PUBLIC HEALTH RESEARCH

Mental Well-Being Related To Lifestyle and Risky Behaviours in 18-25 Year Old: Evidence from North-East Scotland

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ABSTRACT

Received	12 December 2013
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Introduction	This study assesses the mental well-being of young adults (18-25 year olds), a recognized weight gain time period, in relation to self-reported weight, diet, physical activity and other risky lifestyle behaviours.
Methods	A questionnaire survey was conducted amongst young adults in the North-East of Scotland. Mental well-being was assessed using the Warwick-Edinburgh Mental Well-being Scale. Demographic, diet, physical activity, smoking, alcohol, sexual relations and drug taking factors were investigated. Univariate analyses and generalised linear models explored the most informative factors with respect to mental well-being.
Results	One thousand one hundred and thirteen young adults responded. Lower mental well-being scores were associated with being underweight, those suffering from obesity, snacking habits and for drug takers. Increased physical activity (PA) was linked with better mental well-being even if PA was not enjoyed. Improved mental well-being was also associated with having or having had a sexual partner. Education, smoking and alcohol provided no additional information.
Conclusions	This large cross community study utilised different factors altogether and consequently provides important information on emerging adults. The results indicate that adaptable behaviours (body weight, nutrition, exercise, personal relationships, attitudes towards drugs) affect mental well-being. Future interventions should consider these lifestyles and risky behaviours to promote not only future health but also positive mental health of this often neglected, vulnerable age group.
Keywords	Mental well - being - Lifestyle - Risky behavior - young/emerging adults.

INTRODUCTION

Young adults between the ages of 18-25 years (sometimes termed emerging adults) are at an important transition point when they often undertake less than ideal behaviours such as reduced physical activity (PA), poor diets, risky drug taking and sexual explorations. From a research perspective they are a 'neglected age group' and 'hard to reach' (The Prince's Trust. Reaching the Hardest to Reach, 2004) but are also recognised as being at risk of long-term lifestyle consequences as they 'take over' their own independent living[1].

Just as health and illness in general are determined by multiple and interacting social, psychological and biological factors, so too are mental health and mental illness. Mental, social, and behavioural health problems often interact and affect a person's behaviour and mental well-being[2]. The World Health Organisation consider positive mental health as being the 'foundation for mental well-being and effective functioning for both the individual and the community' and defined it as a state 'which allows individuals to realise their abilities, cope with the normal stresses of life, work productively and fruitfully, and make a contribution to their community'[2]. Hence the link between lifestyle and mental well-being potentially may be critical for this particular age group and their future. Physical activity has been seen to benefit mental well-being in general[3], for young to middle aged working adults[4] and for adolescence[5] as have diet and nutritional interventions[6]. The initiation of a healthy lifestyle for those already with obesity related illnesses is also of benefit with respect to mental well-being for the general adult population[7] and for young adults[8].

At the same time, low mental well-being has been linked with risky behaviour[9] especially excessive alcohol use in young adults[10], smoking in general[11] as well as substance misuse[12] and risky sexual behaviour, in adolescents[13]. However, for many of these behaviours, the direction of causality is uncertain.

The focus of this paper then is to explore the relationship of mental well-being with, not only lifestyle factors (diet, physical activity) and risky behaviours (smoking, sexual, alcohol and drug) but also attitudes and intentions amongst 18-25 year olds using data from a single, extensive population-based lifestyle survey.

METHOD

The study originally was commissioned by NHS-Grampian to determine lifestyle factors amongst 18-25 year olds and was conducted in the North-East of Scotland, some of which have been already reported[14]. Included measures were mental well-being, using the Warwick Edinburgh Mental Well-being Scale (WEMWBS), demographic factors,

lifestyle variables and risky behaviours. These secondary analyses, focused on the mental well-being measure. Guided by a steering group (Community Health Partnership leads for Public Health, Physical activity and Nutrition for NHS Grampian, experts in Public Health, Health Promotion and Sociology, representatives from University of Aberdeen, Robert Gordon University and Aberdeen College, and a Medical Statistician), the original questionnaire was based on the Theory of Planned Behaviour (TPB) and Social Cognitive Theory (SCT), both commonly used for health behaviours[15;16]. Consequently variables also assessing subjective norm, perceived behavioural control and intention along with barriers and facilitators were included in the questionnaire but only for diet and PA.

The questionnaire of 91 questions was sent electronically to all university and college students in the area during 2007-08 since direct access to email addresses for the 18-25 year olds only was denied for data protection reasons. For those not in education, employment or training (NEET), a hard copy of the questionnaire was sent to a 2% random sample of 18-25 year olds (n=1800) in the community (age and gender stratified according to the population) using the Community Health Index (CHI), a computer based population index used by NHS Scotland. Also attached was an information sheet, signed by the director of NHS-Grampian public health, which explained the nature and purpose of the survey along with contact details should further clarification be required. Ethics permission was not required at the time of this study since the work was not on patients, NHS staff or premises. Consent was assumed by the fact that individuals responded. Since some of the students will have been mature and/or postgraduates, not all would have been eligible for this survey, making the target sample size difficult to determine. However, according to the 2001 Census, the projected number of 18-25 year olds resident in the Grampian Health board area in 2007 was N=53,562.

The WEMWBS, the measure used in the Scottish Health Survey, 2012, covers the positive aspects of mental health as determined by WHO and is a tool for monitoring mental well-being at a population level. It was originally developed on students but validated for all adults. The version used here had 14[17] items covering a range of aspects of mental well-being (e.g. I've been feeling relaxed, I have been thinking clearly). Responses are recorded in the form of a 5 point Likert scale 'None of the time'; 'Rarely'; 'Some of the time'; 'Often' and 'All of the time'. While total scores range from 14 to 70, with a higher score reflecting a higher level of mental well-being, the scores here were averaged giving a continuous measure between 1

and 5 per person for easy reference to the original scale.

This paper examines associations with mental well-being, as secondary analyses. A selection of 41 questions from the original survey (91 questions) were determined a-priori depending on their likely relevance on mental well-being determined by an expert panel made up from the original steering group and utilising current literature. The selection was then further refined using a method similar to hierarchical regression. Hence from the Demographic block, age, gender, employment/education status, body mass index (BMI), deprivation, and ethnicity were initially considered. Here BMI was based on self-reported height and weight. Although not sufficient for individual diagnostic purposes, previous work on a similar sample indicated these to be sufficient for assessing trends and general patterns at a population level[18].

The Diet block focused on diet behaviour represented here by the average number of times fruit and vegetables were consumed daily and during the week. These were followed by attitude questions about eating a healthy diet, denoted here by the familiar message of eating '5 a day' and whether they intended to eat '5 a day' (Diet intention). Finally, the average amount of snacks eaten daily was calculated and categorised. Similarly questions in the PA block concentrated on behaviour (the amount of moderate PA each claimed to undertake during a typical week) along with attitudes towards the recommended levels of PA, their intention of being more active (PA intention) and if they felt able to do a sufficient amount of PA (PA perceived behavioural control (PBC)). Note that barriers and facilitators about achieving a healthy diet and adequate PA were not included.

The other factors from the original survey considered were the more risky behaviours. The Smoking block was restricted here to just whether they smoked (behaviour) along with the amount that they currently smoked daily (none for non-smokers) and the age of when they first started to smoke (coded 'never' for non-smokers). Most people in the UK drink alcohol once they reach 18 years old. Hence the Alcohol block focussed on the amount of alcohol consumed by each participant in the last 7 days but was recoded according to categories of low, medium, high as determined by UK Government for men and women, 'The Government's alcohol strategy', March 2012. Also considered were the age of when they were first-ever drunk. In the Sexual Relations block, since some young adults may only just be 18 years old (currently consensual sex at 16 is legal in the UK), the question about if they have ever had sex was selected along with the age they first had sex and then whether or not they have ever had or have a long-term partner. In the block of illicit Drug Taking, it was important to determine whether they had ever taken drugs. This question was verified later in the questionnaire by asking about a non-existing drug, one which anyone who truly used illicit drugs would have recognised as bogus thereby determining the validity of their earlier response. While quantities and varieties were originally asked, it was judged more important to consider the attitudes about taking drugs to see if these were associated with mental well-being (those verified as not illicit drug users were coded 'non-drug taking').

Statistical Analysis: Having selected variables potentially influencing mental well-being, a strategic block approach was undertaken using the blocks described above; Demographics, Diet and PA behaviours and then each of the potentially Risky Behaviours (Smoking, Alcohol, Sexual Relations and Drug Taking). Initially, mental well-being was assessed univariately with each variable using suitable tests (t-tests, ANOVA or non-parametric equivalents where appropriate, or relevant Chi-squared tests). Within each block, significant variables from these univariate analyses were subsequently considered altogether within a block Generalised Linear Model (GLM) subsequently reduced to include only significant variables from that block.

The significant variables from these block models were then pooled into one combined GLM with mental well-being as the response variable Similar to each of the block models the combined model was reduced to finally include only significant variables. All assumptions were checked at each stage.

RESULTS

The survey was conducted in 2007-8. There were 1313 completed questionnaires considered for analysis of which 284 were hard copies (of the 1800 sent out ie 16% response) and the rest were via internet access. This represented around 3% of the Grampian population based on the 2001 Censuspopulation estimate for this age group in the region at the time. It should be noted that the Scottish Health Survey 2012 only surveyed around 0.09% of the Scottish adult population based on the 2012 mid-point estimated Scottish population, interviewing just under 400 young adults. The basic characteristics of this sample group are given in Table 1 (similar results were found for both the hard copy and internet returns).

Table 1 Sample Demographic Characteristics

Gender (n=1282)	Female (73%)
Employment/ education status	% (n=1312)
Full time Student	65
Full time Employed	13
Student & Employed	18
Unemployed	3
Other	1
Age categories	% (n=1313)
18-19	36
20-22	45
23+	19
Ethnicity (n=1307)	Caucasian (94%)
BMI categories	% (n=1212)
Underweight	31
Normal/overweight	62
Obese	7
SES† Deprivation	% (n=1307)
1 (least deprived)	4
2	15
3	15
4	43
5	7
6 (most deprived)	15

† Scottish deprivation 2001[19]
Note varying sample sizes due to missing data

The majority of respondents (94%) were white Caucasian and so ethnicity was not a variable considered any further. Mental well-being overall was relatively normally distributed with the mean (sd) mental well-being score of the whole sample estimated at 3.44 (0.67).

Univariate and Block Generalised Linear Models (GLMs):
Mental well-being was univariately investigated with variables from each block described in the methods section and given in Table 2. Those univariately associated with mental well-being (marked ‡ in Table 2) were then considered together in each block giving a block GLM with average mental well-being as the response variable. Similarly for each block GLM, significant variables (marked †) were assessed using a manual backward step-wise selection process.

For the Demographics Block this process left only 'Age groups' and 'BMI categories'. The Diet Block retained 'Eating '5 a day is'

worthless/worthwhile and the 'Average number of daily snacks'.For the PA Block the 'Amount of moderate PA/typical week' remained as did 'Doing Sufficient PA is' *stressful/relaxing* and *not enjoyable/enjoyable* along with'Can do sufficient PA'. The Smoking Block kept both 'Age category when first smoked' and 'Quantity smoked daily'. Given that none of the alcohol variables were univariately significant they were not considered in the block GLM. From the Sexual Relations and Drug Taking Blocks only the variables 'Have/had a long-term partner' and '*Drughelps you forget problems*' respectively remained in their respective block model.

The significant variables from each of the above block models were put together into a combined GLM and reduced down, again using a manual backward stepwise selection leaving just eight of the variables from several of the blocks (marked * in Table 2).

Table 2 Significance of Variables with Mental well-being in Block and Combined GLMs

Block	‡	†	*
Demographics Block			
Age groups	-	-	-
Gender			
Employment/study status			

BMI categories	n	n	n
SES[a]			
Ethnicity			
Diet Block			
Amount of fruit a day	+		
Amount of vegetables a day			
Eating '5 a day' is :			
unpleasant →pleasant	+		
worthless →worthwhile	+	+	
unhealthy →healthy			
stupid →clever	+		
Would like to eat '5 a day' (intention)			
Average number of daily snacks	-	-	-
Physical Activity Block			
Amount of moderate PA/typical week	+	+	+
Attitudes about doing Sufficient PA[b]			
difficult →easy	+		
stressful →relaxing	+	+	+
not enjoyable →enjoyable	+	+	+
unhealthy →healthy			
Would like to do more PA (Intention)			
Can do Sufficient PA[b] (PBC)	+	+	+
Smoking Block (plus non-smoker category)			
Age category when first smoked	-	-	
Quantity smoked daily	-	-	
Alcohol Block			
Quantity of alcohol (last 7 days)			
Alcohol category (low/medium/high) [c]			
Age category first was drunk			
Sexual Relations Block			
Have you ever had sex			
What age did you first have sex			
Have/had a long-term partner	y+	y+	y+
Drug taking Block (plus non-drug category)			
Have you ever taken drugs	y-		
Attitudes towards Illicit Drug taking:			
You like drugs	y-		
Taking drugs a mature thing	y-		
Drugs help you relax	y-		
Likes the way drugs make you feel	y-		
Drugs helps you to talk to people	y-		
Don't want the feel the odd one out	y-		
Drugs help you forget problems	y-	y-	y-
Feel forced to take drugs	y-		
Drugs helps you dance better	y-		
You need drugs to feel normal	y-		
Unable to stop even if wanted to	y-		

PA: Physical Activity

PBC: Perceived Behaviour Control

[a]   Scottish deprivation 2001[19]

[b]   Moderate intensity Physical Activity for 5 days or more for 30 minutes[20]

[c]   Defined levels for men and women[21]

‡(p<0.05) univariately with Mental well-being

† (p<0.05) in the Block GLM

* (p<0.05) in Combined GLM

+/- Positive/Negative association with Mental well-being

    n   Normal weight: Positive association with Mental well-being
    y+ Yes: Positive association with Mental well-being
    y- Yes: Negative association with Mental well-being

Table 3 Parameters of Final combined Block GLM model, n= 1026

Parameter	each variable (n)	Beta coefficient	p-value
Intercept		3.808	**.000**
BMI			**.026**
Obese	*68*	*-.130*	*.121*
Underweight	*326*	*-.109*	*.015*
Normal/Overweight	*632*	*0*[a]	*.*
Snacks			**.027**
8+	*121*	*-.239*	*.006*
5-7	*373*	*-.140*	*.053*
2-4	*427*	*-.081*	*.253*
1 or less	*105*	*0*[a]	*.*
Moderate PA Behaviour on:			**.020**
0-1 days/week	*238*	*.087*	*.190*
2-4 days/week	*504*	*.145*	*.006*
5-7 days/week	*284*	*0*[a]	*.*
PA is stressful/relaxing			**.001**
Negative	*177*	*-.227*	*.001*
Neutral	*375*	*-.144*	*.005*
Positive	*474*	*0*[a]	*.*
PA is not enjoyable/enjoyable			**.016**
Negative	*146*	*.010*	*.884*
Neutral	*284*	*-.142*	*.009*
Positive	*596*	*0*[a]	*.*
Can do sufficient PA			**.004**
Not confident	*214*	*-.201*	*.001*
Neutral	*213*	*-.071*	*.207*
Confident	*599*	*0*[a]	*.*
Have/had a partner			**<0.001**
No	*322*	*-.165*	*<.0001*
Yes	*704*	*0*[a]	*.*
Drugs help forget problems			**<0.001**
Yes	*110*	*-.274*	*<.001*
No	*361*	*-.048*	*.279*
Non drug user	*555*	*0*[a]	*.*

[a]reference group
GLM: Generalised Linear Model
Adjusted R Squared = .081

The final model with variables and coefficients are shown in Table 3. While the fit of this final model (Adj R^2 = 0.081) is exceptionally poor and would not be used for predictive purposes, it does indicate factors with some association with mental well-being. From this we can see that the extremes of BMI, obese and especially underweight, had a negative impact on mental well-being as did increased numbers of snacks in the day. Feeling positive and confident about exercise had benefits as did having/had a long-term partner. This model has also homed in on 'Drugs help to forget problems'. Note that, attitudes towards drugs were highly multi-collinear (all were univariately significant). As such,

interpretation should be broadened, whereby if an illicit drug user agreed with any of the drug statements then they would be estimated to have a lower mental well-being, compared to a non-illicit drug user.

DISCUSSION

This was a relatively large study (n=1313) specifically conducted on young adults (18-25 year olds), with individuals not only from the further and higher education, but also with a representation from those in the community. It investigates lifestyle and risky behaviours along with mental well-being of young adults using the WEMWBS as a validated measure of positive mental health. This

particular age group, are notoriously difficult to gain information about and most studies attempting to work with them generally are restricted to those in education. A recent (2011) Australian national survey asked 11-24 year olds to rank items from lists about what they valued, what concerned them and where they turned for advice[22]. While this was in response to growing concerns about mental well-being amongst young Australians and was large (n=48,000) it did not link behaviours to mental well-being which was the main address of the current study.

The progression of results through the different level of analysis saw that, of the demographic variables only BMI had any relevance to mental well-being with the extremes, underweight and obesity, seemingly reducing mental well-being. While here the obese group result was not significant, this was probably due to the relatively few (6.8%) suffering from obesity in this age group. For the general population, health related quality of life has been negatively related to both underweight and obese individuals along with gender differences[23]. Women who are underweight often want to lose weight while men want to be more muscular. The impact of obesity on mental health has caused discussion with some believing it to have a strong causal link to reduced mental well-being[7] while others suggesting the evidence is modest or even weak and controversially a recent study[24] even found increased BMI to be positively related to mental well-being.

Of the Diet variables, ultimately the most important with respect to mental well-being was the average number of snacks young adults had daily. Mental well-being declined the more snacks people had particularly at the extreme (8 or more). This may not be surprising since people often claim to 'need' comfort food[25]. The conundrum is what comes first; the snacking inducing lower mental well-being or mood/emotion making you vulnerable to temptation. This is a complex relationship that is both physiological, (perhaps driven by a lack of nutrients which once satisfied induces the body to produce opiates[25]) and psychological with negative emotions either increasing or decreasing food intake depending on the individual (perhaps driven by their predisposition to high or low anxiety traits). While biological explanations are not definitive, it has been noted that those experiencing negative emotions can feel satisfied, happy and relaxed immediately after the consumption of food containing carbohydrates [26].

Having a pro-active reaction towards Physical Activity seems to be important. Those young adults with lower mental well-being also tended to find PA stressful. However, those who did not enjoy doing PA but did it anyway had similar mental well-being to those who did enjoy doing it. The variation was seen for those who were neutral about doing PA, suggesting indifference towards PA or not doing PA could reduce mental well-being in young adults. This indicates that provided the exercise evokes a reaction (not necessarily positive) then partaking in it improves the general psyche. Physical activity has been identified to be a viable tool for enhancing mental well-being across a person's lifespan[27]. Kort-Butler et al[5] concluded that extracurricular activities including physical activity improved self-esteem in a group of adolescents while Yang et al[4] suggested that one benefit of leisure and PA is to help young adults cope with job strain and may play a role in long-term mental well-being.

Attitudes toward drug use were interesting. Those claiming to be illicit drug users (just under half of the sample), did not generally agree with the statement(s) in this survey. However, some did agree stating that drugs helped them in some way. Despite this, their mental well-being tended to be slightly lower. Class A drugs have been seen to induce an array of complex psychological problems[12].

The only variable relating to sexual relations in the final model explaining mental well-being was whether the participant currently had a long term partner or had had one in the past. Having/had a sexual partner was also seen to be important in other studies[22] although, Burris et al, who surveyed predominantly Caucasian university students, found that health states (psychological well-being and distress) were negatively associated with the number of sexual partners[28]. There is also evidence that initiating sex at an early age (13 year olds) could be detrimental[13], particularly for girls.

The final model in this study did not retain any of the smoking or alcohol variables in relation to mental well-being. They were initially included since smoking and alcohol and depression are often associated with each other in the general population and smoking has been negatively associated with mental well-being, poor health, depression and anxiety[11]. This current study was student dominated which may have confounded the results - another study found amongst university students that alcohol use was associated with a positive sense of mental well-being[29].

Major strengths of this study are its size (n=1313, representing around 3% of the target population which is larger than national surveys), the heterogeneity of the participants, and the ability to analyse the different factors together in one study. While based in the North-East of Scotland this study could have relevance for other similar communities. A recognised weakness is the inability to truly report the response rate (unknown for the internet based responses and 16% for the hard copy returns). It should be noted however, that response rates for studies in this age group are

notoriously low – hence their reputation of being hard-to-reach. The survey actively sought to include those in education, those in employment and those in neither, nonetheless there is uncertainty about the representativeness of the sample. Certainly women are over represented and it is possible that those with low mental well-being may not have responded at a similar rate to the rest. As a consequence our results should be used with caution as indicators rather than true predictors of the associations.

Another limitation is that BMI was calculated from self-reported weights and heights. While these are not wholly reliable for individual diagnostic purposes, it was felt that they would be sufficient for assessing trends and general patterns at a population level[18]. While weight and height can have gender biases, together as BMI these tend to cancel each other out.

Originally there were 91 questions in the original questionnaire. These were considered prior to analysis and only the most pertinent to mental well-being selected. Although the original questionnaire was grounded using theoretical concepts these were mainly in relation to diet and physical activity. Some of these have been considered like the behaviour, intention, perceived behaviour control and attitudes for diet and PA. However, the variables relating to the barriers and facilitators specifically related to diet and PA and thus were not taken into account since they did not relate directly to barriers and facilitators of mental well-being.

While ethnic groups disparities have been reported with respect to mental well-being[30] this was not a factor in this particular study and could not be investigated with the participants being predominately white Caucasian.

CONCLUSIONS

This study provides an important body of information on the emerging adult group based on a large sample across the community in North-East Scotland, the evidence of which could have relevance for other similar communities. It further describes and evaluates lifestyle factors and their associations with mental well-being considering these different factors altogether in one study.

While the final model using these lifestyle and risky behaviours cannot accurately predict mental well-being it does provide more insight into how lifestyle aspects inter-relate to mental well-being. These were mostly adaptable behaviours to be included in future lifestyle behaviour control interventions with multiple approaches (to address body weight, nutrition, exercise, personal relationships, attitudes towards drugs). Such an approach would promote not only future health but also positive mental health.

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