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Health inequalities, risky behaviours and protective factors in adolescents: an analysis of secondary survey data from the UK

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ABSTRACT

Objective: Adolescents are at risk of developing detrimental health behaviours that will affect their adult health. The aim was to estimate prevalence of health risk behaviours (HRB), comparing young people (12–18 years old) in Wiltshire (UK) who are vulnerable (looked after children, special education needs and disabilities, young carers and military dependents) to those who are not vulnerable and assess whether these behaviours are associated with protective factors (e.g. friendship groups).

Study design: Secondary analysis of cross-sectional survey data ($n = 4129$).

Methods: In total, 900 vulnerable young people were compared with 3229 non-vulnerable young people. Differences between the two groups were assessed using Chi-squared tests, and associations with possible protective factors were assessed using logistic regression (adjusting for confounding factors).

Results: Vulnerable young people have a higher prevalence of smoking tobacco (15% vs 9%, $P < 0.001$), using cannabis (7% vs 5%, $P = 0.03$) and self-harming (16% vs 9%, $P < 0.001$) monthly or more compared with the rest of the Wiltshire adolescent population. Whilst vulnerable young people have many shared protective factors with non-vulnerable young people, there are also differences between the two groups.

Conclusions: There are shared protective factors across HRB that can build on the resilience of a young person, impacting their current and future health. Therefore, we should focus our attention on developing protective factors that promote health and well-being, not solely delivering specialist interventions targeted at specific risks. Further consideration should be given to identifying and promoting protective factors specifically for vulnerable people as they have higher levels of HRB and experience protective factors differently.

Abbreviations: ASD, Autism Spectrum Disorder; BME, Black or minority ethnic; HRB, health risk behaviours; LAC, looked after children; SEND, Special Educational Needs and Disabilities; SES, socio-economic status.

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Introduction

The general trend observed in health risk behaviours (HRB) in adolescents is that they are falling.[1,2] However, there are concerns that this is not the case for certain vulnerable groups and that in general, self-harm, physical inactivity and unhealthy eating levels are rising.[2,3] Because adolescence is a point in the life course when young people are at risk of developing detrimental health behaviours that will affect their adult health,[2] this lack of improvement in the health of the most vulnerable adolescents leads to a health inequality that may widen during young adulthood and continue to grow throughout the life course, ultimately leading to inequalities in life expectancy.[4]

Five out of 10 significantly detrimental HRB—smoking tobacco, drinking alcohol, unsafe sex, physical inactivity and being overweight—are developed during adolescence, yet are still modifiable, and therefore, there is the opportunity to prevent the development of non-communicable diseases which have significant burden of disease and can lead to premature death.[2] Literature on preventing the development of HRB in adolescence describes the importance of building resilience and protective factors and preventing a young person's exposure to adverse childhood experiences.[2,5–7] There is evidence of a link between low socio-economic status (SES) and HRB[8] and outcomes[9] in adolescents. However, SES as a construct is not useful for the purposes of targeting resources and interventions at young people who most need them and does not capture the full range of experiences that predispose to vulnerability. It is important to continue to explore the factors that can make young people vulnerable to developing poor health, particularly focussing on ways that enable us to target resources and interventions at young people who most need them.

There is currently limited evidence on how other categories of young people that are currently used in education, social care, health and by other professional groups such as looked after children (LAC), young carers and children with special educational needs and disabilities (SEND) experience HRBs. It is commonly recognised that the health and educational needs of children in care are different from and greater than many other groups of children and young people,[10] and concerning levels of health problems are often found in research conducted on children and adolescents in foster care.[11] A quarter of young women leaving care are either pregnant or young mothers, and almost half of young women are pregnant within 18–24 months of leaving care.[12] Whilst research exists on the impact of being a carer on the day-to-day lives of young people, we are not aware of studies looking at prevalence of HRB in this group. Unsurprisingly, young carers were found to experience more stress and anxiety than young people without caring responsibilities,[13] and studies have found that young carers are more likely to have problems sleeping and increased levels of self-harm.[14] A survey of 3198 participants from the UK armed forces found that 51% of service personnel perceived their military career as having a negative impact on their children.[15] While military dependents are reported to have similar to lower rates of HRB,[16] research from the United States found that a parent's deployment leads to higher rates of anxiety and depressive symptoms in children.[17] Although the government code of practice into supporting the health of young people with SEND states that '*For too long, health has been the missing partner in the SEND system*',[18] there is little epidemiological evidence about HRBs among these young people. Similarly, Blum et al.[19] noted the lack of research on the subject of disability and HRB. They conducted an analysis of data from the US National Longitudinal Study of Adolescent Health, including the associations between five HRB and the protective factors of school and home. They discovered that disabled young people were exposed to significantly more HRB and significantly fewer protective factors.

This study will provide a greater understanding of the wider determinants of adolescent health behaviours and the relationships that exist between vulnerability, health behaviours and protective factors, such as friendship groups, to enable decision-makers and practitioners to work more effectively to reduce HRBs amongst adolescents.

Methods

Research design

This is a secondary analysis of the data collected by the Wiltshire Pupil Health and Well-being Survey, referred to as 'the survey'. This survey is commissioned by Wiltshire Council, UK, to capture the voice and experience of young people and inform commissioning and service development. It is currently run every 2 years. This research uses the data captured in 2015.

Participants

The survey was offered to all Wiltshire secondary schools and Further Education Providers.[20] In total, 64 schools and colleges across Wiltshire in 19 of the 20 community areas took part, and from these schools and colleges, a total of 6912 pupils completed the survey. Our sample comprises the 4129 who were aged 12–18 years (in school years 8, 10 and 12).

Health risk behaviours (Outcome variables)

The survey included questions on the following HRBs: smoking tobacco, using cannabis, self-harming and drinking alcohol. These represent the key health risks in adolescence[2,3,9,11] and are among the top 10 risk factors that cause the greatest burden to the health of the UK population.[21]

Protective factors (exposure variables)

A literature review informed the conceptual model for the study (Fig. 1). The exposure variables were identified from the literature review as factors associated with HRBs that were available in the survey data; they were bedtime, eating breakfast, club participation, enjoyment of school, friendships, physical activity and trying at school. Some factors identified in the literature review, such as strength of family relationships and healthy diet, were not available in the survey.

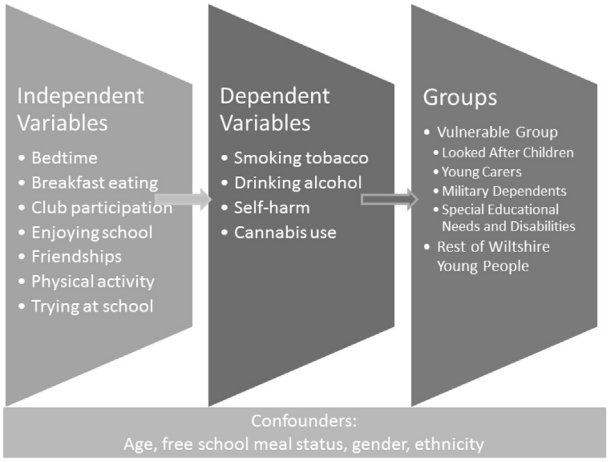

Fig. 1 – The conceptual model developed for this research.

Confounders

Potential confounders (described in Fig. 1) were identified from the literature. Age was recorded as an integer (12, 13, 14, 15, 16, 17, or 18 years) and treated as a continuous variable. All confounders were categorical—free school meal status (receives, does not receive), gender (female, male) and ethnicity (white British, other).

Vulnerable groups

A local HRB prevalence report[22] was used to identify vulnerable groups who might experience higher than average HRB. These were LAC, young people with SEND, young carers and military dependents. Any young person who did not identify as belonging to one of these groups was assumed to belong to the comparison 'non-vulnerable' group.

Ethics

The study was approved by the Health and Applied Sciences Faculty Research Ethics Committee at the University of the West of England and was conducted in line the Information Governance Policies of Wiltshire Council, who own the survey data.

Data analysis

Data were analysed using SPSS v19[23] and Excel 2010, using pairwise exclusion to deal with missing data. Demographics of the sample were described. Histograms were used to check for normality of continuous variables.

Chi-squared tests were used to test for differences in HRBs comparing vulnerable and non-vulnerable (the rest of Wiltshire) young people. Confidence intervals were also calculated for the prevalence of HRB in these groups. Multivariate logistic regression models were run for each HRB. The regression models included all of the protective factors of interest, mutually adjusted, to ascertain whether they were associated with HRB. In addition, categorical variables for potential confounders (gender, age category and ethnicity[24]) were added to the model. Being in receipt of free school meals was also added as a potential confounder as the only available proxy measure for SES. R-square values were used to assess model fit, and odds ratios (ORs) (with 95% confidence intervals) described the size of the association between the predictor variables (protective factors) and each HRB.

Results

The sample of 4129 young people in Wiltshire aged 12–18 years who responded to the survey represent 10.1% of the 40,788 young people aged 12–18 years in Wiltshire.[25] Table 1 describes the sample by gender, ethnicity and age. Of the sample of 4129 young people, 13.3% reported being from a Black or Minority Ethnic (BME) group, compared to 7% of this age group for the total Wiltshire population.[25] The sample is therefore over representative of the BME population in Wiltshire. Wiltshire's BME population is 3.4% compared with 14.6% for England and Wales.[25] Of the survey respondents, 8% were in receipt of free school meals, which is identical to the percentage in the Wiltshire Schools Census,[26] so the sample is representative in this regard. Nationally in 2018, 12.4% of the secondary school population were in receipt of free school meals.[40]

Table 2 gives the prevalence of HRBs for vulnerable young people and non-vulnerable young people (the rest of the population of young people living in Wiltshire). Chi-squared tests of association are also shown. There is strong evidence that vulnerable young people are more likely than the rest of the Wiltshire population to smoke tobacco, use cannabis and self-harm monthly or more.

Table 3 shows adjusted ORs for the associations between protective factors and HRBs within the two different groups (vulnerable and non-vulnerable). Of the protective factors considered, club participation was the only one that did not show evidence of a relationship with HRBs.

On the whole, the patterns of relationship between protective factor and HRBs are similar in the vulnerable and non-vulnerable groups. However, comparison of ORs suggests that certain factors which are strongly protective in the non-vulnerable population have an even greater protective effect for vulnerable young people. For example, eating breakfast reduced the odds of self-harm in the non-vulnerable group by 66% (OR = 0.34, P = 0.00) but reduced the risk even further to 80% in the vulnerable group (OR = 0.20, P = 0.00).

There were also two instances where the vulnerable group appears to have additional protective factors not experienced by the non-vulnerable group—eating breakfast reduced the odds of cannabis use by 83% in the vulnerable group (OR = 0.17, P = 0.00), but there was no evidence of an effect for the non-vulnerable group (OR = 0.82, P = 0.62). Similarly, friendships were a protective factor for self-harm in the vulnerable group with a 69% reduction in the odds of self-harm (OR = 0.31, P = 0.00), but there was much weaker evidence of a relationship for the non-vulnerable population (OR = 0.69, P = 0.09).

Conversely, in three instances, there was no evidence of an effect in the vulnerable groups where there was evidence of an effect in the non-vulnerable group—trying at school was associated with a 64% reduction in the odds of tobacco

Table 1 – Demographics of the sample.

Groups	Total sample	Median age	White British	Other ethnicity	Male	Female
	N (% of sample)	Years	N (% of group)	N (% of group)	N (% of group)	N (% of group)
Total sample	4129 (100%)	14	3579 (87%)	550 (13%)	1789 (43%)	2340 (57%)
Vulnerable[a]	900 (22%)	15	757 (84%)	143 (16%)	421 (47%)	479 (53%)
LAC	98 (2%)	15	69 (70%)	29 (30%)	45 (46%)	53 (54%)
Young carer	232 (7%)	14	190 (82%)	42 (18%)	85 (37%)	147 (63%)
SEND	400 (10%)	15	349 (87%)	51 (13%)	235 (59%)	165 (41%)
Military dependent	326 (8%)	14	266 (82%)	60 (18%)	136 (42%)	190 (58%)
Rest of Wiltshire	3229 (78%)	14	2822 (87%)	407 (13%)	1368 (42%)	1861 (58%)

LAC, looked after children; SEND, special educational needs and disabilities.
[a] The vulnerable category comprises LAC, young carers, SEND and military dependents.

smoking (OR = 0.36, P = 0.00) and a 42% reduction in the odds of self-harm (OR = 0.58, P = 0.02) and enjoyment of school indicating a 47% reduction in the odds of alcohol consumption (OR = 0.53, P = 0.02).

Free school meals uptake was associated with risks experienced by the non-vulnerable group, but with no significant risks found in the vulnerable group—a 63% reduction in the odds of self-harm (OR = 0.37, P = 0.05) and a 2-fold increase in risk of odds of tobacco smoking (OR = 2.11, P = 0.04).

Discussion

Current research on inequalities in adolescent HRB focusses on SES, and no consistent pattern has been established across HRBs.[9] We have taken a novel approach by considering HRBs amongst specific groups of vulnerable young people—being a looked after child, young carer, having a SEND or being a military dependent. Vulnerable young people in our sample have a higher prevalence of smoking tobacco, using cannabis and self-harming (monthly or more) compared with those in the rest of the population. There was however no strong evidence of a difference between the two groups in the prevalence of drinking alcohol. The finding of an association between smoking prevalence and vulnerability is consistent with previous research which has linked lower SES to increased levels of smoking.[9,27] Associations between SES and self-harm have also been found in previous research,[28] and the current analysis found a notable difference in the prevalence of self-harm between vulnerable and non-vulnerable young people. Levels of self-harm amongst young people are believed to be increasing,[29,30] and these results suggest a significant health inequality for certain groups of young people. We found that vulnerable young people are self-harming almost twice as much as those in the rest of the population. Cannabis use has been found in previous research to be linked to higher SES.[27] However, our analysis suggests that vulnerable young people use cannabis more than the rest of the population of young people.

Earlier bedtime and eating breakfast were both associated with a reduction in all of the HRBs of interest for both vulnerable and non-vulnerable young people. Eating breakfast has been found in previous research to have a significant relationship with a reduction in smoking.[31] There is little research on the impact of lack of sleep on HRBs; however, sleep has previously been linked to mental and emotional problems.[32] Whilst the logistic regression models used in this study adjusted for several confounders, it is likely that the association between both early bedtime and eating breakfast and HRBs is very complex and affected by variables that were not measured. Therefore, whilst both factors have intrinsic qualities necessary for good health, they could also be proxies

Table 2 – Proportion of young people who participate in HRB.

Group	Does participate in HRB		Does not participate in HRB		Total who answered the question (n)	χ^2_1 (continuity correction)	P-value
	n (%)	95% CI	n (%)	95% CI			
Alcohol (weekly or more)							
Non-vulnerable	316 (11.4%)	10.3%–12.6%	2448 (88.1%)	87.4%–89.8%	2764		
Vulnerable	104 (13.3%)	11.0%–17.7%	676 (88.6%)	84.3%–89.1%	780	1.93	0.17
Cannabis (monthly or more)							
Non-vulnerable	162 (5.3%)	4.5%–6.0%	2921 (94.7%)	94.0%–95.5%	3083		
Vulnerable	63 (7.3%)	5.6%–9.1%	798 (92.7%)	90.9%–94.4%	861	4.95	0.03
Tobacco (monthly or more)							
Non-vulnerable	274 (8.8%)	7.8%–9.8%	2849 (91.2%)	90.2%–92.2%	3123		
Vulnerable	134 (15.4%)	13.0%–17.8%	738 (84.6%)	82.2%–87.0%	872	31.60	0.00
Self-harm (monthly or more)							
Non-vulnerable	209 (9.2%)	8.0%–10.4%	2059 (90.8%)	89.6%–92.0%	2268		
Vulnerable	107 (16.0%)	13.2%–18.8%	562 (84.0%)	81.2%–86.8%	669	24.02	0.00

HRB, health risk behaviour; CI, confidence interval.

Table 3 – Odds ratios for protective factors and HRB for Vulnerable and Non-vulnerable groups, adjusted free school meals status, age, gender and ethnicity.

Protective factors	Health Risk Behaviours			
	Smoking [OR (95% CI)]	Alcohol [OR (95% CI)]	Self-harm [OR (95% CI)]	Cannabis [OR (95% CI)]
Bedtime				
Non-vulnerable	0.42[b] (0.24 – 0.73)	0.41[b] (0.25 – 0.68)	0.56[a] (0.34 – 0.93)	0.31[b] (0.15 – 0.65)
Vulnerable	0.38[b] (0.19 – 0.74)	0.36[b] (0.17 – 0.80)	0.47[a] (0.23 – 0.97)	0.35[a] (0.15 – 0.82)
Eating breakfast				
Non-vulnerable	0.40[b] (0.23 – 0.70)	0.57[a] (0.34 – 0.93)	0.34[b] (0.22 – 0.53)	0.82 (0.38 – 1.76)
Vulnerable	0.16[b] (0.8 – 0.35)	0.30[b] (0.13 – 0.71)	0.20[b] (0.09 – 0.42)	0.17[b] (0.06 – 0.47)
Club participation				
Non-vulnerable	0.62 (0.35 – 1.12)	0.84 (0.51 – 1.38)	0.98 (0.62 – 1.56)	0.50 (0.23 – 1.11)
Vulnerable	0.64 (0.31 – 1.31)	0.65 (0.27 – 1.55)	1.48 (0.72 – 3.04)	0.72 (0.29 – 1.80)
Enjoyment of school				
Non-vulnerable	0.59 (0.31 – 1.15)	0.53[a] (0.30 – 0.91)	0.42[b] (0.25 – 0.72)	0.84 (0.36 – 1.98)
Vulnerable	0.67 (0.31 – 1.44)	0.51 (0.20 – 1.33)	0.36[a] (0.15 – 0.83)	1.36 (0.52 – 3.58)
Friendships				
Non-vulnerable	1.43 (0.83 – 2.46)	1.08 (0.66 – 1.75)	0.69 (0.45 – 1.06)	1.24 (0.60 – 2.57)
Vulnerable	1.01 (0.53 – 1.92)	2.08 (0.94 – 4.62)	.31[b] (0.16 – 0.62)	1.23 (0.53 – 2.81)
Physical activity				
Non-vulnerable	1.02 (0.59 – 1.79)	1.86[b] (1.13 – 3.06)	0.83 (0.52 – 1.32)	2.45[a] (1.16 – 5.18)
Vulnerable	1.02 (0.52 – 2.00)	1.02 (0.45 – 2.31)	1.81 (0.89 – 3.68)	1.78 (0.72 – 4.15)
Try at school				
Non-vulnerable	0.36[b] (0.21 – 0.62)	0.70 (0.42 – 1.16)	0.58[a] (0.37 – 0.92)	0.20[b] (0.09 – 0.43)
Vulnerable	0.56 (0.28 – 1.11)	0.58 (0.26 – 1.27)	1.07 (0.53 – 2.16)	0.35[a] (0.15 – 0.84)

[a] p-value ≤0.05.
[b] p-value ≤ 0.01.

for other factors that determine health behaviours, such as stable home routines and good parenting. The absence of these factors may be an indicator of the quality of a young person's home life, and in turn, this environment is likely to impact upon their health. Friendship was associated with a reduction in the odds of self-harming of 70% for this group, one of the largest associations found in this study. The quality of friendship groups has previously been found to be associated with mental health.[33] However, it has also been found that increased time with friends increases engagement in HRB.[34]

Previous research has revealed that participating in clubs reduces HRBs, although some clubs were found to increase the risk of drinking.[35] We found no evidence of an association between club participation and HRBs when the vulnerable and non-vulnerable populations were looked at separately. However, we found that physical activity increased the odds of drinking alcohol for the non-vulnerable group. A previous study has found that physical activity reduces the risks of drinking alcohol.[36] Additionally, we found that physical activity is associated with a large increase in the odds of cannabis use for the non-vulnerable; this association has not been reported by other studies. Future research should further investigate the mechanisms by which physical activity is associated with alcohol use (such as sports clubs) and seek to replicate our finding regarding physical activity and cannabis use.

Trying at school, also described as school conscientiousness, has previously been found to reduce alcohol drinking and smoking.[37] This study found that trying at school was negatively associated with smoking, self-harm and cannabis use for the non-vulnerable population and cannabis use for vulnerable young people, although the direction of causation cannot be determined.

Our findings highlight the importance of focussing on factors other than SES or income when describing inequalities in HRBs in young people. Whilst vulnerable young people share many protective factors with the rest of the population, some important differences were identified, which will allow interventions to be targeted.

Strengths and limitations of this study

We used a large and representative data set to study HRBs in vulnerable groups of young people who are often overlooked, such as LAC and young carers. Because the data used were cross-sectional, causation cannot be inferred. Additionally, the relationships under investigation are very complex, and although we controlled for common confounders, the literature suggested other potential confounders such as quality of relationships with family and school attendance, for which we did not have data. The survey data are self-reported; the data may therefore be subject to reporting bias with participants either under- or over-reporting HRBs. Missing data were dealt with using pairwise deletion to maximise power, but this may have led to underestimates or overestimates of standard errors.

The vulnerable group comprised young people who are in LAC, young carers, military dependents and who have SEND. This is not a homogenous group, and the experiences within it differ greatly. Whilst there is plausible reasoning and a mixed evidence base to support the consideration of LAC, young

people with SEND and young carers as being at risk of poorer outcomes (the definition of 'vulnerable' adopted for this research), there is less evidence to support the suggestion that military dependents are vulnerable. A previous report, based on the survey data used here, suggested that Wiltshire military dependents experience a higher prevalence of HRB,[38] though the findings were not statistically significant. The literature review did not find any evidence of increased HRB or poor health outcomes in military dependents, except for research from the United States which found increased experience of depression linked to parental deployment. Including military dependents in the vulnerable group may therefore have 'diluted' the strength of associations in this analysis.

Finally, the survey was carried out in Wiltshire, a rural county in England with some small and large towns and one small city. It has pockets of both deprivation and affluence. While the findings are only generalisable to other similar populations, the conclusions are likely to have some relevance to practice in a wide range of settings.

Implications for practice

This research has shown that vulnerable young people experience inequalities in HRBs that need to be addressed in public health practice. While the theory that promoting resilience equips young people to deal with risk-taking is widely accepted,[39] services to reduce HRB currently tend to focus on reducing individual behaviours in isolation. For example, smoking prevention programmes may focus on social norming or ensuring young people understand the harms of tobacco. We found evidence of protective factors that are associated with reductions in HRBs. These may be important for developing a young person's resilience and thereby reducing the experience of multiple HRB, which can have a significant impact on current and future health. Furthermore, there was some evidence that vulnerable young people may respond differently to protective factors, and this needs to be considered when developing prevention strategies and interventions to reduce adolescent risk-taking behaviours. Future research should perform similar analyses using data from large birth cohort studies that have prospectively measured protective factors and risk behaviours, assessing relationships for the various subgroups of vulnerable young people separately, considering populations (e.g. urban/rural) and including other potential protective factors such as strength of family relationships.

Conclusion

Comparing vulnerable young people with the rest of the population, we have found a significant inequality in the experience of HRBs. The vulnerable group were at greater risk of using cannabis and tobacco and of self-harming. This highlights the need to respond to these health inequalities. We have also found protective factors that are associated with a reduced risk of these behaviours for both the vulnerable group and the rest of the population. There are many factors that can build resilience and reduce HRBs, which can have a significant impact on current and future health. It is well known that adolescent risk behaviours cluster together; this research suggests that these risk behaviours share proximal determinants of health and therefore public health interventions for adolescence need to focus on promoting general health and well-being, not solely delivering specialist interventions targeted at specific risks.

Author statements

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Ethical approval

The study was approved by the Health and Applied Sciences Faculty Research Ethics Committee at the University of the West of England and was conducted in line the Information Governance Policies of Wiltshire Council, who own the survey data.

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Competing interests

None declared.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.puhe.2019.03.001.