Title: A systematic review and meta-analysis of diabetes mellitus, cardiovascular and respiratory condition epidemiology in sexual minority women.

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Web Supplement 1. – Search strategy for Medline, Embase, PsycInfo and CAB Abstracts. December 2016

Database: Ovid MEDLINE(R) 1948 to Present (including In-Process & Other Non-Indexed Citations)

Search Strategy:

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1 lesbian.mp. or Homosexuality, Female/ (5704)

2 Bisexuality/ or bisexual women.mp. (4142)

3 wsw.mp. (120)

4 WSMW.mp. (5)

5 sexual orientation.mp. or Sexual Behavior/ (56050)

6 sexual identity.mp. (1251)

7 queer.mp. or Homosexuality/ (13250)

8 1 or 2 or 3 or 4 or 5 or 6 or 7 (70952)

9 limit 8 to yr="2015 -Current" (4625)

10 limit 9 to female (3011)

11 Great Britain/ or UK.mp. (276229)

12 10 and 11 (62)

SEARCH QUERY - EMBASE

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((('homosexual female':ab,ti or 'bisexual female':ab,ti or 'women who have sex with women':ab,ti and [2015-2016]/py) or ('homosexual female'/exp or 'homosexual female') or 'bisexual female' or 'women who have sex with women' or wsw or wsmw) and (2015:py or 2016:py or 2017:py)) and 'united kingdom'

Database: PsycINFO <1967 to November Week 1 2016>

Search Strategy:

--------------------------------------------------------------------------------

1 exp Lesbianism/ or exp Sexual Orientation/ or exp Homosexuality/ or exp Bisexuality/ or lesbian$.mp. (30632)

2 bisexual women.mp. (613)

3 wsw.mp. (46)

4 wsmw.mp. (2)

5 sexual identity.mp. (3150)

6 queer.mp. (3030)

7 1 or 2 or 3 or 4 or 5 or 6 (32610)

8 limit 7 to (human and yr="2015 -Current") (3331)

9 limit 8 to female (1815)

10 Great britain.mp. (2848)

11 united kingdom.mp. (8990)

12 uk.mp. (30316)

13 british.mp. (20760)

14 gb.mp. (241)

15 english.mp. (118463)

16 scottish.mp. (2638)

17 welsh.mp. (1111)

18 irish.mp. (3268)

19 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 (177759)

20 9 and 19 (57)

Database: CAB Abstracts <1973 to 2016 Week 44>

Search Strategy:

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1 exp Lesbianism/ or exp Sexual Orientation/ or exp Homosexuality/ or exp Bisexuality/ or lesbian$.mp. (2168)

2 bisexual women.mp. (25)

3 wsw.mp. (100)

4 wsmw.mp. (1)

5 sexual identity.mp. (113)

6 queer.mp. (104)

7 1 or 2 or 3 or 4 or 5 or 6 (2365)

8 limit 7 to (human and yr="2015 -Current") [Limit not valid in CAB Abstracts; records were retained] (412)

9 limit 8 to female [Limit not valid in CAB Abstracts; records were retained] (412)

10 Great britain.mp. (34833)

11 united kingdom.mp. (152174)

12 uk.mp. (170127)

13 british.mp. (188436)

14 gb.mp. (8148)

15 english.mp. (41160)

16 scottish.mp. (5784)

17 welsh.mp. (3198)

18 irish.mp. (15558)

19 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 (252567)

20 9 and 19 (10)

Database: OVID Medline April 2015

1 Exp Homosexuality, Female/

2 wsw.tw

3 lesbian\*.tw

4 gay.tw

5 LGBT\*.tw

6 homosexual\*.tw

7 Exp Bisexuality/

8 bisexual\*.tw

9 pan?sexual\*.tw

10 queer\*.tw

11 “sexual orientation”.tw

12 “sexual preference\*”

13 ”sexual minorit\*”.tw

14 “same sex”.tw

15 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14

Web Table 1. Participant baseline characteristics

|  | Number of hetero-sexual women | Age | Ethnicity | Number of lesbians/bisexual/SMW | Age | Ethnicity | Demographic imbalances compared to heterosexual women. | Prevalence estimates weighted by: | Adjusted odds ratios weighted by: |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Blosnich  (2014) | 51,639 | Mean 47.3 (SE 0.16) | 61.4% white, 3.6% black, 26.3% Hispanic | 615 lesbians, 451 bisexual women | Mean 43.1 (SE 1.33) lesbians, 35.1 (SE 1.41) bisexual women | 70.8% white, 4.3% black, 15.9% Hispanic lesbians,  61.1% white, 5.5% black, 24.0% Hispanic bisexual women | SMW younger, fewer partnered, lesbians more educated, more employed, bisexual women less educated, fewer employed, less income. | Age race/ethnicity, education, income | Age race/ethnicity, education, income (only conducted where bivariate analyses p<0.05) |
| Blosnich  (2013) | 53,875 opposite sex partnered | Mean 33.0 (SE 0.06) | 67.5% white | 433 same-sex partnered | Mean 32.7 (SE 0.69) | 72.6% white | Same sex partnered lower income, | Education, income, race/ethnicity, overweight, smoking | ‘weighted to account for sampling design’ |
| Boehmer  (2014) | 90,608 | Mean 43.0 (SE 0.03) | 50.1% white, 6.5% black, 13.0% Asian 24.6% Hispanic | 1,265 lesbians, 1,369 bisexual women | Mean 42.4 (SE 0.47) lesbians, 36.3 (SE 0.53) bisexual women | 68.5% white, 7.4% black, 4.9% Asian 11.8% Hispanic lesbians,  57.6% white, 10.0% Asian 7.0% black, 16.9% Hispanic bisexual women | SMW younger, more white, more educated, more US born, lesbians more income, bisexual women less income, fewer with health insurance | Unadjusted prevalence reported | Age, race/ethnicity, education, household income, nativity |
| Conron  (2010) | 39,701 | 35.2% aged 18-33 | 83.2% white, 4.1% black, 2.6% Asian, 8.9% Hispanic | 719 lesbian, 432 bisexual women | 30.4% lesbians, 65.1% bisexual women aged 18-33 | 87.2% white, 4.5% black, 1.2% Asian, lesbian, 5.7% Hispanic  78.9% white, 4.7% black, 5.7% Asian, 9.3% Hispanic bisexual women | Lesbians more educated | Age, gender | Age, gender, education, income |
| Dilley  (2010) | 47,505 | Mean 46.3 | 85.6% white, 1.8% black, 3.6% Asian, 7.1% Hispanic | 589 lesbian, 561 bisexual women | Mean 40.0 lesbian, 32.9 bisexual women. | 85.5% white, 1.6% black, 3.1% Asian, 7.2% Hispanic | More higher education in lesbians, less in bisexual women. Lesbians and bisexuals lower income. | Assumed that unadjusted prevalence reported | Sexual orientation, age, education |
| Everett  (2013)  and | 6,072 | Mean 28.7 (whole sample) | NR | 138 gay/mostly gay 1345 bisexual/ mostly heterosexual, | NR | NR | NR | Possibly unadjusted prevalence reported | N/A |
| Clarke (2015) | 5713 | Mean 28.8 (95%CI 28.6 to 29.1) | 67.7% white | 71 homosexual, 60 mostly homosexual, 154 bisexual, 1089 mostly heterosexual | Mean (95%CI) 28.9 (28.3 to 29.5), homosexual, 28.4 (27.8 to 29.0) mostly homosexual, 28.3 (27.9 to 28.6) bisexual, 28.5 (28.2 to 28.7) mostly heterosexual | White 64.1% homosexual, 73.2% mostly homosexual, 69.4% bisexual, 77.5% mostly heterosexual | NR | See above | N/A |
| Farmer  (2013) | 5,356 | 36.2% aged 20-29 | 69.8% white, 12.0% black, 12.9% Hispanic | 437 SMW | 49.2% aged 20-29 | 73.4% white, 13.2% black, 8.6% Hispanic | SMW younger | Possibly unadjusted prevalence reported | N/A |
| Fredriksen-Goldsen  (2012) | 49,092 | Mean 46.6 (SE 0.12) | 83.7% white | 626 lesbians, 536 bisexual women | Mean 42.9 (SE 0.81) lesbian, 32.7 (SE 0.85) bisexual women | 85.4% white lesbian, 78.2% white bisexual women. | SMW younger, fewer partnered, lesbians less education, bisexual women lower income | Age | Age, education, income |
| Fredriksen-Goldsen  (2013) | 57,466 | Mean 63.8 (SD 0.06) | 91.8% white | 562 lesbians, 291 bisexual women | Mean 58.6 (SD 0.37) | 90.3% white | SMW more employed, fewer partnered, fewer less educated | Unclear weighting factors | Age, education, income |
| Frisch  (2013) | 61,993,266 | Aged 18+ | NR | 655,941 same sex cohabiting | Aged 18+ | NR | NR | (Mortality estimate - by age) | N/A |
| Garland-Forshee  (2014) | 25,602 | 28.8% aged 18-34 | 86.7% white | 347 lesbians, 322 bisexual women | 26.9% lesbian, 62.3% bisexual women aged 18-34 | 81.6% lesbians, 85.8% bisexual women white | SMW less likely to be partnered, more education, more urban residence, Lesbians more employed, Bisexual women younger, less income | Unclear weighting factors | Age, education, relationship status, rural or urban residency |
| Jackson (2016) | 37,185 | NR | 68.3% white, 12.3% black, 12.9% Hispanic | 525 lesbians, 353 bisexual women | NR | 71.4% white, 12.7% black, 12.5% Hispanic lesbian  73.5% white, 16.0% black, 7.2% Hispanic bisexual women | Lesbians more educated, fewer partnered, bisexual women less income | Age, ethnicity, educational attainment, annual household income, occupational class, health status, region of residence | Age race/ethnicity, education, income, occupational class, health status, region of residence |
| Ward (2015) | 17,399 | NR | NR | 296 lesbians, 121 bisexual women | NR | NR | NR | As Jackson 2016 above | Age, race/ethnicity, education, income, marriage status, employment, health insurance status, region of residence |
| Kann (2016) identity | 6,105 | NR | NR | 167 lesbian, 734 bisexual women | NR | NR | NR | Sex, race/ ethnicity and grade | N/A |
| Kann (2016) behaviour | 3,054 | NR | NR | 173 lesbians, 572 bisexual women | NR | NR | NR | Sex, race/ ethnicity and grade | N/A |
| Matthews  (2014) | 6,110 | 25.7% aged 18-34 | 71.3% white, 20.7% black, 5.2% Hispanic | 86 SMW | 40.6% aged 18-34 | 77.7% white, 14.1% black, 1.7% Hispanic | SMW younger, more likely to use mobile phones | Survey design | Age |
| McNair  (2011) | 8,083 | 25-30 | NR | 99 lesbians, 100 bisexual women | 25-30 | NR | SMW lower income, less likely to be partnered, fewer with children, more urban residence, Lesbians more educated, bisexual women less educated, | Unclear weighting factors | N/A |

Web Table 2. Critical Appraisal Skills Programme (CASP) quality assessment results

| Study | 1 | 2 | 3 | 4 | 5a | 5b | 6a | 6b | 9 | 10 | 11 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Blosnich  (2014) | Y | Y | Y | N | n | CT | N/A | N/A | Y | Y | Y |
| Blosnich  (2013) | Y | Y | CT | N | N | CT | N/A | N/A | Y | Y | Y |
| Boehmer  (2014) | Y | Y | Y | N | CT | N | N/A | N/A | Y | Y | Y |
| Clarke (2015) | Y | Y | Y | Y | N | CT | N/A | N/A | Y | Y | Y |
| Conron  (2010) | Y | Y | Y | N | N | CT | N/A | N/A | Y | Y | Y |
| Dilley  (2010) | Y | Y | Y | N | N | CT | N/A | N/A | Y | Y | Y |
| Everett  (2013) | Y | Y | Y | Y | N | CT | N/A | N/A | Y | Y | Y |
| Farmer  (2013) | Y | Y | Y | N | N | CT | N/A | N/A | Y | Y | Y |
| Fredriksen-Goldsen  (2012) | Y | Y | Y | N | N | CT | N/A | N/A | Y | Y | Y |
| Fredriksen-Goldsen  (2013) | Y | Y | Y | N | N | CT | N/A | N/A | Y | Y | Y |
| Frisch  (2013) | Y | Y | CT | Y | N | CT | CT | Y | Y | Y | N/A |
| Garland-Forshee  (2014) | Y | Y | Y | N | N | CT | N/A | N/A | Y | Y | Y |
| Jackson (2016) | Y | Y | Y | N | N | Y | N/A | N/A | Y | Y | Y |
| Kann (2016) | Y | Y | Y | N | N | Y | N/A | N/A | Y | Y | Y |
| Matthews  (2014) | Y | Y | Y | N | CT | CT | N/A | N/A | Y | Y | Y |
| McNair  (2011) | Y | Y | Y | N | N | CT | N/A | N/A | Y | Y | Y |
| Ward (2015) | Y | Y | Y | N | N | CT | N/A | N/A | Y | Y | Y |
| The checklist questions were 1. Did the study address a clearly focused issue? 2. Was the cohort recruited in an acceptable way? 3. Was the exposure accurately measured to minimise bias? 4. Was the outcome accurately measured to minimise bias? 5a. Have the authors identified all important confounding factors? 5b) Have they taken account of the confounding factors in the design and/or analysis? 6a. Was the follow up of subjects complete enough? 6b. Was the follow up of subjects long enough? 9. Do you believe the results? 10. Can the results be applied to the local population? 11. Do the results of this study fit with other available evidence? | | | | | | | | | | | |

Web Table 3. Prevalence of CVD by sexual orientation

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Study name | Heterosexual | Lesbian | AOR (95%CI) | Bisexual | AOR (95%CI) | SMW | AOR (95%CI) |
| Blosnich 2014& | 5.8%#  (SE 0.002) | 5.0%#  (SE 0.002) | NR | 7.0%#  (SE 0.024) | NR | NR | NR |
| Boehmer 2014£ | 4.9%  (SE 0.11) | 5.8%  (SE 1.30) | 1.46 (0.92 to 2.34) | 3.8%  (SE 0.75) | 1.14 (0.75 to 1.72) | NR | NR |
| Conron 2010& | 1.3%#  (SE 0.1) | 1.8%#  (SE 0.6) | 1.92 (0.95 to 3.87) | 3.3%#  (SE 2.2) | 2.24 (0.53 to 9.43) | NR | NR |
| Fredriksen-Goldsen 2013& | 10.7%# | NR | NR | NR | NR | 10.5%# | 1.37 (1.00 to 1.86)\* |
| Garland-Forshee 2014& | 6.2%# (5.8 to 6.6) | 4.0%#  (2.1 to 7.5) | 1.0 (0.5 to 1.9) | 1.8%#  (0.6 to 6.0) | 0.7 (0.2 to 2.9) | NR | NR |
| Jackson 2016 (heart disease) | 10.8% | 9.9% | 0.91 (0.61 to1.35) | 7.2% | 0.73 (0.40 to 1.35) | NR | NR |
| Jackson 2016 (stroke) | 3.2% | 5.8% | 1.96 (1.14 to 3.39)\* | 3.4% | 1.68 (0.71 to 3.97) | NR | NR |
| Matthews 2014 | 4.1% | NR | NR | NR | NR | 0.4% | 0.19 (0.04 to 0.87) |

\* - statistically significant to p<0.05 or less, # - weighted percentages, & - calculated from weighted percentages, £ - calculated from unweighted percentages, RR – relative risk.

Web Table 4. Prevalence of hypertension (or hypertensive medication use) by sexual orientation

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Study name | Heterosexual | Lesbian | AOR (95%CI) | Bisexual | AOR (95%CI) | SMW | AOR (95%CI) |
| Boehmer 2014 | 21.2%  (SE 0.19) | 19.0%  (SE 1.81) | 0.99 (0.77 to 1.26) | 17.6%  (SE 1.70) | 1.21 (0.95 to 1.53) | NR | NR |
| Boehmer 2014 (medication use) | 65.3%  (SE 0.47) | 66.0%  (SE 4.29) | 1.57 (0.90 to 2.75) | 45.0%  (SE 4.69) | 0.74 (0.44 to 1.24) | NR | NR |
| Dilley 2010 | 22.7%  (22.1 to 23.4) | 14.7%  (9.8 to 21.4) | 1.0 (0.6 to 1.7) | 17.0%  (12.2 to 23.1) | 1.6 (1.1 to 2.5)\* | NR | NR |
| Everett 2013& | 12.2%#  (SE 0.65) | 10.3%#  (SE 3.21) | NR | 11.4%#  (SE 1.19) | NR | NR | NR |
| Farmer 2013£ (medication use) | 14.7% | NR | NR | NR | NR | 11.6% | Not statistically significant |
| Garland-Forshee 2014 | 25.6%#  (24.3 to 26.8) | 22.9%#  (13.8 to 35.7) | 1.2 (0.6 to 2.4) | 12.4%#  (7.5 to 19.9) | 0.9 (0.5 to 1.7) | NR | NR |
| Jackson 2016 | 35.5% | 32.2% | 0.91 (0.74 to 1.12) | 32.1% | 0.96 (0.71 to 1.31) | NR | NR |
| Matthews 2014 | 33.2% | NR | NR | NR | NR | 22.0% | 1.00 (0.43 to 2.33) |

\* - statistically significant to p<0.05 or less, # - weighted percentages, & - calculated from weighted percentages, £ - calculated from unweighted percentages, RR – relative risk.

Web Table 5. Prevalence of any type of diabetes mellitus by sexual orientation

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Study name | Heterosexual | Lesbian | AOR (95%CI) | Bisexual | AOR (95%CI) | SMW | AOR (95%CI) |
| Blosnich 2014& | 10.2%#  (SE 0.002) | 6.8%#  (SE 0.016) | NR | 6.1%#  (SE 0.016) | 0.75 (0.44 to 1.29) | NR | NR |
| Boehmer 2014£ | 5.7%  (SE 0.12) | 4.6%  (SE 0.74) | 1.07 (0.76 to 1.50) | 4.2% | 1.10 (0.79 to 1.55) | NR | NR |
| Clark 2015 | 6.0% | 1.9% | NR | 6.8% | NR | 7.2% | NR |
| Conron 2010 | 3.9%  (SE 0.1) | 3.8%  (SE 0.9) | 1.23 (0.74 to 2.06) | 3.9%  (SE 1.1) | 1.04 (0.62 to 1.76) | NR | NR |
| Dilley 2010 | 6.3%  (6.0 to 6.5) | 5.1%  (3.3 to 7.7) | 1.3 (0.8 to 2.0) | 5.8%  (3.8 to 8.8) | 1.8 (1.1 to 2.8)\* | NR | NR |
| Farmer 2013 | 5.3% | NR | NR | NR | NR | 6.4% | Not statistically significant |
| Garland-Forshee 2014 | 6.5%  (6.1 to 6.8) | 10.8%  (4.1 to 26.0) | 2.2 (0.6 to 7.8) | 2.4%  (1.2 to 5.0) | 0.8 (0.4 to 1.6) | NR | NR |
| Jackson 2016 | 10.7% | 7.7% | 0.88 (0.58 to 1.34) | 7.1% | 0.63 (0.33 to 1.20) | NR | NR |
| Matthews 2014 | 11.3%# | NR | NR | NR | NR | 4.3%# | 0.55 (0.17 to 1.82) |

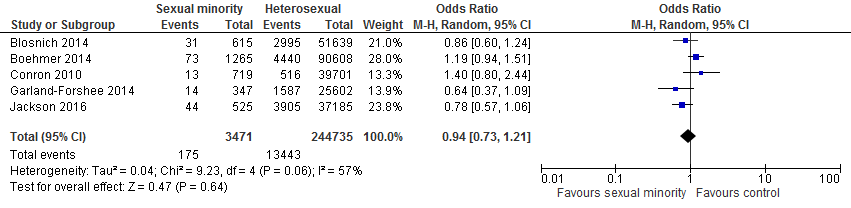
\* - statistically significant to p<0.05 or less, # - weighted percentages, & - calculated from weighted percentages, £ - calculated from unweighted percentages, RR – relative risk.

Web Figure 1. PRISMA flow diagram

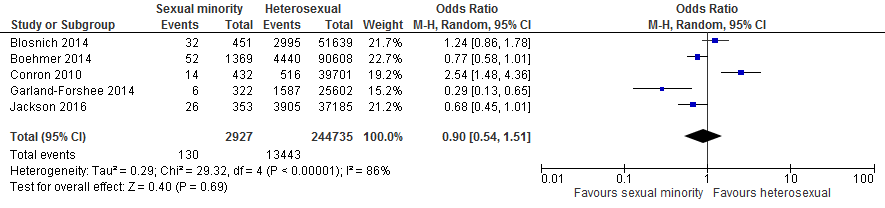


\* Reasons for 674 full text exclusions: case studies = 7, diagnostic studies = 8, experimental studies = 8, in children only = 7, no comparison with heterosexual women = 1, no relevant numerical outcomes = 94, pilot studies = 2, qualitative studies = 123, results in men and women combined only = 124, reviews/editorials = 74, surveys on wrong topic = 226.

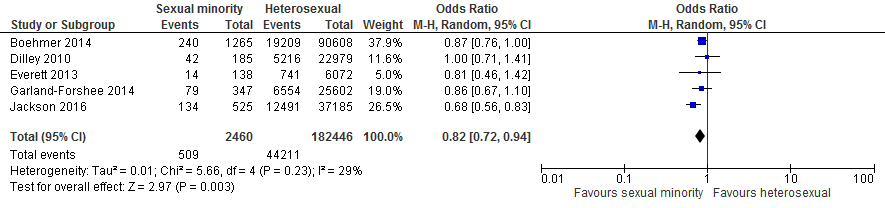
Web Figure 2a. CVD in lesbians



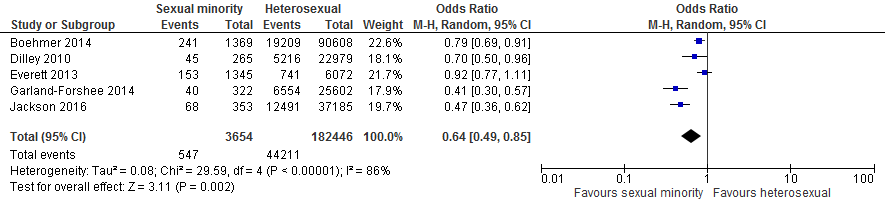
Web Figure 2b, CVD in bisexual women



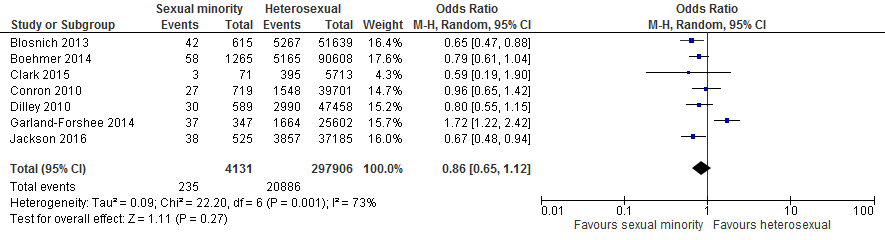
Web Figure 3a. Hypertension in lesbians



Web Figure 3b. Hypertension in bisexual women



Web Figure 4a. Diabetes mellitus in lesbians



Web Figure 4b. Diabetes mellitus in bisexual women

