Well-being among older gay and bisexual men and women in England: a cross-sectional population study

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Summary: We report lower quality of life and sexual satisfaction in older LGB people compared to heterosexual peers. As LGB older people are becoming a more visible population, research on well-being in this population is urgently needed.

Abstract

Objectives: Lesbian, gay and bisexual (LGB) older people present an under represented population in research, with limited research citing higher depression prevalence, loneliness, rejection and overall lower health and well-being outcomes. Our study compares well-being, defined as quality of life, life satisfaction, sexual satisfaction and depression, among lesbian, gay and bisexual (LGB) to their heterosexual peers.

Design: Cross-sectional population study using data from the English Longitudinal Study of Aging (ELSA), a representative panel study of older adults aged 50 and older.

Setting and Participants: Data were from ELSA-Wave 6, included data collected 2012/2013. A total of 5691 participants were included in the analysis with 326 (5.7%) self-identifying as LGB.

Measures: Well-being was measured using: CASP-19, a quality of life questionnaire; Satisfaction with Life Scale for life satisfaction and Center for Epidemiologic Studies Depression Scale for depressive symptoms; while sexual satisfaction was asked using the question: "*During the past three months, how satisfied have you been with your overall sex life?"*. T-test and Chi-square test were used for differences in socio-demographic characteristics between LGB and heterosexual participants. Bivariate logistical regression and linear regression were used for associations between sexual orientation and well-being outcomes.

Results: In unadjusted models, LGB participants reported significantly lower mean quality of life and life satisfaction as well as significantly lower odds of reporting satisfaction with their overall sex life and higher odds of reporting depressive symptoms above threshold. After adjustment for sociodemographic and health-related covariates, there remained significant differences between

LGB and heterosexual groups in mean quality of life scores (B=-0.96, 95% CI -1.87 to -0.06, p=0.037) and odds of sexual satisfaction (OR=0.56, 95% CI 0.38 to 0.82, p=0.003).

Conclusions/Implications: LGB older people report lower quality of life and lower sexual satisfaction than their heterosexual counterparts, possibly associated with a number of unwanted social experiences.

Introduction

The promotion of healthy aging has been accepted as a national public health strategy in many developed countries and is accompanied by the shift from measuring medical comorbidities towards subjective well-being, which has been identified as an important factor and means of determining healthy aging [1]. Well-being is itself a complex construct that encompasses different health related, social and psychological dimensions, often distinguished as evaluative well-being (life satisfaction), hedonic (positive and negative affects) and eudemonic well-being (meaning and quality of life) [2,3]. However most research uses specific measures, which do not reflect the multi-dimensional constructs of well-being [1]. Furthermore, most research in the well-being of older adults does not take into account sexual satisfaction and sexuality related outcomes.

Sex and sexuality are core aspects of the human experience and encompass a variety of distinct components related to personal identity such as sexual orientation and gender roles, and those related to sexual behaviour such as intercourse, intimacy and pleasure [4,5]. As these are closely related to self-esteem, mood and other components that affect quality of life and well-being it makes them an important personal issue throughout the adult life span – even at advanced age [5,6]. The increasing life expectancy and the availability of pharmacological support means that many older adults are continuing to be sexually active [7]. Furthermore, regular consensual sexual expression has been shown to contribute to physical and psychological well-being and is associated with a reduction in age-associated physical and mental health problems [8,9]. Although the role of sexual satisfaction on maintained psychological and physical well-has been under-investigated, studies have shown that frequency of sexual intercourse is associated with reduced risk of some cancers and fatal coronary events as well as lower overall mortality in men, while enjoyment of intercourse has similar benefits in women [10-13].

The vast majority of research conducted on life satisfaction, quality of life, sexual satisfaction and overall well-being in older adults has been limited to heterosexual samples, while the available data on lesbian, gay and bisexual (LGB) individuals is scarce. This may be due to the predominance of people who identify as heterosexual in community-based studies as well as the reluctance of older adults to identify as non-heterosexual to researchers [8,14]. Lesbian, gay, bisexual and transgender (LGBT) older adults have been known to suffer from health inequalities that are similar to other disadvantageous populations such as racial/ethnic minorities or deprived socioeconomic groups, making it important to compare LGB older adults with their heterosexual counterparts when considering health and well-being outcomes [15]. Studies have noted higher rates of poor mental health, smoking, excessive drinking, limitations in activities of daily living, weakened immune system, cardiovascular illness, lower social capital and connectedness[16], depression and loneliness in LGB older adults compared with their heterosexual peers [15,17-19]. However, to our knowledge none have explicitly compared differences in other aspects of well-being, such as quality of life or sexual satisfaction, between LGB and heterosexual older adults. In addition, the preponderance of existing evidence is from studies conducted in the US. Findings may not generalise to other countries where social attitudes to and experiences of non-heterosexual older adults may differ.

Since the literature suggests that there is a significant difference in well-being between LGBT and heterosexual people in adulthood, we hypothesize that in older people we would see similar findings, especially given the demographic trends and the ever-increasing visibility of older LGB people. Thus, the present study aimed to compare well-being (conceptualized as quality of life, life satisfaction, sexual satisfaction and depression) among lesbian, gay and bisexual older people and their heterosexual counterparts.

Method

Study population

Data were from the English Longitudinal Study of Ageing (ELSA), a longitudinal panel study of men and women aged 50 and older recruited from households in England [20]. The study began in 2002, with data collected at two-year intervals via computer-assisted personal interview and self-completion questionnaires. Participants who move into a care home or institution remain eligible and there is provision for collection of a reduced set of information by proxy where a sample member is unable to take part through poor health, or through physical or cognitive disability. Wave 6 (2012/13) included a questionnaire about sexual relationships and attitudes, which included items relating to sexual orientation. There were 10,601 participants interviewed in Wave 6 of ELSA, of whom 72 were institutional interviews and 274 were interviews by proxy. A total of 7,079 (67%) who were interviewed in person in the home returned the sexual relationships and attitudes questionnaire. We excluded 1,388 participants (19.6%) with missing data on sexual orientation or sociodemographic covariates, leaving a final sample for analysis of 5,691 men and women. Ethical approval was obtained from the National Research Ethics Service and all participants gave full informed consent.

Measures

Exposure: sexual orientation

Sexual orientation was assessed with the question: "*Which statement best describes your sexual desires over your lifetime? Please include being interested in sex, fantasising about sex or wanting to have sex*". Response options were 1) entirely for women, 2) mostly for women, but some desires for men, 3) equally for women and men, 4) mostly for men, but some desires for women, 5) entirely for men, and 6) no sexual desires in lifetime. We categorised participants with desires entirely for the opposite sex as heterosexual, entirely for the same-sex as lesbian/gay and those endorsing response

options 2, 3 or 4 as bisexual. Due to the low numbers of LGB participants in our sample, we analysed data using a binary sexual orientation variable (heterosexual vs. LGB), but report descriptive outcomes data separately for lesbian, gay and bisexual participants in Supplementary Table 1. We coded the sexual orientation of those reporting no sexual desires as missing for our primary analyses, but include descriptive data on the group of self-identifying asexual people in Supplementary Table 1.

Outcomes: wellbeing

Quality of life was assessed with the CASP-19 [21], a scale designed to measure quality of life in older people. Items cover four domains of quality of life; control (e.g. *"I feel that what happens to me is out of my control"*), autonomy (e.g. *"My health stops me from doing things I want to do"*), self-realisation (e.g. *"I feel that life is full of opportunities"*), and pleasure (e.g. *"I enjoy being in the company of others"*). Respondents are asked how often each statement applies to them (often=0, sometimes=1, not often=2, never=3). Positively-worded items are reverse scored so that a higher total score indicates higher quality of life (range: 0–57).

Life satisfaction was assessed with the Satisfaction With Life Scale [22] which asks respondents to rate the extent to which they agree with five statements: *"In most ways my life is close to my ideal"*; *"The conditions of my life are excellent"*; *"I am satisfied with my life"*; *"So far I have got the important things I want in life"*; *"If I could live my life again, I would change almost nothing"* on a scale from 0 (strongly disagree) to 6 (strongly agree). Responses are summed to produce a total score between 0 and 30, with higher scores indicating greater life satisfaction.

Sexual satisfaction was assessed with the question "*During the past three months, how satisfied have you been with your overall sex life?*" with responses on a 5-point scale from very satisfied to very dissatisfied. This item was only asked of participants who reported being sexually active in the past

year, in response to the question "*Have you had any sexual activity (sexual intercourse, masturbation, petting or fondling) in the past year?*" (yes/no). We dichotomised responses to distinguish between participants who reported being moderately or very dissatisfied from those who reported being neither satisfied nor dissatisfied, moderately satisfied or very satisfied, as has been done in previous investigations [23,24].

Depressive symptoms were assessed with an eight-item version of the Center for Epidemiologic Studies Depression Scale (CES-D) [25], a scale highly validated for use in older adults [26]. This asks about feelings over the last week (e.g. "Over the last week have you felt sad"), with binary response options (1=yes, 0=no). Positively framed items were reverse scored. Data were dichotomised to distinguish between scores <4 (low depressive symptoms) vs. ≥4 (high depressive symptoms), an established cut-off [26].

Covariates

All potential confounders were selected prior to analysis. Demographic information collected included age, sex, ethnicity (white vs. non-white) and partnership status (married or cohabiting vs. separated, divorced, widowed, or single). Socio-economic status (SES) was based on household non-pension wealth (which has been identified as particularly relevant to health outcomes in this age group [27], categorised into quintiles across all wave 6 ELSA participants. Current smoking status (smoker vs. non-smoker) was self-reported. Frequency of alcohol intake was categorised as never/rarely (never – once or twice a year), regularly (once every couple of months – twice a week), or frequently (3 days a week – almost every day) [26]. Physical activity was assessed with three items that asked participants how often they took part in vigorous, moderate and low-intensity activities (more than once a week, once a week, 1-3 times a month, hardly ever/never) [28], and further categorised into three groups, as

previously described [29]: inactive (no moderate/vigorous activity on a weekly basis); moderate activity at least once a week; and vigorous activity at least once a week.

Statistical analysis

Analyses were performed using IBM SPSS Statistics 25. Data were weighted to correct for sampling probabilities and for differential non-response and to calibrate back to the 2011 National Census population distributions for age and sex. The weights accounted for the differential probability of being included in Wave 6 of ELSA and for non-response to the questionnaire assessing sexual activity. Details can be found at http://doc.ukdataservice.ac.uk/doc/5050/mrdoc/pdf/5050_elsa_w6_technical_report_v1.pdf.

Differences between heterosexual and LGB participants' sociodemographic characteristics and health behaviours were tested using independent *t*-tests for continuous variables and chi-square tests for categorical variables. We used linear regression (for continuous outcomes) and binary logistic regression (for categorical outcomes) to analyse associations between sexual orientation and wellbeing. For each outcome, we performed two models: an unadjusted model testing the bivariate association with sexual orientation, and a multivariable model that adjusted for all the above-listed sociodemographic and health-related covariates. In all models, the reference category was the heterosexual group. A p-value <0.05 was used to indicate statistical significance.

Results

Of the 5,691 participants in our sample, 326 (5.7%) were LGB and 5,365 (94.3%) were heterosexual. Sample characteristics in relation to sexual orientation are summarised in Table 1. The LGB group was on average slightly younger than the heterosexual group (61.2 vs. 64.9 years, p<0.001), a higher proportion were female (p=0.045), white (p=0.012), and less wealthy (p=0.008) and a lower

proportion were married or cohabiting (p<0.001). Rates of smoking (p=0.005) and frequent alcohol intake (p=0.003) were higher in the LGB group, but prevalence of inactivity was lower (p=0.008). The groups did not differ on limiting long-standing illness (p=0.967).

Associations between sexual orientation and wellbeing are shown in Table 2. In unadjusted models, participants who were LGB reported significantly lower mean quality of life (39.39 vs. 40.65, *B*=-1.21, 95% CI -2.24 to -0.18, p=0.021) and life satisfaction (18.82 vs. 20.05, *B*=-1.21, 95% CI -1.96 to -0.46, p=0.001) than those who were heterosexual. They also had significantly lower odds of reporting satisfaction with their overall sex life (OR=0.60, 95% CI 0.41 to 0.86, p=0.006) and higher odds of reporting depressive symptoms above threshold (OR=1.35, 95% CI 1.01 to 1.81, p=0.044). After adjustment for sociodemographic and health-related covariates, there remained significant differences between LGB and heterosexual groups in mean quality of life scores (*B*=-0.96, 95% CU -1.87 to -0.06, p=0.037) and odds of sexual satisfaction (OR=0.56, 95% CI 0.38 to 0.82, p=0.003). The mean rating of life satisfaction remained marginally lower among LGB participants after adjustment, but the difference was not statistically significant (p=0.063). No significant difference between groups was observed for depressive symptoms after adjustment for covariates (p=0.515).

Discussion

In our population-based study of older adults in England, 5.7% (326) men and women were identified as lesbian, gay or bisexual (LGB). This proportion makes our study among the upper end of other UK based population studies that report between 2.5 and 5.8% LGB participants [30]. Although we observed no difference between LGB participants and heterosexual ones in terms of having a limiting long-standing illness, LGB participants reported significantly more smoking and frequent alcohol intake (Table 1). Higher prevalence of alcohol consumption and smoking in the LGB

population have been previously reported [31]. The reasons for this are likely in the fact that these behaviours are maintained through social networks and safe places of gathering, which for many LGB people have traditionally been bars and similar establishments [32]. Given the higher levels of loneliness and social exclusion in LGB older people it is plausible that these unhealthy behaviours persist due to fear of added exclusion from social group if the behaviour stops [33]. Furthermore, some studies indicated that such unwanted health behaviour is a coping mechanism in sexual minority adults, which could apply to LGB older people as well [34].

We also reported that LGB participants are significantly less likely to be cohabitating or married, which is not surprising given that the ability to form legally recognized unions came into effect in 2005 in England as a form of a civil partnership, while full marriage equality in 2014. Studies have confirmed that following legal recognition of civil unions, more LGB people enter into domestic and legal partnerships [35]. Overall, living in a legally recognized union was associated with less psychiatric morbidity, psychological distress and more well-being and better self-rated health in LGB people [36-38]. However, studies have shown that higher proportions of older LGB people tend to be single, live alone and be childless and more than 50% report loneliness and isolation [39-41]. These factors are likely to have a negative effect on subjective well-being, with studies showing that those who report better well-being tend to have more supportive relationships [42].

Our study found that LGB participants reported significantly lower quality of life, life satisfaction and satisfaction with overall sex life. Furthermore, LGB participants had higher odds of reporting depressive symptoms. However, after the model was adjusted for various socio-economic factors only quality of life and sexual satisfaction remained significantly lower in LGB participants. Lower quality of life in older LGB people has been shown in other studies [43]. Potentially the most prominent reason for this is minority stress and so-called “gay stigma”. Minority stress is caused by

experiences, anticipation and internalisation of discrimination, as well as concealment of one's sexual orientation [44]. Lifelong experiences of discrimination, rejection, prejudice and stereotyping create a hostile social environment in which many LGB people live and has been shown to be associated with depression and lower quality of life [45]. It is worth noting that having a positive view on one's sexual identity was associated with increased mental health quality of life [43]. It is therefore important that health care professionals working with LGB older people identify signs of minority stress and emphasise affirmative sources of help.

Life satisfaction is known to change across the life span, with older adults generally achieving higher scores in comparison to younger adults; a phenomenon often referred to as a "paradox of aging". A recent study reported differences in life satisfaction trajectories between sexual orientations, with bisexual people on a significantly less favourable trajectory compared with heterosexuals [46], a point which serves to reinforce the potential dual-exclusion from both gay/lesbian and heterosexual communities faced by bisexual respondents[47]. However, the study was limited by a small sample size. In our study, the mean rating of life satisfaction was found to be significantly lower in the crude model and remained only marginally lower after adjusting.

To the best of our ability, we were not able to find any literature investigating sexual satisfaction in older LGB people. This may be due to stigma that is compounded by misconceptions surrounding sexuality of older people. It is possible to hypothesise that these stereotypes limit research on this topic. However, in a culture that is dominated by imagery of youth and beauty, older adults are especially vulnerable to ageist stigma. One study reported that older gay and bisexual men with HIV report significantly more cases of ageism and rejection by younger gay men [48]. Also unlike in most samples of older people where women tend to live more often alone, the same is true gay and bisexual older men [39], which would further limit having a sexual partner. Furthermore, as prevalence

of various chronic mental and physical health issues and disability is higher in LGB older adults it is possible that these prevent sexual enjoyment [31]. Studies on HIV negative samples and lesbian and bisexual older women are urgently needed.

The present study provides much needed insight into the various aspects of well-being related to older LGB people. However, the results need to be interpreted in light of the limitations. Firstly, although a large population based study, only 53% of the sample was available for analysis given a large amount of missing data. There are also significant differences between respondents and non-respondents in several socio-demographic characteristics (age by sex, government office region, highest educational qualification, white/non-white ethnicity, marital status, self-reported general health, needed help with showcards). However, potential problems were minimised with the use of appropriate weights. Furthermore, as studies have indicated reluctance of people to come out to researchers it is possible that LGB participants were more likely than heterosexual participants to choose not to answer questions on sexual orientation, which could add to the data distortion. Third, given the proportion of people who identified as non-heterosexual, we combined them in a single group which did not allow subgroup analyses, future research should proactively target and elicit responses from a larger population of sexual minorities such that more specific group level analyses can be conducted. Furthermore, there is a possibility that people who declared no sexual desires identified as asexual, however we were not able to confirm this from the variables and we felt it inappropriate to group them in the main analysis. In terms of non-binary or trans* identifying people, these variables were not available in ELSA. Descriptive results for each of the available subgroups may be found in the supplementary table. Finally, the cross-sectional study design prohibits any causal conclusions.

Conclusions/Relevance

In conclusion, LGB older people tend to report lower quality of life and lower sexual satisfaction than their heterosexual counterparts. Potential reasons for these differences include a wide variety of unwanted social experiences such as prejudice, rejection, ageism, stigmatisation and discrimination. If global demographic trends continue, the proportion and visibility of older LGB people will continue to increase, which signals a great and urgent need for more research concerning this underserved population. Lastly, it is important to realise that LGB population is not a heterogeneous group but rather comprises of a variety of sub-populations, each with its own unique needs that deserve representation in research as well as health policies.

Conflict of Interest: The authors declare no conflict of interest.

Table 1 Sample characteristics in relation to sexual orientation

	Heterosexual (*n*=5,365)*	**LGB (*n*=326)**	***p***
Age (years), mean (SD)	64.88 (9.88)	61.21 (8.96)	<0.001
Sex			
Men	49.3	43.7	0.045
Women	50.7	56.3	-
Ethnicity			
White	94.9	98.0	0.012
Non-white	5.1	2.0	-
Partnership status			
Married/cohabiting	68.3	52.8	<0.001
Single/divorced/widowed	31.7	47.2	-
Wealth quintile			
1 (poorest)	17.9	24.6	0.008
2	19.8	17.8	-
3	20.7	15.8	-
4	21.2	19.0	-
5 (richest)	20.4	22.8	-
Smoking status			
Non-smoker	86.4	81.0	0.005
Smoker	13.6	19.0	-
Alcohol intake			
Never/rarely	22.5	21.9	0.003
Regularly	43.6	35.6	-
Frequently	33.9	42.6	-
Physical activity			
Inactive	22.6	16.1	0.008
Moderately active at least once a week	45.9	46.5	-
Vigorously active at least once a week	31.5	37.4	-
Limiting long-standing illness			
No	66.6	66.7	0.967
Yes	33.4	33.3	-

* Unweighted sample sizes.
All figures are weighted for sampling probabilities and differential non-response.
Values are percentages unless otherwise stated.
SD = standard deviation

Table 2 Associations between sexual orientation and wellbeing

	%/mean (SE)	Unadjusted* OR/Coeff. [95% CI]	*p*	Adjusted † OR/Coeff. [95% CI]	*p*
Quality of life					
Heterosexual	40.65 (0.12)	Ref	-	Ref	-
LGB	39.39 (0.47)	-1.21 [-2.24; -0.18]	0.021	-0.96 [-1.87; -0.06]	0.037
Life satisfaction					
Heterosexual	20.05 (0.09)	Ref	-	Ref	-
LGB	18.82 (0.34)	-1.21 [-1.96; -0.46]	0.001	-0.65 [-1.34; 0.04]	0.063
Satisfied with sex life					
Heterosexual	83.7 (0.7)	1.00 (Ref)	-	1.00 (Ref)	-
LGB	75.5 (2.7)	0.60 [0.41; 0.86]	0.006	0.56 [0.38; 0.82]	0.003
Depressive symptoms above threshold					
Heterosexual	12.5 (0.4)	1.00 (Ref)	-	1.00 (Ref)	-
LGB	16.5 (1.7)	1.35 (1.01; 1.81]	0.044	1.12 [0.80; 1.55]	0.515

All figures are weighted for sampling probabilities and differential non-response.
*Bivariate associations between sexual orientation and wellbeing.
†Associations between sexual orientation and wellbeing adjusted for age, sex, ethnicity, partnership status, wealth, smoking status, alcohol intake, physical activity and limiting long-standing illness.
SE = standard error, OR = odds ratio, CI = confidence interval, Coeff = coefficient.
Possible scores on the quality of life scale range from 0-57, and on life satisfaction scale range from 0-30, with higher scores indicating better quality of life and greater life satisfaction, respectively.
Depressive symptoms were measured on an 8-point scale with a threshold of 4 or more symptoms indicative significant symptomatology.

References

1. Jivraj S, Nazroo J, Vanhoutte B, Chandola T. Aging and Subjective Well-Being in Later Life. *The Journals of Gerontology: Series B.* 2014;69(6):930-941.
2. Delle Fave A, Bassi M, Boccaletti ES, Roncaglione C, Bernardelli G, Mari D. Promoting Well-Being in Old Age: The Psychological Benefits of Two Training Programs of Adapted Physical Activity. *Front Psychol.* 2018;9:828.
3. Steptoe A, Deaton A, Stone AA. Subjective wellbeing, health, and ageing. *Lancet.* 2015;385(9968):640-648.
4. American Psychological Association. Answers to your questions: For better understanding of sexual orientation and homosexuality. 2008; https://web.archive.org/web/20130808032050/http://www.apa.org/helpcenter/sexual-orientation.aspx. Accessed 24.10., 2018.
5. World Health Organization. Defining sexual health. 2006; https://www.who.int/reproductivehealth/topics/sexual_health/sh_definitions/en/. Accessed 18.10., 2018.
6. Griebling TL. Sexuality and aging: a focus on lesbian, gay, bisexual, and transgender (LGBT) needs in palliative and end of life care. *Curr Opin Support Palliat Care.* 2016;10(1):95-101.
7. Field N, Mercer CH, Sonnenberg P, et al. Associations between health and sexual lifestyles in Britain: findings from the third National Survey of Sexual Attitudes and Lifestyles (Natsal-3). *Lancet.* 2013;382(9907):1830-1844.
8. DeLamater J. Sexual expression in later life: a review and synthesis. *J Sex Res.* 2012;49(2-3):125-141.

9. Flynn TJ, Gow AJ. Examining associations between sexual behaviours and quality of life in older adults. *Age Ageing.* 2015;44(5):823-828.

10. Brody S, Preut R. Vaginal intercourse frequency and heart rate variability. *Journal of sex & marital therapy.* 2003;29(5):371-380.

11. Costa RM, Brody S. Sexual satisfaction, relationship satisfaction, and health are associated with greater frequency of penile-vaginal intercourse. *Arch Sex Behav.* 2012;41(1):9-10.

12. Ebrahim S, May M, Ben Shlomo Y, et al. Sexual intercourse and risk of ischaemic stroke and coronary heart disease: the Caerphilly study. *J Epidemiol Community Health.* 2002;56(2):99-102.

13. Palmore EB. Predictors of the longevity difference: a 25-year follow-up. *Gerontologist.* 1982;22(6):513-518.

14. Institute of Medicine. *The Health of Lesbian, Gay, Bisexual and Transgender People: Building a Foundation for Better Understanding.* Washington, DC: The National Academies Press; 2011.

15. Emlet CA. Social, Economic, and Health Disparities Among LGBT Older Adults. *Generations.*40(2):16-22.

16. Westwood S, King A, Almack K, Yiu-Tung S, Bailey L. Good practice in health and social care provision for LGBT older people in the UK. In: Fish J, Karban K, eds. *Lesbian, Gay, Bisexual and Trans Health Inequalities: International Perspectives in Social Work.* Bristol: Policy Press; 2015:145-158.

17. Conron KJ, Mimiaga MJ, Landers SJ. A population-based study of sexual orientation identity and gender differences in adult health. *Am J Public Health.* 2010;100(10):1953-1960.

18. Dilley JA, Simmons KW, Boysun MJ, Pizacani BA, Stark MJ. Demonstrating the importance and feasibility of including sexual orientation in public health surveys: health disparities in the Pacific Northwest. *Am J Public Health.* 2010;100(3):460-467.

19. Choi SK, Meyer IH. *LGBT Aging: A Review of Research Findings, Needs, and Policy Implications.* Los Angeles: The Williams Institute;2016.

20. Steptoe A, Breeze E, Banks J, Nazroo J. Cohort profile: the English longitudinal study of ageing. *International journal of epidemiology.* 2013;42(6):1640-1648.

21. Hyde M, Wiggins RD, Higgs P, Blane DB. A measure of quality of life in early old age: the theory, development and properties of a needs satisfaction model (CASP-19). *Aging Ment Health.* 2003;7(3):186-194.

22. Diener E, Emmons RA, Larsen RJ, Griffin S. The Satisfaction With Life Scale. *J Pers Assess.* 1985;49(1):71-75.

23. Jackson SE, Wardle J, Steptoe A, Fisher A. Sexuality after a cancer diagnosis: A population-based study. *Cancer.* 2016;122(24):3883-3891.

24. Lee DM, Nazroo J, O'Connor DB, Blake M, Pendleton N. Sexual Health and Well-being Among Older Men and Women in England: Findings from the English Longitudinal Study of Ageing. *Arch Sex Behav.* 2016;45(1):133-144.

25. Radloff LS. The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement.* 1977;1(3):385-401.

26. Steffick DE. *Documentation of affective functioning measures in the Health and Retirement Study. HRS Documentation Report.* 2000.

27. Banks J, Karlsen S, Oldfield Z. Socio-economic position. In: Marmot A, ed. *Health, Wealth and Lifestyle of the Older Population in England.* London: Institute for Fiscal Studies; 2003.

28. Demakakos P, Hamer M, Stamatakis E, Steptoe A. Low-intensity physical activity is associated with reduced risk of incident type 2 diabetes in older adults: evidence from the English Longitudinal Study of Ageing. *Diabetologia.* 2010;53(9):1877-1885.

29. Hamer M, Molloy GJ, de Oliveira C, Demakakos P. Leisure time physical activity, risk of depressive symptoms, and inflammatory mediators: the English Longitudinal Study of Ageing. *Psychoneuroendocrinology.* 2009;34(7):1050-1055.

30. van Kampen SC, Lee W, Fornasiero M, Husk K. The proportion of the population of England that self-identifies as lesbian, gay or bisexual: producing modelled estimates based on national social surveys. *BMC Res Notes.* 2017;10(1):594.

31. Fredriksen-Goldsen KI, Kim HJ, Barkan SE, Muraco A, Hoy-Ellis CP. Health disparities among lesbian, gay, and bisexual older adults: results from a population-based study. *Am J Public Health.* 2013;103(10):1802-1809.

32. Trocki KF, Drabble L, Midanik L. Use of heavier drinking contexts among heterosexuals, homosexuals and bisexuals: results from a National Household Probability Survey. *J Stud Alcohol.* 2005;66(1):105-110.

33. Reynolds NR, Neidig JL, Wewers ME. Illness representation and smoking behavior: a focus group study of HIV-positive men. *J Assoc Nurses AIDS Care.* 2004;15(4):37-47.

34. Slater ME, Godette D, Huang B, Ruan WJ, Kerridge BT. Sexual Orientation-Based Discrimination, Excessive Alcohol Use, and Substance Use Disorders Among Sexual Minority Adults. *LGBT Health.* 2017;4(5):337-344.

35. Twenge JM, Sherman RA, Wells BE. Changes in American Adults' Reported Same-Sex Sexual Experiences and Attitudes, 1973-2014. *Arch Sex Behav.* 2016;45(7):1713-1730.

36. Hatzenbuehler ML, McLaughlin KA, Keyes KM, Hasin DS. The impact of institutional discrimination on psychiatric disorders in lesbian, gay, and bisexual populations: a prospective study. *Am J Public Health.* 2010;100(3):452-459.

37. Kail BL, Acosta KL, Wright ER. State-level marriage equality and the health of same-sex couples. *Am J Public Health.* 2015;105(6):1101-1105.

38. Riggle ED, Rostosky SS, Horne SG. Psychological distress, well-being, and legal recognition in same-sex couple relationships. *J Fam Psychol.* 2010;24(1):82-86.

39. Fredriksen-Goldsen KI, Kim HJ, Emlet CA, et al. *The Aging and Health Report: Disparities and Resilience among Lesbian, Gay, Bisexual, and Transgender Older Adults* Seattle, WA: Institute for Multigenerational Health;2011.

40. Wallace SP, Cochran SD, Durazo EM, Ford CL. The health of aging lesbian, gay and bisexual adults in California. *Policy Brief UCLA Cent Health Policy Res.* 2011(PB2011-2):1-8.

41. de Vries B. Aspects of life and death, grief and loss in lesbian, gay, bisexual and transgender communities. In: Doka KJ, Tucci AS, eds. *Living with grief: Diversity in end-of-life care.* Washington, DC: Hospice Foundation of America; 2009.

42. Diener E, Seligman ME. Very happy people. *Psychol Sci.* 2002;13(1):81-84.

43. Fredriksen-Goldsen KI, Kim HJ, Shiu C, Goldsen J, Emlet CA. Successful Aging Among LGBT Older Adults: Physical and Mental Health-Related Quality of Life by Age Group. *Gerontologist.* 2015;55(1):154-168.

44. Meyer IH. Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: conceptual issues and research evidence. *Psychol Bull.* 2003;129(5):674-697.

45. Wight RG, LeBlanc AJ, de Vries B, Detels R. Stress and mental health among midlife and older gay-identified men. *Am J Public Health.* 2012;102(3):503-510.

46. Wardecker BM, Matsick JL, Graham-Engeland JE, Almeida DM. Life Satisfaction Across Adulthood in Bisexual Men and Women: Findings from the Midlife in the United States (MIDUS) Study. *Arch Sex Behav.* 2018.

47. Molina Y, Marquez JH, Logan DE, Leeson CJ, Balsam KF, Kaysen DL. Current intimate relationship status, depression, and alcohol use among bisexual women: The mediating roles of bisexual-specific minority stressors. *Sex Roles.* 2015;73(1):43-57.

48. Schrimshaw EW, Siegel K. Perceived barriers to social support from family and friends among older adults with HIV/AIDS. *J Health Psychol.* 2003;8(6):738-752.