Steps Towards Alcohol Misuse Prevention Programme (STAMPP): A test of long term effectiveness

SHORT REPORT

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EVIDENCE BRIEF

Why did we start?

STAMPP was a cluster Randomised Controlled Trial (cRCT) of a school-based alcohol-harm reduction programme combined with a community-based, Brief Intervention for parents. The intervention aimed to reduce the numbers of adolescents engaging in risky alcohol consumption (heavy episodic drinking, HED), and reduce the physical and social harms associated with that drinking. The cRCT (ISRCTN47028486), which was conducted in Northern Ireland and Scotland, demonstrated that the intervention had significantly reduced the numbers of teenagers engaging in HED, compared against schools offering normal health education, at around one year after the programme ended (Sumnall et al., 2017). However, no differences in the number (variety) of alcohol-related harms (ARH) were observed between control and intervention schools within the original STAMPP trial. While the combined intervention was effective (and cost effective) in reducing the numbers of adolescents engaging in early onset HED, little is known about its long-term effects. In light of this, we set out to test the long term effect of the combined school and parental intervention (at three and four years after it ended).

What did we do?

We contacted the schools that originally participated in the STAMPP trial and invited them to participate in additional data collection sweeps. A further two annual rounds of data collection (T5 – school year 13, +57 months post baseline and T6 – school year 14, +69 months post baseline) were undertaken. The T5 and T6 sweeps represent the final year of secondary education in Scotland (T5) and in Northern Ireland (T6). Data were collected on the study's two primary outcomes (HED and ARH), as well as a range of secondary outcomes and additional covariates (potential mediators and moderators). We replicated the outcome analysis specified in the original STAMPP protocol and data analysis plan, at the two new endpoints (T5 and T6). In addition, some analysis of secondary outcomes was also undertaken.

What answer did we get?

The intervention reduced the prevalence of HED amongst adolescents by around 9 percentage points at one year after the programme was completed, when compared against standard health education (17% vs 26%; OR=0.60, 95% CI 0.49 to 0.73). However, these differences were not observed at either T5 (around 3 years after the completion of the programme) or T6 (around 4 years after the completion of the programme). While the positive effect of the intervention was sustained for around one year after all components of the programme were completed, this effect dissipated over subsequent years. The intervention delivered a substantive reduction in the numbers of young people engaging in HED over the short to medium term, but this effect reduces over the longer term, as participants grow older. No differences were observed in the pupils' reports of ARH between intervention schools and control (Education as normal, EAN) schools across all study end points (T3, T5, and T6).

What should be done now?

STAMPP is one of the few school-based alcohol prevention trials that has demonstrated a positive intervention effect on adolescent risk behaviour, and one that is inexpensive to deliver and cost effective. However, given that the intervention is very brief (it consists of only 10 school lessons over two academic years and a parents' evening), it is perhaps not surprising that its impact eventually dissipates as adolescents approach the legal age for alcohol consumption. Given that intervention is one of the few school-based prevention programmes with a demonstrated evidence base, we would recommend that it is rolled out across schools in Northern Ireland. The inclusion of booster/top up sessions in the years following the delivery of the initial 10 lessons may ensure that the positive reduction in risky adolescent drinking is preserved over the longer term.

Background

The consumption of alcohol by adolescents remains a public health concern. Globally, alcohol use is the leading risk factor for disability adjusted life years (DALYs) in 15-19 year olds (Mokdad et al., 2016). Although the overall proportion of adolescents drinking alcohol in the UK has declined in recent years, alcohol-related health harms remain high (Healey, Rahman, Faizal, & Kinderman, 2014). Given that those who report early initiation of alcohol intoxication are more likely to report adverse alcohol-related outcomes in young adulthood (Kuntsche et al., 2013; Maimaris & McCambridge, 2014; Morean et al., 2014), it is all the more important that interventions which target adolescent alcohol use are carefully evaluated, and that any possible main and moderated intervention effects are understood.

The Steps Towards Alcohol Misuse Prevention Programme (STAMPP; Sumnall et al., 2017) was a cRCT that compared the effects of a combined, culturally adapted intervention based on the School Health and Alcohol Harm Reduction Project (SHAHRP; (McBride, Farringdon, Midford, Meuleners, & Phillips, 2004; McKay, McBride, Sumnall, & Cole, 2012), and a researcher-developed parental Brief Intervention based on the Swedish Örebro Prevention Program (Koutakis, Stattin, & Kerr, 2008), in Intervention Group schools, against health EAN (Control Group schools). The version of SHAHRP used in the STAMPP study had been tested previously in the Northern Irish context (McKay et al., 2012). The parental component for the parents of children who were concurrently in receipt of the classroom intervention, and has been previously detailed elsewhere (Sumnall et al., 2017).

The STAMPP study was conducted in the context of a literature which evidenced very little behavioural change success for classroom-based universal prevention programmes. Indeed, reviews of the literature had not only cited the lack of impact as an issue, but also the lack of high quality trials (Faggiano et al., 2008; Foxcroft & Tsertsvadze, 2011). However, despite these misgivings, there is a widespread recognition that interventions which develop social skills appear to be superior to those that seek to enhance only knowledge (Faggiano et al., 2008). While the literature evidencing the short-term impact of universal prevention programmes is sparse, that examining their longer-term (+3 years or more) impact is almost completely lacking.

Foxcroft and colleagues (2003; 2012) reviewed universal school-based alcohol prevention interventions studies that included 0-3+ years follow up. For those studies which had a 3+ year follow up, the Strengthening Families Programme (SFP) showed positive, albeit modest, effects up to 4 years after delivery and showed significant effects on lifetime use, lifetime drunkenness, and using alcohol without permission. While Foxcroft et al (2003; 2012) concluded that the SFP was a promising approach, subsequent evaluations have failed to replicate the longer-term impact (Skärstrand, Sundell, & Andréasson, 2013) with some evidence of a "decline effect" (Gorman, 2017). Foxcroft and Tsertsvadze (2012) reported that Life Skills Training showed reduced self-reported drunkenness at + 6 years, although the effect size was small, and trials of the Good Behavior Game in the USA have shown a reduction in alcohol use disorders at age 19-21 (see also Kellam et al., 2011). This programme is delivered to children in the first grade, age 6-7 years old, so incorporated follow up of around 12 years. However, in Dutch school children, whilst use of tobacco was reduced at ages 10 and 13, there were no long term effects on use of alcohol (van Lier, Huizink, & Crijnen, 2009).

Newton and colleagues (2017) reviewed combined school and parental alcohol prevention programmes. They identified nine effective programmes (delaying or reducing alcohol use) with follow up times from post-test to 72 months. Extending the findings of Foxcroft et al (2012), they concluded that the SFP was effective up to 72 months in reducing lifetime alcohol use, whilst lifetime drunkenness was reduced only at 48 months. In a Dutch study, (Koning et al., 2009) reported that the Preventing Heavy Alcohol Use in Adolescents (PAS) showed effects in reducing onset of heavy weekly alcohol use at 10-months, but not at 22 or 34 months. Foxcroft et al. (2012) also reported that the Adolescent Transition Programme was effective in reducing growth of alcohol use up to 60 months from baseline (Connell, Dishion, Yasui, & Kavanagh, 2007), while Champion and colleagues (2013) reviewed computer- and internet-based prevention programmes for schools and did not identify any additional studies with long term outcomes.

The STAMPP trial involved 70 post-primary schools in Northern Ireland and a further 35 post-primary schools in Glasgow and Inverclyde. The intervention was a combination of a universal school-based alcohol intervention (SHARHP, which is currently being delivered in Northern Ireland based on our previous work in Belfast) and a parental intervention. In the STAMPP trial, questionnaires were administered to participants at baseline (June 2012) and at three follow-ups: +12 months, +24months, and primary outcome analyses were performed on data gathered at +33 months from baseline, at least 10 months after the intervention had been implemented. The +33 month primary outcome analysis demonstrated that when STAMPP was compared to EAN in both a Scottish and Northern Irish context, pupils in control schools (in receipt of EAN) reported significantly higher rates of HED in the past month (Primary outcome #1) than pupils in the intervention (STAMPP) schools. However, the study arms (EAN vs STAMPP) did not differ significantly in terms of the number of ARH reported in the previous six months (Primary Outcome #2)(McKay et al., 2018).

Aims and Objectives

The primary aim of this study was to assess the long-term effect of a combined classroom-parental intervention in relation to the study's two primary outcomes (HED and ARH) assessed at year 13 (+57 months post baseline) and year 14 (+69 months post baseline).

In addition to assessing drinking outcomes, the study aimed to collect data on a range of secondary outcomes and potential moderators and mediators of adolescent drinking behaviours. These included:

(i)   unsupervised drinking
(ii)   lifetime drinking
(iii)   academic, social and emotional self-efficacy (the self-efficacy questionnaire for children),
(iv)   parental rules about alcohol (the rules about alcohol questionnaire),
(v)   sensation seeking (the brief sensation seeking scale - 4),

Methods

STAMPP originally involved post-primary schools in Northern Ireland (NI; N = 70), and both Glasgow (N = 30), and Inverclyde (N = 5) Local Authority areas in Scotland, with schools as the unit of randomisation. The research was approved by Liverpool John Moores University Research Ethics Committee (11/HEA/097). The trial protocol is available from http://www.nets.nihr.ac.uk/projects/phr/10300209. The additional follow-ups (T5 and T6) were approved by the QUB School of Social Science, Education and Social Work Research Ethics Committee.

Participants

Participants in the present study represent a sub-sample of those who previously participated in the study (McKay et al., 2018). The present sample is smaller as a result of both school-level and individual-level attrition. All schools in Scotland remained active study participants, however, there was pupil attrition with some pupils not remaining in school after the S4 National Lower Examinations. A total of 62 of the initial 70 schools in Northern Ireland continued to participate, however, as in Scotland, some pupils left school after the GSCE examinations at the end of school year 12.

A total of 5029 pupils participated in the T5 data sweep. Of these, 4857 had had participated in the study before the provision of the intervention (i.e. who were present in the school during year 8 or year 9 [T0 and T1 data sweeps]). Given that 12738 pupils were randomised into the STAMPP trial, the retention rate at T5 was 38%. As this is a post GCSE only data sweep, the sample attrition is mainly driven by the proportion of pupils who exited the education system at the end of year 12. In addition, 172 pupils joined the study in the intervening years between the introduction of the first phase intervention and the T5 data sweep.

Table 1 provides the sample characteristics of the retained trial sample for both T5 and T6. Between T0 and T6, we see a slight reduction in the number of male respondents and those reporting free school meal eligibility mainly due to sample attrition. More female students, and students not entitled to a free school meal stay on at school post-16.

The T6 data sweep was conducted in NI only (as Scotland has no equivalent of NI year 14). Of the original 7742 Northern Ireland pupils who participated in the STAMPP Trial (i.e. were present at either the T0 (year 8) or T1 (year 9) data collection sweeps, 3388 (43.8%) participated at sweep 6 (year 14). In addition, a further 68 pupils who were not part of the original study completed questionnaires at T6, giving a total T6 (year 14) sample size of 3456. It can be assumed that the 68 pupils joined participating schools at some stage during the study period (year 8 to year 14). As around 60% of NI pupils proceed onto post-16 education[1], we estimate that the achieved sample is approximately 71% of the available sample (i.e. those pupils in post-compulsory education).

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[1] Department for Education (2018). Annual enrolments at schools and in funded preschool education in Northern Ireland, 2017/18. Statistical Bulletin 2/2018. https://www.education-ni.gov.uk/publications/school-enrolments-201718-statistical-bulletins

However, anecdotally schools informed us that a proportion of pupils return for year 13 only in order to repeat GCSE examinations.

Table 1: Sample characteristics (T5)

	Study Arm (T5)				
	Control	Intervention	Total T5	Total T6 (NI only)	Total T0
	(N=2240)	(N=2617)	(N=4857)	(N=3456)	(11316)
	N (%column)	N (%column)	N (%column)	N (%column)	N (%column)
Gender					
Male	933 (41.7)	1110 (42.4)	2043 (42.1)	1419 (41.1)	5621 (50.5)
Female	1307 (58.3)	1507 (57.6)	2814 (57.9)	2037 (58.9)	5499 (49.5)
Free School Meals					
No	1776 (79.6)	2037 (79.3)	3849 (79.6)	2806 (81.5)	8725 (77.4)
Yes	454 (20.4)	532 (20.7)	986 (20.4)	636 (18.5)	2548 (22.6)
Location					
NI	1372 (61.3)	1605 (61.3)	2977 (61.3)	3456 (100)	7022 (62.1)
Scotland	868 (38.8)	1012 (38.7)	1880 (38.7)	-	4294 (37.9)
HED					
No	968 (43.9)	1174 (45.7)	2142 (44.9)	2293 (67.0)	10343 (92.3)
Yes	1237 (56.1)	1394 (54.3)	2631 (55.1)	1131 (33.0)	863 (7.7)

Note: The percentages are calculated on the basis of the complete cases only. HED = heavy episodic drinking

Measures

Primary outcomes

The study re-examined the two primary outcomes, previously examined at +33 months;

(i) the prevalence of self-reported HED in the previous 30 days (HED defined as the consumption of ≥6 units [males]/ ≥4.5 units [females] on one or more occasions) and

(ii) the number of self-reported ARH (caused by own drinking) in the previous six months. To assess the HED primary outcome, participants were presented with pictorial prompts of how much alcohol ≥6/≥4.5 UK units represents. Pictures presented the most popular drinks consumed in the two study areas and respondents were asked to report the frequency of consuming this amount of alcohol over the previous month. ARH associated with own use of alcohol were measured using a 16-item scale developed for the Australian SHAHRP trial (internal consistency 0.9; McBride et al., 2004). For example, participants were asked to report frequency of having a hangover after drinking, or if they had got into a physical fight when drinking.

Secondary outcomes and moderators

ARH associated with other people's use of alcohol were measured using a six-item scale (internal consistency 0.7; McBride et al., 2000). Sample items in the 'else harm' questionnaire included how frequently participants had been verbally abused by someone else who had been drinking, or how often they had been the passenger in a car when the driver had been drinking. For both ARH measures there was a Likert-type scale on which participants were asked how many times in the

past six months they had experienced the individual harm. Possible responses were: never, once, twice, 3–4 times, 5–11 times and >12 times.

Attitudes towards alcohol were measured using a six-item scale initially developed for use in the Australian development study (internal consistency 0.64; McBride et al., 2004). Sample items include, "It is okay for young people to drink as long as they do it safely", or "young people can enjoy alcohol without having to get drunk". Responses are on a five point Likert-type scale; 1 = Completely agree, to 5 = Completely disagree. Scores on the six items are summed to give an overall attitudes score, with a lower score indicative of a better attitude. Alcohol-related knowledge was measured using a 19-item knowledge index (internal consistency 0.73; McBride et al., 2004). Participants were offered a series of statements, for example, "you can do things to sober up more quickly", and the response options, true, false, unsure. Alcohol-related knowledge was assessed by summing the correct responses.

Self-efficacy was assessed using the Self-Efficacy Questionnaire for Children (SEQ-C; Muris, 2001) contains 21 items assessing three domains of self-efficacy: (a) academic self-efficacy (ω current study = .91), (b) emotional self-efficacy (ω current study = .91), and (c) social self-efficacy (ω current study = .83). Each subscale consists of seven items, and respondents rate their competence in each self-efficacy domain on a 5-point Likert scale (1 = not at all; 5 = very well). Scores on items within factors were totalled and divided by seven to give a mean score.

Sensation seeking was measured using the four-item Brief Sensation Seeking Scale (BSSS-4; Stephenson, Hoyle, Palmgreen, & Slater, 2003): "(a) I would like to explore strange places; (b) I like to do frightening things; (c) I like new and exciting experiences, even if I have to break the rules; and (d) I prefer friends who are exciting and unpredictable" (p.282). Responses to the four items were given on a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5) and totalled to give a sensation seeking score. Scores in the present study were found to be factor saturated (ω current study = .82).

Rules about Alcohol was assessed by a 10-item questionnaire (Van der Vorst, Engels, Meeus, Dekovic, & Van Leeuwe, 2005) that examines adolescents' perceptions of the rules and boundaries their parents place on their access to, and consumption of alcohol. Participants were asked about drinking situations ranging from being allowed to drink alcohol at home when a parent is around, to being allowed to come home drunk. Responses were scored on a five-point Likert scale (1 = completely acceptable; 5 = completely unacceptable) with higher scores indicating stricter rules. Scores were averaged within subjects, creating a mean parental rules score.

Personal and Public Involvement (PPI)

The original adaptation of the SHARHP intervention (SHAHRP being the classroom component of STAMPP) involved consultation with a range of stakeholders from young people through to service commissioners, but this was not part of this follow-on project. Similarly, the parental Brief Intervention designed as part of the STAMPP trial involved a range of stakeholders. As part of the larger STAMPP data collection there were numerous stakeholder engagement activities that included interviews, focus groups, and seminars. As this project was following the cohort post-STAMPP there were no further attempts at PPI as the initial trial was effectively finished.

Findings

Prevalence rates Year 8 (T0) to Year 14 (T6)

As the pupils grow older, the prevalence of HED increased (see Table 2). The prevalence rate of HED rises from around 8% in year 8 pupils to around 55% amongst year 13 pupils. By year 14, 67% of secondary school pupils in the NI sample had engaged in HED in the last month.

At baseline, no difference in HED was observed between the control and intervention schools. However, by year 12 (T3) a gap of nine percentage points was recorded between the two trial arms with intervention schools reporting a lower level of HED. This equates to a significant odds ratio of 0·60 (95% CI 0·49-0·73). No difference in self-reported ARH was observed at T3 (incident rate ratio = 0·92, CI 0·78-1.05).

Table 2: Unadjusted prevalence of HED by study ARM (T0 to T6)

Sweep	Full sample (NI & Scotland)		NI sample only	
	Control % (n)	Intervention % (n)	Control % (n)	Intervention % (n)
Year 8/S1 (T0)	7.8 (432)	7.6 (431)	6.3 (218)	6.0 (210)
Year 9/S2 (T1)	9.7 (530)	7.5 (410)	7.1 (244)	4.9 (168)
Year 10/S3 (T2)	13.9 (722)	10.9 (573)	9.0 (293)	6.9 (229)
Year 11/S4 (T3)	25.6 (1300)	17.0 (879)	20.8 (670)	13.6 (446)
Year 12/S5 (T4)	36.5 (1466)	34.9 (1488)	34.2 (993)	32.3 (947)
Year 13/S6 (T5)	56.1 (1237)	54.3 (1394)	55.4 (743)	53.5 (837)
Year 14 (T6)	-	-	68.7 (1085)	65.2 (1159)

Figure 1 provides the unadjusted prevalence rates across both study arms. It is clear that the maximum intervention effect was observed at T3 (Year 11/S4 – 33 months post baseline), approximately one year after the completion of the intervention. By T4 the intervention effect has dissipated, and little difference between the control and intervention schools could be detected. Little difference in the prevalence rates between the control and intervention schools could be detected at either T4 (45 months post baseline), T5 (57 months post baseline) or T6 (69 months post baseline).
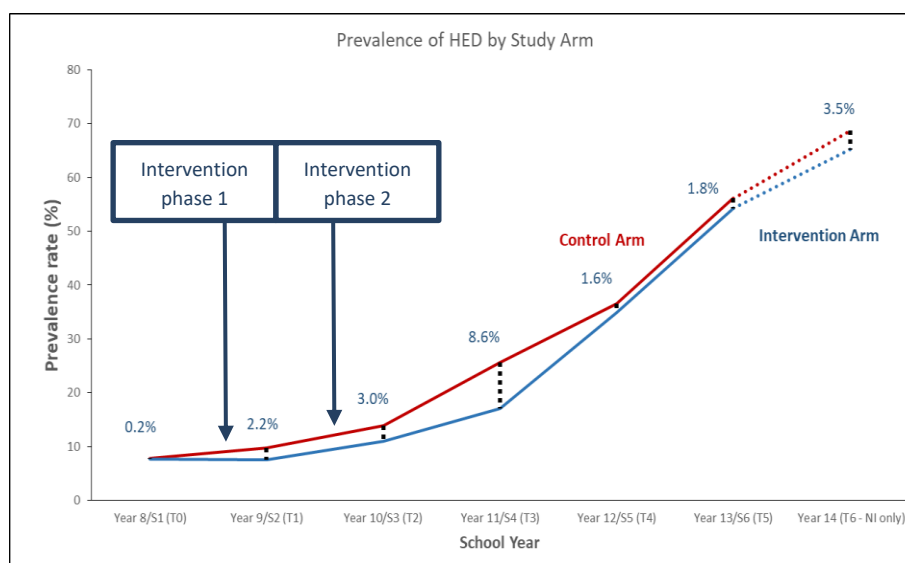
Figure 1

Table 3 provides the mean number of ARH caused by the respondents' own drinking, the second of the study's two primary outcomes. As with HED, the number of reported ARH increased with age over the course of the study, from an average of less than one ARH reported at baseline to over three by sweep 6. While the number of ARH was significantly lower in NI compared to Scotland, little difference was detected in the number of ARH between the control and intervention arms. (Table 3).

Table 3: Mean number of self-reported ARH by study ARM (T0 to T6)

Sweep	Full sample (NI & Scotland)		NI sample only	
	Control m(sd)	Intervention m(sd)	Control m(sd)	Intervention m(sd)
Year 8/S1 (T0)	0.76 (1.94)	0.80 (2.11)	0.56 (1.71)	0.57 (1.79)
Year 9/S2 (T1)	0.82 (2.08)	0.70 (1.8)	0.62 (1.83)	0.49 (1.57)
Year 10/S3 (T2)	1.18 (2.54)	1.05 (2.37)	0.79 (2.10)	0.66 (1.86)
Year 11/S4 (T3)	1.74 (3.00)	1.60 (2.90)	1.33 (2.61)	1.21 (2.58)
Year 13/S6 (T5)	3.12 (3.40)	2.83 (3.11)	3.05 (3.46)	2.68 (2.98)
Year 14 (T6)	-	-	3.41 (3.11)	3.47 (3.27)

Notes: ARH questions were not asked in the T4 data sweep. Each of the 16 ARH questions were dichotomised (yes/no). The ARH primary outcome is a count of the number of ARH experienced (0-16)

The primary outcome models estimated at T3, were also replicated at both T5 and T6 as a formal test of long-term intervention effects. Table 4 gives the T5 and T6 primary outcome models for HED. Baseline drinking was a significant predictor of drinking in late adolescence at all time points, evidencing the influence of early onset drinking on later consumption patterns. No significant difference in HED was detected between control and intervention groups/arms at either T5 or T6.

Table 4: HED primary outcome analysis T5 and T6

ITT Complete case analysis	Estimate	S.E.	OR	P value
T5				
Within level				
Baseline HED	1.034	0.206	2.812	<0.001
Between Level				
Intervention Arm	-0.067	0.121		0.581
Free School Meals (tertile)	0.160	0.082		0.053
School Type				
Boys School Dummy	0.248	0.175		0.155
Girls School Dummy	0.243	0.102		0.017
Location (NI)	-0.005	0.148		0.971
School level residual variance	0.200	0.052		<0.001
Threshold (HEDT5$1)	-0.072	0.137		0.600
T6				
Within level				
Baseline HED	1.780	0.499	5.931	<0.001
Between Level				
Intervention Arm	-0.095	0.126		0.449
Free School Meals (tertile)	0.376	0.102		<0.001
School Type				
Boys School Dummy	0.447	0.134		0.001
Girls School Dummy	0.353	0.130		0.007
School level residual variance	0.114	0.044		0.101
Threshold (HEDT6$1)	-0.427	0.117		<0.001

The model is a 2 level random intercepts models with a logit link function. T5 N = 4773; T6 N = 3340.

In addition to the HED analysis, the primary outcome models for ARH were also estimated on T5 and T6 data. As with HED, baseline ARHs significantly predicted ARH at T5 and T6. Given that no significant intervention effect of ARH effect was observed at T3 (when the largest effect on HED was recorded), it is not surprising that no intervention effect was observed at either T5 or T6 in relation to self-reported ARH (Tables 5 and 6). It is interesting to note that pupils in single sex schools tend to report more AHR and HED than pupils in mixed sex schools.

Table 5: ARH primary outcome analysis T5

	Estimate	S.E.	P value
ITT Complete case analysis			
T5			
Within level			
Baseline Harms	0.128	0.013	<0.001
Between Level			
Intervention Arm	0.068	0.068	0.318
Free School Meals (tertile)	0.092	0.041	0.025
School Type			
Boys School Dummy	0.111	0.106	0.294
Girls School Dummy	0.198	0.096	0.039
Location	0.049	0.077	0.526
Residual variances	0.056	0.022	0.010
Intercept (HarmsT5)	0.911	0.088	<0.001
Dispersion (HarmsT5)	1.244	0.075	<0.001

Table 6: ARH primary outcome analysis T6

	Estimate	S.E.	P value
T6			
Within level			
Baseline Harms	0.092	0.016	<0.001
Between Level			
Intervention Arm	0.035	0.063	0.581
Free School Meals (tertile)	0.153	0.040	<0.001
School Type			
Boys School Dummy	0.260	0.058	<0.001
Girls School Dummy	0.360	0.085	<0.001
Residual variances	0.030	0.009	0.002
Intercept (HarmsT6)	0.985	0.070	<0.001
Dispersion (HarmsT6)	0.829	0.066	<0.001

The model is a 2 level random intercepts models with a negative binomial link function. T5 N = 4847; T6 N = 3379

In addition to the primary outcome models, the outcome analysis was replicated across a number of secondary outcomes at T3 and T5, including ARH caused by someone else's drinking, attitudes towards alcohol and knowledge about alcohol (Table 5.6). The only additional significant intervention effect was observed for alcohol knowledge at T3, with intervention schools having higher average levels of alcohol knowledge than control schools, mirroring the significant differences in HED across control and intervention schools. While the reduction in HED in intervention schools was paralleled with a significant increase in knowledge amongst these pupils, there was no observed difference in attitudes towards alcohol between control and intervention schools.

Table 5.7. Secondary outcome models – intervention parameter estimates only

	Estimate	S.E.	P value	N
ITT Complete case analysis				
Intervention → T5 Harms (else)	-0.048	0.066	0.481	4845
Intervention → T5 Attitudes	-0.032	0.024	0.171	4845
Intervention → T3 Attitudes	-0.006	0.025	0.815	10352
Intervention → T3 Knowledge	**2.084**	**0.160**	**<0.001**	10336

Notes:

All models estimates were 2 level random intercepts models. A negative binomial link function was used for harms (else). All models included covariates at both the between level (stratification variables – school type and school free school meals; and location) and within level (T0 baseline scores HED with a mean value replacement for any missing values).

T5 = 57 month post baseline follow-up; T3 = 33 month post baseline follow-up. Knowledge was not assessed at T5.

To assess the possibility of the subgroup effects (i.e. the treatment effect varying across different pupil subgroups) segmented models were estimated across a number of different level one pupil characteristics, including early onset drinking at T0, sensation seeking (mean split at T0), academic self-efficacy (mean split T3), attitudes towards alcohol (mean split T3), alcohol-related knowledge (mean split T3) and parental rules towards alcohol (mean split T3). This method was adopted as estimating cross-level interactions would require the addition of random slopes (a substantive departure for the random intercepts model specified in the trial data analysis plan) and such models are better able to test a level two variable moderation of a level one effect rather than a level one variable moderation of a level two school effect. However, it must be noted that the study was not powered to undertake this moderation analysis at T5 and as such is likely to be underpowered. Therefore, this analysis is exploratory.

Table 7. Moderation models for HED – intervention parameter estimates only (T5)

	Estimate	S.E.	P value	N
ITT Complete case analysis				
HED outcome				
Abstinent at T0 only	-0.128	0.137	0.349	3642
Ever drank (T0)	0.118	0.168	0.481	735
Last year drinkers (T0)	0.099	0.191	0.606	578
Sensation seeking below mean (T0)	-0.108	0.133	0.418	2793
Sensation seeking above mean (T0)	-0.004	0.154	0.977	1980
Academic self-efficacy below mean (T3)	-0.040	0.152	0.794	1979
Academic self-efficacy above mean (T3)	-0.045	0.139	0.745	2794
Attitudes towards alcohol below mean (T3)	-0.110	0.132	0.406	3061
Attitudes towards alcohol above mean (T3)	0.077	0.148	0.602	1712
Alcohol knowledge below mean (T3)	-0.102	0.141	0.469	2593
Alcohol knowledge above mean (T3)	-0.125	0.154	0.417	2180
Parental rules about alcohol below mean (T3)	-0.147	0.118	0.212	1912
Parental rules about alcohol above mean (T3)	0.075	0.140	0.594	2861

Notes:

All models estimates were 2 level random intercepts models. The link function varied by outcome (binary outcome = logit; count outcome = negative binomial, normal = no link function). All models included covariates at both the between level (stratification variables – school type and school free school meals; and location) and within level (T0 baseline scores on heavy episodic drinking with a mean value replacement for any missing values).

T5 = 57 month post baseline follow-up; T3 = 33 month post baseline follow-up. HED = Heavy episodic drinking

As Table 7 shows, no significant intervention effects were observed at T5 across the various subgroups incuded in the analysis. While there is no significant intervention effect across the sample as a whole at T5 (see table 5.4), there is also no significant treatment effects within particular sub-populations within the sample, for example pupils with high alcohol-related knowledge, or those whose parents have strict rules regarding their access to alcohol.

Conclusion

Against the backdrop of a literature replete with criticisms of the impact of universal school-based interventions, the STAMPP trial demonstrated that a relatively inexpensive, and easy-to-deliver classroom intervention, combined with a parental brief intervention, can impact on HED (but not number of ARH) in adolescents. One of the STAMPP conclusions (Sumnall et al., 2017) was that, given the overall low amount of ARH reported, it may be that the effect of STAMPP on ARH experienced could be 'delayed' in time. The present study sought to test that hypothesis, as well as examining what (if any) longer-term effects of STAMPP persisted after the trial duration.

Not surprisingly (given the extant literature on health interventions), longer-term effects were not observed for HED. However, as Figure 1 clearly demonstrates, the optimal impact on HED was observed precisely where the interventions were being delivered and sustained for one year. Therefore, we conclude that the combination of the adapted SHAHRP and a novel Brief Intervention for parents is an effective alcohol education intervention, but that it's administration should not be understood by school leaders, health commissioners, or anyone else as an 'inoculation' against drinking behaviours. In other words, the evidence clearly shows that behaviour change is possible, and we recommend that, in order to see prolonged effects of the combined intervention, that they be extended across the lifetime of school life, either by means of further structured lessons or booster sessions. It is our view that to interpret Figure 1 any other way would be injudicious. As the combined intervention was ultimately cost neutral, where the accrued savings due to the reduction in drinking behaviour exceed highly conservative estimates of the costs of delivery (see Sumnall et al., 2017) there are few barriers to its successful implementation.

Turning to the ARH question, the results clearly suggest that the hypothesis about a 'delayed' effect on ARH was not supported. It remains for further work to be undertaken to examine the nature and structure of the ARH examined herein. It is possible that there are cultural issues at play such that the ARH experienced in Australian context (from whence the ARH scale was taken) are somewhat different to those experienced in the UK. Further, this scale was developed in the early 2000's and a large literature continues to evidence changing drinking patterns among adolescents world-wide. It may also be the case that for the intervention to be successful, it needs to be delivered at a time when the target behaviour is emerging within the relevant population. For most adolescent drinkers, the emergence of ARH may occur outside the effectiveness window of the interventions (up to one year after its delivery). The initial STAMPP trial did find a subgroup effect for ARH amongst early onset drinkers (those who had started drinking before the start of the study) but this effect was not sustained to T5 or T6. Finally, it is also possible that the interventions simply have no effect on ARH, although that would be at odds with a local study that was the precursor to STAMPP (see McKay et al., 2012). However, it should be pointed out that the McKay et al (2012) study used a Latent Class analytical approach, and any significant ARH effect could be an artefact of that.

The STAMPP trial involved a combination of two interventions and it is not clear whether both are required for the beneficial effects on HED. Given the known success of (adapted) SHAHRP on its own it is theoretically possible that this was the primary active ingredient in the STAMPP trial. Given the potential cost savings of focusing on one rather than two interventions this is a hypothesis worth exploring. Unfortunately, the STAMPP trial data are not suitable for that analysis.

Practice and Policy Implications/Recommendations

As outlined above, the core finding of this study was that the combination of adapted SHAHRP and a novel Brief Intervention for parents was an effective intervention in reducing HED amongst adolescents, but that the positive impact was only sustained for 12 months after the intervention ended.

On the basis of this, a number of robust policy and practice recommendations can be made, including the following:

- The combined intervention approach should be recognised as an effective and cost effective universal prevention intervention that significantly and substantively reduces HED in adolescents within the NI context.

- The combined intervention should be rolled out as a key component of a 'whole school' approach to alcohol that complies with the latest NICE guidelines [PH7]. The STAMPP trial intervention is one of the few UK school-based alcohol prevention programmes to show effectiveness in reducing HED in adolescents.

- The implementation of the combined intervention (classroom and parental) should be supplemented with additional lessons/booster sessions beginning one year after the classroom/parental intervention. As some adolescents had started drinking before the delivery of the combined intervention some consideration should also be given to intervening earlier. Given the increasing rate of alcohol consumption over the teenage years, booster session should have a particular focus on harm prevention and reduction.

- The parental component of the STAMPP trial should be further enhanced and strengthened to ensure greater parental involvement, particularly in relation to setting rules regarding their children's access to alcohol.

Pathway to Impact

This study has provided robust evidence on the long-term impact of a universal schools-based alcohol intervention. The findings of this study will be of interest to policy makers and practitioners engaged in the development and implementation of the post-NSD alcohol strategy in NI. To support the utilisation of the study findings within future policy and practice development, the study's pathway to impact includes the following:

(i) A dissemination event for schools, local alcohol and drug agencies, and policy makers that covered the study findings in relation to the short term and long term outcomes of the combined intervention, the impact of parents (in the form of parental rules about alcohol) in shaping adolescent drinking, and the important role time perspective places in young people risk taking behaviour.

(ii) A brief plain English report for non-academic users.

(iii) A news article for the School for Social Sciences, Education and Social Work, Education News Letter, distributed to NI schools, colleges and agencies.

(iv) Presentation of findings at relevant academic conferences (e.g. European Society for Prevention Research 2019 Conference).

(v) A new dataset containing three data sweeps in addition to those generated by STAMPP (for school years 12, 13 and 14). This will be utilised for further analysis of secondary outcomes and supplementary measures.

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