Association of Depression and Anxiety with Sexual Orientation in a Convenience Sample of Latvian Young Adults

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Keywords: Depression; Anxiety; Sexual orientation; Violence; Mental health

Article

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Abstract: Background. Depression and anxiety and its association with sexual orientation in Latvia is understudied. Outcomes. Kinsey scale, primary outcomes for mental health disturbances were defined as person's subjective feeling of depression and anxiety. Materials and Methods. Participants aged 18-30 year old (n=503) was asked to do a self-administered anonymous web-based survey regarding social and family status, sexual identification and behaviour, violence experience and mental health information. To describe person`s sexual orientation Kinsey scale was used. Prevalence of depression and anxiety, univariate and multivariate regression analysis was performed to measure relations between investigated factors. Results. A total of 503 participants (i.e., 365 females, 133 males, 5 others) were included in the study. Mean (SD) age of participants was 23.0 (3.7) years. Mean (SD) value on the Kinsey scale was 1.4 (1.8) and median (IQR) value was 1.0 (0-2.0) where 1 is defined as 'mostly heterosexual, only slightly homosexual' person and 2 is 'mostly heterosexual, but more than slightly homosexual'. Prevalence of persons reported violence experience was 20.3%, anxiety 56.3% and depression 37.6%. Logistic regression analysis showed that experience of violence was associated with higher odds of developing anxiety and depression (OR: 2.6 [95% CI: 1.7-4.0] and 2.4 [95% CI: 1.5-3.9], respectively). Being in relationship was associated with higher odds of developing anxiety (OR: 2.8[95% CI: 1.3-6.3]). Male sex and income 1001-2000 euros a month were associated with lower odds of developing anxiety (OR: 0.4 [95% CI: 0.2-0.5] and aOR: 0.3 [95% CI: 0.1-0.8], respectively). Sexual orientation showed no significant value in association with anxiety and depression (OR: 1.1 [95% CI: 1.0-1.2] and OR: 1.1 [95% CI: 1.02-1.2], respectively). Conclusions. In our study, the significant factors for developing depression and anxiety were experiencing violence, being female, being in a relationship, and having no income, while sexual orientation showed no significance in relation to depression and anxiety.

Keywords: depression; anxiety; sexual orientation; violence; mental health

1. Introduction

Health is defined by World Health Organization (WHO) as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". Mental health is integral part of it and affects our emotional, psychological and physical well-being. It impacts how we think, how we act, how we perform at our daily tasks. It is condition which allows us to fulfil our ambitions and plans at highest extent. In 2023 WHO estimated approximately 5% of adults worldwide having depression [1]. Our wellbeing is complex and affected by different everyday experiences such as employment status, income and working conditions [2], lifestyle [3], marital status [4], experience of violence and abuse [5]. It becomes imperative to delve deeper into the intricate relationship between these factors and mental health outcomes, a task that this study seeks to undertake.

According to the Centre for Disease Prevention and Control of Latvia 5.7% Latvians aged 15-74 years old in 2019 marked having depressive symptoms, 8.4% indicated having chronic depression, feeling tension and low mood indicated 54% [6], although the most recent findings by the study

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published in 2023 suggest that many cases are left undiagnosed and the point prevalence of depression according to the PHQ-9 was 6.4% [7].

2021 survey data give evidence that 25.1% Latvian women aged 18-74 in adulthood had experience of physical or sexual violence, 9% reported having psychological disorders later in life. Respectively 19.5% of Latvian men aged 18-74 in adulthood had experience of physical or sexual violence. In general 37.4% Latvian males and females report having violence experience in their childhood [8].

Depression and anxiety are mental health conditions that affect individuals from all walks of life, and sexual orientation is an important aspect of identity that can influence an individual's mental health. Different studies show that lesbian, gay, bisexual and transgender, queer, intersex and asexual (LGBTQIA+) persons are at higher risk of developing depressive and anxiety symptoms [9–12]. The Minority Stress Model [13] posits that stigma, prejudice, and discrimination may increase psychological distress in LGBTQIA+ populations. However, the evidence varies across the studies, for example evidence suggests that disparities may vary across gender [14], bisexuality status [15] and different measures of sexual orientation [16]. In this study, we aim to explore the association between sexual orientation and depression and anxiety, and to identify potential factors that may contribute to these mental health outcomes. By examining the intersection of sexual orientation and mental health, we hope to increase our understanding of these important issues and ultimately improve mental health outcomes for all individuals, regardless of their sexual orientation.

2. Materials and Methods

Participants

The target population was Latvian young adults aged 18-30 years old. Study sample consisted of 503 volunteers who participated in a web-based survey. The mean age of responders was 23.0 years (SD 3.7) and the median was 22.0 years (IQR 21.0-25.0). Regarding sex, responses indicated 365 females (72.6%), 133 males (26.4%) and 5 ‘other’ (1.0%). Participants were recruited mainly through social media such as ‘Instagram’ and ‘Facebook’, the survey was also widespread between medical and other faculty students. So, the study collected data in a convenience sample.

Measures

Demographics

Sociodemographic characteristics included information such as sex, age, marital status, children, employment status, level of education and income. Sex was assessed as male, female or other. Age was measured in years from 18 to 30 years. We used four categories to assess marital status: single, divorced, in relationship or married. To assess if person has any children we used ‘yes/no’ answer options. Employment status was assessed with four categories: unemployed, student, maternity/paternity leave and employed. Level of education was initially assessed by using 7 categories: primary school, high school, vocational, bachelor/university degree, unfinished university degree, masters or PhD. For the analysis categories were combined into following – primary, secondary/vocational or university degree/unfinished university degree. To assess the income we used five categories: none, less than 500 euros per month, 500-1000 euros per month, 1001-2000 euros per month than 2001 euros or more per month. We also included information about the family to assess if person was raised in full family, as evidence shows, family structure plays significant role in emotional well-being and has an association with developing depression [17–19]. Participants were asked if they grew up in a full family with possible answers: full family, with one parent, no parents. Studies show that growing up with siblings also have an impact on emotional well-being in adulthood, for example being treated worse by father or mother compared to sibling is associated with greater depressive and anxiety symptoms [20]. Therefore, we also wanted to assess if participants grew up with siblings, possible answers were ‘Yes’ or ‘No’.

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Sexual orientation

Participants responded to a Kinsey scale [21] using points from 0 to 6, including X as asexual or no sociosexual contacts. Points are represented as following: 0 – exclusively heterosexual; 1 – mostly heterosexual, only slightly homosexual; 2 – mostly heterosexual, but more than slightly homosexual; 3 – equally heterosexual and homosexual; 4 – mostly homosexual, but more than slightly heterosexual; 5 – mostly homosexual, only slightly heterosexual and 6 – exclusively homosexual.

For complete evaluation we included in survey questions about sex of the partner and age of first intercourse. To assess sex of the partner we used categories: no sex, same sex, both sexes or opposite sex. To assess age of the first intercourse we used age in years.

Mental health

To assess persons mental health respondents had to mark if they feel any of following symptoms: anxiety, depression, insomnia, panic attacks, loss of appetite, fear, agitation, or none. Later in the analysis we only used anxiety and depression categories as they were most common.

As evidence shows experience of violence has negative impact on mental health [22,23], we wanted to assess if respondents had experience of violence earlier in life with possible answers 'Yes' or 'No'.

Statistical analysis

Descriptive statistics was used such as proportions for categorical variables and means (with standard deviations (SD)) and medians (with interquartile ranges (IQR)) for continuous variables. Associations between depression, anxiety and independent variables were detected using univariate and multivariate binary logistic regression. Adjustment was performed by all factors significant at univariate analysis at the level of $p<0.1$ simultaneously. Interaction between independent factors was checked before. Results were assessed as statistically significant if $p<0.05$.

3. Results

Characteristics of the total sample is summarised in Table 1. Survey results showed that students made total of 151 person (30.0%), majority were employed (n=306; 60.8%). 55.6% of participants were with either finished or unfinished university degree (n=278), others have secondary or vocational education (n=212; 42.4%). Regarding income, 199 participants (39.7%) have income of 500-1000 euros a month, others have either less than 500 euros a month or between 1001 and 2000 euros - 139 (27.7%) and 113 (22.6%) persons respectively. Most of participants were single 235 (46.9%) and in relationship 222 (44.3%).

The mean score on the Kinsey scale was 1.4 (SD 1.4), indicating that the majority of participants identified as mostly heterosexual, only slightly homosexual. The median score was 1.0, with an interquartile range of 0-2.0, demonstrating the diversity in sexual orientation among the participants. The prevalence rates of anxiety and depression among the participants were found to be 56.3% and 37.6%, respectively.

Table 1. Characteristics of the total sample (n=503).

Variables		n(%)
Sex	Female	365 (72.6)
	Male	133 (26.4)
	Other	5 (1.0)
Age (years)	Min.-max.	17-51
	Mean (SD)	23.0 (3.7)
	Median (IQR)	22.0 (21.0-25.0)
Marital status	Single	235 (46.9)
	Divorced	14 (2.8)

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	In relationship	222 (44.3)
	Married	30 (6.0)
Children	No	473 (94.0)
	Yes	30(6.0)
Employment status	Unemployed	44 (8.7)
	Student	151 (30.0)
	Maternity/paternity leave	2 (0.4)
	Employed	306 (60.8)
Education	University degree, unfinished university degree	278 (55.6)
	Secondary, vocational	212 (42.4)
	Primary	10 (2.0)
Income	None	34 (6.8)
	<500	139 (27.7)
	500-1000	199 (39.7)
	1001-2000	113 (22.6)
	2001+	16 (3.2)
Homosexuality scale	Min.-max.	0-6
	Mean (SD)	1.4 (1.8)
	Median (IQR)	1.0 (0-2.0)
	0	213 (42.3)
	1	127 (25.2)
	2	40 (8.0)
	3	53 (10.5)
	4	8 (1.6)
	5	16 (3.2)
	6	36 (7.2)
	X	10 (2.0)
Transgender	No	497 (98.8)
	Yes	6 (1.2)
Sex of the partners	No sex	55 (11.0)
	Same sex	35 (7.0)
	Both sexes	98 (19.6)
	Opposite sex	311 (62.3)
Age of first intercourse	No sex	55 (11.2)
	10-15	40 (8.2)
	15-20	351 (71.8)
	20+	43 (8.8)
Grown up with both parents	No	152 (30.2)
	Yes	351 (69.8)
Grown up with siblings	No	111 (22.1)
	Yes	392 (77.9)
Violence experience	No	401 (79.7)
	Yes	102 (20.3)
Anxiety	No	220 (43.7)

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Depression	Yes	283 (56.3)
	No	314 (62.4)
	Yes	189 (37.6)

Table 2 presents stratified prevalence of depression and results of univariate and multivariate logistic regression analysis. Univariate analysis showed that four factors are statistically significantly associated with depression – having income more or 2001 euros (vs. no income) increased odds for depression 3.8 times [95% CI 1.03-12.4], being homosexual increased odds 1.1 times [95% CI 1.02-1.2] and having sexual partners of both sexes increased odds 1.6 times [95% CI 1.04-2.6], experience of violence increased odds 2.6 times [95% 1.7-4.0].

After adjustment only association between violence experience and depression remained statistically significant. Experience of violence was associated with increased odds for developing depression [OR 2.4 [95% CI: 1.5-3.9]]. Other factors did not show any significant association.

Table 2. Prevalence of depression, results of univariate and multivariate logistic regression analysis.

Factor	Depression		No depression		OR	95% CI	p	aOR*	95% CI	p
	n	%	n	%						
Gender										
Other	2	40.0	3	60.0	1.1	0.2-6.7	0.91			
Male	50	37.6	83	62.4	1.0	0.7-1.5	0.99			
Female	137	37.5	228	62.5	1					
Age										
Median (IQR)	22.0	21.0-25.5	22.0	20.0-25.0	1.02	1.0-1.1	0.46			
Marital status										
Single	90	38.3	145	61.7	2.5	1.0-6.3	0.06	2.3	0.8-6.3	0.11
Divorced	6	42.9	8	57.1	3.0	0.8-12.0	0.12	3.3	0.8-13.8	0.11
In relationships	87	39.2	135	60.8	2.6	1.0-6.6	0.05	2.5	0.9-6.8	0.07
Married	6	20.0	24	80.0	1			1		
Employment										

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Unemployed	19	43.2	25	56.8	1.4	0.7-2.7	0.37			
Employed	116	37.9	190	62.1	1.1	0.7-1.6	0.66			
Maternity/paternity leave	0	0	2	100.0	-	-	-			
Student	54	35.8	97	64.2	1					
Children										
No	178	37.6	295	62.4	1.0	0.5-2.2	0.92			
Yes	11	36.7	19	63.3	1					
Education										
Primary	6	60.0	4	40.0	2.4	0.66-8.7	0.18	2.4	0.6-9.6	0.21
Secondary, vocational	75	35.4	137	64.6	0.9	0.6-1.3	0.48	0.8	0.5-1.2	0.27
University degree, unfinished university degree	107	38.5	171	61.5	1			1		
Income										
2001+	9	56.3	7	43.8	**3.8**	**1.03-12.4**	**0.045**	3.0	0.7-12.0	0.13
1001-2000	36	31.9	77	68.1	1.3	0.6-3.1	0.55	1.3	0.5-3.4	0.61
500-1000	81	40.7	118	59.3	1.9	0.8-4.3	0.12	1.6	0.6-3.9	0.34
<500	53	38.1	86	61.9	1.7	0.7-3.9	0.21	1.5	0.6-3.8	0.35
None	9	26.5	25	73.5	1			1		
Homosexuality scale										
Median (IQR)	1.0	0.0-3.0	1.0	0.0-2.0	**1.1**	**1.02-1.2**	**0.02**	1.1	1.0-1.3	0.08
Sex of the partners										

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No sex	23	41.8	32	58.2	1.4	0.8-2.5	0.27	1.3	0.7-2.7	0.42
Same sex	13	37.1	22	62.9	1.1	0.6-2.4	0.72	0.6	0.2-1.8	0.40
Both sexes	45	45.9	53	54.1	**1.6**	**1.04-2.6**	**0.035**	1.0	0.5-1.8	0.95
Opposite sex	106	34.1	205	65.9	1			1		
Age at first intercourse										
No sex	23	41.8	32	58.2	1.1	0.5-2.5	0.82			
10-15	16	40.0	24	60.0	1.0	0.4-2.5	0.97			
15-20	126	35.9	225	64.1	0.9	0.4-1.6	0.64			
20+	17	39.5	26	60.5	1					
Grown up with both parents										
No	66	43.4	86	56.6	1.4	1.0-2.1	0.08	1.5	1.0-2.3	0.07
Yes	123	35.0	228	65.0	1					
Grown up with siblings										
Yes	148	37.8	244	62.2	1.0	0.7-1.6	0.88			
No	41	36.9	70	63.1	1					
Violence experience										
Yes	57	55.9	45	44.1	**2.6**	**1.7-4.0**	**<0.001**	**2.6**	**1.6-4.3**	**<0.001**
No	132	32.9	269	67.1	1					

Table 3 presents the stratified prevalence of anxiety and results of univariate and multivariate logistic regression analysis. Univariate analysis indicated that three factors are statistically significantly associated with the anxiety – being in relationship (vs. being married) increased the odds of anxiety 2.8 times [95% CI 1.3-6.3], violence experience increased the odds 2.4 times [95% CI 1.5-3.9], whereas male gender (vs. female) seemed to be preventive as per the anxiety (OR 0.4 [95% CI 0.2-0.4]).

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After adjustment four factors were statistically significantly associated with anxiety, i.e. experience of violence kept higher odds of developing anxiety (OR 2.6 [95% CI: 1.7-4.0]). Being in relationship but not married was associated with higher odds of developing anxiety (OR 2.8[95% CI: 1.3-6.3]). Male sex (vs. female) and income more or 1001-2000 euros (vs. none) a month were associated with lower odds of developing anxiety (OR 0.4 [95% CI: 0.2-0.5] and OR 0.3 [95% CI: 0.1-0.8], respectively).

Sexual orientation showed no significant value in association (as per the multivariate analyses) with anxiety and depression (OR: 1.0 [95% CI: 0.8-1.2] and OR: 1.1 [95% CI: 1.0-1.3], respectively).

Table 3. Prevalence of anxiety, results of univariate and multivariate logistic regression analysis.

Factor	Anxiety		No anxiety		OR	95% CI	p	aOR*	95% CI	p
	n	%	n	%						
Gender										
Other	3	60.0	2	40.0	0.9	0.1-5.3	0.9	0.7	0.1-7.1	0.7
Male	50	37.6	83	62.4	**0.4**	**0.2-0.5**	**<0.001**	**0.4**	**0.2-0.6**	**<0.001**
Female	230	63.0	135	37.0	1			1		
Age										
Median (IQR)					0.9	0.9-1.0	0.06	1.02	1.0-1.1	0.49
Marital status										
Single	128	54.5	107	45.5	2.1	0.9-4.5	0.07	2.2	0.9-5.6	0.09
Divorced	6	42.9	8	57.1	1.3	0.4-4.7	0.70	1.4	0.4-5.7	0.61
In relationships	138	62.2	84	37.8	**2.8**	**1.3-6.3**	**0.01**	**2.8**	**1.1-7.0**	**0.02**
Married	11	36.7	19	63.3	1			1		
Employment										
Unemployed	25	56.8	19	43.2	1.0	0.5-1.9	0.93			
Employed	171	55.9	135	44.1	0.9	0.6-1.4	0.73			
Maternity/paternity leave	0	0	2	100.0	-	-	-			
Student	87	57.6	64	42.4	1					
Children										
No	269	56.9	204	43.1	1.5	0.7-3.2	0.28			
Yes	14	46.7	16	53.3	1					
Education										
Primary	8	80.0	2	20.0	3.0	0.6-14.6	0.17	2.6	0.5-13.9	0.25
Secondary, vocational	116	54.7	96	45.3	0.9	0.6-1.3	0.64	0.7	0.4-1.1	0.09
University degree, unfinished university degree	158	56.8	120	43.2	1			1		
Income										
2001+	7	43.8	9	56.3	0.5	0.2-1.8	0.32	0.3	0.1-1.2	0.09
1001-2000	48	42.5	65	57.5	0.5	0.2-1.1	0.10	**0.3**	**0.1-0.8**	**0.02**
500-1000	117	58.8	82	41.2	1.0	0.5-2.1	0.99	0.5	0.2-1.3	0.16
<500	89	64.0	50	36.0	1.2	0.6-2.7	0.57	0.8	0.3-2.0	0.63
None	20	58.8	14	41.2	1			1		

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Homosexuality scale										
Median (IQR)					1.1	1.0-1.2	0.14	1.0	0.8-1.2	0.92
Sex of the partners										
No sex	30	54.5	25	45.5	1.0	0.6-1.8	0.94	0.5	0.2-1.3	0.14
Same sex	20	57.1	15	42.9	1.1	0.6-2.3	0.73	2.3	0.8-7.3	0.14
Both sexes	62	63.3	36	36.7	1.5	0.9-2.3	0.11	1.5	0.8-2.8	0.19
Opposite sex	168	54.0	143	46.0	1			1		
Age at first intercourse										
No sex	30	54.5	25	45.5	0.6	0.3-1.3	0.20	-	-	-
10-15	21	52.5	19	47.5	0.5	0.2-1.3	0.17	0.5	0.2-1.3	0.16
15-20	196	55.8	155	44.2	0.6	0.3-1.2	0.15	0.5	0.2-1.1	0.07
20+	29	67.4	14	32.6	1			1		
Grown up with both parents										
No	88	57.9	64	42.1	1.1	0.7-1.6	0.63			
Yes	195	55.6	156	44.4	1					
Grown up with siblings										
Yes	217	55.4	175	44.6	0.8	0.6-1.3	0.44			
No	66	59.5	45	40.5	1					
Violence experience										
Yes	74	72.5	28	27.5	**2.4**	**1.5-3.9**	**<0.001**	**2.5**	**1.4-4.4**	**0.002**
No	209	52.1	192	47.9	1			1		

4. Discussion

The prevalence rates of anxiety and depression among the participants were found to be 56.3% and 37.6%, respectively. Although this study has a limitation, because the analysis was based on respondents subjective feeling without use of a valid evaluation tool and it is possible that depression rate was thus overestimated. Despite this, these results allow us to get an idea of the substantial burden of mental issues in the young adult population of Latvia. Notably, the study revealed a prevalence rate of 20.3% for individuals who reported experiencing violence. Logistic regression analysis demonstrated significant associations between violence experience and increased odds of developing anxiety and depression. Our findings are consistent to earlier studies, for example to Nedley et al. [24] whose study concluded that violence, in particular sexual abuse, increases the level of depression regardless of sexual orientation. These findings underline the detrimental impact of violence on mental health outcomes and emphasize the importance of addressing and preventing violence within society [25,26].

Furthermore, being in a relationship but not married was associated with higher odds of developing anxiety, as indicated by the logistic regression analysis. This finding suggests that relationship status may contribute to increased psychological distress or anxiety symptoms among young adults [27]. One of the theories that explains why marriage can be a protective factor for mental health is social control theory [28] that emphasise how spouses monitor one another's behaviour encouraging healthy lifestyle and promoting well-being. On the contrary single people or in relationship but not married usually are living alone and may be less able to monitor their partners behaviour.

In contrast, male sex (vs. female) and an income range of more or 1001-2000 euros per month (vs. no income) were associated with lower odds of developing anxiety. These results suggest potential protective factors associated with being male [29,30]. Men and women have differences on

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molecular level and one explanation why men are less likely to develop anxiety is that women have higher stress-induced cortisol level [31], also negatively valenced emotional stimuli cause greater activation of the amygdala in females. Even this small increase in amygdala activation in females could lead to greater emotional arousal because their amygdala response would be amplified by their greater amygdala-LC connectivity [30].

Having a higher income is also related with lower odds in relation to developing anxiety symptoms [32,33]. Study by De Castro et al. show that people from low-income countries urban areas has difficulties across various functional domains such as difficulties communicating, with self-care, difficulties making friends which are related to higher odds of developing anxiety and depression [33]. However, it is important to note that further research is needed to explore the underlying mechanisms behind these associations.

Interestingly, the study did not find a significant association between sexual orientation and anxiety or depression. These results differ from previous studies, which reported that all sexual minorities are at higher risk of developing mental disorder [34]. Although, there are contradictions between previous studies as well. For example, Nam et al. [35] study showed that only bisexual individuals has higher odds for developing anxiety, depression and suicidality comparing to heterosexuals and gay/lesbian populations. They suggest that the reason can be a 'double discrimination' that bisexuals face. The study by Lefevor et al. [36] showed that when sexual attraction, behaviour, and identity were accounted for, relationship between sexual orientation 'branchedness/discordance' and health outcomes disappeared. The present study found may suggest that in previous years stigma on LGBTQIA+ individuals has diminished and doesn't cause such psychological distress as it used to. However, it is essential to interpret this result cautiously, considering the complexities of mental health and sexual orientation [37].

However, it is crucial to acknowledge certain limitations of the study. The cross-sectional nature of the data restricts the ability to establish causal relationships between variables. Additionally, the reliance on self-reported measures for mental health outcomes and experiences of violence may introduce response biases. The absence of randomization and representativeness in participant selection introduces the possibility of selection bias. Moreover, there is a limitation in the study due to the absence of a validated tool for example PHQ9 [38] and GAD7 [39]. Future research should consider longitudinal designs and utilize validated measures to enhance the robustness of the findings.

5. Conclusions

Our study did not reveal association of higher odds for developing depression and anxiety with any particular sexual orientation. Further research should be done to investigate contributing factors that increase odds of developing depression and anxiety.

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