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RESEARCH ARTICLE

THE ASSOCIATION BETWEEN LIFESTYLE AND SOCIAL FACTORS WITH ONSET OF DEPRESSION, ANXIETY AND STRESS

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ABSTRACT

Background: Optimum treatment and prevention of mental illness appears a neglected area within healthcare, with continuous rise in diagnosed cases. **Aim:** The aim was to investigate whether social and lifestyle factors can be associated with the onset of depression, anxiety and stress symptoms amongst people 18 years and over. **Methods:** A self-completed questionnaire collected data on demographic characteristics, lifestyle habits, social factors and participants perceptions of experiencing depression, anxiety and stress symptoms. The demographics, lifestyle and social factors were then used to explore their association with reported depression, anxiety and stress symptoms. **Results:** Depression symptoms had a greater association with the level of alcohol consumption (100%, 88% and 55% in high, medium-and low-level drinkers). Smoking was more prevalent in participants reporting depressive symptoms (80%) when compared to non-smokers (68%). Low income was found to be associated with a high prevalence of depressive and stress symptoms (73% and 91%) and high income was found to associated with stress symptoms only (75%). Lack of companionship was reported by 89% of participants who experienced symptoms of depression. **Conclusion:** A positive correlation was found between alcohol consumption and depression and anxiety. In this study sample, smoking was associated with depression alone and not with anxiety or stress. Low income and depressive or stress symptoms association was significant, no strong association was found with anxiety. Stress was reported by high-income participants. Lack of companionship was reported by those who reported depressive symptoms more so than those reported anxiety and stress.

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INTRODUCTION

According to the World Health Organisation (WHO) (2019), mental ill health has continued to grow significantly in all countries. It is expected that 35-50% of people globally will experience mental health problems and 76%-85% of those do not receive treatment. The most prevalent mental health problem is depression followed by anxiety (Mental Health Foundation, 2016). Depression is characterised by persistent low mood and a lack of interest, pleasure or motivation to do things (WHO, 2019). There are various forms of depression including situational, major, seasonal, postpartum, premenstrual, bipolar disorder and psychotic depression (Truschel, 2020). Anxiety is characterised by the persistent feeling of worry and fear. This may involve physical symptoms such as shortness of breath, tachycardia and tachypnoea (Mental Health Foundation, 2018). Anxiety takes various forms including generalised anxiety, social anxiety, panic disorder, phobias, post-traumatic stress disorder and obsessive-compulsive disorder (Mind, 2017). Stress is characterised by feelings of overwhelming pressure and the inability to cope with otherwise normal life demands.

Feeling pressured to perform certain actions occasionally, is considered a normal part of life but the ongoing feeling of being pressured may cause chronic stress (Mental Health Foundation, accessed 2020). In the past year a significantly large percentage of the population in the United Kingdom (UK) experienced stress (74%) (Mental Health Foundation, 2018). As stress is common amongst most people at some stage in their life it is not considered a mental disorder. it is often assumed that people recover quickly, and it is a 'normal' part of life. However, this is a misconception as chronic stress may progress to depression and/or anxiety (Mind, 2017). Risk factors shared amongst all three include financial problems, current life events and physical health issues (Mental Health Foundation, 2018). As a result, it may be difficult for people to differentiate between the three conditions. Complex and technical public health promotion, not easily understood by the public, leads many to make an incorrect self-diagnosis of stress.

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Currently treatment of depression and anxiety focus on psychotherapy as first line for mild to moderate cases and combined with pharmacological treatment more severe cases. Although the relationship between stress and mental health is recognised there are no national guidelines in the UK for diagnosing and treating chronic stress.

Gender and mental health: Although numerous studies report females to be more likely to suffer from mental health problems than males, it was also reported that 78% of all suicides in 2018 were males. This supports that men are less likely to report mental illness than women (Mental Health Foundation, 2019). This suggests the underlying cause of male suicides may be undiagnosed or undertreated mental illness. A survey-based study conducted in Belgium over 3 years on 3204 women and 2907 men aged 16 or over, found women experienced more depressive symptoms, for a longer period of time than men (Bracke,1998). Another study concluded that from a sample of 54 men and women, it was women who reported greater anxiety than men in response to stress (Chaplin *et al*.,2008). A study on 377 women and 210 men aged 18-65 found that women felt more stressed than men (Wiegner *et al*., 2011).

Age and mental health: Recent UK studies found that 74% of the adult population (16 or over), experienced symptoms of stress compared to younger people (60%) (under 16). The prevalence of depression and anxiety disorders reported in adults was 9% (6% with anxiety, 3% with depression). Whereas lower levels were seen in younger people at 4% (3% with anxiety,1% with depression) (Mental Health Foundation, 2016). Other studies have challenged these figures. A Germany study on 5318 adults (18-79) found high rates of mental health in younger age groups (37%) compared to 65-79-year old's (20%) (Jacobi *et al*., 2014). This difference may be due to behavioral / lifestyle differences between countries.

Ethnicity and mental health: Studies have investigated differences in prevalence of mental health conditions amongst ethnic groups, for example, white British were found to be least likely to have mental health problem followed by black British people. African-Caribbean, Indian and Pakistani people reportedly had better mental wellbeing than white people (Mental health foundation, 2016). However, these statistics capture only reported cases and cultural beliefs around mental health and the stigma mental illness may compromise the accuracy of these reported figures. Consequently, there is convincing evidence that ethnicity is a risk factor for mental health issues.

Occupation and mental health: Having paid employment is considered beneficial as it is associated with security and a low risk of financial hardship leading to depression, anxiety and stress. This is also supported by data collected from the UK population between 1993-2007. Of 20,126 people aged 16-64 the prevalence of mental disorders was higher in those unemployed (29%) compared to those in employment (15.5%) (Spiers *et al*.,2016). However, it is important to note that occupation may also be the cause of depression/anxiety/stress depending on the occupation.

Diet and Good Mental Health: Ansari, Adetunji and Oskrochi (2014) in a cross-sectional study found that from 3,706 students across seven universities in the UK, consumption of sweets and fast food were significantly positively associated with female students reporting higher stress levels and male and female students reported higher depressive symptoms. This also was supported by local study of university students which reported increased consumption of sweet food, especially chocolate during the examination period (Belal *et al*., 2019). It was also found that consumption of fish and seafood was associated with reduced depressive symptoms in males, consumption of meat was not associated with depression, anxiety or stress for both sexes and vegetables consumption were negatively associated with anxiety and depression (Ansari *et al*., 2014). Another study found that people with mild to moderate stress were able to maintain their fruits and vegetable consumption, however people with high levels of stress increased their level of snacking of fruit and vegetables between meals (Cartwright *et al*., 2003). This finding agrees with Mikolajczyk, Ansari and Maxwell, (2009) who suggested depressive symptoms were associated with less vegetable and meat intake.

Alcohol and mental health: It is a common belief that alcohol consumption can alleviate symptoms of depression, anxiety and stress. The Mental Health Foundation (2018) reports that regular moderate to high alcohol consumption may deplete serotonin levels in the brain leading to depression and anxiety. A study by Shortt (2018) concluded that of the 90 participants in a cross-sectional survey, those involved in binge drinking showed higher levels of depression, anxiety and stress and the higher consumption of alcohol correlated with higher levels of depression and anxiety.

Smoking and mental health: Another common belief is that smoking improves mood. However, the long-term effects of smoking on mental health can be overlooked, though withdrawal symptoms are likely to cause onset of anxiety and stress. A randomised study (n=1020 of high school students) revealed that in their sample there was no correlation between smoking and onset of depression and anxiety symptoms (Khademalhosseini, Ahmadi and Khademalhosseini, 2015). However, only 5.4% of all participants were smokers, making this finding unreliable. A cohort study (n=4520) concluded that significantly higher levels of depression and anxiety were reported in smokers compared to non-smokers (Wagena *et al*., 2005). A further study of 469 smokers, found that smoking cessation was associated with lower levels of stress in previously highly dependent smokers after one year (Hajek, Taylor and McRobbie, 2010). However, overall, research on the association between smoking and onset of stress is limited.

Income and mental health: The effect of low income on psychological disorders has been extensively researched and this is known to be a significant risk factor for mental health issues. This is supported by a study of 2937 participants (18-65) which concluded that financial strain was associated with depressive and/or anxiety disorders (Dijkstra-Kersten *et al*., 2015). Similar findings came from the by Sargent-Cox, Butterworth and Anstey (2011) of 1973 Australian adults. The study found an increase was observed in the number of depressive and anxiety symptoms during the global financial crisis. In a study on 36,984 participants it was also concluded that the prevalence of stress was 50% higher in low earners compared to higher earners (Caron and Liu, 2010). This indicates consistent evidence confirms the association between low income and occurrence of all three conditions. However, few studies have made associations between higher bands of income and mental health conditions.

A study of 2,111 participants aged 7-17 concluded that those with low socioeconomic status were at higher risk of developing mental health problems (Reiss *et al*., 2019).

Companionship or loneliness and mental health: Loneliness and depression have been extensively researched documented to have a strong positive correlation as consequence rather than cause. This was supported by the Singh and Misra (2009) study on loneliness and depression in old age of (n=55) people aged 60-80. However, there was no strong evidence on prevalence of anxiety or stress and loneliness. Lack of companionship and loneliness are not necessarily the same, as some individuals may have experienced lack of companionship due to personal preference and therefore do not feel lonely; and others may have companionship and suffers from loneliness. Differences in definition of the terms may also cause differences in perception of the two factors and therefore cause differences in outcome.

Co-morbidity with stress, depression and anxiety: A study based on prevalence of depression, anxiety and stress amongst 600 nurses found stress levels (18.5%) to be closer to levels of depression (13.2%) than the level of anxiety (39.8%) (Tran *et al*., 2019). The study therefore implied co-morbidity of stress with depression is much more likely than stress with anxiety.

Aim: The aim of this study was to investigate whether social and lifestyle factors can be associated with the onset of depression, anxiety and stress symptoms amongst people 18 and over.

Method: This small scale pilot study consisted of a self-administered, paper-based questionnaire (Appendix 1) which was divided into two sections. The first half had four demographic questions, three lifestyle factor and two social factor questions. The second half was based on 18 questions related to occurrence of depression, anxiety, stress symptoms and overlapping symptoms across all three conditions adopted from the Depression Anxiety Stress Scale test (DASS-21) A validated and widely accepted questionnaire. Participants were provided with participant information sheet and were verbally asked if they wanted to participate in the study. Verbal informed consent was obtained before handing over the study questionnaire. The data collection was completed in one day, no personal identifiers were collected and returning a completed questionnaire was accepted as implied consent to participate.

Ethics: The study was approved by the School of Pharmacy Ethics Committee of The University on 12/11/2019 before conducting the research.

Sample: A pragmatic sample of 50 participants, an equal number of males and females, 18 years of age or over who were present on the university campus on the day of data collection.

Data analysis: Data was transcribed onto a Microsoft Excel™ master-sheet. Demographics, lifestyle and social factor were used as variables to trend all other data regarding depression, anxiety and stress, where frequencies and percentages were calculated.

RESULTS

Demographic characteristics of the sample: The sample had equal numbers of males and females. Most participants were aged 20-35 years old (70%) with only 4% under the age of 20 years and 26% over the age of 35 years. The majority of participants were students (66%) and 34% from other occupations. There were approximately equal numbers of participants of different ethnicities (34% Asian, 34% white and 32% black background). There were slightly more white females (53%) than males (47%) and slightly more Asian males (53%) than females (47%). Black males and females were the same (50% of each) (Figure 1). Participants <20 years of age were all males (8%), the majority of participants were aged 20-35 years (68% females and 72% males) followed by 36-50 years old (32% females, 20% males). There were higher male students (80%) than female students (52%) and higher females in the workforce (48%) than males (20%). Majority of those aged 36-50 were in the workforce (92%) and majority of 20-35-year old were students (86%). The majority of black (36%) and Asian (40%) participants were students (24% from white background) and white participants (52%) were in the workforce (24% of each of Asian and black background participants).

Demographic and dietary characteristics: Of participants (88%) ate meat and fish (17% were vegetarian and 5% vegan) (Figure 1).

Figure 1: diet trended by age and ethnicity

Demographic characteristics and consumption of alcohol

The sample reported 32% of participants did not drink, 28% reported to only drink occasionally, 22% drank 1-4 times per month, 14% drank 1-4 times per week and 4% consumed alcohol on daily basis. Only participants from black ethnic background (12% of all black participants) reported to drink daily and Asians participants were the highest (47%) to report they never drank. A majority of males aged 36-50 (60%) drank more regularly at 1-4 times per month and males under 20 were 50/50 split between occasional and 1-4 times per month drinkers. Examining alcohol consumption, gender and ethnicity, 67% of Asian males, 62% of black males and 62% of black females consumed alcohol. The majority of Black and Asian students reported never drinking alcohol and most Blacks and Asians in the workforce consumed onlyd 1-4 times/month. All males aged 20-35 in the workforce reported consuming alcohol at 1-4 times/week and all males aged 36-50 students drank 1-4 times/month (Figure 2).

Figure 2: Alcohol consumption by study variables

Demographic and smoking characteristics: Most participants (64%) never smoked, 16% had previously smoked and ceased but 20% reported to be smokers. Of those who smoked, 70% smoked >5 cigarettes a day, the remainder smoked <5 cigarettes a day. Considerably more females (72%) never smoked or stopped smoking (16%) than males (56% and 16% respectively). There were 12% of all females never smoked vs. 28% of males. All those <20 years of age were non-smokers but only 69% and 46% of 20-35 and >35 age groups were non-smokers; with 19% and 23% of participants from the 20-35 and >35 age groups reported to be smokers. There were similar levels of students and those in the workforce that had never smoked (67% and 56% respectively),

Table 1. Responses to questions regarding, depression, anxiety, stress and general emotional wellbeing

	male					female				
	always	sometimes	rarely	never	N/A	always	sometimes	rarely	never	N/A
felt sad,low mood or upset	8%	60%	20%	12%	0%	12%	40%	36%	12%	0%
couldn't seem to get any enjoyment out of the things they did previously enjoy	12%	28%	40%	16%	4%	8%	28%	36%	28%	0%
found it difficult to have the initiative to do things	20%	32%	36%	8%	4%	4%	48%	24%	24%	0%
experienced breathing difficulty(e.g. excessively rapid breathing,breathlessness in the absence of physical exertion)	0%	16%	24%	60%	0%	8%	20%	28%	44%	0%
found themselves in situations that made them so anxious they were most relieved when they ended	12%	48%	24%	16%	0%	16%	20%	32%	28%	4%
felt scared and worried without any good reason	4%	32%	40%	24%	0%	16%	24%	16%	44%	0%
found it difficult to relax	20%	44%	20%	16%	0%	12%	32%	28%	24%	4%
got upset easily	8%	40%	24%	28%	0%	16%	36%	24%	20%	4%
got impatient when delayed in any way (e.g. lifts,traffic lights,being kept waiting)	28%	52%	16%	4%	0%	24%	32%	36%	8%	0%
felt tired all the time	36%	24%	32%	8%	0%	28%	28%	32%	8%	4%
had difficulty with concentrating	32%	56%	8%	4%	0%	24%	32%	28%	16%	0%
had difficulty with memory	4%	28%	44%	24%	0%	28%	20%	32%	20%	0%
had difficulty with making decisions	12%	28%	52%	8%	0%	0%	48%	40%	12%	0%
experienced changes in sleep pattern	24%	28%	28%	20%	0%	32%	32%	28%	8%	0%
had trouble initiating sleep	8%	32%	32%	28%	0%	16%	36%	32%	16%	0%
had trouble staying asleep	16%	32%	24%	28%	0%	28%	32%	32%	8%	0%
sometimes felt on edge	8%	44%	28%	20%	0%	4%	56%	28%	12%	0%
found it difficult to cope with things they used to be able to cope with	16%	36%	32%	16%	0%	8%	44%	16%	32%	0%

Table 2. Responses to questions regarding, depression, anxiety, stress and general emotional wellbeing

	White					Black					Asian				
	always	sometime	rarely	never	N/A	always	sometime	rarely	never	N/A	always	sometime	rarely	never	N/A
felt sad,low mood or upset	6%	71%	23%	0%	0%	6%	38%	31%	25%	0%	18%	41%	29%	12%	0%
couldn't seem to get any enjoyment out of the things they did previously enjoy	18%	23%	41%	18%	0%	0%	25%	44%	25%	6%	12%	35%	29%	24%	0%
found it difficult to have the initiative to do things	18%	47%	24%	11%	0%	13%	25%	31%	25%	6%	6%	46%	36%	12%	0%
experienced breathing difficulty(e.g. excessively rapid breathing,breathlessness in the absence of physical	0%	30%	35%	35%	0%	6%	6%	12%	76%	0%	6%	18%	30%	46%	0%
found themselves in situations that made them so anxious they were most relieved when they ended	12%	35%	35%	18%	0%	12%	32%	25%	25%	6%	18%	34%	24%	24%	0%
felt scared and worried without any good reason	4%	24%	48%	24%	0%	6%	31%	6%	57%	0%	18%	29%	29%	24%	0%
found it difficult to relax	29%	29%	42%	0%	0%	12%	31%	6%	45%	6%	6%	52%	24%	18%	0%
got upset easily	12%	41%	29%	18%	0%	18%	27%	18%	31%	6%	6%	46%	24%	24%	0%
got impatient when delayed in any way (e.g. lifts,traffic lights,being kept waiting)	30%	35%	35%	0%	0%	31%	39%	18%	12%	0%	18%	52%	24%	6%	0%
felt tired all the time	53%	18%	29%	0%	0%	18%	27%	31%	18%	6%	24%	35%	35%	6%	0%
had difficulty with concentrating	35%	47%	18%	0%	0%	31%	31%	12%	26%	0%	18%	52%	24%	6%	0%
had difficulty with memory	28%	18%	36%	18%	0%	12%	18%	31%	39%	0%	6%	36%	46%	12%	0%
had difficulty with making decisions	6%	47%	47%	0%	0%	6%	26%	37%	31%	0%	6%	42%	52%	0%	0%
experienced changes in sleep pattern	35%	24%	35%	6%	0%	26%	31%	17%	26%	0%	24%	36%	28%	12%	0%
had trouble initiating sleep	29%	24%	35%	12%	0%	6%	51%	12%	31%	0%	0%	28%	48%	24%	0%
had trouble staying asleep	41%	23%	18%	18%	0%	12%	38%	25%	25%	0%	12%	36%	40%	12%	0%
sometimes felt on edge	0%	64%	24%	12%	0%	6%	45%	31%	18%	0%	12%	41%	29%	18%	0%
found it difficult to cope with things they used to be able to cope with	0%	58%	24%	18%	0%	25%	25%	19%	31%	0%	12%	35%	29%	24%	0%

stopped smoking (12% and 27% respectively) or smoke (21% and 17% respectively) (Figure 3).

Figure 3: Smoking trended by gender, age and ethnicity

Demographic and annual income characteristics: Most participants (42%) were earning an average income of £5,000-£20,000, 26% earning over -£20,000, 22% under £5000 and 10% reported no income. Most males (88%) and females (92%) had some income. All those <20 years of age earned <£5,000 and all aged 36-50 earned >£5000 where participants from 20-35 years of age were spread over all categories (14%, 26% 51% and 9% as no income, <£5000, between £5000>£20000 and £21000>£50000 respectively). Most students (85%) were earning £5,000-£20,000 annually and nearly all those in the workforce (94%) were making £21,000-£50,000 with only 6% earned <£5000. Only participants from Asian and black background reported having no income at all (19% and 12% respectively). Almost all females aged 36-50 (87%) were on high income of £21,000-£50,000 and all males under 20 (100%) were on under £5,000. All Asian and black males in the workforce and Asian females in the workforce were on the higher income of £21,000-£50,000. All students <20 years of age earnt under £5,000 and all students and 83% of workforce participants aged 36-50 years earnt over £5,000 (Figure 4).

Figure 4: Income status by study variables

Demographic and lack of companionship characteristics: In this study, 42% of participants reported never experiencing lack of companionship where all others reported a range from often (6%), sometimes (30%) or rarely (22%). Amongst males, 36% reported lack of companionship vs. 48% of females, but no males reported to always lack companionship vs. 12% of all females. The majority of those who reported that they never felt lack of companionship (98%) or often had these feelings (14%) were aged >20 years and over, where 50% of those reported to often or sometimes having these feelings were <20 years of age. No white participants reported often experiencing lack of companionship where 6% of participants from Asian background and 13% of people from black background did. Most males (60%) and females (62%) aged 36-50 never experienced lack of companionship. No white males or females reported to often feel a lack of companionship. Only student participants from the 20-35 years age group and people in the workforce from the 35-50 years age group reported all three categories of rarely, sometimes or often (Figures 5).

Figure 5: Companionship status by study variables

Gender and symptoms of depression, anxiety and stress: Males reported experiencing more signs of depression, anxiety and stress (often/sometimes) at an average of 53%, 37%, 64% of all males, compared to 47%, 35% and 51% of women (Figure 6). Table 1 shows responses of males and females to questions regarding, depression, anxiety, stress and general emotional wellbeing. There were 88% of males and females reported feeling sad, low mood or upset (depression sign); 76% of females and 56% males felt scared and worried without good reason (anxiety sign); 80% of females and 88% of males felt on the edge (stress sign); 80% of females and 92% of males had changes in sleeping patterns (insomnia signs) and lastly 84% of all females and 68% of all males found it difficult to cope with things they used to be able to cope with (general wellbeing).

Ethnicity and symptoms of depression, anxiety and stress
White participants reported the highest prevalence of depression (61%), Asians reported the greatest prevalence in anxiety (41%), whites and Asians had similar stress levels (59%,60%) whereas black background participants had the fewest symptoms of depression, anxiety and stress (27%,31%,53%). Figure 7 and Table 2 are showing details of ethnic group responses to questions regarding, depression, anxiety, stress and general emotional wellbeing. All white participants, 75% black participants and 88% of Asian participants reported felt sad, low mood or upset (depression sign); 76% of all white participants, 43% black participants and 74% of Asian participants felt scared and worried without good reason (anxiety sign); 88% of all white participants, 82% black participants and 82% of Asian participants reported felt on the edge (stress sign); 94% of all white participants, 72% black participants and 88% of Asian participants reported had changes in sleeping patterns (insomnia signs) and lastly 82% of all white participants, 69% black participants and 76% of Asian participants reported found it difficult to cope with things they used to be able to cope with (general wellbeing).

DISCUSSION

Gender and mental health: More males reported experiencing symptoms of all three mental health issues compared to females. These results are not consistent with many other previous findings e.g. a Belgian study on 6,111 participants found greater levels of depression amongst women (Bracke,1998). Results from a study based on 27 men and 27 women also found women to have greater anxiety then men (65% vs. 20%) ($p<0.0001$) (Chaplin *et al*.,2008). Results from this study also differed to a study based on 587 primary health care patients that found 36% of women felt stressed vs 26% of males (Wiegner *et al*.,2015). The different stressors of each study may be responsible for the inconsistent results as Wiegner's study was based on patients from a primary care setting in which women responded more than men to the stressor of poor physical health and wellbeing, whereas this study was predominantly based on students in which males were more stressed most likely due to the stressor of academic pressure.

Ethnicity and mental health: The study found those of white ethnicity had the highest prevalence of depression which is similar to findings of other studies. Budhwani *et al*. (2015) (n=17,249) concluded that participants from a white background had the highest rate of depression, followed by Asians (50%) and those from black background (55%). Participants in this study from black background were also found to have the lowest prevalence of stress contrary to other studies that have found black ethnicity reported the highest stress level. Smith's (2005) study found that 18% of black Caribbean's reported high stress compared to 11% of white and 8% of Asian participants. The difference in results is most probably due to numbers, but also may be due the fact that most studies only assessed response in relation to work stress, however this study was inclusive of stress originating from a variety of sources e.g. educational, health and situational stressors.

Lifestyle, social factors and mental health: Associations between lifestyle and social factors and reduced prevalence of mental health issues were found in this study. A trend was observed in all of the factors for those presenting with no symptoms to any mental health issue e.g. drank very small quantities or no alcohol (89% never/occasionally drank alcohol), were non-smokers (61%), received medium to high income (72% £5,000-£20,000/ £21,000-£50,000) and never/rarely experienced lack of companionship (75%). This suggests a combination of these four factors is likely to result in reduced onset in at least one of the psychological conditions depression, anxiety and stress. However, for all those experiencing symptoms of one or more of the psychological conditions, the results of the study showed a small majority of these participants that often/sometimes experienced lack of companionship (58%). No further significant associations were found between the lifestyle factors and mental health symptoms. The reasons for this inconclusive finding may be due to participants not providing honest responses to questions due to feeling uncomfortable revealing personal and sensitive details about themselves, or they may have felt pressurised to alter responses due to concerns of discrimination/ embarrassment from friends/colleagues if present whilst taking their questionnaire due to personal lifestyle choices e.g. whether they smoke/drink alcohol regularly. Another reason may be because the mental health symptoms they were experiencing may have impaired their ability to complete the questionnaire accurately e.g. lack of interest in the questionnaire.

Associations between individual conditions and risk factors

Companionship: This study found lack of companionship was a significant predictor for depression, more so than for anxiety and stress. However, of all participants reporting lack of companionship, 89% also had symptoms of depression. Although few studies have been conducted specifically on companionship, these results are consistent with a similar study on loneliness, depression and anxiety that found over half of participants that experienced loneliness was also depressed and 42% had anxiety (Beutel *et al*.,2017). A study by Samele *et al*. (2018) found 37% of participants who were lonely were also stressed. Although limited research has been conducted on stress and companionship, the two findings were consistent regarding the low numbers with co-occurrence of stress and lack of companionship/loneliness. Participants experiencing unhealthy relationships were overlooked in most studies which may be a reason for the lack of association and contrary findings.

Income: This study found those on lower income had a higher prevalence of symptoms for stress (91%) and/or depression (73%), whereas less than 50% had anxiety symptoms. This is consistent with a previous study on the prevalence of depression, anxiety and stress in 397 participants that found those on lower income to have high prevalence of depression and stress, but no significant association was found with anxiety (Teh *et al*., 2015). Possible reasons for these similar results may be because a majority of participants across both studies consisted of university students. Students are commonly known to have limited income whilst in education. This study also found that high income was associated with high prevalence of stress (75% of all people experiencing only stress symptoms received a higher income of £21,000-£50,000). This finding was similar to that in a national American study that found 68% of people earning more than $200,000 were stressed compared to 47% of those earning $35,000-$50,000 (Petrone,2018). One of the reasons was that higher earners experienced reduced job satisfaction compared to lower earners.

Smoking: This study found that non-smokers had reduced symptoms of depression (68% vs 80%) but greater stress (95% vs 90%) and fairy equal anxiety levels (58% vs 60%) compared to those who smoked. However, a similar study found that smokers had greater scores of depression, generalised anxiety and stress than non-smokers (McCabe, 2003). This discrepancy in anxiety and stress results may be because McCabe (2003) study excluded all anxiety disorders apart from generalised anxiety disorder. Another explanation for the higher stress levels in non-smokers may be that it was situational and temporary stress given that both groups of participants had high stress levels and data was recorded around the examination period.

Alcohol: A positive correlation was found between increased frequency of alcohol consumption and prevalence of depression, anxiety and stress symptoms. Depression had the strongest association with alcohol as it was the most prevalent condition and it showed the greatest differences in results between low, medium and high drinkers at 55%,88%,100%. Anxiety consecutively had the lowest prevalence in low, average to high drinkers at 55%,63% and 75%. However, there was only a small reduction in prevalence of stress between high and low drinkers of 17% in comparison to depression and anxiety which reduced by almost half. Also, stress symptoms remained very high amongst low drinkers (83% vs depression and anxiety at 55%). Other studies such as Shortt (2018) found similar results of a positive correlation between alcohol consumption and prevalence of depression and anxiety. However, surprisingly Shortt's study found a negative correlation between alcohol consumption and prevalence of stress. The differences in assessment tools used may be responsible for the differences in our results. Shortt's study used the DASS-21 questionnaire which has been validated for use in previous studies and is the most commonly used assessment for depression, anxiety and stress. Both studies therefore raise questions about whether more specific risk factors e.g. alcohol dependence may be more of a prominent risk factor for mental health issues than drinking habits alone due to withdrawal symptoms possibly exacerbating symptoms of anxiety and stress.

Stress and overlapping symptoms: Finally, similar levels were seen in those experiencing symptoms of stress and overlapping symptoms of depression, anxiety from those who smoked (both 90%), drank alcohol more frequently-(1-4 times/week) (both 100%) and average drinkers-(1-4 times/month) (stress=88%, overlapping symptoms=75%). There are a limited number of studies that have assessed occurrence of overlapping symptoms of depression, anxiety and stress compared to occurrence of symptoms of stress alone, but there may be two explanations for these findings. The first is that the overlapping symptoms are in fact due to stress alone, which is plausible given the similar results of stress symptoms experienced alone. The second is that the high prevalence of co-morbidity with stress and mental health conditions within these population groups. Therefore, this data reinforces that stress can cause progression onto depression/ anxiety or depression/anxiety symptoms may be easily mistaken for stress.

Limitations: This study has limitations; a self-reported questionnaire was used to collect data which may have caused discrepancies in results, as responses may have been altered due to influences/differences in perception for certain questions. Clinical assessments were not conducted. The length of time individuals was exposed to risk factors such as smoking was not determined. Also, the small sample size may not be representative of the population.

Conclusion and Recommendation

Overall, the results from this study, add and broadly correspond to the existing data. The introduction of additional treatment and preventative strategies have been advised to better manage the rise in mental health and stress levels as well as reducing the stigma surrounding mental health. The study also identified risk factors that may be associated with specific mental health issues more so than others providing an incentive for future research to further explore this concept and to potentially improve public health promotion and reduce misdiagnosis. Although the study findings on association between stress and overlapping mental health symptoms are debateable, this will encourage further study in this area to emphasise the need for diagnostic criteria to clinically diagnose and differentiate between chronic stress and mental health disorders.

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The association of social and lifestyle factors with onset of depressio anxiety and stress

Questionnaire (Please mark 'X' where applicable)

Part 1 - Social and life style

1. **Please indicate your gender.**
   - ☐ Please write here.....
   - ☐ Prefer not to say
2. **How old are you?**
   - ☐ Please write here.....
   - ☐ Prefer not to say
3. **What is your occupation?**
   - ☐ Please write here.....
   - ☐ Prefer not to say
4. **What is your ethnic background?**
   - ☐ Please write here.....
   - ☐ Prefer not to say
5. **How would you best describe your diet?**
   - ☐ I am a vegan
   - ☐ I am a vegetarian
   - ☐ I eat meat and fish
   - ☐ I eat fish only
   - ☐ Others (please specify).....
6. **How often do you drink alcohol?**
   - ☐ Never
   - ☐ Occasionally <1 drink per month (how much).....
   - ☐ 1-4 times per month (how much).....
   - ☐ 1-4 times a week (how much).....
   - ☐ Daily (how much).....

7. **How many cigarettes do you smoke a day?**

- ☐ I never smoked
- ☐ I stopped smoking recently
- ☐ I stopped smoking long time ago
- ☐ I smoke ..... cigarette a day
- ☐ I am planning to stop smoking
- ☐ Prefer not to say

8. **Which of the following best describes your annual income or financial support last year?**

- ☐ I do not have an income
- ☐ Under £5,000
- ☐ Between £5,000 and £20,000
- ☐ Between £21,000 and £50,000
- ☐ Over £50,000
- ☐ Prefer not to say

9. **Do you feel that you lack companionship?**

- ☐ I often feel this way
- ☐ I sometimes feel this way
- ☐ I rarely feel this way
- ☐ I never feel this way
- ☐ Prefer not to say

Part 2 – Depression, anxiety and stress questions

Please read each statement and place a tick (✓) under the description which indicates how much the statement applied to you over the past two weeks.

There are no right or wrong answers.

Question	Statement	Never	Rarely	Sometime	Always	N/A
10	I felt sad, low mood or upset					
11	I couldn't seem to get any enjoyment out of the things I did previously enjoy					
12	I found it difficult to have the initiative to do things					
13	I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)					
14	I found myself in situations that made me so anxious I was most relieved when they ended					
15	I felt scared and worried without any good reason					
16	I found it difficult to relax					
17	I found myself getting upset easily					
18	I found myself getting impatient when I was delayed in any way (e.g. Lifts, traffic lights, being kept waiting)					
19	I felt tired all the time					
20	I had difficulty with concentrating					
21	I had difficulty with my memory					
22	I had difficulty with making decisions					
23	I experienced changes in my sleep pattern					
24	I had trouble in initiating sleep					
25	I had trouble in staying sleep					
26	I sometimes feel on edge					
27	I found it difficult to cope with all the things I used to be able to cope with					

Thank you for your participation

Part 2 – Depression, anxiety and stress questions

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Question	Statement	Never	Rarely	Sometime	Always	N/A
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Thank you for your participation

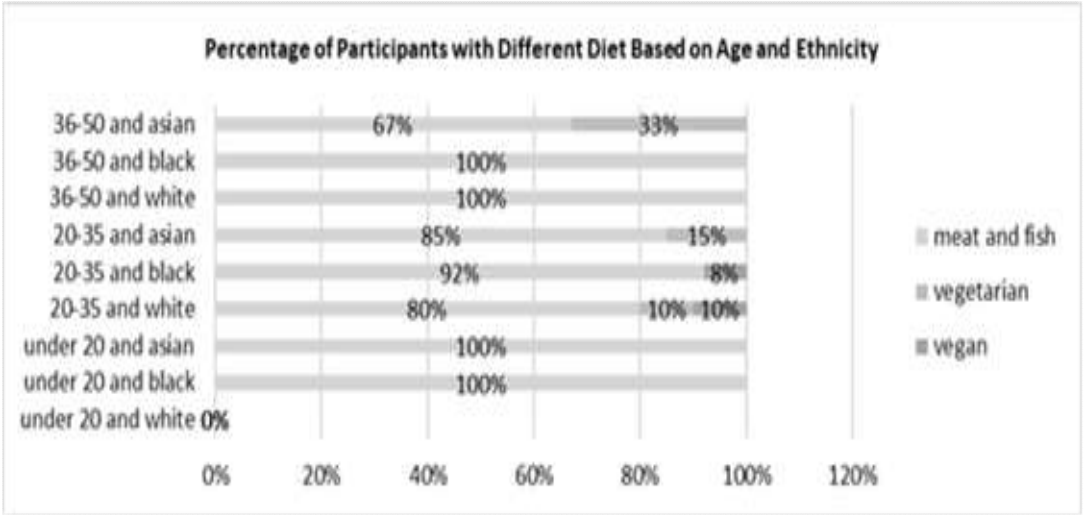


Figure 1.

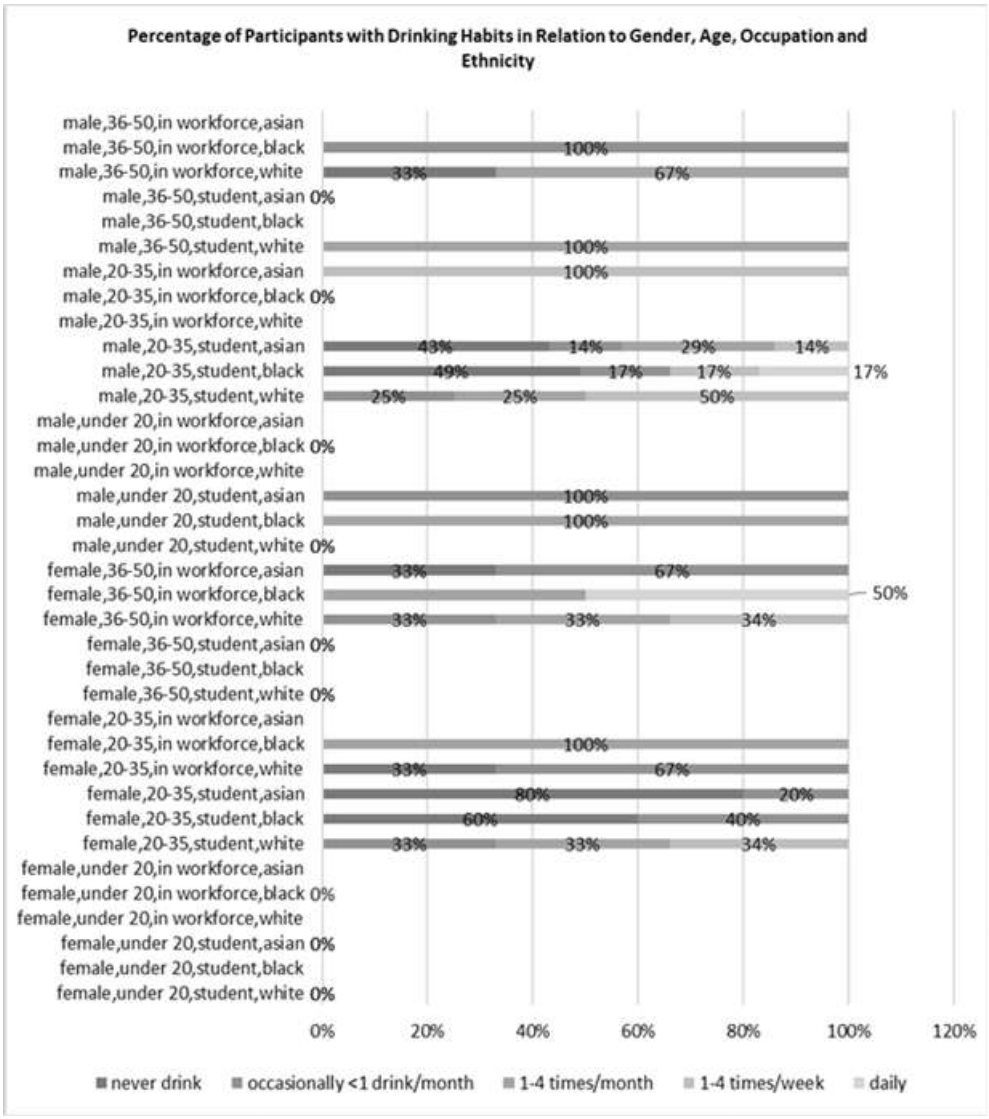
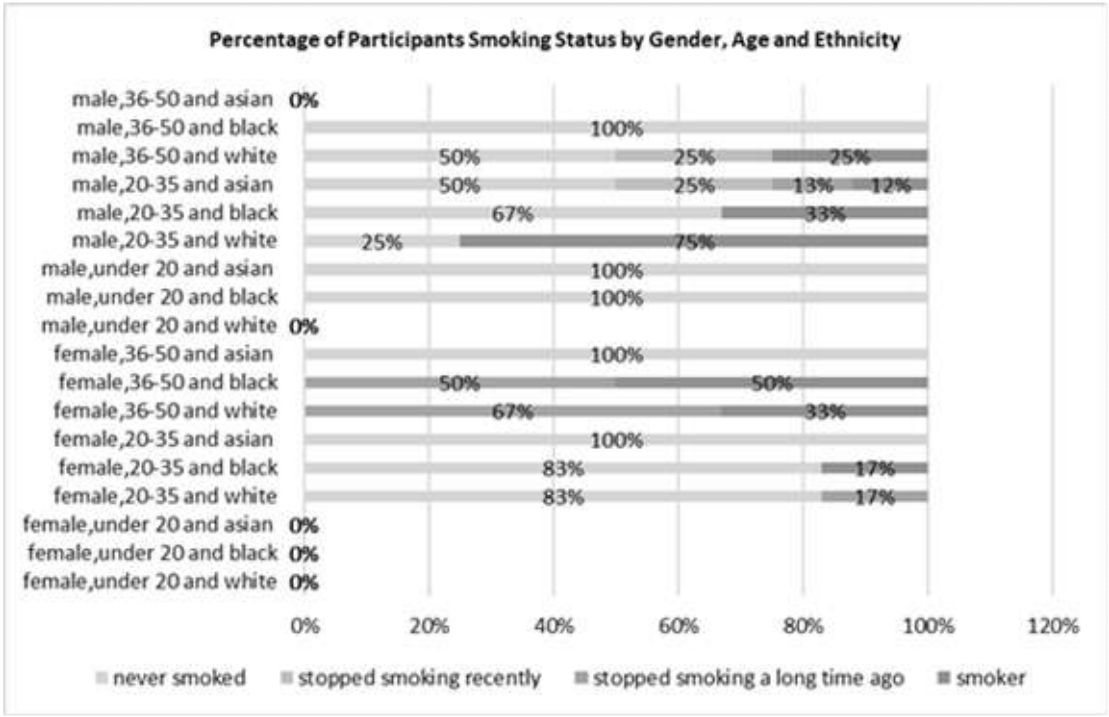


Figure 2.



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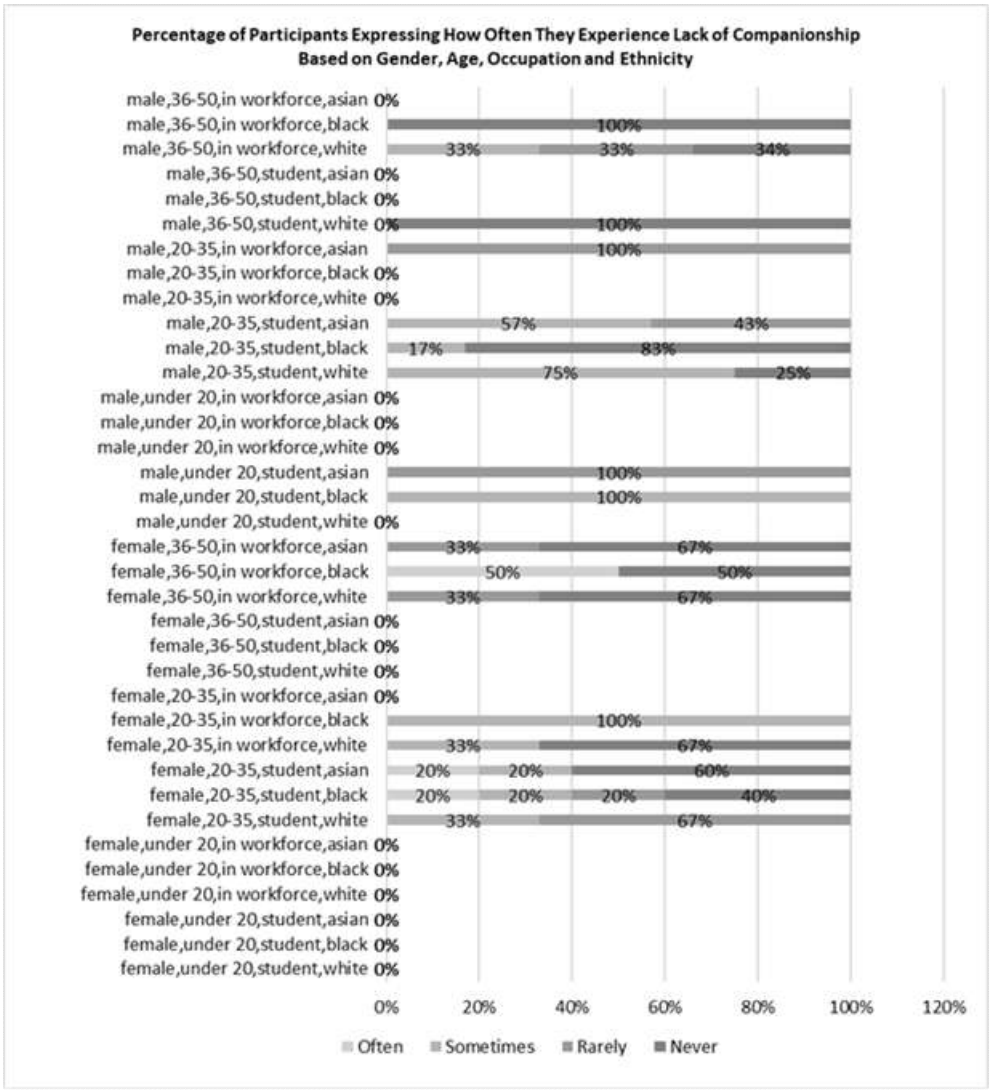

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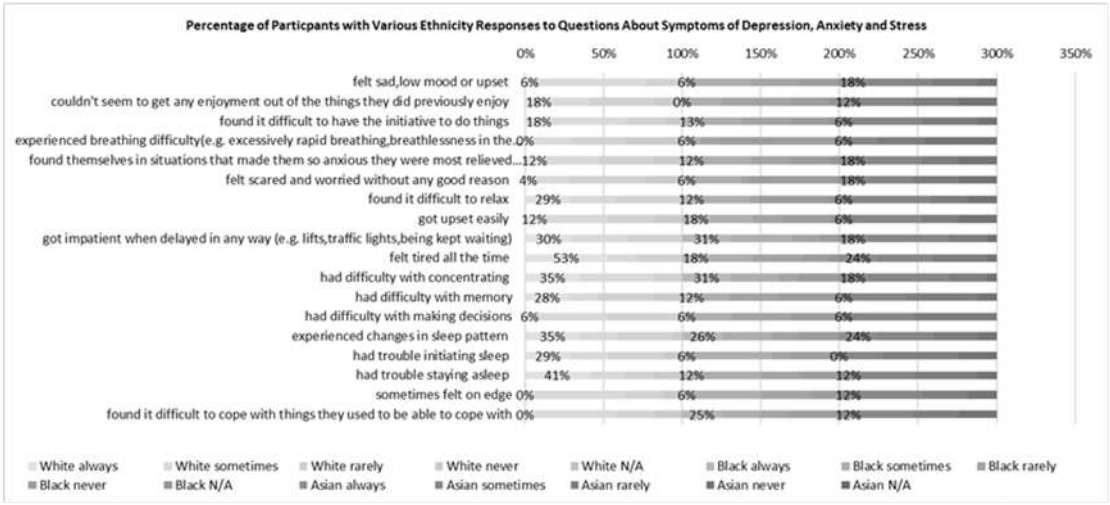

Figure 5.

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