

Comparing the Health of Non-heterosexual to Heterosexual Youth in Viet Nam: Analysis Using Propensity Score Matching

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BACKGROUND

- Methodological: A challenge in research of sexual minority health disparities is lack of comparable LGBT and non-LGBT samples. Even with population samples (preferred over separately recruited LGBT and non-LGBT samples), confounding remains problematic due to small LGBT percentages.
- Geographical: No prior research examined LGBT health disparities in Viet Nam

AIMS

- Apply propensity score matching (a causal inference method) to control for confounders
- Examine health disparities comparing non-heterosexual to heterosexual youth in a national survey of Vietnamese youth (SAVY 2009)

WHAT IS PROPENSITY SCORE MATCHING?

The interest is to determine the effect of an exposure on an outcome, in the context of an observational study. We may find that the exposed and the unexposed groups are different in various characteristics. If these characteristics affect the outcome, they confound the relationship between the exposure and the outcome (unless they are mediators).

The propensity score is a measure of tendency to be in the exposed group given these characteristics, often estimated using logistic regression. It can be used to match exposed and unexposed individuals, or to reweight the sample, in order to achieve balance (i.e., similar distributions of) the characteristics in the exposed and the unexposed group. This helps eliminate the confounding effects of the characteristics considered.

These methods are causal inference methods because, with the assumption of no unobserved confounding, the difference in the outcome between the two groups can logically be attributed to the exposure.

METHODS

Variables

- Exposure: Non-heterosexuality, operationalized as attracted to the same sex or both sexes, as proxy for different life experience as a non-heterosexual person
- Outcomes: various health indicators
- Confounders considered: age, ethnicity, urban/rural location, geographical regions, education, work status, family assets, and parent education

Matching – using MatchIt

- Matched heterosexual to non-heterosexual individuals
- Matched for male & female youth separately
- Combined nearest matching with caliper on propensity score, Mahalanobis distance on continuous variables (age, family assets score, parent education/grade) and exact matching on ethnicity, urban/rural location, geographical region, and education level/step
- Variable ratio matching to make use of good candidates for matching
- Matched in several steps with relaxation of certain matching criteria to acquire matches for all non-heterosexual individuals
- Computed weights for heterosexual matches so that matched sets for all non-heterosexual persons had the same weights, and sum of all weights equals number of heterosexual matches

Analysis of matched samples

- Computed proportions of health variables and their variance (using weights computed at previous step)
- Computed risk ratios (RR), estimated variance for log RR based on variance of proportion using the Delta method, and computed confidence intervals for RR

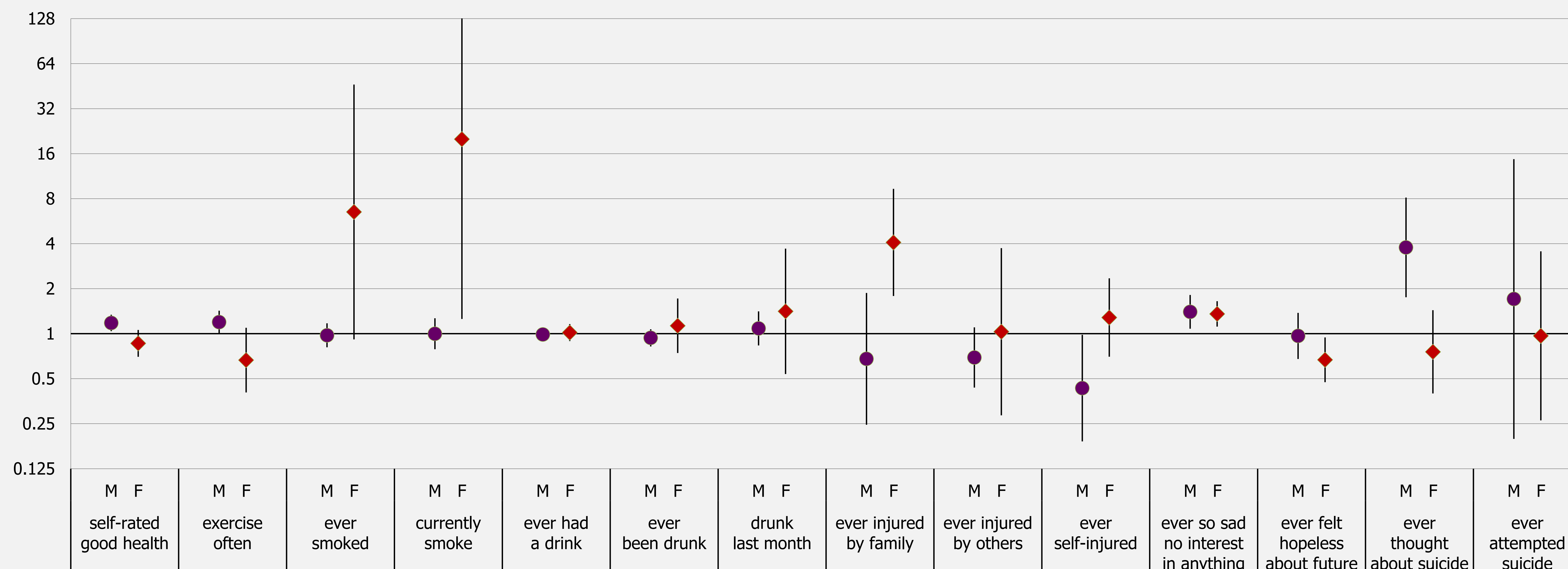
RESULTS – Characteristics of matched samples

	Male Youth			Female Youth		
	non-het n=160	matched het n=1482	p-value	non-het n=155	matched het n=622	p-value
	mean (SD)		t p-value	mean (SD)		t p-value
Propensity score	0.078 (0.039)	0.076 (0.038)	0.55	0.196 (0.093)	0.195 (0.092)	0.91
Age	20.2 (3.1)	20.1 (3.1)	0.73	19.4 (3.08)	19.5 (3.11)	0.85
Family assets score	-0.09 (0.83)	-0.08 (0.82)	0.93	0.08 (0.88)	0.14 (0.88)	0.44
	proportion		chi2 p-value	proportion		chi2 p-value
Kinh ethnicity	0.738	0.744	0.86	0.826	0.832	0.85
Area:						
big city	0.05	0.08		0.05	0.06	
other city	0.06	0.04	0.06	0.05	0.04	0.78
provincial/district town	0.13	0.08		0.14	0.12	
Rural	0.76	0.81		0.76	0.78	
region:						
1	0.18	0.18		0.12	0.12	
2	0.24	0.24		0.24	0.24	
3	0.34	0.34		0.41	0.41	
4	0.06	0.06	1	0.03	0.03	1
5	0.06	0.06		0.09	0.09	
6	0.13	0.13		0.12	0.12	
Ever worked	0.63	0.65	0.59	0.48	0.50	0.80
Education:						
Primary	0.41	0.41		0.23	0.23	
lower secondary	0.32	0.32		0.39	0.39	
higher secondary	0.21	0.21	1	0.24	0.24	1
above secondary	0.07	0.07		0.14	0.14	
Parents' education:						
Primary	0.20	0.20		0.14	0.17	
lower secondary	0.38	0.43		0.45	0.41	
higher secondary	0.21	0.19	0.62	0.26	0.26	0.59
above secondary	0.11	0.08		0.10	0.12	
don't know	0.11	0.09		0.06	0.05	

RESULTS – Proportions and RRs of outcomes

	Male Youth			Female Youth		
	non-het proportion (95% CI)	matched het proportion (95% CI)	RR (95% CI)	non-het proportion (95% CI)	matched het proportion (95% CI)	RR (95% CI)
Self-rated good health	0.67 (0.60 – 0.75)	0.57 (0.53 – 0.61)	1.18 (1.04 – 1.34)	0.43 (0.35 – 0.51)	0.50 (0.45 – 0.55)	0.86 (0.70 – 1.06)
Exercise often	0.51 (0.44 – 0.59)	0.43 (0.39 – 0.47)	1.20 (1.00 – 1.42)	0.11 (0.06 – 0.16)	0.16 (0.13 – 0.20)	0.67 (0.40 – 1.10)
Smoking:						
Ever	0.46 (0.39 – 0.54)	0.47 (0.44 – 0.51)	0.98 (0.81 – 1.17)	0.013 (0 – 0.031)	0.002 (0 – 0.005)	6.52 (0.92 – 46.38)
Current	0.34 (0.27 – 0.42)	0.34 (0.31 – 0.38)	1.00 (0.79 – 1.27)	0.006 (0 – 0.019)	0.0003 (0 – 0.001)	20.00 (1.25 – 318.97)
Drinking:						
ever had a drink	0.93 (0.88 – 0.97)	0.94 (0.92 – 0.95)	0.99 (0.94 – 1.04)	0.68 (0.60 – 0.75)	0.67 (0.62 – 0.71)	1.02 (0.89 – 1.16)
ever been drunk	0.62 (0.54 – 0.69)	0.66 (0.63 – 0.69)	0.94 (0.82 – 1.07)	0.17 (0.11 – 0.23)	0.15 (0.11 – 0.18)	1.13 (0.74 – 1.72)
drunk in the past month	0.31 (0.24 – 0.38)	0.29 (0.25 – 0.32)	1.08 (0.83 – 1.41)	0.04 (0.01 – 0.07)	0.03 (0.01 – 0.04)	1.41 (0.54 – 3.71)
Injury:						
ever been injured by family member(s)	0.025 (0.001 – 0.049)	0.037 (0.026 – 0.048)	0.68 (0.25 – 1.87)	0.08 (0.04 – 0.12)	0.02 (0.01 – 0.03)	4.08 (1.79 – 9.30)
ever been injured by people outside family	0.12 (0.07 – 0.17)	0.17 (0.14 – 0.20)	0.69 (0.44 – 1.10)	0.02 (0 – 0.04)	0.02 (0.01 – 0.03)	1.03 (0.28 – 1.73)
ever self-injure	0.04 (0.01 – 0.07)	0.09 (0.07 – 0.11)	0.43 (0.19 – 0.98)	0.09 (0.05 – 0.14)	0.07 (0.05 – 0.09)	1.28 (0.70 – 2.34)
Depressed mood:						
ever so sad that not interested in anything	0.34 (0.26 – 0.41)	0.24 (0.21 – 0.27)	1.40 (1.08 – 1.82)	0.53 (0.45 – 0.61)	0.39 (0.34 – 0.44)	1.36 (1.11 – 1.65)
ever felt hopeless about the future	0.19 (0.13 – 0.25)	0.20 (0.17 – 0.23)	0.97 (0.68 – 1.38)	0.21 (0.14 – 0.27)	0.31 (0.26 – 0.36)	0.67 (0.47 – 0.94)
Suicidality:						
ever thought about suicide	0.06 (0.02 – 0.09)	0.01 (0.01 – 0.02)	3.78 (1.75 – 8.13)	0.07 (0.03 – 0.11)	0.09 (0.07 – 0.12)	0.76 (0.40 – 1.43)
ever attempted suicide	0.006 (0 – 0.018)	0.004 (0.0003 – 0.007)	1.71 (0.20 – 14.70)	0.02 (0 – 0.04)	0.02 (0.01 – 0.03)	0.97 (0.26 – 3.55)

RESULTS – Risk ratios (with 95% CI) of health outcomes comparing non-heterosexual to heterosexual youth, by gender



Note: The confidence interval for the RR of currently smoking among female youth has been truncated. The upper limit is 319.

TO SUM UP

For youth that are similar in family background (family assets, parent education), residential location (urban/rural, geographical region), and select individual characteristics (age, education, work status),

compared to heterosexual males, non-heterosexual males are:

- 1.18 times (95% CI 1.04 – 1.34) more likely to self-rate to have good health
- 1.19 times (95% CI 1.00 – 1.42) more likely to exercise often
- only 0.43 times (95% CI 0.19 – 0.98) as likely to have caused injury to oneself
- 1.40 times (95% CI 1.08 – 1.82) more likely to have ever felt so depressed they were not interested in anything
- 3.78 time (95% CI 1.75 – 8.13) more likely to have thought about suicide;

compared to heterosexual females, non-heterosexual females are:

- 20 times (95% CI 1.25 – 319) more likely to smoke currently
- 4.08 times (95% CI 1.79 – 9.30) more likely to have been injured due to violence by family member(s)
- 1.36 times (95% CI 1.11 – 1.65) more likely to have ever felt so depressed they were not interested in anything
- only 0.67 times (95% CI 0.47 – 0.94) as likely to have ever felt hopeless about the future.

LIMITATION

Education level may be in the causal pathway, and matching on it may have led to underestimation of the effect of life experience as a non-heterosexual person on health.

Question for you:

Should we leave education out of the matching?
Or:
Would you control for education (or not) when examining sexual-orientation-related health disparities?

Thank you!