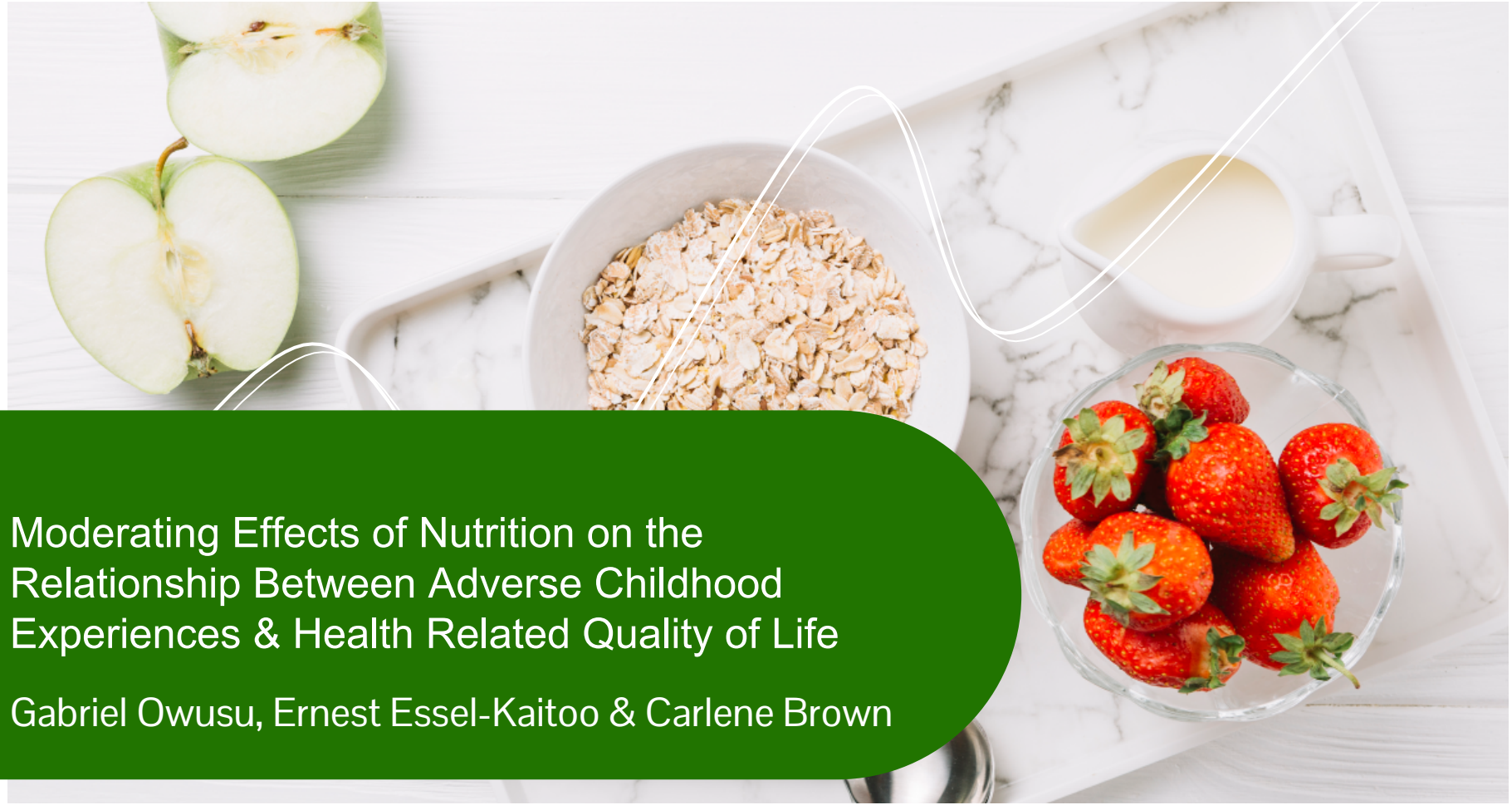

Moderating Effects of Nutrition on the Relationship Between Adverse Childhood Experiences & Health Related Quality of Life

Gabriel Owusu, Ernest Essel-Kaitoo & Carlene Brown

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01

Purpose

Purpose

The purpose of this study is to investigate the moderating effects of nutrition on the relationship between adverse childhood experiences (ACE) and health-related quality of life (HRQOL). Adverse childhood experiences (ACE) are defined as a series of traumatic events that occur during childhood and or adolescents that carry various risks that can materialize when an individual reaches adulthood (Moon & Han, 2022). Health-related quality of life (HRQOL) is multifaceted. According to the Centers for Disease Control and Prevention (CDC), HRQOL can be characterized as, “an individual’s or a group’s perceived physical and mental health over time” (2021, para. 1).

The importance of exploring ACEs cannot be overstated. Merrick and fellow researchers (2019) contend that ACEs have been linked to leading causes of morbidity and mortality in adults. These researchers found that ACEs were significantly associated with worsened health outcomes, health risk behaviors, as well as socioeconomic challenges (Merrick et al., 2019). Correspondingly, HRQOL, has been reportedly connected to ACE manifesting in adverse health conditions contributing to excessive unhealthy days in adults (Chanlongbutra et al., 2018; Salinas-Miranda et al., 2015). Notably, nutrition was found to be significantly associated with ACE revealing that individuals with higher ACE scores were more likely to engage in risky health-related behavior for nutrition (Merve et al., 2022). With this in mind, the proposed study may aid in garnering insight into the possible effects of nutrition on ACE and HRQOL in order to promote positive health related behaviors that could mitigate the potential effects of ACE on HRQOL.

02

Research Questions & Hypotheses

Research Questions

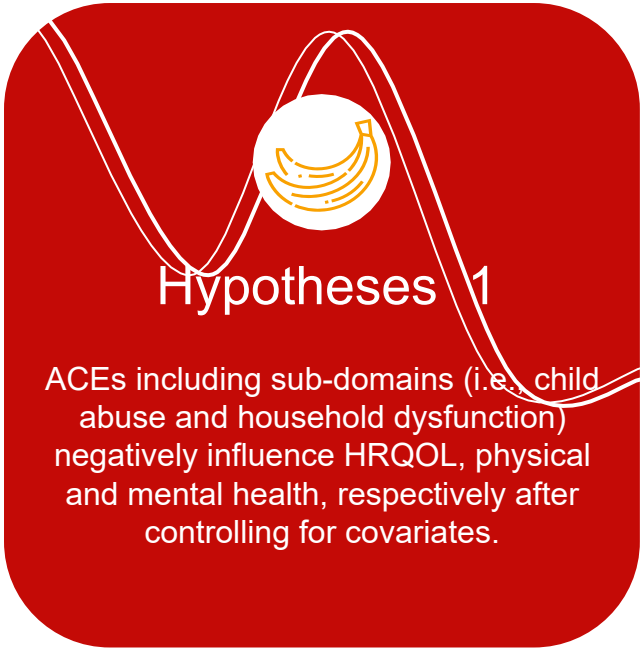
Question 1

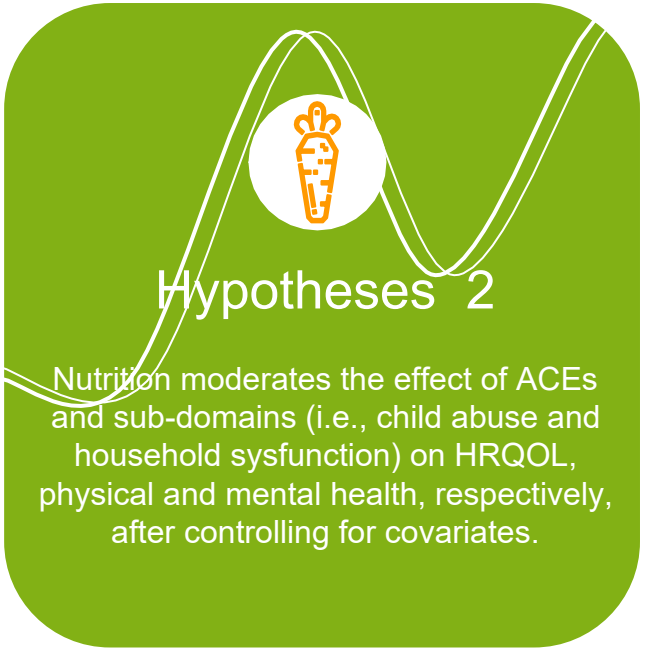
Do Adverse Childhood Experiences (ACEs) including sub-domains (i.e., child abuse and household dysfunction) negatively influence Health Related Quality of Life (HRQOL (physical & mental Health) after controlling for covariates.

Question 2

Does level of Nutrition moderate the effect of Adverse Childhood Experiences (ACEs) including sub-domains (i.e., child abuse and household dysfunction) negatively influence Health Related Quality of Life (HRQOL (physical & mental Health) after controlling for covariates.

Hypotheses


Hypotheses 1
ACEs including sub-domains (i.e., child abuse and household dysfunction) negatively influence HRQOL, physical and mental health, respectively after controlling for covariates.


Hypotheses 2
Nutrition moderates the effect of ACEs and sub-domains (i.e., child abuse and household sysfunction) on HRQOL, physical and mental health, respectively, after controlling for covariates.

03

Methods

Variables

Adverse Childhood Experiences

- Predictor variable
- 11 Indicators
- 3 ordinal indicators (0, 1-2, 3+)

Nutrition

- Moderator variable
- 4 Indicators
- Met recommendations,
  Did not meet recommendations

Health Related Quality of Life

- Outcome variable
- 2 Indicators
- 0=Poor (28 > days poor mental & physical health, 1=Good (27 < days poor mental & physical health

Child Abuse

- Predictor variable
- 6 Indicators
- 0=No, 1=Yes

Household Dysfunction

- Predictor variable
- 5 Indicators
- 0=No, 1=Yes

Demographics

- Age
- Race/Ethnicity
- Gender
- Education

Adverse Childhood Experiences

Child Abuse

ACEPUNCH - How often did your parents or adults in your home ever slap, hit, kick, punch or beat each other up?

ACEHURT1 - Not including spanking, (before age 18), how often did a parent or adult in your home ever hit, beat, kick, or physically hurt you in any way? Was it (Never, Once, More than once)?

ACESWEAR - How often did a parent or adult in your home ever swear at you, insult you, or put you down?

ACETOUCH - How often did anyone at least 5 years older than you or an adult, ever touch you sexually?

ACETTHEM - How often did anyone at least 5 years older than you or an adult, try to make you touch them sexually?

ACEHVSEX - How often did anyone at least 5 years older than you or an adult, force you to have sex?

Household Dysfunction

ACEDEPRS - Did you live with anyone who was depressed, mentally ill, or suicidal?

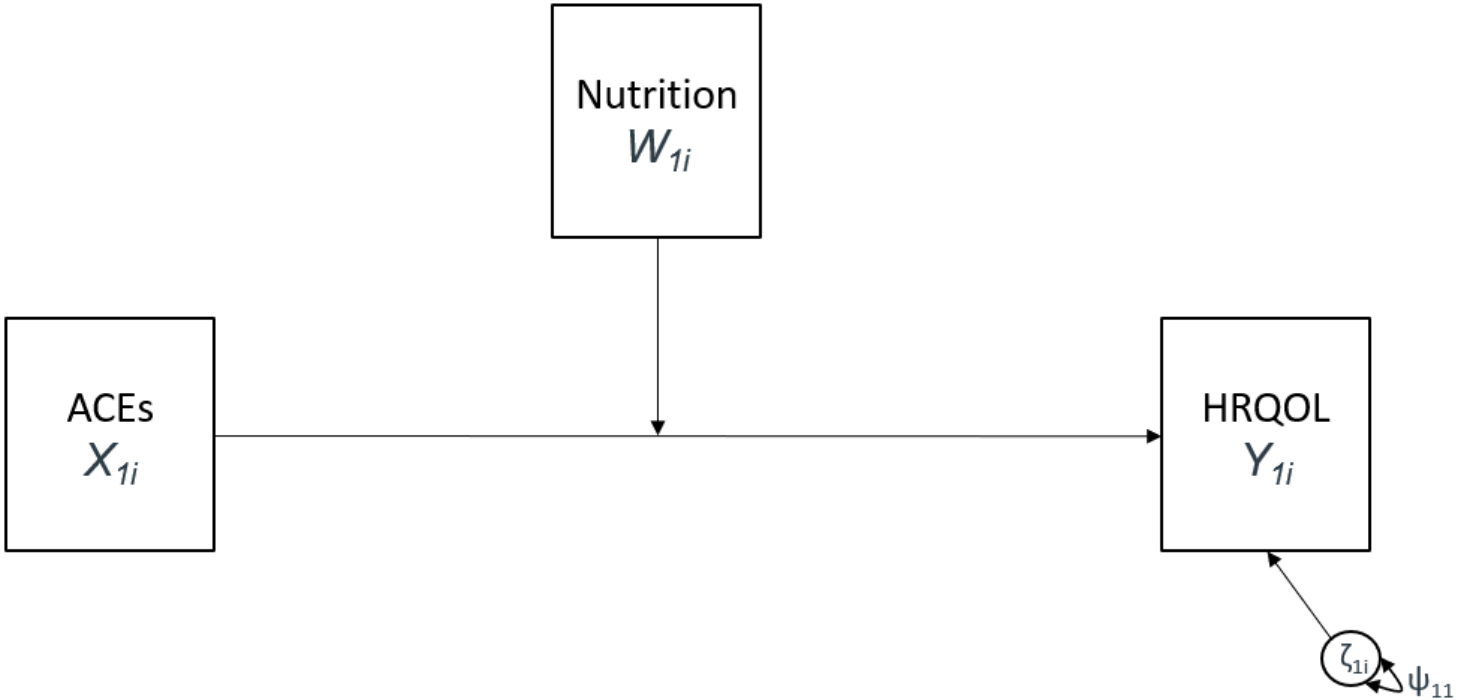
ACEDRINK - Did you live with anyone who was a problem drinker or alcoholic?

ACEDRUGS - Did you live with anyone who used illegal street drugs or who abused prescription medications?

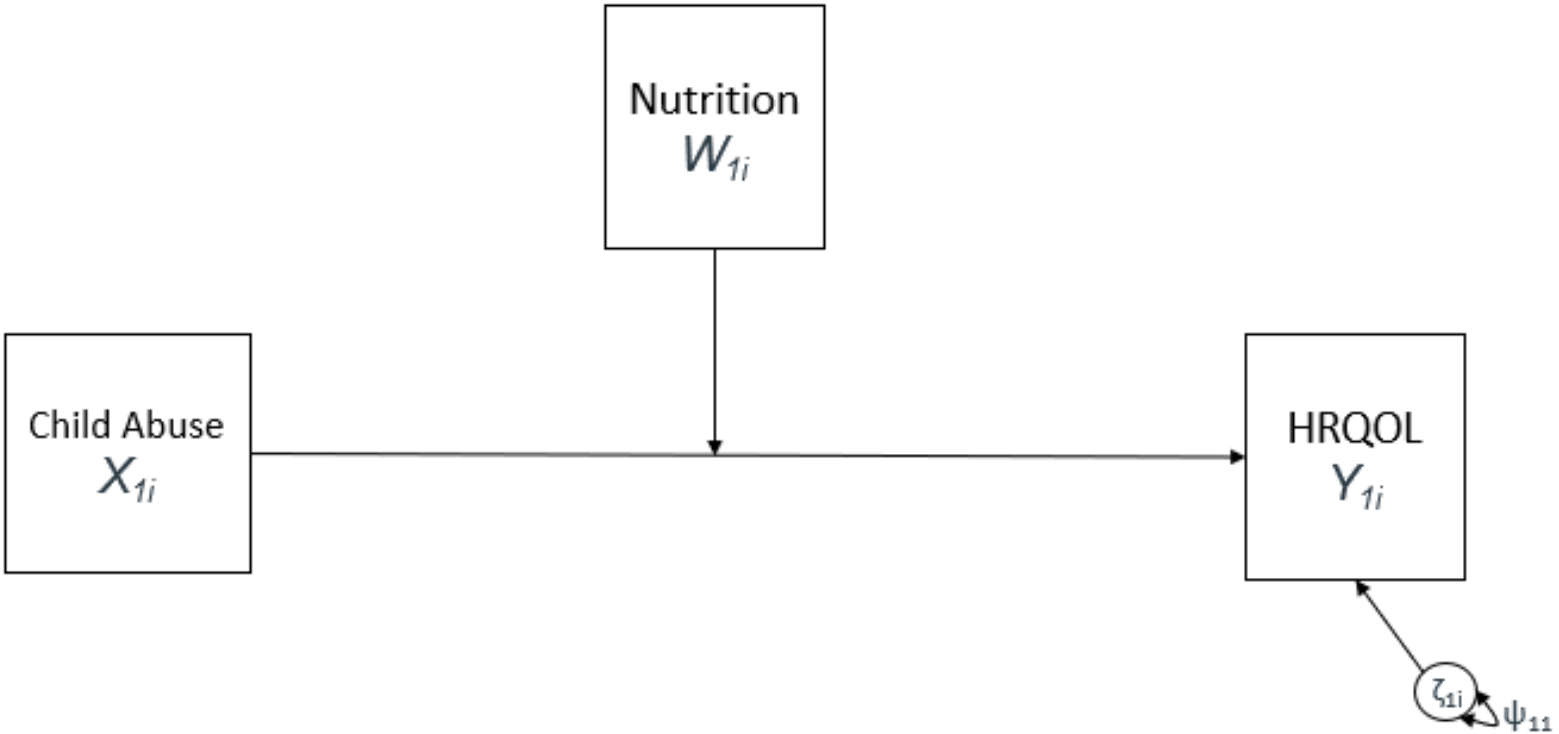
ACEPRISN -Did you live with anyone who served time or was sentenced to serve time in a prison, jail, or other correctional facility?

ACEDIVRC - Were your parents separated or divorced?

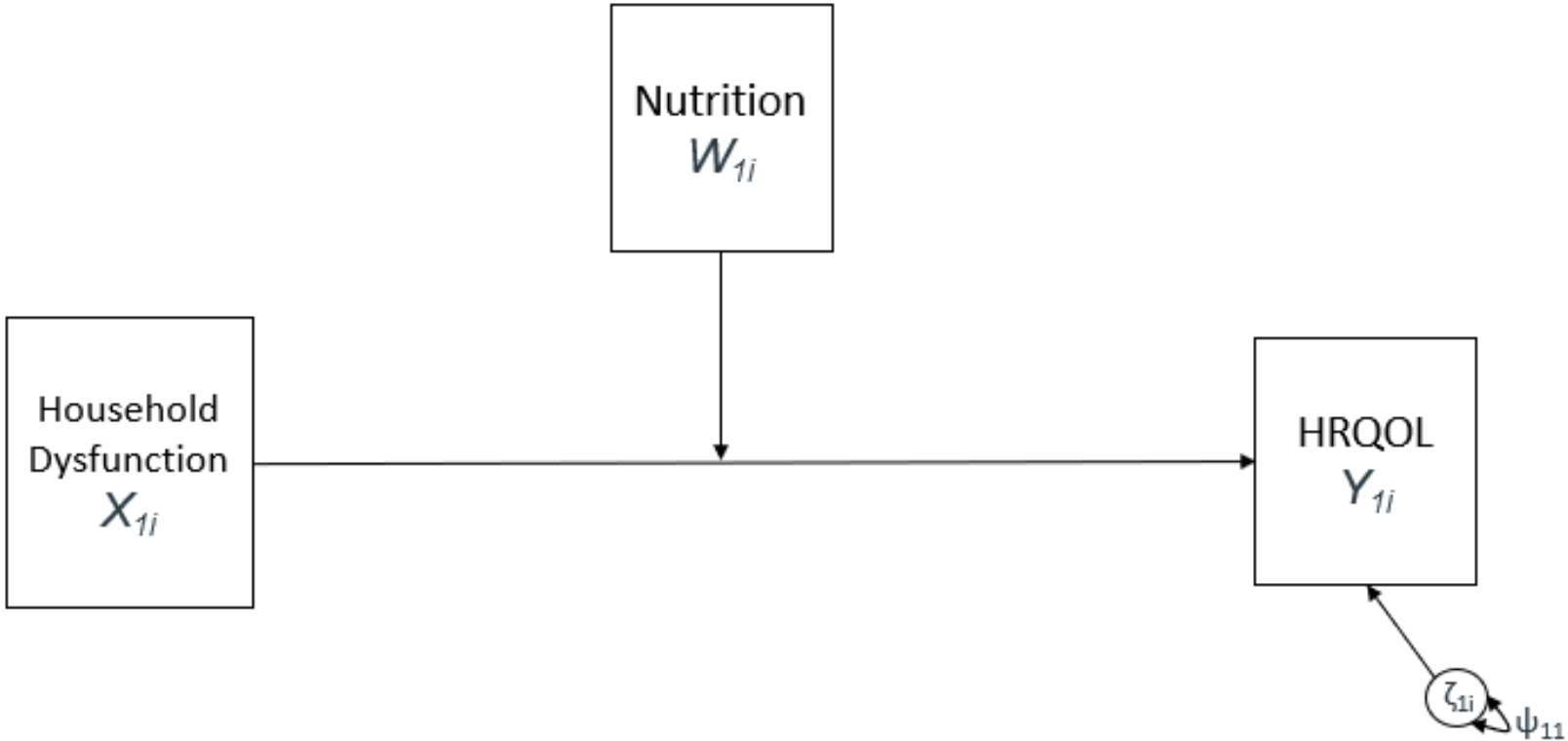
Model One



Model Two



Model Three


Nutrition
W_{1i}
Household Dysfunction
X_{1i}
HRQOL
Y_{1i}
ζ_{1i}
ψ_{11}


Estimation Method
MLR
Maximum-Likelihood Estimator

04

Results

Descriptives

Table 1

Gender of Respondents

Gender of Respondents

Gender	Frequency	Percent
Male	32163	45.5
Female	38468	54.5

Table 2

Race of Respondents

Race of Respondents

Race/Ethnicity	Frequency	Percent
White only, non-Hispanic	54919	77.8
Black only, non-Hispanic	7434	10.5
American Indian or Alaskan Native only, Non-Hispanic	889	1.3
Asian only, non-Hispanic	925	1.3
Native Hawaiian or other Pacific Islander only, Non-Hispanic	97	.1
Other race only, non-Hispanic	474	.7
Multiracial, non-Hispanic	1109	1.6
Hispanic	3144	4.5
Don't know/Not sure/Refused	1640	2.3

Descriptives

Table 3

Age of Respondents

Age of Respondents

Age	Frequency	Percent
Age 18 to 24	3840	5.4
Age 25 to 34	6487	9.2
Age 35 to 44	8254	11.7
Age 45 to 54	10115	14.3
Age 55 to 64	13287	18.8
Age 65 or older	28648	40.6

Descriptives

Table 4

Education Level of Respondents

Education Level of Respondents

Education level	Frequency	Percent
Never attended school or only kindergarten	57	.1
Grades 1 through 8 (Elementary)	1222	1.7
Grades 9 through 11 (Some high school)	2861	4.1
Grade 12 or GED (High school graduate)	18662	26.4
College 1 year to 3 years (Some college or technical school)	20028	28.4
College 4 years or more (College graduate)	27400	38.8
Refused	399	.6

Descriptives

Table 5
Health Related Quality of Life

Variable		N	Mean	Standard Deviation
Health-Related Quality of Life	PHYSHLTH	70630	62.53	36.445
	MENTHLTH	70630	60.87	37.180

Descriptives

Table 6

Adverse Childhood Experiences

Adverse Childhood Experiences		Frequency	Percent
ACEDEPRS	YES	10326	17.6
	NO	46934	79.9
	DON'T KNOW	482	.8
	REFUSED	1021	1.7
ACEDRINK	YES	13670	23.3
	NO	43807	74.7
	DON'T KNOW	203	.3
	REFUSED	967	1.6
ACEDRUGS	YES	5386	9.2
	NO	52033	88.8
	DON'T KNOW	285	.5
	REFUSED	913	1.6
ACEPRISN	YES	3840	6.6
	NO	53724	91.7
	DON'T KNOW	145	.2
	REFUSED	870	1.5
ACEDIVRC	YES	13470	23.0
	NO	42957	73.4
	DON'T KNOW	316	.5
	Not married	858	1.5
	REFUSED	946	1.6
ACEPUNCH	Never	48044	82.1
	Once	2138	3.7
	More than once	6363	10.9
	Dont know	708	1.2
	Refused	1252	2.1
ACEHURT1	Never	44172	75.6
	Once	3555	6.1
	More than once	9067	15.5
	Dont know	347	.6
	Refused	1320	2.3
ACESWEAR	Never	37999	65.0
	Once	3154	5.4
	More than once	15354	26.3
	Dont know	584	1.0
	Refused	1325	2.3
ACETOUCH	Never	50392	86.3
	Once	2247	3.9
	More than once	3934	6.7
	Dont know	204	.3
	Refused	1586	2.7
ACETTHEM	Never	52095	89.3
	Once	1705	2.9
	More than once	2773	4.8
	Dont know	211	.4
	Refused	1535	2.6
ACEHVSEX	Never	53993	92.6
	Once	917	1.6
	More than once	1683	2.9
	Dont know	188	.3
	Refused	1497	2.6

Descriptives

Table 7

HRQOL, ACE, Child Abuse, Household Dysfunction, Nutrition Frequencies

Item		N		Percent
HRQOL	Poor physical health	55,731		78.9
	Poor mental health	54,514		77.2
ACE	0	35,325		50
	1	20,349	35,306	49.9
	2+	14,957		
Child Abuse	Yes	26,144		37
Household Dysfunction	Yes	26,029		36.9
Nutrition	Met recommendations	3,974		5.6
	Did not Meet recommendations	66,657		94.4

Descriptives

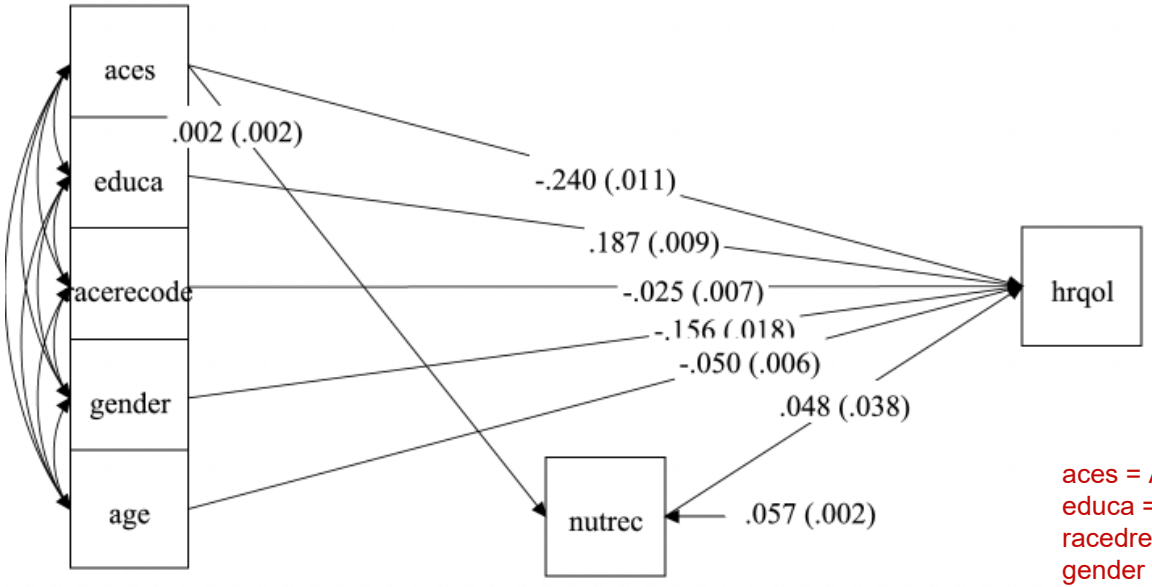
Table 8

Nutrition Recommendations

Nutrition Recommendations	N	Percent
Met	3,974	5.6
Did Not Meet	66,657	94.4

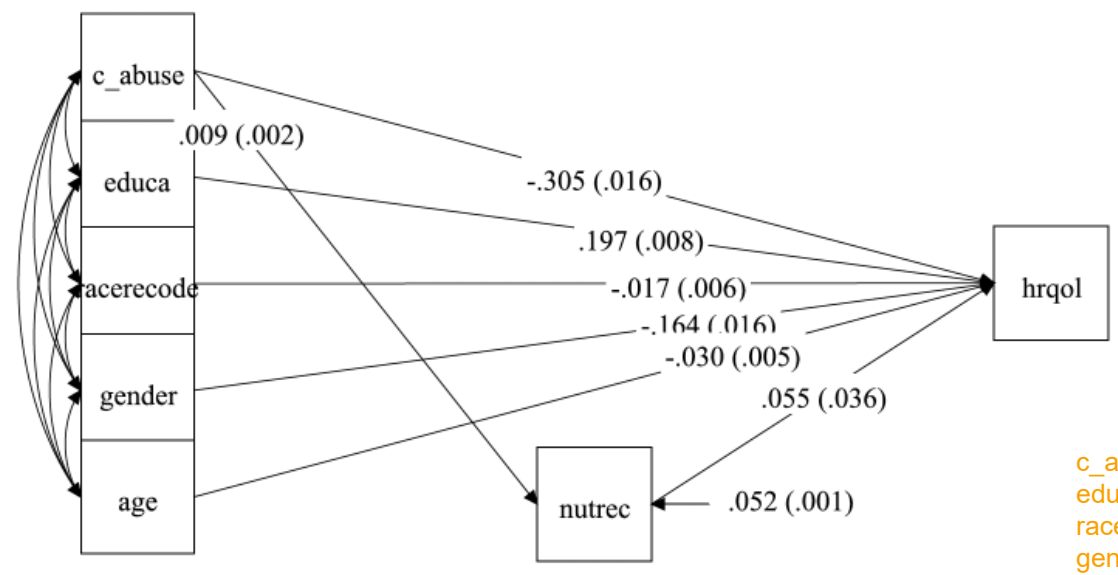
This study delineates adequate fruit intake as 2 servings per day and adequate vegetable intake as 2.5 servings per day.

Model One



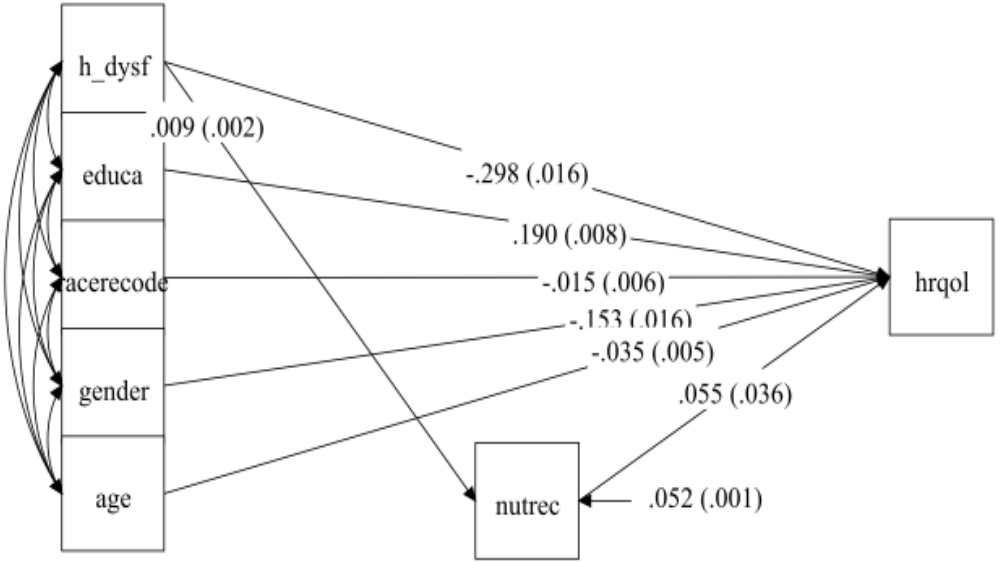
aces = Adverse childhood experiences
educa = Education level
racedrecode = White, Hispanic & Other
gender = Female & Male
age = 6 categories ((1)-Age 18-24, (2)-Age 25-34, (3)-Age 35-44, (4-)Age 45-54, (5)-Age 55-64, 6-Age 65+)
nutrec = Nutrition recommendations
hrqol = Health-related quality of life

Model Two



c_abuse = Child abuse
educa = Education level
racerecode = White, Hispanic & Other
gender = Female & Male
age = 6 categories ((1)-Age 18-24, (2)-Age 25-34, (3)-Age 35-44, (4-)Age 45-54, (5)-Age 55-64, 6-Age 65+)
nutrec = Nutrition recommendations
hrqol = Health-related quality of life

Model Three



h_dysf = Household dysfunction
racerecode = White. Hispanic & Other
gender = Female & Male
age = 6 categories ((1)-Age 18-24, (2)-Age 25-34, (3)-Age 35-44, (4-)Age 45-54, (5)-Age 55-64, 6-Age 65+)
nutrec = Nutrition recommendations
hrqol = Health-related quality of life

Fit Indices

Table 9

Fit Indices

	Model One	Model Two	Model Three
X^2	286.00*	327.593*	327.536*
RMSEA	0.035	0.034	0.034
CFI	0.784	0.772	0.761
TLI	0.405	0.374	0.324
SRMR	0.158	0.147	0.149

	Chi-Square	RMSEA	SRMR	CFI	TLI
Model Fit Guidelines	Non-significant Chi-square test = Good fit	< .05 = Excellent fit < .08 = Moderate fit Over .10 = Poor fit	< .08 = Good fit	Values over .95 = Good fit .90 = Acceptable	Values over .90-.95 = Good fit

Model Results

Table 10

Model One Results

HRQOL on	Estimate	P-value
ACE	-0.240	<0.0001
Educa	0.048	0.202
NUTREC	0.187	<0.0001
Race	-0.025	<0.0001
Gender	-0.156	<0.0001
Age	-0.050	<0.0001

Model Results

Table 11

Model Two Results

HRQOL on	Estimate	P-value
Child Abuse	-0.305	<0.0001
Educa	0.055	0.1230
NUTREC	0.197	<0.0001
Race	-0.017	<0.006
Gender	-0.164	<0.0001
Age	-0.030	<0.000

Model Results

Table 12

Model Three Results

HRQOL on	Estimate	P-value
Household dysfunction	-0.298	<0.0001
NUTREC	0.055	0.1230
Educa	0.182	<0.0001
Race	-0.017	0.012
Gender	-0.164	<0.0001
Age	-0.035	<0.0001

Hypothesis One:

ACEs including sub-domains (i.e., child abuse and household dysfunction) negatively influence HRQOL, physical and mental health, respectively after controlling for covariates. ACEs including sub-domains (i.e., child abuse and household dysfunction negatively influence HRQOL, physical and mental health, respectively after controlling for covariates.

The results of the analysis provided confirmation for Hypothesis One showing that ACEs, including the sub-domains of childabuse and household dysfunction, negatively influence HRQOL. Individuals who encountered greater levels of adverse childhood experiences were found to experience lower levels of health-related quality of life. These effects remained significant after controlling for age, gender, race, and education level.

These findings provide evidence that ACEs and the sub-domains of childabuse and household dysfunction have a detrimental effect on both mental and physical aspects of health underscoring the importance of addressing ACEs in an effort to improve health outcomes.

Hypothesis Two:

Nutrition moderates the effect of ACEs and sub-domains (i.e., childabuse and household dysfunction) on HRQOL, physical and mental health, respectively, after controlling for covariates.

Contrary to Hypothesis Two, the results of this current study did not support the moderating effect of nutrition on the relationship between ACEs and HRQOL. The interaction between nutrition and ACEs and the sub-domains of childabuse and household dysfunction was not found to be a significant predictor of HRQOL (physical or mental health), after controlling for covariates age, gender, race, and education level.

These findings suggest that the impact of ACEs and sub-domains on HRQOL is not significantly influenced by nutrition, at least not in the way that was hypothesized in this study. Further research is needed to explore other potential moderators or factors that may influence the impact of ACEs on HRQOL.

Limitations

- **Cross-sectional design:** The study used a cross-sectional design; it would be unable to establish causal relationships. **Longitudinal** studies would provide stronger evidence for causality.

- **Self-reported measures:** The study relied on self-reported measures. This could introduce reporting bias and affect the accuracy of the findings.


Questions?

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Model Results

Table 13

Model One Unstandardized & Standardized Results

		STDYX	STDY	STD
Directional Path	Unstandardized Effect(SE)	Standardized Effect (SE)	Standardized Effect (SE)	Standardized Effect (SE)
ACES → HRQOL	-0.240(.011)**	-0.195(.009)**	-0.230(.010)**	-0.240(.011)**
NUTREC → HRQOL	0.048(.038)	0.011(.009)	0.011(.009)	0.048(.038)
EDUCA → HRQOL	0.187(.009)**	0.176(.008)**	0.179(.008)**	0.187(.009)**
RACE → HRQOL	-0.025(.007)**	-0.031(.006)**	-0.024(.007)**	-0.025(.007)**
GENDER → HRQOL	-0.156(.018)**	-0.075(.009)**	-0.150(.017)**	-0.156(.018)**
AGE → HRQOL	-0.050(.006)**	-0.075(.009)**	-0.048(.006)**	-0.050(.006)**

Note. †$p < .10$, *$p < .05$, **$p < .01$,; ACES = adverse childhood experiences, NUTREC = nutrition recommendations, EDUCA = education levels, RACE = race, GENDER = gender, AGE = age

Model Results

Table 14

Model Two Unstandardized & Standardized Results

		STDYX	STDY	STD
Directional Path	Unstandardized Effect(SE)	Standardized Effect (SE)	Standardized Effect (SE)	Standardized Effect (SE)
C_ABUSE → HRQOL	-0.305 (.016)**	-0.143(.007)**	-0.295(.015)**	-0.305(.016)**
NUTREC → HRQOL	0.055(.036)	0.012(.008)	0.012(.008)	0.055(.036)
EDUCA → HRQOL	0.197(.008)**	0.188(.007)**	0.191(.008)**	0.197(.008)**
RACE → HRQOL	-0.017(.006)**	-0.022(.008)**	-0.016(.006)**	-0.017(.006)**
GENDER → HRQOL	-0.164(.016)**	-0.079(.008)**	-0.158(.016)**	-0.164(.016)**
AGE → HRQOL	-0.030(.005)**	-0.046(.008)**	-0.029(.005)**	-0.030(.005)**

Note. †$p < .10$, *$p < .05$, **$p < .01$,; C_ABUSE = child abuse, NUTREC = nutrition recommendations, EDUCA = education levels, RACE = race, GENDER = gender, AGE = age

Model Results

Table 15

Model Three Unstandardized & Standardized Results

		STDYX	STDY	STD
Directional Path	Unstandardized Effect(SE)	Standardized Effect (SE)	Standardized Effect (SE)	Standardized Effect (SE)
H_DYSF → HRQOL	-0.298 (.016)**	-0.140(.008)**	-0.288(.016)**	-0.3298(.016)**
NUTREC → HRQOL	0.055(.036)	0.012(.008)	0.012(.008)	0.055(.036)
EDUCA → HRQOL	0.190(.008)**	0.182(.007)**	0.184(.008)**	0.190(.008)**
RACE → HRQOL	-0.015(.006)**	-0.020(.008)**	-0.015(.006)**	-0.015(.006)**
GENDER → HRQOL	-0.153(.016)**	-0.074(.008)**	-0.148(.016)**	-0.153(.016)**
AGE → HRQOL	-0.035(.005)**	-0.054(.008)**	-0.034(.005)**	-0.035(.005)**

Note. †$p < .10$, *$p < .05$, **$p < .01$,; H_DYSF = household dysfunction, NUTREC = nutrition recommendations, EDUCA = education levels, RACE = race, GENDER = gender, AGE = age