

## The Hong Kong Healthy Schools Award Scheme, school health and student health: An exploratory study

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### Abstract

**Objective:** The Hong Kong Healthy Schools Award Scheme (HKHSA) developed an assessment and monitoring system to examine the status of Health Promoting School (HPS). This study made use of the HKHSA programme to investigate the school health ‘profile’ and student health status of four gold award schools following 3–4 years’ participation in the scheme.

**Design:** Repeated cross-sectional student health surveys of the same year level (Secondary 3) were conducted over different time periods and achievement of HKHSA was assessed by repeated assessments of the school health profile using HPS indicators.

**Setting:** This study included four schools with the Healthy School gold award in Hong Kong, together with students from three of the four schools.

**Methods:** School performance in the six HPS key areas were analysed using radial plot graphs and students’ health behaviours were measured by means of repeated cross-sectional student health surveys.

**Results:** The four gold award schools demonstrated various degrees of achievement in different HPS key areas with student health behaviours markedly improving in these schools. Further analyses revealed how certain HPS key area components are associated with the sustained positive health behaviours among students.

**Conclusion:** The ongoing implementation of HPS impacts on schools’ environment and students’ health behaviours. The HKHSA is designed for formative and summative assessment of school health promotion. Findings provide insight into an HPS assessment process, signalling future directions for the development of school health promotion.

### Keywords

Evaluation, Health Promoting School, healthy school award, Hong Kong, school health profiles, student health behaviours

\*Until January 2013

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## Background

Schools are important settings for promoting the health and social development of children (St Leger et al., 2007; Tones, 2005). Evidence suggests that the way schools are led and managed, the opportunities students have to participate in and take responsibility for shaping policies, how teachers relate to and treat students, and how schools engage local community and parents build protective factors for health and reduce health risk behaviour (Stewart-Brown, 2006). The Social Development Model suggests that creating healthy school environments is an effective intervention to assist students in learning healthy behaviours and avoiding health risk behaviours (Catalano et al., 2004b). Several individual, family, school and community factors predict both positive (e.g. success in schools) and negative (e.g. delinquency) outcomes in school (Catalano et al., 2004a).

During the 1990s, evidence accumulated to show how the use of the Health Promoting School (HPS) concept can enhance the health and well-being of students (Lister-Sharp et al., 1999; Moon et al., 1999b; St Leger, 1999). The concept of the HPS was initiated by the World Health Organization (WHO, 1996) and aims to move beyond individual behaviour to consider organisational change, such as improving the school's physical and social environment, its curricula and teaching and learning methods (Lee et al., 2003). Six key action areas were later refined during WHO Stakeholders' meeting in 2009 as follows: Healthy School Policy, School Physical Environment, School Social Environment, Community Link, Action Competency for Healthy Living and Services for Health Care and Promotion Services (WHO, 2009).

At the turn of this century, further evidence on the effectiveness of HPS was reported (Aldringer et al., 2008; Busch et al., 2017; Lee et al., 2006, 2008, 2016; St Leger and Nutbeam, 2000). There is also a growing body of evidence to demonstrate the importance of a whole school approach in promoting mental well-being in schools (Stewart-Brown, 2006; Weare and Markham, 2005). Guidelines for School Health published by bodies such as the International Union for Health Promotion and Education (IUHPE, 2009) have summarised much of the available evidence of school health effectiveness (St Leger et al., 2010), yet little is known about how schools perform in the different key areas identified by the HPS approach. While very few schools have been able to implement an HPS approach in its entirety (Adamowitsch et al., 2017; Joyce et al., 2017), HPS indicators should facilitate formative assessment, with a focus on qualitative feedback and observation of progress, making health promotion part of schooling rather than an add-on activity (Hoyle et al., 2008). Suitable indicators should highlight the ways in which schools are able to adopt HPS principles successfully and the conditions that need to be in place for the HPS concept to flourish (Inchley et al., 2006).

In Hong Kong, the Centre for Health Education and Health Promotion at The Chinese University of Hong Kong (CHEP) developed the Hong Kong Healthy Schools Award Scheme (HKHSA) with a structured system of assessment and monitoring to allow for a comprehensive examination of HPS key areas and overall effectiveness (Lee, 2002; Lee et al., 2005a, 2007a, 2014). The scheme was based on WHO (1996, 2000) guidelines after wide consultation in 1995. Each key area has a number of components with targets for the school to achieve and each component consists of different indicators with a points system to reflect the level of performance. The respective set of indicators was developed from guidelines based on extensive literature and documentary reviews, both locally and overseas, but with contextualisation specific to Asian Pacific countries (Lee et al., 2005a). The system of assessment for HKHSA has undergone a process of validation by Lee et al. (2014) which involved the following:

Face validation: pilot testing on some schools with principals and teachers having a basic understanding of HPS;

Content validation: with HPS experts (both local and international) commenting on the contents;

Criterion validation: with HPS experts with experience in Healthy School Award schemes observing the process of accreditation and benchmarking against international standards in the local context.

Together, these components cover school-based changes/initiatives as well as the involvement of parents, school management committees and community, and also teacher education and training in relation to health promotion actions and outcomes. The HKHSA categorised schools into three different levels of achievement (i.e. gold, silver and bronze award) and analysed areas of strength and weakness according to the level of accomplishment reflected by performance on the different components under each key area (Lee, 2002). An appropriate award was granted once the school had demonstrated fulfilment of the relevant requirement. Schools could progress up the levels until they achieved the Gold Award.

The English Wessex Healthy Schools Award (WWSA) scheme, developed in 1990, had shown positive award-related changes in children's health behaviours, with award schools having a more health-promoting culture than non-award schools (Moon et al., 1999a, 1999b). These same findings were replicated in a later Hong Kong study (Lee et al., 2005b, 2006, 2008). Further evidence was required, however, to reflect the impact of health promotion in schools on students' health status (Hoyle et al., 2008) as well as how participation in the scheme might motivate change (Joyce et al., 2017). Although a comprehensive school health policy framework can help develop a healthy school community, it is important to identify the practical steps that school communities can take when working within such a framework to effect change (Stolp et al., 2015). Some of these strategies may be context-specific, providing practice-based evidence that can be more widely used to support the development of a healthy school community (Stolp et al., 2015f). Studies on those schools with the highest level of award may provide further evidence in this respect.

## Aims

Against this background, this study investigated the relationship between a healthy school award, school quality as reflected by a school health profile, and student health behaviours. It took the form of an exploratory study of four gold award schools participated for 3–4 years in the HKHSA. The hypotheses to be tested were as follows: (1) that schools with the award would demonstrate improvement of student health behaviour and (2) that certain HPS components of HPS would have a greater impact than others on health improvement.

## Methods

### *Participants*

Four secondary schools with gold award status were selected so as to represent the diversity of schools in Hong Kong (Appendix 1 summarises details of the four schools). Data reflecting each school health profile were collected during site visits by CHEP assessors to each school as part of award accreditation at different time periods between 2001 and 2006. Assessors employed a structured system of assessment (Lee et al., 2005, 2007a, 2014). Students aged 14–15 years in their third year of secondary school (S3) were selected to examine changes in student health behaviour and self-reported health status, so as to understand the possible cumulative impact of the HPS at this mid-point of schooling.

### *Tools to assess school performance*

The HKHSA was built on the six HPS areas (i.e. school health policy, school health services, personal health skills (PHS), school physical and social environment and community relationships [CRs]) identified in the Western Pacific Regional Office of the WHO (1996, 2000) guidelines (Lee, 2002). A set of indicators and guidelines was developed for the HKHSA based on extensive literature and documentary review to provide a structure for monitoring progress and assessing schools' performance in each HPS key area (IUHPE, 2009; Lee et al., 2014; Lister-Sharp et al., 1999; Moon et al., 1999a, 1999b; St Leger, 1999, St Leger et al., 2010; Tones, 2005).

The validity of the indicators and the accreditation process was established by HPS consultants during field visits to different schools in Hong Kong, benchmarking their observations against international standards within the local context (Lee et al., 2005a, 2007a, 2007b; Moon, 1999a, 1999b; St Leger, 1999; Tones, 2005). The assessors made use of this set of indicators for summative assessment when undertaking school visits to explore what forms of health promotion and education schools actually carried out (Lee et al., 2007a, 2007b, 2014). Formative assessment, involving regular communication with designated school health coordinators, personal interviews, focus group discussions and observation, was conducted before, during and after the audit. All the formative and summative assessments together constitute an institution's overall 'profile' of school improvement.

For each of the six HPS key areas, a number of components and checkpoints were developed, allocating points for each of the criteria met for the indicators (Lee, 2002; Lee et al., 2014). A rating system was developed, whereby schools needed to achieve a specified number of points in different HPS component areas to be considered for a Bronze, Silver or Gold award.

### *Instruments to assess student health*

Health data on students were collected by means of the Hong Kong Student Health Survey Questionnaire (HKSHSQ). This was adapted from the 1999 Youth Risk Behaviour Survey designed by the US Centers for Disease Control and Prevention (Brener et al., 2002; Lee et al., 2001, Lee & Tsang, 2004), the pupil questionnaire from the WHSA Evaluation for students (Moon et al., 1999a), and validated life satisfaction scales (Shek, 1992), with face validity and reliability being assessed by pre- and post-tests with a group of students. The student health surveys were administered on two to three different occasions in each of the four schools between 2001 and 2006. The survey results created a 'student health profile', with the data being made available to schools to inform their health promotion planning and also for research and evaluation purposes, as reported in this paper.

### *Data collection*

Repeated cross-sectional student health surveys of the same year level (i.e. S3) were conducted during different time periods using the HKSHSQ (Tables 2 to 5) when individual schools opted to be considered for inclusion in the HKHSA.

School health profiles reflecting the status of HPS were assessed at baseline and repeated after a certain time period to determine the level of award within the HKHSA. Data on health attitudes and behaviours were compared at intervals (1–3 years) to observe differences of particular health behaviours over time. Trends identified through this surveillance process provided an indication of progress and success in implementing an HPS approach.

The time periods for repeated measurements fell within the time frame of the respective schools undergoing HKHSA award assessment, so data from each school were analysed separately. All four schools underwent repeated measurements at time period 3 years or more later than baseline assessment to allow an analysis of improvements made after a sufficient time of implementation of HPS initiative aiming for award.

### Data analysis

The accreditation system employed by the HKHSA allowed assessment scores to be converted to percentages in each of the six HPS key areas. A radial plot graph was used to represent and compare the mean proportion for each HPS key area at two different time periods (Figure 1(a) to (d)). The proportion of students' responses to different questions related to health behaviours and health status on the HKSHSQ was tabulated at different time periods and chi-square analysis was used to test for statistical significance at different time periods when the student health survey was administered (Tables 1 to 4). For schools A, B and D, data were collected at three different time periods and statistical significance tests were also performed to analyse the trends (Tables 1, 2 and 4). Only those questions with statistical significant changes over time ( $p < .05$ ) are presented under different categories as shown in Tables 1 to 4.

### Results

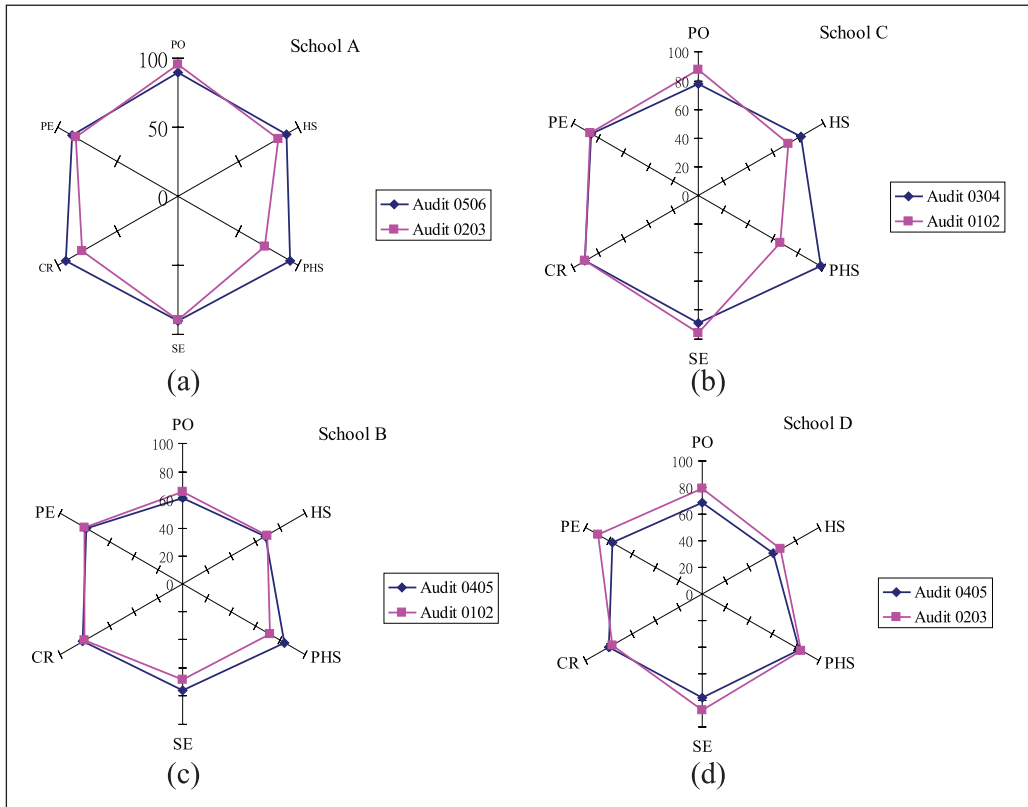
Figure 1 provides an overview of all six key area scores at baseline (first audit exercise) and at a subsequent audit of the four schools by a radial plot graph.

School A achieved a very high standard in school health policy (PO), school health services (HS), school physical environment (SPE) and school social environment (SSE) at baseline with over 90% adherence to the guidelines and this was maintained in 2005/2006 (Figure 1(a)), whereas PHS and CR improved to a very high standard (from below 80% to 93% adherence to the guidelines). After 3 years of HPS implementation, students displayed a stronger perception of the health benefits of exercise (Table 1). Behaviours related to diet, exercise and smoking had improved as had health seeking behaviour for emotional problems (Table 1).

In school B, improvement was observed in the key areas of PHS and SSE (84% and 76% adherence to guidelines, respectively) but no improvement was observed in PO and HS (below 70% adherence to guidelines) (Figure 1(b)). SPE and CR remained at a good standard (76% and 81% adherence to guidelines, respectively). Students showed improvements in healthy eating, less alcohol and smoking, and also better emotional and social health in 2002 one year after implementation of HKHSA, but these were not sustained by year 2005 (Table 2). Attitudes towards exercise and health showed some improvement over the years (Table 2).

In school C, a demonstrable improvement was observed in PHS after 3 years (Figure 1(c)). An improvement could also be found in HS (98% adherence to guidelines). However, there was a slight decrease in PO, while the other three key areas maintained a high level of achievement after 3 years (80%–90% adherence to guidelines). There was an improvement in students' eating behaviour, anti-social behaviour, emotional health and attitudes towards regular exercise, non-smoking and sex in school C (Table 3).

In school D, CR and PHS were maintained at a high level after 3 years of HPS implementation (over 80% adherence to guidelines) (Figure 1(d)). Improvements were observed with trends in students' dietary behaviours, emotional health and risk behaviours such as smoking, alcohol and substance misuse and also positive attitudes towards smoking, safety, the use of drugs and weight management (Table 4).



**Figure 1.** Radial plot showing HPS performance in each of the four schools at two different points in time: (a) school A, (b) school B, (c) school C and (d) school D. PO: school health policy; HS: school health services; PE: physical environment; SE: social environment; PHS: personal health skills; CR: community relationship.

## Discussion

Evidence has emerged during the past decade to indicate that a whole school approach to health promotion such as that advocated by the HPS model can enable young people to achieve improved health outcomes (Patton et al., 2006; Stewart-Brown, 2006; Weare, 2015). Data from the HKHSA, an HPS flagship initiative in Hong Kong, add further evidence of the enabling effects of the HPS model on students' health improvement.

## PHS

Figure 1(a) to (d) reveals an improvement in the PHS key area after 3 years in each of the four schools. Analysis also revealed that the development of PHS within those schools had moved beyond the formal curriculum (Table 5). A Norwegian study showed that schools offering non-curricular activities three or more times per week had a higher proportion of students reporting their everyday participation in physical activities at recess (Haug et al., 2010). Teacher professional development in school health promotion also improved the health status of students. A US study demonstrated that a 5-day institute for teachers helped improve physical fitness and health-related knowledge and attitudes among students (Sobezyk et al., 1995).

**Table 1.** Comparison of student health survey results for school A – S3 students only.

	Student health survey period			Chi-square/ p value
	5/2002 (N= 185)	10/2003 (N= 177)	10/2006 (N= 197)	
<i>Personal health attitudes</i>				
Not having regular exercise will not affect health (agree or strongly agree)	45.4% (141)	27.2% (136)	33.5% (167)	0.005/.04
<i>Dietary behaviours and sedentary lifestyles</i>				
Ate vegetables (at least three servings a day)	9.2% (163)	2.5% (157)	10.4% (192)	0.015/.58
Ate chocolates (at least four times per week)	35.6% (163)	25.5% (157)	39.6% (192)	0.019/.36
Drank a fizzy drink (at least four times per week)	33.7% (163)	36.7% (158)	21.9% (192)	0.005/.012
Bought food from a hawker (yes)	59.1% (159)	52.5% (162)	38.5% (192)	0.000/.000
Bought food from fast food shops (yes)	83.3% (162)	80.5% (159)	70.3% (192)	0.008/.03
Had breakfast (yes)	67.9% (162)	68.8% (154)	87.0% (192)	0.000/.000
Watched television ( $\geq 3$ hours/day)	62.0% (163)	66.7% (162)	37.5% (192)	0.000/.000
<i>Anti-social behaviour</i>				
Did not go to school because of feeling unsafe (yes)	6.7% (163)	4.3% (163)	0.5% (191)	0.007/.02
<i>Emotional health</i>				
Ever considered seeking help with planned or attempted suicide (yes)	15.6% (45)	33.3% (33)	41.2% (34)	0.034/.011
<i>Smoking – attitudes and behaviours</i>				
Smoked cigarettes in the past 30 days (yes)	19.9% (161)	22.4% (161)	7.4% (189)	0.000/.001
Smoked a whole cigarette for the first time (10 years old or below)	6.3% (48)	24.1% (54)	21.7% (46)	0.041/.047

The values within parentheses indicate the number of students responded to question.

There is a need for systematic and co-ordinated approach in curriculum development (including co-curricular activities) with support from school management to integrate health and well-being more deeply into the school curricular system rather than being delivered through many isolated activities by health promotion service providers (Adamowitsch et al., 2017). In Brazil, a comprehensive curriculum was found to be more likely to have higher percentage of dental caries-free children (Moyses et al., 2003). Study has shown that implementation of HPS can improve health literacy (Lee, 2009) so the focus should be on the availability of enabling conditions for health literacy (Jurg et al., 2008). The retirement of school head as well as deputy head of school B may explain the lack of continuing improvement of healthy behaviours and attitudes such as exercise.

### *School health policy (PO)*

All schools established more comprehensive school health policies between the two audit points with some policies not being in place initially and some showing further improvement particularly with respect to harmonious and safe school polices (Table 5). Students were found to have better knowledge and attitudes towards exercise when there was a written policy on physical activity in a



**Table 2.** Comparison of student health survey results for school B – S3 students only.

	Student Health Survey period			Chi square/p-value
	10/2001 (N=240)	10/2002 (N=245)	10/2005 (N=240)	
<i>Personal health attitudes</i>				
Wear protective measures (e.g. helmet or seat belt) (never use)	61.1% (108)	65.2% (102)	40.6% (128)	0.002/.004
Not having regular exercise will not affect health (agree/strongly agree)	44.3% (174)	38.1% (215)	29.0% (176)	0.012/.03
Enjoy physical education (PE) lessons (agree/strongly agree)	59.8% (184)	75.0% (224)	76.7% (189)	0.000/.000
<i>Dietary behaviours</i>				
Had breakfast (yes)	82.1% (207)	90.2% (244)	91.4% (209)	0.006/.004
Ate vegetables (at least three servings a day)	8.7% (207)	4.1% (243)	10.5% (210)	0.03/.5
Ate crisps (at least four times per week)	11.6% (207)	6.6% (244)	14.3% (210)	0.024/.37
Ate chocolates (at least four times per week)	36.2% (207)	23.9% (243)	40.0% (210)	0.001/.4
Ate street food (at least four times per week)	24.8% (206)	9.1% (243)	17.6% (210)	0.000/.05
Ate dessert (at least four times per week)	13.5% (207)	17.7% (243)	28.6% (210)	0.000/.000
Drank fizzy drink (at least four times per week)	14.0% (207)	7.8% (243)	14.8% (210)	0.04/.8
Drank sugary drink (at least four times per week)	54.1% (207)	38.1% (244)	39.5% (210)	0.001/.003
Bought food from street hawkers (yes)	32.0% (206)	16.9% (243)	36.2% (210)	0.000/.33
<i>Anti-social behaviour</i>				
Involved in physical fight (yes)	7.2% (207)	1.2% (245)	2.4% (210)	0.001/.007
Been sexually harassed (yes)	17.4% (207)	11.0% (245)	6.2% (209)	0.002/.000
Carried a weapon (yes)	3.4% (207)	1.2% (245)	6.7% (210)	0.008/.07
<i>Emotional health</i>				
Ever felt hopeless (yes)	27.2% (206)	13.1% (245)	23.0% (209)	0.001/.3
Had suicidal thoughts (yes)	22.2% (207)	9.4% (245)	20.5% (210)	0.000/.65
<i>Smoking and drinking – attitudes and behaviours</i>				
Will you drink/smoke when aged 20 (no)	86.4% (184)	93.9% (229)	91.4% (187)	0.05/.11
Will you drink alcohol when aged 20 (definitely yes)	8.9% (168)	8.5% (199)	19.0% (168)	0.004/.007
Ever had a drink of alcohol (yes)	7.7% (207)	9.0% (245)	16.2% (210)	0.010/.005

The values within parentheses indicate the number of students responded to question.



**Table 3.** Comparison of student health survey results for school C – S3 students only.

	Student health survey period		Chi-square/p-value
	10/2001 (N = 194)	10/2004 (N = 199)	
<i>Personal health attitudes and skills</i>			
Enjoy physical education (PE) lessons (agree or strongly agree)	72.5% (177)	83.5% (188)	0.012
Prefer more choices of exercise (agree or strongly agree)	92.6% (176)	98.4% (192)	0.006
Regular exercise is important (agree or strongly agree)	78.1% (169)	88.3% (171)	0.012
<i>Dietary behaviours</i>			
Ate fresh fruit (at least two servings a day)	21.0% (181)	9.6% (198)	0.002
Drank 100% fruit juices (at least once a day)	18.2% (181)	10.2% (197)	0.024
Ate crisps (at least four times per week)	24.4% (180)	10.1% (198)	0.000
Ate chocolates (at least four times per week)	44.2% (181)	31.8% (198)	0.013
Ate preserved food (at least four times per week)	15.0% (180)	7.6% (198)	0.022
Ate street food (at least four times per week)	32.6% (181)	18.7% (198)	0.002
Drank sugary drink (at least four times per week)	64.6% (181)	53.5% (198)	0.028
Bought food from a street hawker (yes)	71.5% (179)	44.6% (193)	0.000
Bought food from fast food shops (yes)	91.5% (177)	83.0% (194)	0.014
<i>Anti-social behaviour</i>			
Threatened by someone (yes)	8.8% (181)	2.0% (198)	0.003
Involved in a physical fight (yes)	21.0% (181)	10.1% (198)	0.003
Personal property stolen or damaged (yes)	27.6% (181)	14.6% (198)	0.002
Carried a weapon (yes)	10.6% (179)	4.0% (198)	0.013
Did not go to school because feeling unsafe (yes)	6.1% (179)	0.5% (198)	0.002
<i>Emotional health</i>			
Ever felt hopeless (yes)	65.7% (178)	77.3% (198)	0.013
Had suicidal thoughts (yes)	25.0% (180)	10.2% (197)	0.000
<i>Smoking attitudes and sexual behaviours</i>			
Will smoke when aged 20 (definitely yes)	4.9% (144)	1.2% (163)	0.004
Ever had sexual intercourse (yes)	7.3% (178)	1.5% (197)	0.006

The values within parentheses indicate the number of students responded to question.

Norwegian study (Haug et al., 2010). Another study has shown that establishment of consultative committee focusing on policies increases teachers' knowledge on health promotion and willingness to spend more time on health topics (McBride et al., 1996). In this study, school D made considerable progress in school health policy development, implementation and monitoring with improvement on different aspects of student health.

### School health services (HS)

Proactive mental health promotion efforts may have contributed to improvement of students' emotional health in schools A, C and D (Table 5). Positive influences on health include how students

**Table 4.** Comparison of student health survey results for school D - S3 students only.

	Student health survey period			Chi-square/ p-value
	10/2001 (N= 160)	10/2002 (N= 158)	10/2005 (N= 168)	
<i>Personal health attitudes and skills</i>				
Wear protective measures (e.g. helmet or seat belt) (never use)	82.9% (111)	76.9% (104)	60.6% (104)	0.002/ 0.000
Eat less, eat food with low calories or low fat to lose weight (yes)	46.4% (151)	31.4% (153)	28.1% (153)	0.002/ 0.001
Exercise to lose or to prevent from gaining weight (yes)	71.9% (153)	57.1% (154)	64.9% (154)	0.026/ 0.2
<i>Dietary behaviours and sedentary lifestyles</i>				
Ate chocolates (at least four times per week)	34.0% (153)	32.9% (155)	21.4% (154)	0.028/ 0.016
Drank fizzy drink (at least four times per week)	37.9% (153)	44.8% (154)	29.2% (154)	0.018/ 0.115
Had breakfast (yes)	67.3% (153)	73.5% (155)	81.2% (154)	0.021/ 0.006
Watched television ( $\geq 3$ hours/day)	60.1% (153)	65.8% (155)	41.6% (154)	0.000/ 0.001
<i>Anti-social behaviour</i>				
Involved in a physical fight (yes)	19.6% (153)	10.9% (156)	9.1% (154)	0.014/ 0.007
Personal property stolen or damaged (yes)	26.1% (153)	20.5% (156)	13.6% (154)	0.023/ 0.006
Been sexually harassed (yes)	17.6% (153)	10.3% (155)	7.8% (154)	0.022/ 0.008
<i>Emotional health</i>				
Ever felt hopeless (yes)	30.1% (153)	17.4% (155)	15.6% (154)	0.003/ 0.002
<i>Smoking, drinking and substance use – attitudes and behaviours</i>				
Smoked cigarettes in the past 30 days (yes)	14.6% (151)	12.2% (156)	3.2% (154)	0.002/ 0.001
Ever tried cigarette smoking, even one or two puffs (yes)	32.2% (152)	23.7% (156)	17.0% (153)	0.008/ 0.002
Will smoke when aged 20 (no)	80.0% (120)	81.8% (121)	90.4% (135)	0.050/ 0.056
Will drink alcohol when aged 20 (no)	28.1% (128)	29.5% (122)	40.0% (130)	0.02/ 0.08
Ever had a drink of alcohol (yes)	71.1% (152)	62.2% (156)	57.8% (154)	0.049/ 0.016
Ever used prescription drugs without doctor's prescription (yes)	5.8% (154)	5.8% (156)	0.6% (154)	0.031/ 0.022

The values within parentheses indicate the number of students responded to question.

are treated by teachers at schools (Blum et al., 2002; Patton et al., 2006; St Leger et al., 2010). If the emotional needs of staff are well looked after, interaction between staff and students may have a positive impact on the well-being of students. Studies have also demonstrated the effectiveness

**Table 5.** Analysis of the components under each key area reflecting improvement in HPS status of the four schools.

Key area	Components accounting for improvement under each respective key area
Personal health skills	<ul style="list-style-type: none"> <li>• Developing a comprehensive curriculum with health-related issues for students to acquire health skills</li> <li>• Equipping staff with better skills to promote health</li> <li>• All four schools organised community outreach activities in which students could participate, such as voluntary work with the elderly. Students were coached and supported to put their classroom learning into practice</li> </ul>
School health policies	<ul style="list-style-type: none"> <li>• Harmonious school policy (for violence and bullying in school)</li> <li>• Safe school policy</li> <li>• During the second audit, an equal opportunities policy and measures were established in school C</li> <li>• School C also made major improvement on their policies related to infectious disease control and the prevention of substance abuse</li> <li>• In school D, there was considerable progress in the consultative nature of their school health policy development, implementation and monitoring</li> </ul>
School health services	<ul style="list-style-type: none"> <li>• Improvement in developing a system for looking after the emotional needs of staff (schools A, C and D)</li> <li>• Improvement in provision of basic health care services for students, including keeping records of student health status and developing occupational health policies and practices (schools A and C)</li> <li>• Significant improvement in handling emergency situations (school C)</li> <li>• Maintaining a high standard of practice in infectious disease control and providing psychological and counselling services</li> </ul>
School social environment	<ul style="list-style-type: none"> <li>• Establishing an environment of value and mutual respect</li> <li>• Creating an environment of friendliness and care</li> <li>• schools A, C and D showed improvement in developing a system for looking after the emotional needs of staff, apart from maintaining a high standard of practice in infectious disease control and providing psychological and counselling services</li> <li>• Schools A and C also improved the provision of basic health care services for students, keeping records of student health status and developing their occupational health policies and practices. In addition, school C demonstrated a significant improvement in handling emergency situations</li> </ul>
Community relationship	<ul style="list-style-type: none"> <li>• Actively organising family and community health promotion to enhance personal competencies</li> </ul>
School physical environment	<ul style="list-style-type: none"> <li>• School providing adequate and hygienic places for students and staff to eat in</li> </ul>

HPS: Health Promoting School.

of schools in addressing mental health issues by identifying relevant priorities, creating policies and establishing commitments to long-term improvement (Patton et al., 2006; St Leger et al., 2010; Weare, 2000; Weare and Nind, 2011).

### *School social environment (SE)*

Creating a school environment characterised by friendliness and care, value and mutual respect as well as safe environment were factors accounting for food overall social environment particularly in schools A, C, D and rather less so in school B (Table 5, Figure 1(a) to (d)). School B only showed a significant improvement in emotional health during the early phase of the programme but did not sustain this into 2005 unlike the other three schools (Tables 1 to 4). Supportive relationships and clarity about boundaries and expectations in school are key factors in creating an effective school (Weare, 2000). Reasons for not sustaining emotional health in school B likely include an unclear system to cater for teachers' and students' emotional needs and the inadequate provision of appropriate support for students and members of staff with special needs. Targeted programmes and curriculum interventions are needed to improve the emotional and social well-being of students (Weare, 2015).

### *CRs*

All schools reached a very high standard in this key area, especially in relation to proactive linkage with other schools and communities, and activities to promote family and community health activities to enhance personal competencies (Table 5). External reviews by the Hong Kong government's Education Bureau highlighted the successes of schools B and D in linking with community bodies using the HPS concept (available on request). Evidence has shown how engaging parents and communities in schools can enhance positive behaviour and minimise health compromising behaviours (Blum et al., 2002; Patton et al., 2006; St Leger et al., 2010).

All four schools showed significant declines in students' anti-social behaviour. In particular, there was a reduction in incidents of bullying, being threatened and physical fighting, with improved perceptions of school safety in schools A and C. This may be attributed to the co-organisation with community organisations of talks, seminars and activities focusing on school connectedness and good interpersonal relationships between different community groups and participating schools. Universal social and emotional school-based programmes and whole school approaches to bullying prevention with community engagement have also been shown to be effective (Clarke et al., 2015).

### *School's physical environment (PE)*

No marked changes in the school's physical environment were observed in the four schools and the main focus was on improving hygiene in the eating environment rather than promoting an environment conducive to healthy eating (Table 5). Nutrition knowledge transmitted through classroom teaching alone may not be sufficient to influence young people's eating patterns as they also need access to healthy food and social support (Contento, 2011). Physical space is always a structural constraint for schools in Hong Kong and opportunities for physical change are limited. Providing healthy food in schools can also be a daunting challenge as schools need sufficient bargaining power to negotiate contracts that place health and nutrition as top priorities with business-driven food service providers. However, improvements in other HPS key areas, for example, drafting healthy eating school policies, developing PHS through health education and building better CRs to advocate for change may partially compensate for the limitations in the school's ability to improve health behaviours such as healthy eating.

### *Limitations*

A number of contextual factors need to be taken into account when interpreting the data, such as the geographical location of the schools, the socio-economic background of students' families as well as the philosophies of the schools' sponsoring bodies (Appendix 1). The effect of HPS

implementation on school health promotion actions and student health outcomes may be confounded by the above factors.

Although each school's characteristics, geographic location and demographic characteristics were recorded and between them, they typify the most common types of secondary schools in Hong Kong. The small sample size containing only four schools is a major limitation of the study, and they had also reached an advanced level of HPS implementation. Findings cannot generalise to schools at earlier stages of HPS implementation.

Another limitation concerns the nature of cross-sectional nature of the analysis of youth risk health behaviours. While causal relationships cannot be established, undertaking repeated cross-sectional surveys on students of a certain age at particular schools allows for the observation of health behaviour trends over time. These trends can serve as an indicator of school needs.

## Conclusion

This study adds further evidence concerning how the ongoing implementation of an HPS approach can impact students' health behaviour and health status as reported through repeated student health surveys and also the school health environment as observed in relation to changes in the six HPS key areas. The formative (process) and summative (outcome) evaluation undertaken by HKHSA and reported here provides insights into the relative contribution of different HPS areas to students' health.

## Implications for school health

Comparative assessments of performance in each of the six HPS areas in the form of a school health profile, together with a student health profile, can provide a holistic picture of HPS progress and are important formative and summative assessment tools for HPS implementation. Gathering data and monitoring school performance in each of the six HPS key areas is a means to investigating the relative contribution of different school actions to student health and understanding where additional focus is required. The rich data reported here illustrate the utility of student and school-level data for health promotion priority setting at school and community levels.

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