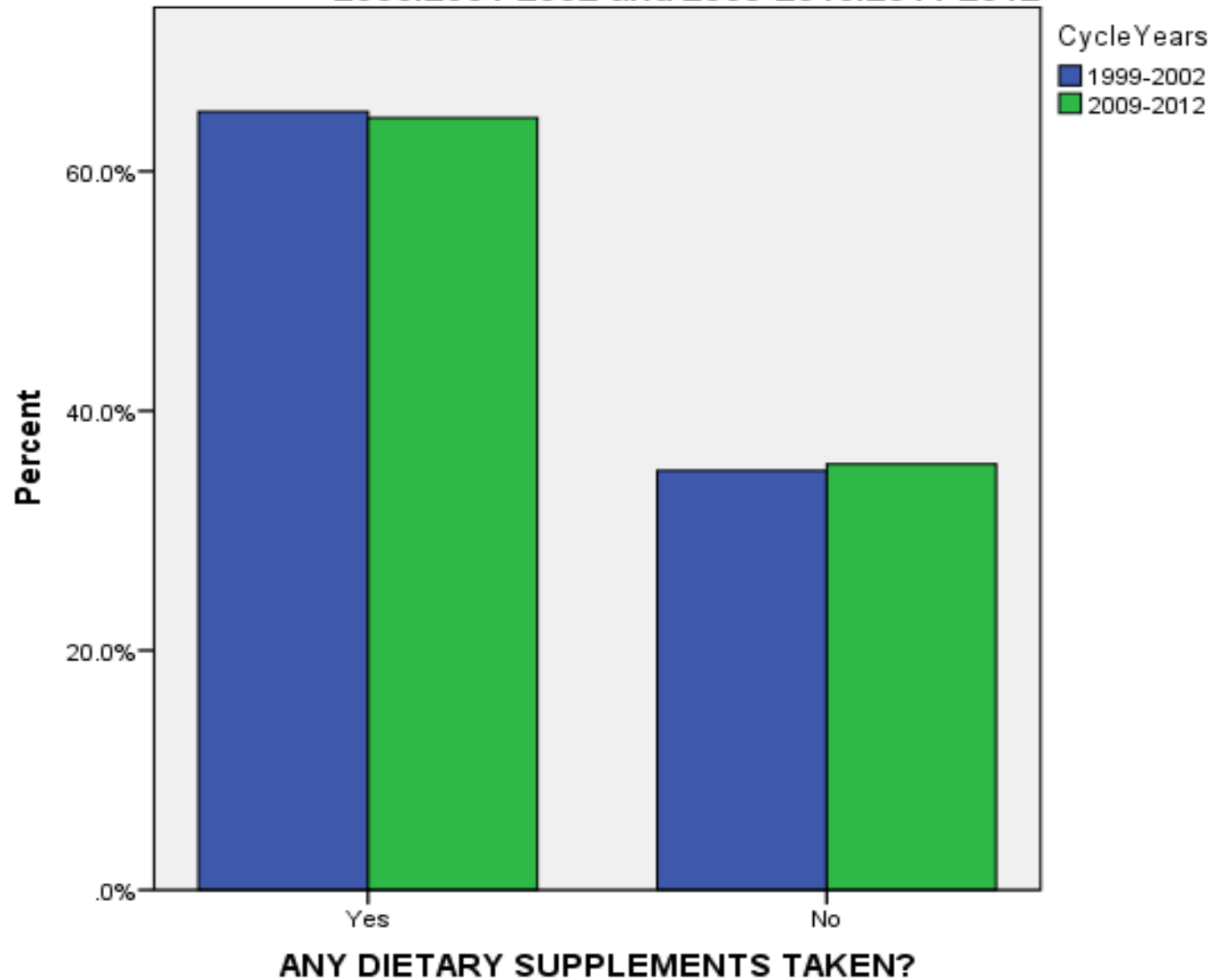


Figure 1: Percentage of Supplement Users and Non Users in the NHANES Cycles 1999-2000/2001-2002 and 2009-2010/2011-2012; Yes=63% in the 1999-2000/2001-2002 (n=903) versus 64% in the 2009-2010/2011-2012 (n=9996)

Percentage of Supplement Users and Non Users Stratified by Education Level for the NHANES Cycles 1999-2000/2001-2002

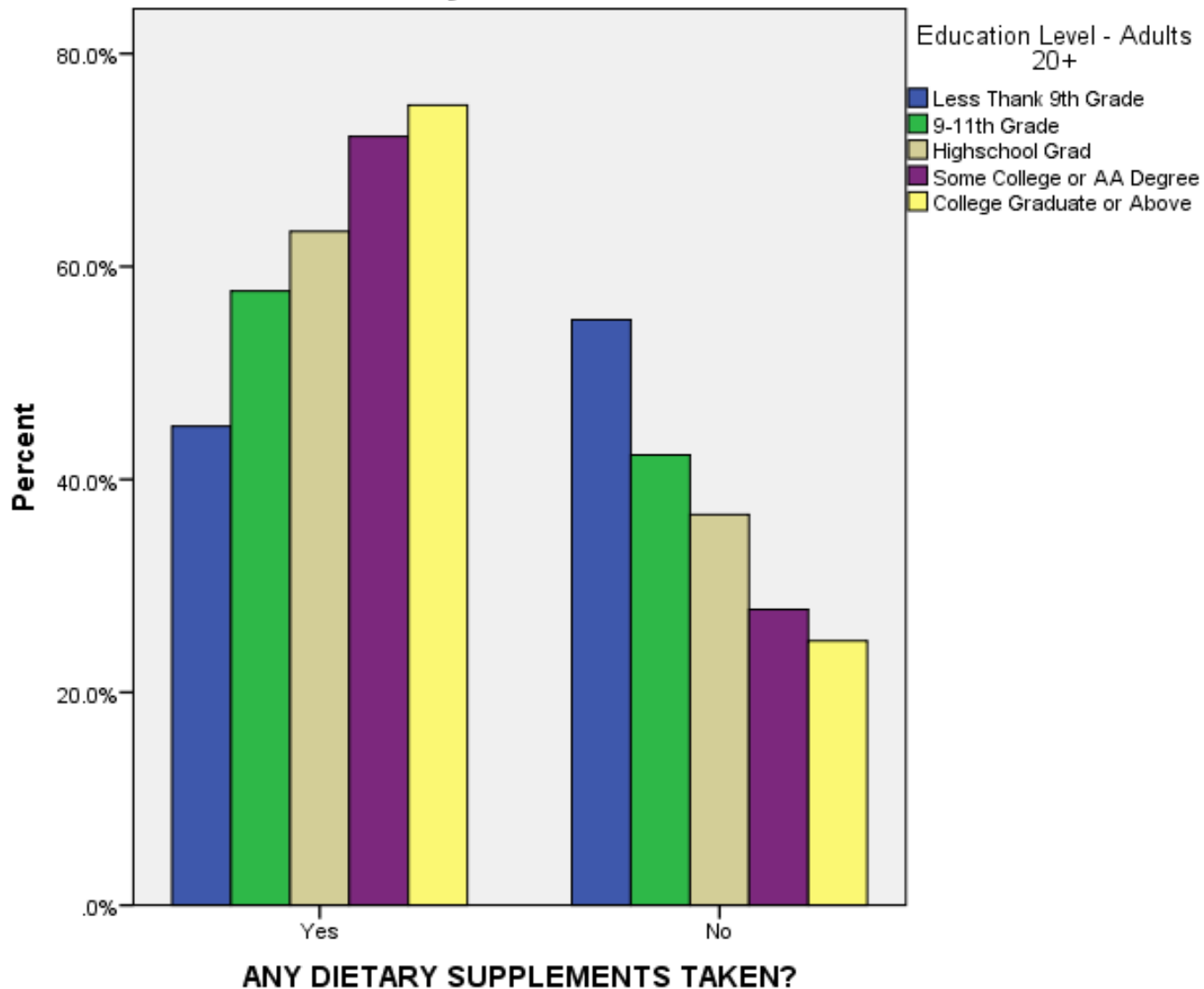


Figure 2: Percentage of Supplement Users and Non Users Stratified by Education Level for the NHANES Cycles 1999-2000/2001-2002

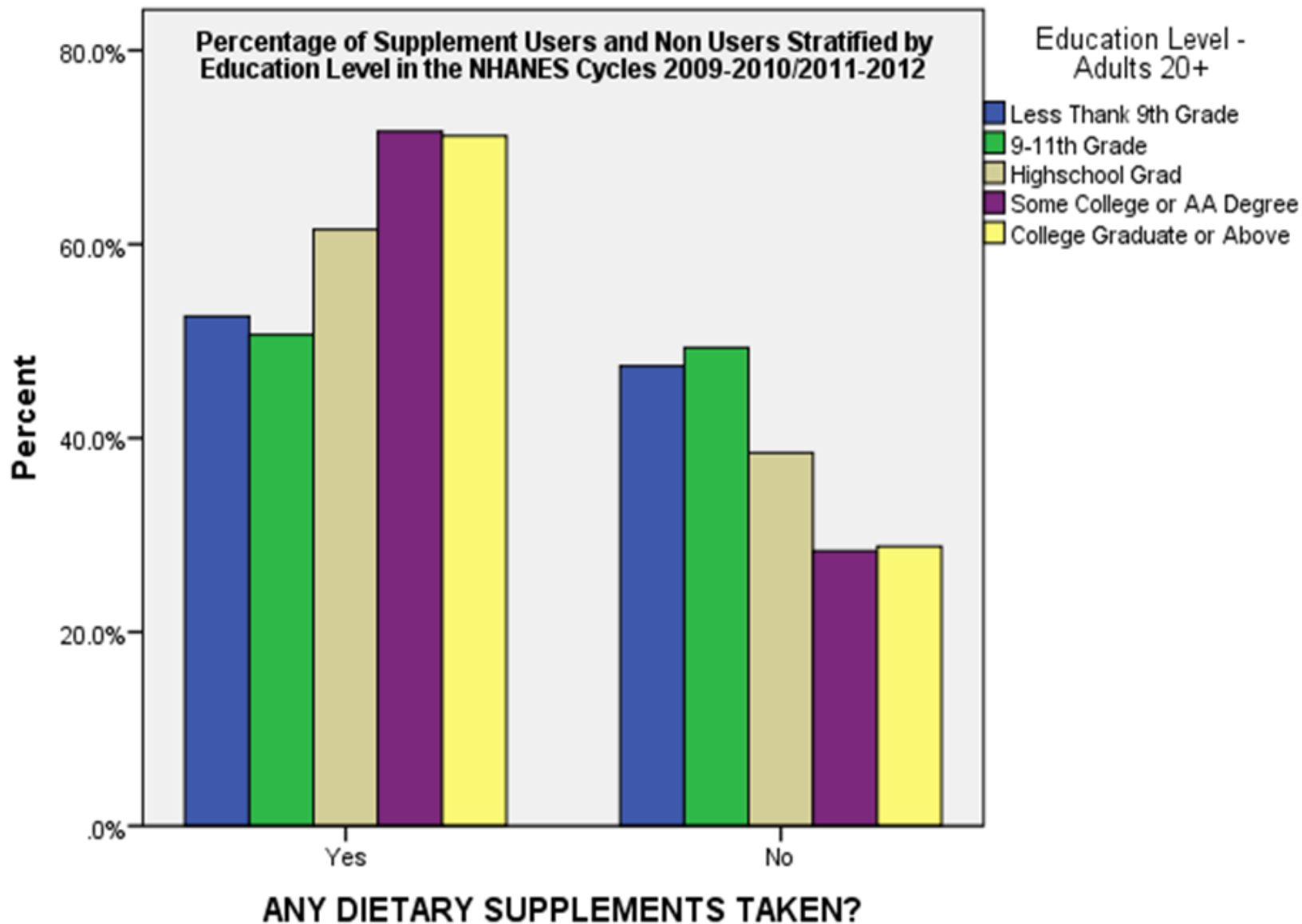


Figure 3: Percentage of Supplement Users and Non Users Stratified by Education Level for the NHANES Cycles 2009-2010/2011-2012

Percentage of Supplement Users and Non Users Stratified by Race for the NHANES Cycles 1999-2000/2001-2002

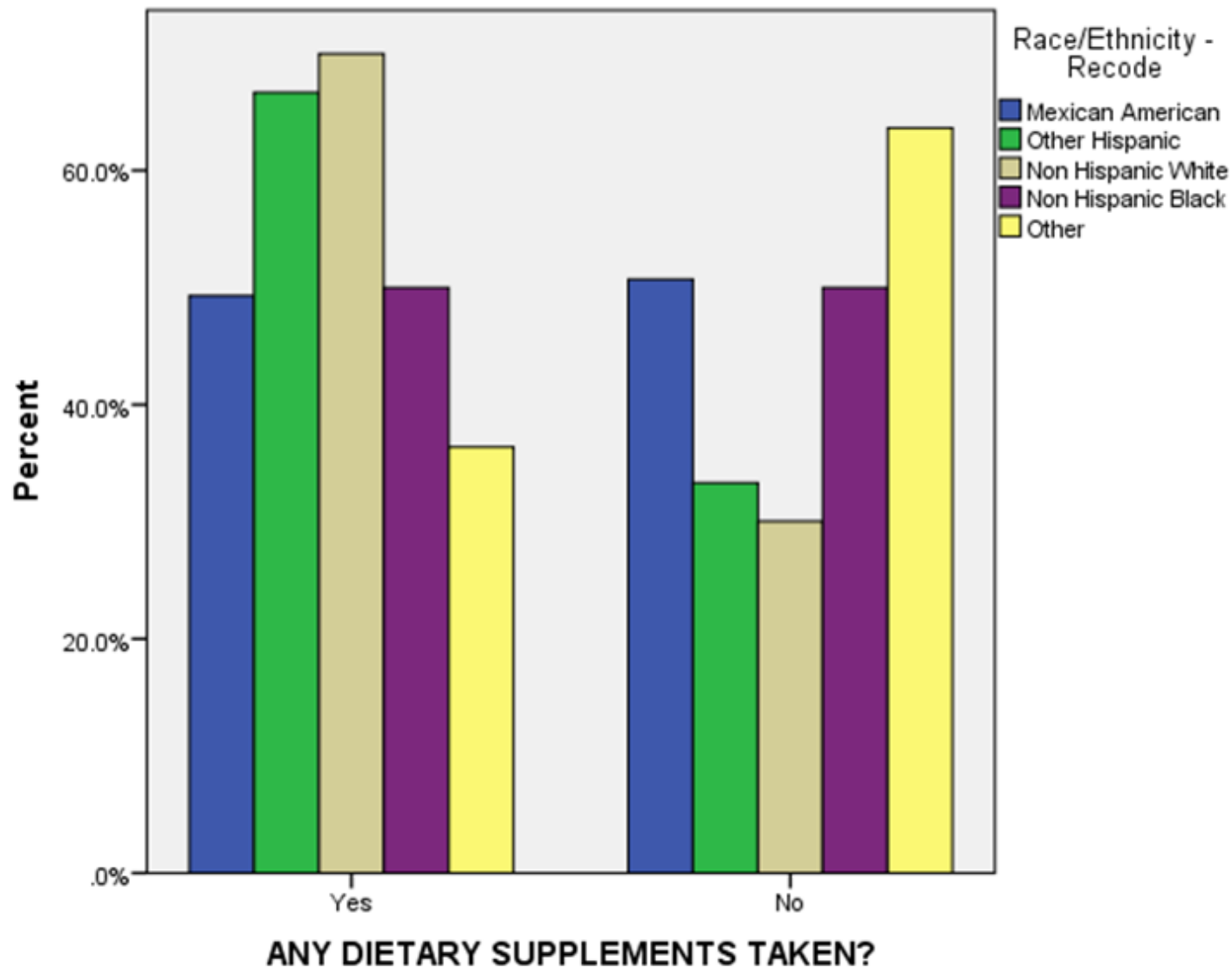


Figure 4: Percentage of Supplement Users and Non Users Stratified by Race for the NHANES Cycles 1999-2000/2001-2002

Percentage of Supplement Users and Non Users Stratified by Race for the NHANES Cycles 2009-2010/2011-2012

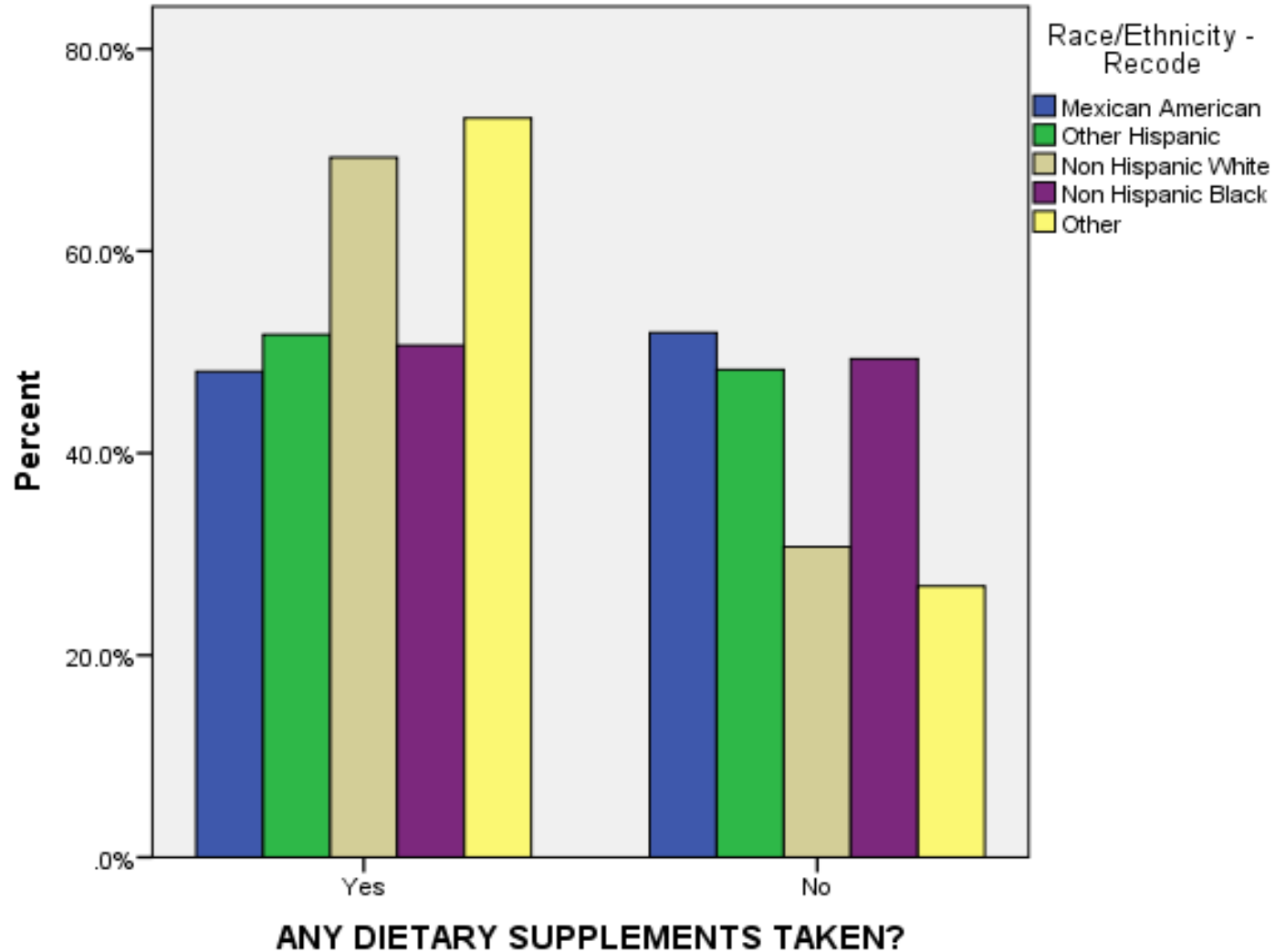


Figure 5: Percentage of Supplement Users and Non Users Stratified by Race for the NHANES Cycles 2009-2010/2011-2012

Difference in Median Dash Diet Score Between Supplement Users and Non Users in the NHANES Cycles 2009-2010/2011-2012

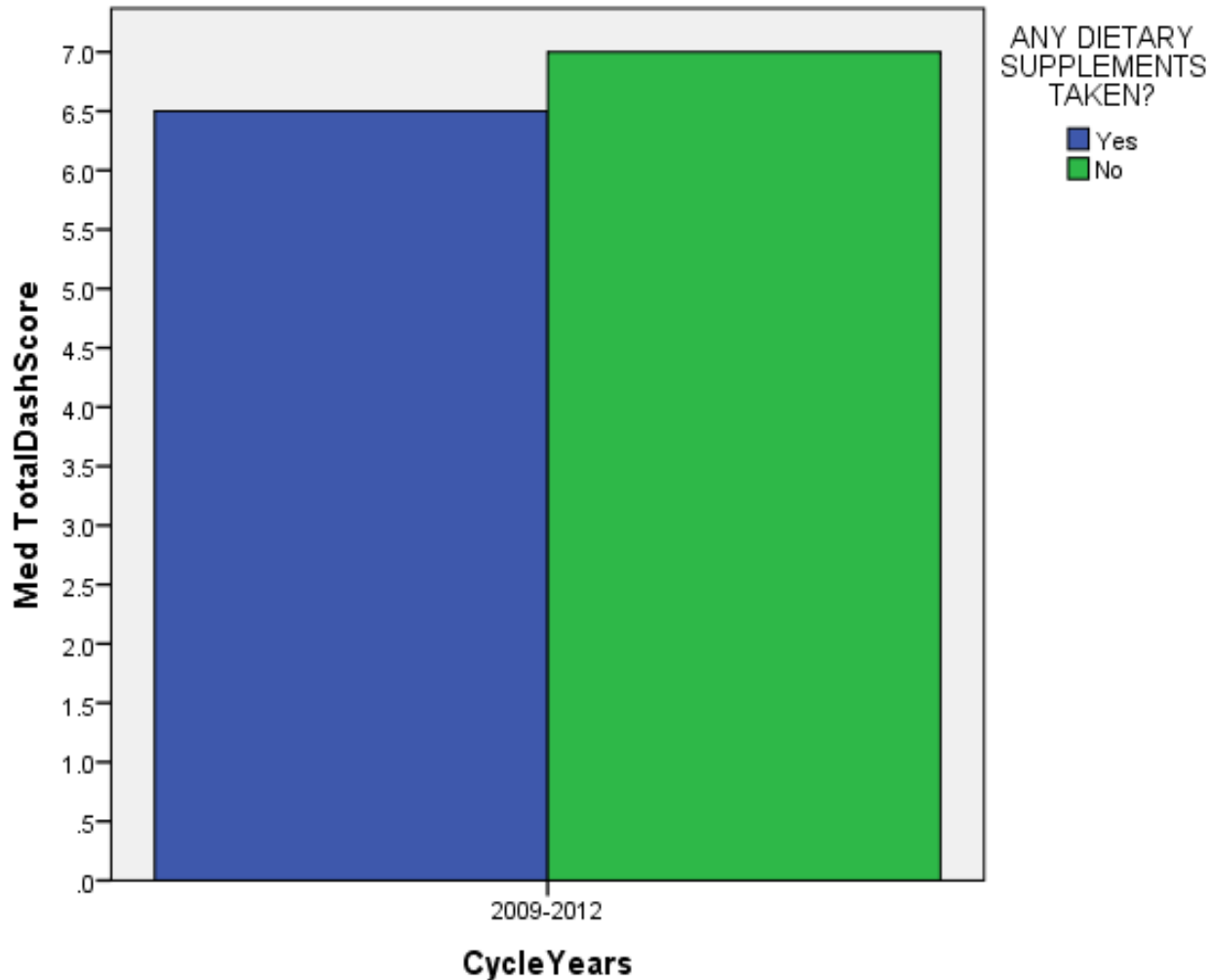


Figure 6: Figure 6: Difference in Median DASH Diet Score Between Supplement Users and Non Users in the NHANES Cycles 2009-2010/2011-2012; Yes supplements (median: 6.5, IQR: 6.5-7.0) vs. no supplements (median: 7.0, IQR: 6.5-7.5), $U=96589.5$, $z=-3.2$, $p=0.001$, $r=0.1$, small effect size

Difference in Median DASH Scores Between Supplement Users and Non Users in the NHANES Cycles 1999-2000/2001-2002 and 2009-2010/2011-2012

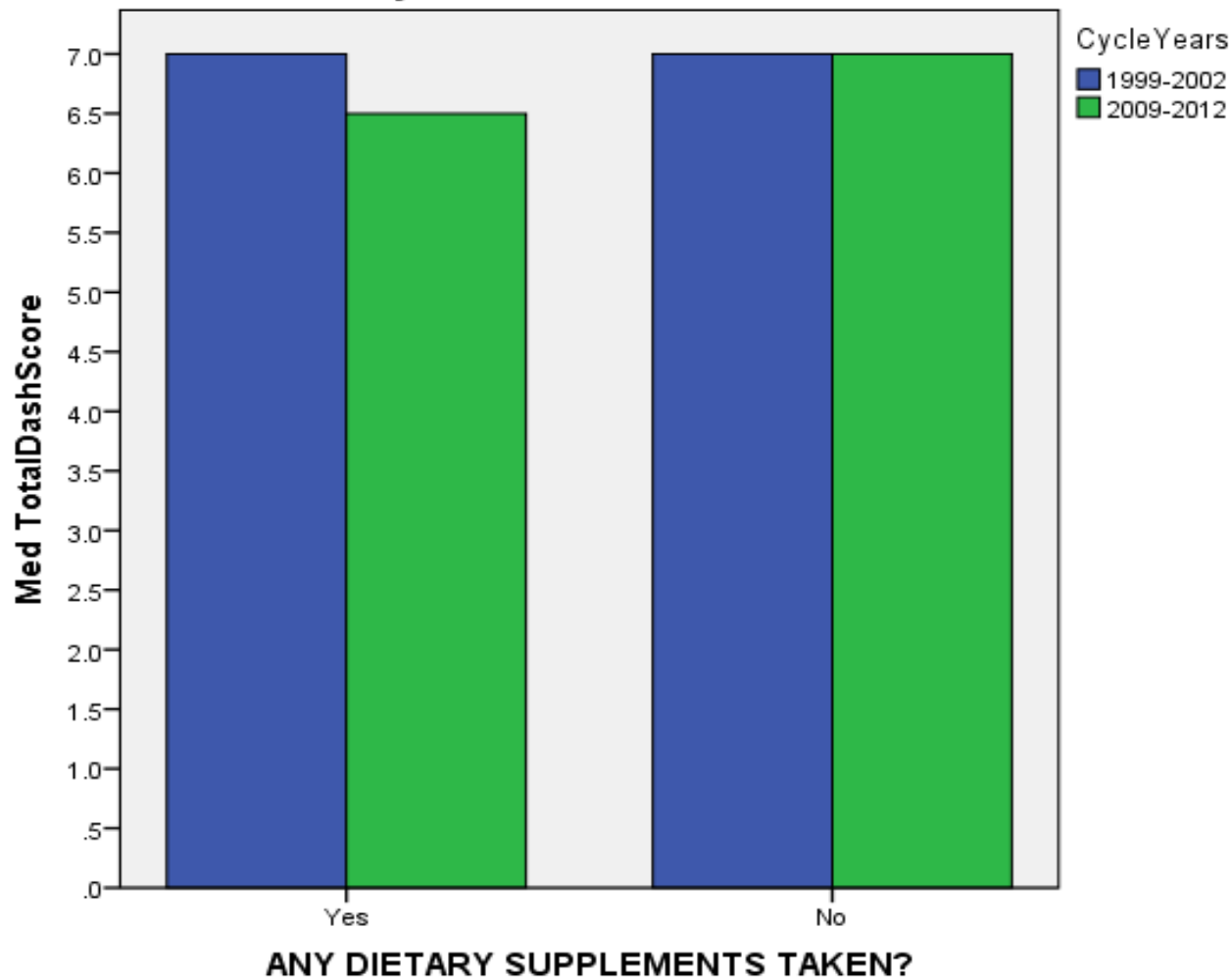


Figure 7: Yes supplements in 1999-2000/2001-2002 (median: 7.0, IQR: 6.5-7.5) vs. yes supplement in 2009-2010/2011-2012 (median: 6.5, IQR: 6.5-7.0), $U=135908.0$, $z=-3.3$, $p=0.001$, $r=0.1$, small effect size

Discussion

- Dietary supplement use steadily increasing since 1970s
 - Current study shows, in cancer patients, hasn't changed significantly since 1999
- Studies have shown cancer patients making positive changes in terms of health (diet, exercise, dietary supplements)
 - Current study shows poorer diet quality in more recent dietary supplement users (**not clinically significant**)
 - Important to assess impact of dietary supplements on overall diet quality
- Bours et al showed opposite results to current study
 - Patient taking dietary supplements with trend towards healthier dietary changes
- Future Research
 - Specific cancer types
 - Specific/individual dietary supplements
 - Utilizing different assessment of diet quality

Limitations

- Diet quality score
 - The DASH diet score used did not show, amongst this population's dietary quality, any clinically significant difference between supplement users and non-users.
 - Different diet quality score may have been a better indicator of differences
- Lack of differentiation between cancer types
- Lack of differentiation of specific dietary supplements used

Conclusions

- High prevalence of dietary supplement use within the cancer population
 - Important to assess how the use of dietary supplements affects an individual's overall dietary quality.
- Current study findings suggest statistically significant difference in dietary quality among supplement users and non-users in more recent years
 - Supplement users with poorer diet quality
 - Not clinically significant
- Still provides rationale for further research on the effects of dietary supplement use on diet quality in cancer patients

References

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