



Pragmatic pilot cluster randomised control trial of a school-based peer-led anti-smoking intervention for 13-14 year olds in Malaysia: Process evaluation

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Pragmatic pilot cluster randomised control trial of a school-based peer-led anti-smoking intervention for 13-14 year olds in Malaysia: Process evaluation

ABSTRACT

Purpose

This paper reports the process evaluation of a pilot randomised control trial of an anti-smoking intervention for Malaysian 13-14 year olds, conducted in 2011/12. It was hypothesised that trained peer supporters would promote non-smoking among classmates through informal conversations.

Methodology

Smoking-related baseline and follow-up questionnaires were administered, seven months apart, to Form 1 students (n=2118) attending eight schools across two districts in Sabah (Kota Kinabalu; Keningau). Concealed stratified randomisation assigned two schools per-district to the control and intervention arms. Control schools received usual care. Intervention schools received usual care and the peer supporter intervention. Peer supporters completed smoking-related knowledge and attitudes questionnaires before and after peer supporter training and peer supporter training evaluation questionnaires. They also discussed the peer supporter training and role in focus groups immediately following training (n=4) and three months later (n=3), and additionally, recorded post-training anti-smoking activity in diaries.

Findings

The pilot trial found that student recruitment was high (baseline students matched at follow-up n=1681 (79% of class-registered students). More boys (n=38) than girls

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3 (n=35) attended peer supporter training. Post-training, most peer supporters had
4 improved smoking-related knowledge (n=55; 75%) and attitudes (n=57; 78%), and
5 returned diaries (n=49; 67%). Some focus group boys reported they were reluctant
6 peer supporters and/or found resisting smoking difficult.
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11 12 13 14 **Practical implications**

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16 Future trials would benefit from outlined modifications to peer supporter selection,
17 recruitment and training and additionally, assessments of context and intervention
18 reach.
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24 25 **Originality**

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27 Trials of complex public health interventions are scarce in economically developing
28 countries.
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33 34 **Key words**

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36 Adolescent smoking prevention and cessation, peer education, schools
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40 41 **Article classification**

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3 **Pragmatic pilot cluster randomised control trial of a school-based peer-led anti-**
4 **smoking intervention for 13-14 year olds in Malaysia: Process evaluation**
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9 **BACKGROUND**

10 Cigarette smoking is the primary cause of premature death in Malaysia (Ministry of
11 Health, Malaysia, 2003). Reducing adolescent smoking is consequently an important
12 Malaysian public health objective (Ministry of Health, Malaysia, 2010). Overall
13 adolescent smoking prevalence in Malaysia is relatively high (20%) (Mochizuki-
14 Kobayashi et al., 2006; Warren et al., 2008), but is much higher among adolescent
15 boys (36%) than adolescent girls (4%) (Hammond et al., 2008; Sirichotiratana et al.,
16 2008). Attending primary school until the age of twelve is mandatory in Malaysia
17 (Ministry of Education, Malaysia, 1996) but most Malaysian teenagers attend
18 secondary school. Hence, secondary school-based anti-smoking interventions in
19 Malaysia are potentially wide-reaching.
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37 Social cognition models such as Bandura's social learning theory (Bandura, 1977) and
38 the Theory of Planned Behaviour (TPB) (Ajzen, 1991) purport to explain human
39 behaviour including smoking during adolescence. Bandura (1977) reasoned that
40 people would learn to smoke indirectly by observing and modelling other people with
41 whom they identify. The TPB (Ajzen, 1991) predicts that smoking-related behaviour
42 is determined by behavioural intention which is future intention regarding smoking
43 uptake or abstaining from smoking. Behavioural intention, in turn, is determined by
44 three proximal variables; attitudes, subjective norms and perceived behavioural
45 control. Attitudes are beliefs for or against smoking and views regarding the
46 consequences of choosing to smoke or choosing to refrain from smoking. Subjective
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3 norms focus on what a person believes important people such as friends want him/her
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5 to do in relation to smoking. Perceived behavioural control refers to the perceived
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7 difficulty a person has in acting in accordance with her/his smoking-related wishes.
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10 Factors such as gender, ethnicity and socio-economic status are external to the model
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12 and only influence behavioural intention through their influence on the three proximal
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14 variables.

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18 School-based peer-led anti-smoking interventions are theoretically informed by social
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20 learning theory (Bandura, 1977) and the TPB (Ajzen, 1991). These interventions aim
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22 to promote positive changes in adolescent smoking-related behaviour through social
23
24 influence and modelling. Two types of intervention fall under the umbrella term of
25
26 school-based peer-led interventions (Audrey et al., 2004). First, students may deliver
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28 classroom-based sessions on smoking-related issues to peers or younger students.
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31 Second, trained peer supporters may influence classmates' smoking-related behaviour
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33 through informal conversations, social influence and modelling. Drawing upon
34
35 Audrey et al. (2004), this paper proposes that through these informal conversations,
36
37 peer supporters are hypothesised to be able to, 1) change their classmates' smoking-
38
39 related knowledge and attitudes, 2) act as role models for their peers and thereby
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41 promote non-smoking subjective group norms and customs within school, and 3) help
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43 their classmates to formulate strategies to resist coercive pressure from other people to
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45 smoke and thereby promote the perceived behavioural control of their classmates.
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52 A school-based peer-led anti-smoking intervention based upon informal conversations
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54 between trained peer supporters and their classmates was evaluated in a large
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56 comprehensive randomised control trial in the UK (the ASSIST trial) (Campbell et al.,
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3 2008). Smoking uptake among 12-13 year olds in this trial was significantly lower in
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5 intervention schools (Campbell et al., 2008). However, a relatively recent systematic
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7 review found that the ASSIST trial was the only published randomised control trial
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9 that had evaluated this type of intervention (Thomas et al., 2013). Additionally, trials
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11 of complex public health interventions including school-based anti-smoking
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13 interventions are relatively rare in economically developing countries.
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18 This paper reports on the mixed methods process evaluation of a pragmatic feasibility
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20 and pilot cluster randomised control trial of a school-based peer-led anti-smoking
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22 intervention for 13-14 year olds in their first year at eight Malaysian secondary
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24 schools (Melson, 2015). The pilot trial was conducted in 2011/12 (Melson, 2015).
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28 The pilot trial intervention was similar in purpose and intent to the intervention
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30 adopted by the ASSIST trial (Campbell et al., 2008). This paper therefore chimes with
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32 the findings of Bloor et al. (1999) who reported on the pilot trial preceding the
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34 ASSIST trial.
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38 The objectives of this paper are to report on 1) pilot trial recruitment, 2) baseline
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40 smoking-related health promotion activity, 3) the feasibility and acceptability of the
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42 peer supporter training including an economic evaluation, 4) the implementation and
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44 functioning of the peer supporter intervention and 5) potential improvements to both
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46 the design and evaluation of subsequent trials of school-based peer-led anti-smoking
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48 interventions in Malaysia. Additionally, when discussing the study findings, this
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50 paper draws retrospectively upon the MRC guidelines for process evaluation (Moore
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52 et al., 2014). These guidelines recommend that feasibility and pilot trials should focus
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54 on fidelity, dose, reach and context (Moore et al., 2014).
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METHODS

Trial design

Detailed description of the pilot trial is available (ISRCTN registry, 2016; Melson, 2014) and outlined in Figure 1. Briefly, eight schools were recruited, four from Kota Kinabalu and four from Keningau both of which are districts in the Malaysian State of Sabah located on the island of Borneo. Concealed stratified randomisation was used to assign two schools per district to the intervention arm of the pilot trial and two schools per district to the control arm of the pilot trial. Intervention schools received the peer supporter intervention and usual care. Control schools received usual care. The intervention schools were - Kota Kinabalu- Intervention School 1 (IS1), Intervention School 2 (IS2), Keningau- Intervention School 3 (IS3), Intervention School 4 (IS4).

Please insert Figure 1 “Flow diagram of pilot trial” here

Usual care was co-ordinated and delivered by designated health promotion officers. These designated health promotion officers attended a briefing session on usual care guidelines that was delivered by the researcher (EM). Usual care activities included health talks, health exhibitions, displays of audio-visual documentaries and the distribution of leaflets. These activities were commonly implemented in the school hall and open to all students including Form 1 students. The aim of these activities was to promote increased awareness of smoking-related issues throughout the school. Usual care did, however, differ between districts and the pilot trial was, therefore, pragmatic.

Logic model and process evaluation methods

The hypothesised influence of the intervention on smoking-related outcomes is outlined in a logic model (Figure 2).

Please insert Figure 2 “A logic model of how the intervention works” here

Process evaluation data were obtained through a variety of sources (Table 1).

Please insert Table 1 “Data sources for process evaluation” here

The following questions were included in the baseline questionnaire that was administered to Form 1 students attending both intervention and control schools: ‘Can you remember hearing about smoking at school e.g. health talks and exhibitions?’ ‘During this school year, were you taught in any of your classes about the dangers of smoking?’ and ‘How long ago did you discuss smoking and health as part of a lesson?’

Process evaluation regarding the peer supporter training programme focussed on 1) peer supporter selection and recruitment, 2) the training programme itself, 3) peer supporters’ perceived training needs, 3) 4) peer supporters’ pre- and post-training smoking-related knowledge and attitudes, 5) training programme evaluation, and 6) training programme costs.

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3 The intended peer supporter selection process was supported by the head teacher of
4 every intervention school and had two stages. A counselling teacher from each
5 intervention school was asked to:
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10 1. Schedule the administration of a poll for Form 1 students to nominate
11 classmates for peer supporter training who were respected, easy to talk to and had
12 leadership qualities.
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16 2. Draw upon the poll results and select students for peer supporter training who
17 could communicate effectively and had an interest in helping peers, a pleasant
18 personality and leadership qualities. Each peer supporter provided written parental
19 consent. Students who smoked were eligible for peer supporter training providing
20 they agreed to stop smoking.
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30 However, EM discovered after the peer supporter training had been completed that
31 even though head teachers in all the intervention schools supported a counselling
32 teacher-administered student poll, these polls were not administered in any
33 intervention school. Instead counselling teachers selected students directly for peer
34 supporter training.
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42 The peer supporter training programme was synthesised from the YPEER Peer
43 Education: Training of Trainers Manual (YPEER, 2003), IPPF/WHR Peer to Peer:
44 Creating Successful Peer Education Programs (IPPF/WHR, 2004), the Peace Corps
45 Life Skills Manual (Peace Corps, 2001) and the Malaysian PROSTAR peer supporter
46 training programme for young people that was originally aimed at HIV prevention
47 (PROSTAR, 2004). Programme details are available (Melson, 2014) but briefly the
48 programme comprised seven sessions; Session 1 Introduction and Ice Breaker;
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3 Session 2 Understanding the role of peer supporter; Session 3 Communication;
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5 Session 4 Facts about tobacco and smoking; Session 5 Identifying high risk smoking-
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7 related situations and overcoming peer pressure; Session 6 Reflection session (Values
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9 and perceptions related to smoking); Session 7 Planning and leadership. The aims,
10
11 objectives and example activities of the peer supporter training programme are
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13 outlined in Table 2.
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18 Please insert Table 2 “Peer supporter training programme aims, objectives and
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20 examples of activities” here
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25 Peer supporter training in each district was delivered over three consecutive days in a
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27 venue outside of school premises. This training was facilitated by EM and eleven
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29 staff members from various health agencies in Sabah. Co-trainers had previously
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31 trained as PROSTAR programme trainers and additionally attended a training session
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33 on the newly developed anti-smoking peer supporter training programme and
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35 accompanying training manual.
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41 The needs assessment questionnaire was administered immediately prior to the peer
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43 supporter training. It focused on characteristics and support that students believed
44
45 were required in order to be a successful peer educator e.g. motivation, knowledge,
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47 supervision, recognition and reward. It also asked students what skills and personal
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49 strengths they believed they had e.g. self-confidence, helpfulness, patience, good
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51 listening skills, good team work skills, and good communication skills.
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3 The knowledge and attitudes questionnaires are available (Melson, 2014). Briefly, the
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5 knowledge questionnaire comprised twelve smoking-related statements with answer
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7 options true, false and don't know. Questions included 'More than 10,000 people are
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9 killed by cigarette smoking in Malaysia each year'; 'Nicotine in cigarettes is not
10
11 addictive'; 'Smokers are more likely to get lung cancer than non-smokers'; 'The
12
13 health of people is not affected by second-hand smoke'. Students scored 1 for a
14
15 correct answer and 0 for other answers. The attitudes questionnaire comprised twelve
16
17 statements that had five point scales anchored 'strongly agree' and 'strongly
18
19 disagree'. Agreement corresponded with a positive (anti-smoking) attitude in most
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21 attitude questions. Positive (anti-smoking) attitudes scored 2 for strongly agree, 1 for
22
23 agree, 0 for don't know, -1 for disagree and -2 for strongly disagree. Some questions
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25 were inverted in intent so that strongly agree corresponded with a negative (pro-
26
27 smoking) attitude but were reversed for scoring purposes. Questions included 'I prefer
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29 being with friends who do not smoke'; 'Smoking should be strictly prohibited in
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31 public areas in order to promote public health'; 'Smoking reduces stress and is
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33 relaxing'.

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40 The evaluation of training questionnaire asked peer supporters to 1) identify the
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42 component of the training programme they found most useful, 2) identify any
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44 component of the training programme they disliked, and 3) provide suggestions for
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46 improving the training course.
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51 Two single gender focus group discussions that aimed to elicit peer supporters' views
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53 of their training were conducted in each district immediately following the peer
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55 supporter training. Students (n=8 per focus group) were drawn from both intervention
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3 schools in that district. In each district, EM facilitated one focus group discussion and
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5 a co-trainer of the anti-smoking peer supporter training programme facilitated the
6
7 other. The focus group discussions were semi-structured and identical topic guides
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9 and prompts were used. Efforts were made to involve all participants in these
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11 discussions in order to ensure that data collection was not simply focused on a few
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13 participants.
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18 The second set of three mixed gender focus group discussions were conducted three
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20 months after the peer supporter training was completed and aimed to elicit students'
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22 views regarding their role as peer supporters. Each focus group was comprised of
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24 students from the same school (IS1, six boys, two girls; IS3, four boys, four girls; IS4,
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26 five boys, six girls). Students attending IS2 did not participate in these focus group
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28 discussions. EM facilitated these semi-structured focus group discussions on school
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30 premises using the same topic guide and prompts. Efforts were made to involve all
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32 participants in these discussions in order to ensure that data collection was not simply
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34 focused on a few participants.
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40 All focus group discussions were conducted in Malay and digitally recorded.
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42 Recordings were anonymised, transcribed verbatim and translated into English. The
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44 transcribed discussions were manually reviewed to identify themes. Analytic
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46 induction (Bendassolli, 2013) allowed EM to compare and contrast the different
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48 accounts and build up categories of themes that were directly or obliquely related to
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50 the topic guide components. Focus group discussion excerpts were labelled according
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52 to the related theme and used to provide quotes to illustrate the theme. Quotes
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54 included in this paper were back translated to ensure that they are authentic and
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3 accurately reflected what the young person said. Included quotes are labelled to
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5 indicate the student's gender and school but students' names have been changed.
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10 Post-training, peer supporters recorded their smoking-related peer supporter activity
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12 in diaries. The diaries are available (Melson, 2014). Briefly, peer supporters were
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14 asked to record 1) when the peer supporter activity took place, 2) what activity took
15
16 place e.g. helping classmates, discussions, anti-smoking campaigns, 3) who the peer
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18 supporters talked to i.e. individuals, small groups (<10 people), large groups (10 or
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20 more people), and 4) where the activity took place i.e. at school, home or outside of
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22 school and home. Peer supporters were asked to return their peer supporter diaries to
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24 the researcher six months after the peer supporter training had been completed. The
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26 number of times each activity was recorded in the diaries was summated across all the
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28 returned diaries.
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34 The following questions were included in the follow-up questionnaire that was
35
36 administered to Form 1 students attending both intervention and control schools:
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38 'Have you ever talked to your classmates about smoking issues?' and 'Have you ever
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40 talked to your classmates about the disadvantages of smoking?'.
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45 **RESULTS**

46 **Recruitment of schools**

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49 The first eight schools that were approached agreed to participate in the pilot trial.
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52 **Student recruitment to the pilot trial**

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3 The proportion of class-registered students (total n=2118; Intervention schools (IS)
4 n=1122; Control schools (CS) n=996) who completed baseline and follow-up
5 questionnaires was high (Baseline questionnaires: IS n=1038 (93%); CS n=933
6 (94%); Follow-up questionnaires IS n=990 (88%); CS n=898 (90%)). The proportion
7 of class-registered students whose baseline and follow-up responses were matched i.e.
8 belonging to the same person was also high (IS n=889 (79%); CS n=792 (80%)).
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19 **Baseline smoking-related health promotion activity**

20 At baseline, intervention school students were significantly less likely to recall talks
21 organised by health promotion officers on the dangers of smoking (IS n=841, 81%;
22 CS n=793, 85%) [OR (95%CI); 0.95 (0.92-0.99)]. Similar proportions of students in
23 intervention and control schools reported they had been taught by teachers about the
24 dangers of smoking (IS n=830, 80%; CS n=774, 83%) [OR (95%CI); 0.96 (0.92-
25 1.01)]. However, relatively few recorded that this teaching occurred in secondary
26 school (IS n=104, 10%; CS n=74, 8%) [OR (95%CI); 1.26 (0.95-1.68)].
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39 **Peer supporter selection**

40 In the first set of focus group discussions, most peer supporters reported they were
41 happy and/or proud and/or excited to be selected for peer supporter training and
42 agreed immediately. Some reported they were shocked because they had only been in
43 their new school for about six months. A few said they agreed even though they were
44 worried, but reported that their anxiety abated after attending the training course.
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54 Discussions within both sets of focus groups indicated that, contrary to the outlined
55 peer supporter selection procedure, no counselling teacher within an intervention
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3 school had conducted student polls. Instead, counselling teachers selected students
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5 directly. Therefore, many peers did not know about the selection process.
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- 7 • *Classmates asked me, how I could have been chosen for the peer educator*
8 *training. (Ella (girl) IS3)*
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11
12 Other peers were unhappy they had not been selected.

- 13
14 • *Some classmates were jealous when we went for the [peer educator] training,*
15 *they asked why we were chosen by the counselling teacher. (Lina, (girl) IS4)*
16

17 18 19 **Peer supporter recruitment**

20 The planned peer supporter recruitment rate was n=80 peer supporters for n=1122
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22 class-registered students. Thus, the planned ratio of peer supporters to class-
23
24 registered students was 1 peer supporter per 14 class registered students (7%).
25

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27 However, even though written parent/guardian consent was obtained from every
28
29 selected student only n=73 were trained. Recruitment of students consequently varied
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31 across schools (IS1 n=12, 5% of class-registered students n=233; IS2 n=23, 6% of
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33 class-registered students n=393; IS3 n=19, 10% of class-registered students n=191;
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35 IS4 n=19, 6% of class-registered students n=300). More boys (n=38) were recruited
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37 than girls (n=35).
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43 44 **Peer supporters' needs assessment**

45 The needs assessment questionnaires that were completed by peer supporters prior to
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47 peer supporter training indicated that the majority of students believed that
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49 successfully undertaking the role of peer supporter required students to be motivated
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51 (n=64; 87%) and have knowledge (n=64; 88%). A minority of students also reported
52
53 that in order to undertake peer supporter-related tasks they would need 1) supervision
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55 (n=31/73; 43%) and/or 2) recognition (n=12/73; 16%) and/or 3) reward (n=5/73; 7%).
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5 In relation to personal skills and strengths, the majority of peer supporters believed
6 that prior to the training they were self-confident (n=64; 88%), willingly helped others
7 (n=61; 84%) and were patient (n=57; 78%). More than half also thought they were
8 good listeners (n=50; 69%), able to work in a team (n=47; 64%) and mixed well
9 (n=44; 60%). However, nearly half of the students (n=35; 48%) did not believe they
10 were good communicators.
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21 **Evaluation of the peer supporter training course**

22 Students rated the seven sessions of the training course on a scale of 1 (needs a lot of
23 improvement) to 5 (excellent) (Melson, 2014). All seven sessions obtained a mean
24 score of at least 4 (good) out of 5:
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29 Session 1 Introduction and Ice Breaker mean score n=4.0;

30 Session 2 Understanding the role of peer supporter mean score n=4.4;

31 Session 3 Communication mean score n=4.2;

32 Session 4 Facts about tobacco and smoking mean score n=4.3;

33 Session 5 Identifying high risk smoking-related situations and overcoming peer
34 pressure mean score n=4.5;

35 Session 6 Reflection session (Values and perceptions related to smoking) mean score
36 n=4.3;

37 Session 7 Planning and leadership mean score n=4.3).

38 Thus, the highest mean score (n=4.5) was obtained for Session 5 which aimed to help
39 students identify high risk smoking-related situations and included role play using
40 structured scenarios. No student had experienced role play using structured scenarios
41 before the peer supporter training.
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5 In the evaluation of training questionnaire, peer supporters were asked to identify the
6 part of the training programme they found most useful and any aspect they disliked.
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9 Regarding usefulness, the most common answer referred to learning ways to
10 communicate effectively (n= 18; 25%). The first set of focus group discussions
11 supported this finding.
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15 • *I liked the communication session. We practiced communicating with each
16 other and it will help us in our daily talks and actions. (Rafi (boy) IS4)*
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- 18
19 • *I liked the communication process and the tips to be a good listener. (Shida
20 (girl) IS4)*
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25 A sizable proportion (n=31; 43%) reported they did not dislike any aspect of the
26 programme. The component that was most commonly reported as being disliked was
27 the reflection component (n=14; 19%). This component aimed to reaffirm students'
28 commitment to their families. One participant raised concerns about this component
29 in the first set of focus group discussions.
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33 • *I didn't really like the reflection session. It is good to remind us how our
34 parents love, work hard and sacrifice for our sake, but I pitied one pupil from
35 our school, he just lost his father, I think it needed to be adjusted. (Lina (girl)
36 IS4)*
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39 40 41 42 43 **Peer supporters' suggestions for improving the training course**

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45 In the evaluation of training questionnaire, approximately half of the peer supporters
46 (36; 49%) did not provide any suggestions for improving the peer supporters training
47 course . The most common suggestions for improving the training course included
48 increasing the number of educational games (n=7; 10%), extending the training
49 course (n=5; 7%) and continuing the training (n=3; 4%). The most common focus
50 group suggestion centred on extending the training programme.
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- *Extend the training to a bit longer To one week (Din (boy) IS2)*

Peer supporters' smoking-related knowledge and attitudes pre- and post-peer supporter training

The maximum possible score for the knowledge questionnaire was twelve. The mean knowledge score increased by 1.8 points from 8.2 pre-training to 10.0 post-training.

Post-training, most students had higher knowledge scores (n=55; 75%), some had the same knowledge score (n=13; 18%) and a few had lower knowledge scores (boys n=4, girls n=1; 7% overall).

The maximum possible score for the attitudes questionnaire was twenty-four. The mean attitudes score increased towards non-smoking by 3.4 points from 18.2 pre-training to 21.6 post-training. Post-training, most students had more positive anti-smoking attitudes scores (n=57; 78%), some had the same attitudes score (n=7; 10%) or more negative pro-smoking attitudes scores (boys n=6, girls n=3; 12% overall).

Costs of delivering the peer supporter training courses

The total direct costs (including 2 nights and 3 days accommodation, food, training venue hire, stationary and a banner/backdrop) were Malaysian Ringgit (MYR) 13,282.10 or £2656.40 at a rate of MYR 5 for £1. The average costs were MYR 3320 (£664) per school and MYR 182 (£36) per peer supporter. Catered food for students was the largest contributor to training costs (MYR 6,000).

Peer supporters' experiences

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3 Post-training, peer supporters' experiences were ascertained during the second set of
4 focus group discussions. These discussions focussed on personal abstention from
5 smoking and smoking-related discussions. Personal development outwith the role of
6 non-smoking peer supporter was also identified.
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11 Abstaining from smoking

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14 The peer supporter training programme aimed to promote commitment to non-
15 smoking. When asked in focus groups three months after the training how difficult it
16 was or would be to say 'No' to offers of cigarettes, peer supporters' responses were
17 mixed. For example, refusing cigarettes was straightforward for some peer supporters.
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- 21 • *[I] hate the smell of cigarettes. No matter what people do, I will say I don't*
22 *smoke. For me it's easy to say no. (Lita (girl) IS4)*
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29 Others, particularly boys, felt the training helped them and they were consequently
30 more confident when refusing cigarettes. This increased confidence was gained even
31 though:
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- 34 1. Their friends encouraged them to smoke.
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38 • *Before the training, it was a bit difficult because my friends forced me to try*
39 *smoking. Now it is easy because if they offer me a cigarette I will say directly*
40 *that I don't smoke, if they insist I'll ignore them and walk away. (Ben (boy)*
41 *IS1)*
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43
- 44 2. Their friends put emotional pressure on them to act in similar ways.
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47 • *It is easy now. Before this I have a friend who was upset and threatening not*
48 *to be my friend forever if I don't smoke. (Bret (boy) IS3)*
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- 51 3. They classified themselves as a smoker prior to peer supporter training.
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54 • *Before I was chosen as a peer educator, I was a smoker but now I already*
55 *stopped. Some friends tried to persuade me to smoke but now I know ways to*
56 *avoid smoking. (Wong (boy) IS1)*
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3 However, some boys said they did or would find it difficult to refuse cigarettes

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1. They found themselves in situations in which friends offered them cigarettes.
 - *It's difficult to say no [to smoking] ... when our close friends force us to start smoking if we hang around in a group or environment where most of our friends are smokers. (Asraf IS4)*
 2. In common with their peers they were inquisitive and liked to experiment
 - *It is quite difficult because young people like to try [smoking]. (Aidi IS3)*
 - *Young people are curious and want to try new things. (Asraf IS4)*

One boy was tempted to smoke even though he felt keenly that his parents did not want him to smoke and drew upon the sacrifices his parents made for him to reinforce this point.

- *It is difficult. I'm curious to try it [smoking] but I keep reminding myself to remember my parents' advice not to smoke. It is not easy for them to send me to school. (Arul IS3)*

Smoking-related discussions

Most peer supporters had willingly discussed smoking-related issues after peer supporter training. Talking with peers rather than people from other age groups appeared the preferred option.

- *I feel it's difficult to talk or give an opinion about smoking to people who are much older or much younger than me, I feel more comfortable talking or advising my classmates who are the same age. (Arul (boy) IS3)*

A few peer supporters were happy discussing smoking-related issues with people outside of school.

- *I am confident enough to talk to people in my village especially when sharing the information I got about the contents of cigarettes and their risks. (Noor (boy) IS3)*

Focusing on facts about smoking was the most popular approach

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- *I have become braver about telling others not to start smoking because I got the information about the risks of smoking and the contents of cigarettes. (Richi (boy) IS4)*

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However, some peers found photographs of the effects of smoking unsettling.

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- *I showed some pictures to my classmates, some of them were afraid, shocked, they don't want to see them, maybe they were frightened of dying early. (Ella (girl) IS3)*

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Occasionally peer supporters appeared to be a little punitive in their wish to promote non-smoking given that students caught smoking on school premises in Malaysia may potentially be suspended/expelled or subjected to corporal punishment.

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- *I told the discipline teacher about our classmates who smoke and the places they used to smoke in school such as behind the resource centre and toilet. (Rey (boy) IS4)*

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Many peer supporters received support from their classmates and some were praised for their willingness to be peer supporters.

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- *Some of my friends gave me compliments for being a peer educator. (Era (girl) IS1)*

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However, a few students were reluctant peer supporters because classmates mocked them.

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- *I don't feel comfortable being a peer educator because sometimes my friends like to ridicule my role as a peer educator. (Kal (boy) IS1)*

48 Other benefits arising from the peer supporter training

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Several peer supporters felt the training helped them to develop as people outwith their role of non-smoking peer supporter particularly in relation to empathy.

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- *Being a peer educator is really an eye and heart opening for me to understand the feelings of others. My relationship with friends is closer now. (Krista (boy) IS4)*

- *I understand my classmates more when I help them. (Lidia (boy) IS4)*

One peer supporter recounted that since the training she was happy to help others in areas of life that were unrelated to smoking such as schoolwork.

- *I gave advice to my classmates who were having problems with their studies. They like to share problems with me, I gave them support, I have become a listener to their problems. I'm happy they appreciate my opinion. (Ella (girl) IS3)*

Another peer supporter's personal development had an internal focus

- *As a peer educator, our roles are more than advising and educating our classmates. ... We need to look at ourselves, we need to be a good role-model, improve ourselves first before we help others. (Bret (boy) IS3)*

Peer supporter activity

Peer supporter activity was assessed through an analysis of 1) diaries that peer supporters used to record their anti-smoking-related activities and 2) follow-up questionnaire responses from all Form 1 students.

Peer supporters' diaries

Most peer supporters (n=49; 67%) returned their diaries, as requested, six months after completing the peer supporter training. The rate of diary return varied between schools (IS1 6/12 (50%); IS2 14/23 (61%); IS3 16/19 (84%); IS4 13/19 (68%)). Girls (n= 28; 80% of girls) were more likely to return diaries than boys (n=21; 55% of boys).

Reported peer supporter activity that targeted peers occurred on an individual basis (n=396; 42%), in small groups of fewer than ten people (n=414; 44%) and in groups with at least ten people (n=124; 13%). Total activity was n=934 (396+414+124).

Girls recorded more overall activity (n=618/934, 66%) than boys (n=316/934, 34%).

In relation to helping classmates, girls again recorded greater activity (n=110) than

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3 boys (n=56). However, the recorded median scores for helping classmates were
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5 relatively small for both girls (n=3) and boys (n=2). These results indicate a few peer
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7 supporters undertook a sizeable proportion of reported occasions during which
8
9 classmates were helped directly.
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11 12 13 **Form 1 students' experiences of smoking-related discussions**

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16 Follow-up questionnaire data indicated that students attending intervention schools
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18 were significantly more likely to report they had smoking-related conversations with
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20 classmates (IS n=428 (43%); CS n=339 (38%)); [OR (95% CI); 1.15 (1.03-1.28)].
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23 However, attending an intervention school did not significantly influence the
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25 likelihood of having discussed the disadvantages of smoking with classmates (IS
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27 n=622 (63%); CS n=532 (59%)); [OR (95% CI); 1.06 (0.99-1.14)].
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32 **DISCUSSION**

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34 The first eight schools that were approached agreed to participate in the pilot trial.
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36 Thus, school recruitment to the pilot trial was straightforward. Student recruitment to
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38 the pilot trial was also high. Implementing a pilot trial of a school-based peer-led
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40 anti-smoking intervention was consequently feasible and acceptable in Malaysia.
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42 These findings also indicate that Malaysian secondary school head teachers support
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44 anti-smoking health promotion interventions and recognise the importance of
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46 participating in trials to evaluate intervention effectiveness. Students were pleased to
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48 be selected for peer supporter training. Most peer supporters also enthusiastically
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50 engaged with the training programme, willingly undertook peer supporter-related
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52 activities and returned diaries. Additionally, some peer supporters reported that the
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54 peer supporter training facilitated their personal development outwith their role of
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3 non-smoking peer supporter. This pilot trial and accompanying process evaluation
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5 did, however, have study limitations that should be considered when implementing
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7 future trials of school-based peer-led anti-smoking interventions with embedded
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9 process evaluation in Malaysia. The MRC guidelines for process evaluation
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11 recommend that feasibility and pilot trials should focus on fidelity, dose, reach and
12
13 context (Moore et al., 2014).
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16 17 18 **Fidelity** 19

20 Fidelity focuses on whether the intervention was implemented as intended. The key
21
22 issues regarding fidelity in this pilot trial were 1) the peer supporter selection process,
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24 2) recruitment of male peer supporters, 3) peer supporter training and, 4) the views of
25
26 teachers and students who were not peer supporters.
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29 30 31 Peer supporter selection 32

33 Student polls were a key aspect of the intended selection process outlined to
34
35 counselling teachers in this pilot trial. Even though all the head teachers in the
36
37 intervention schools supported a counselling teacher-administered student poll, no
38
39 student poll was conducted in any intervention school. We did not anticipate this.
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41 Some students were reportedly unhappy they were omitted from the selection process.
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47 A basic tenet of school-based peer-led interventions is that peer supporters are able to
48
49 influence their peers and sway them towards non-smoking (Bloor et al., 1999). The
50
51 successful peer supporter intervention that was adopted by the ASSIST trial drew
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53 upon student polls to identify potential peer supporters on the basis that classmates
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55 considered them influential within the school context (Audrey et al., 2004). In
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3 contrast, counselling teachers in this pilot trial were instructed to draw upon the
4
5 student poll results and select peer supporters who were pleasant, helpful, good
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7 communicators and had leadership qualities. These students may/may not have been
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9 influential within the school context. However, as highlighted by the ASSIST trial,
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11 the identification of influential students requires student input through, for example,
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13 student polls.
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18 Organising student polls in Malaysia may have been too onerous for counselling
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20 teachers with heavy workloads. Students in the ASSIST trial were invited to
21
22 nominate classmates for peer supporter training via researcher-administered baseline
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24 questionnaires (Audrey et al., 2004). Researchers then identified students with the
25
26 most nominations in each school and worked with teachers to select students for peer
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28 supporter training.
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34 Employing the ASSIST peer supporter selection procedure is, however, unlikely to be
35
36 tenable in Malaysia because many students in a single school year have the same or
37
38 similar names. Thus, identifying nominated students is unlikely to be straightforward.
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40 Teacher or researcher-administered class-level student polls are a possible way
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42 forward in Malaysia as fewer students per class poll would have the same or similar
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44 names.
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48 49 The recruitment of male peer supporters

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51 Unlike the ASSIST trial (Audrey et al., 2004), recruiting male peer supporters in this
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53 pilot trial was straightforward and more boys (n=38) than girls (n=35) were recruited.
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55 However, some boys in the second set of focus group discussions indicated they 1)
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3 had found/would find it difficult to resist smoking and/or 2) were uncomfortable
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5 undertaking peer supporter activities. Additionally, fewer boys (n=21; 55% of boys)
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7 than girls (n=28; 80% of girls) returned completed diaries. The reasons boys were
8
9 less likely to return completed diaries were not identified. Some boys may have had
10
11 informal smoking-related conversations and either forgotten to record them in their
12
13 diaries or forgotten to return their diaries.
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18 It is possible that female peer supporters may be able to influence their male peers on
19
20 smoking-related issues. However, gender differences in adolescent smoking
21
22 prevalence in Malaysia highlight the importance of recruiting male peer supporters.
23
24 Based upon the return of peer supporter diaries, the majority of boys (n=21; 55% of
25
26 boys) appeared to respond well to the peer supporter intervention. This view is
27
28 supported by the observations that post-peer supporter training, only n=4 boys (11%)
29
30 had lower knowledge scores and only n=6 boys (16%) had more negative pro-
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32 smoking attitudes. Thus, even though boys may be more likely to disengage from the
33
34 peer supporter training and intervention than girls, this paper proposes that more boys
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36 than girls are trained as peer supporters in future trials in Malaysia.
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42 This paper suggests that a minority of students may have failed to embrace the aims
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44 of the peer supporter training programme. This suggestion is based upon the
45
46 observation that some students achieved lower knowledge scores post-training and
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48 more negative pro-smoking attitude scores post-training. These students were more
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50 likely to be boys (knowledge test n=4 (11% of boys); attitudes test n=6 (16% of boys)
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52 than girls (knowledge test n=1 (3% of girls); attitudes test n=3 (9% of girls). These
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54 students may have attended the peer supporter training for reasons related to
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3 adventure and derring-do and because the training course was different and they
4 stayed away from school and home for three days with friends. Overcoming this
5 potential problem in future trials may be difficult, especially if greater emphasis is
6 placed on recruiting influential students who may/may not be reluctant to outline their
7 reasons for attending the training course.
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14 15 16 The peer supporter training

17 The current peer supporter training course was rated very highly by peer supporters.
18 Pre-training, approximately half of the peer supporters (n=35; 48%) believed they
19 were poor communicators. Perhaps unsurprisingly, therefore, the training programme
20 session on communication skills was most frequently reported as useful.
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29 It is likely, however, that modifying the current course would be beneficial. The
30 reflection component aimed to reaffirm students' commitment to their family and
31 thereby potentially promote non-smoking. Students' families are commonly forces
32 for sobriety. Teenagers who detach themselves from families and schooling may
33 potentially seek support from youth cultures that are forces for experimentation and
34 hedonism and these youth cultures may encourage teenagers to smoke (Markham,
35 2015). Focus group discussions in this pilot trial supported the view that some
36 Malaysian youth cultures encourage experimentation with cigarettes. However,
37 teenagers' sensitivity to different familial circumstances may have been
38 underestimated in this pilot trial. Approximately one in five peer supporters (n=14;
39 19%) reported in the evaluation of training questionnaire that they disliked the
40 reflection component and focus group discussions highlighted concerns about this
41 component. It is likely that as teenagers mature and develop their identities they need
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3 to be actively involved in the decisions about who and what they are committed to
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5 (Markham, 2015). This paper, therefore, proposes that the reflection session may
6
7 have been too forceful and direct and recommends that it is not included in future
8
9 training programmes.
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14 Peer supporters' attitudes towards smoking were assessed immediately prior to the
15
16 peer supporter training and immediately after the training was completed. Some of
17
18 the attitude questions were inverted in intent so that strongly agree corresponded with
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20 a negative (pro-smoking) attitude but were reversed for scoring purposes. The pilot
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22 trial was conducted in 2011/12. At that time, it was commonly believed that reversing
23
24 some attitude questions would reduce or prevent response bias that was associated
25
26 with self-report questionnaires (Baumgartner and Steenkamp, 2001). Response bias
27
28 threatens the validity of participants' responses. However, van Sonderen et al. (2013)
29
30 subsequently found that reversing questions in self-report questionnaires did not
31
32 prevent response bias and recommended that questions should be expressed in the
33
34 same direction. Therefore, this paper recommends that attitudes questions are not
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36 reversed in future trials.
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43 Views of teachers and students who were not peer supporters regarding the 44 45 intervention

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47 Eliciting the views of teachers and students who were not selected to be peer
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49 supporters would have extended the research team's understanding of the
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51 acceptability and implementation of the intervention. Future trials could, therefore,
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53 usefully consider identifying these views as part of the accompanying process
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55 evaluation.
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Dose (Peer supporter recruitment)

Dose refers to number/proportion of Form 1 students trained as peer supporters. The planned peer supporter recruitment rate in this pilot trial was 7% of class-registered students but the actual peer supporter recruitment rate was slightly lower (6.5%).

This paper proposes that running the training course at the weekend in Kota Kinabalu is a likely contributing factor to this lower than planned recruitment and recommends that future training courses are delivered during the school week.

Training costs per student in this pilot trial (approximately £36) and the ASSIST trial (£32) (Hollingworth et al., 2012) were similar. However, the ASSIST trial recommended that approximately 16% of students should be trained as peer supporters (Audrey et al., 2004). Therefore, replicating the ASSIST trial peer supporter intensity guidelines would have required the training of approximately forty-five peer supporters per average Malaysian secondary school. This would have increased overall peer supporter training costs as the provision of food for students was the largest contributor to these training costs. Training more peer supporters per training course could, however, potentially reduce student-level training costs through economies of scale.

This paper proposes that future trials in Malaysia could consider adopting the ASSIST trial peer supporter recruitment rate, providing, that is, the increased overall training costs are not prohibitive. Alternatively, future trials could consider conducting preliminary social network analysis. This type of analysis would identify the students who wielded the greatest social influence and would more accurately predict how

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2
3 many students would be needed to be trained as peer supporters. Conducting this type
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5 of analysis may even indicate that fewer than 16% of students would need to be
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7 trained as peer supporters.
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10 11 **Reach**

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14 Reach in this pilot trial refers to informal smoking-related discussions between peer
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16 supporters and their Form 1 classmates. Prior to obtaining Form 1 students' responses
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18 in the follow-up questionnaire, it had been anticipated that the following questions
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20 were reasonable and would provide relevant information regarding peer supporters'
21
22 reach; 'Have you ever talked to your classmates about smoking issues?' and 'Have
23
24 you ever talked to your classmates about the disadvantages of smoking?'. However,
25
26 the number of reported discussions between peers on the disadvantages of smoking in
27
28 both intervention schools (n=622) and control schools (n=532) were greater than the
29
30 number of conversations between classmates about smoking-related issues (IS n=428;
31
32 CS n=339), which was not anticipated. Rather, it had been expected that pupils would
33
34 interpret the 'Have you ever talked to your classmates about smoking issues?'
35
36 question as focusing on smoking-related issues in general and there would be more of
37
38 this type of conversation than conversations that focussed on the disadvantages of
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40 smoking. On reflection this paper concludes that these questions are too ambiguous
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42 and should not be included in the process evaluation of future trials.
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50 The hypothesised route through which the intervention influences teenagers'
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52 smoking-related behaviour is through informal communication between peer
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54 supporters and their classmates. Peer supporters may have these conversations with
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56 one or more classmates. Through these informal conversations peer supporters may
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3 help their peers to formulate strategies to resist coercive pressure from other people to
4 smoke (Audrey et al., 2004), as identified in the logic model (Figure 2). Additionally,
5
6 peer supporters may act as agents for promoting non-smoking group norms and
7
8 customs within an identified context by acting as role models for their peers (Audrey
9
10 et al., 2004). Follow-up questionnaires in future trials should, this paper proposes, be
11
12 amended to reflect the hypothesised routes. Potential questions could include: 'Have
13
14 you ever discussed how you might resist smoking with your classmates?'; 'Have you
15
16 ever discussed how you might resist smoking with people you know were trained as
17
18 anti-smoking peer educators?' 'Thinking about the most influential people in your
19
20 school year, would you say that the majority of these influential people smoke or that
21
22 the majority of these influential people do not smoke?' 'Thinking about the people
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24 you know were trained as anti-smoking peer educators, would you say that the
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26 majority of them smoke or that the majority of them do not smoke?'.
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34 **Context**

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36 Context refers to factors outside of the intervention that augment or diminish
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38 intervention effects. Contextual factors may affect teenagers' decisions to smoke
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40 (Markham et al., 2009). Baseline smoking-related health promotion activity prior to
41
42 the intervention was the only contextual factor that was assessed in this pilot trial.
43
44 The research team were retrospectively made aware that the Malaysia National Anti-
45
46 Drugs Agency delivered an anti-illegal drug programme in one intervention school in
47
48 Kota Kinabalu during this pilot trial. Additionally, health promotion activities that
49
50 constituted usual care were not monitored and assessed. Health promotion
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52 interventions and activities that are/are not part of usual care may potentially
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54 influence adolescent smoking and thus, the apparent effectiveness of peer-supporter
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3 interventions. Hence, this paper proposes that future trials should monitor both
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5 additional health promotion activities that focus on substance use (drug use, alcohol
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7 and smoking) and usual care in order to identify variations across schools within and
8
9 between districts. Subsequent analyses could then either adjust for any school-level
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11 differences and/or include post-hoc sensitivity analyses.
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16 Markham et al. (2009) reasoned that as a consequence of the influence of contextual
17
18 factors, transferring similar adolescent anti-smoking interventions between countries
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20 may not be straightforward. Thus, the potential influence of contextual factors on
21
22 intervention effectiveness may be usefully extended in future trials (Markham, 2015;
23
24 Markham et al., 2009). Potentially important contextual factors include variations in
25
26 the aims and values of schools (Weiner et al., 2009) and how well peer supporter
27
28 interventions fit with these aims and values (Samdal and Rowling, 2011).
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32 33 34 **Conclusion**

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36 A fully powered cluster randomised control trial of the intervention with embedded
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38 process evaluation and a follow-up of at least twelve months would be the next step.
39
40 The findings from this pilot study would suggest that such a trial would be feasible
41
42 and straightforward in Malaysia. However, this pilot trial and accompanying process
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44 evaluation has found that future trials may benefit from, 1) modifications to the
45
46 methods for selecting, recruiting and training peer supporters, 2) modifications to
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48 assessments of the influence of the peer supporter training on participants' smoking-
49
50 related attitudes and 3) modifications to assessments of intervention acceptability,
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52 reach and context.
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Table 1 Data sources for process evaluation

Assessment	Data sources	Providers of information
Recruitment to pilot trial	Baseline questionnaire Follow-up questionnaire	All Form 1 students present on day of administration
Baseline smoking-related health promotion activity in schools	Baseline questionnaire	All Form 1 students present on day of administration
Implementation of the peer supporter training courses	Needs assessment questionnaire before the peer supporter training Smoking-related knowledge questionnaire before and immediately after the peer supporter training Smoking-related attitudes questionnaire before and immediately after the peer supporter training Evaluation of the training questionnaire immediately after the peer supporter training First set of single gender focus group discussions immediately after the peer supporter training	Peer supporters Peer supporters Peer supporters Peer supporters Peer supporters
The implementation of the peer-led intervention	Second set of mixed gender focus group discussions three months after completing the training programme Completed Diaries six months after completing the training Follow-up questionnaires	Peer supporters Peer supporters. programme All Form 1 students present on day of administration

Table 2 Peer supporter training programme aims, objectives and examples of activities

Aims	Objectives: By the end of the programme students would:	Example of activity
To facilitate increased understanding of smoking-related issues	Know the extent of tobacco use in Malaysia and worldwide Know the contents of cigarettes Have greater understanding of the short term impact of smoking Have greater insight into smoking-related diseases	Video of an experiment where cigarettes were boiled and their contents identified
To reaffirm commitment to not smoking	Recognise high risk smoking-related situations Have learned strategies for rejecting offers of cigarettes	Role play where participants practised in pairs starting conversations in a variety of scripted scenarios
To facilitate the development of communication skills	Have developed their verbal and non-verbal communication skills Have greater understanding of the different ways of giving and receiving information	Lecture on the basic communication process, the important elements of communication and tips on how to be a good listener
To facilitate personal development	Have experience of working in teams Be able to present in small groups and to the whole group	Assigning their small group of 6 or 7 a name and creating a small group slogan and small group logo
To reaffirm commitment to family	Have reflected on their commitment to their family	Visualisation of each of their identified loved ones and reflection on the wishes of their loved ones for the participant
To understand the role of peer supporter	Understand the activities of a peer supporter Be able to accurately complete diaries	Practise how to use the diaries

Figure 1 Flow diagram of pilot trial

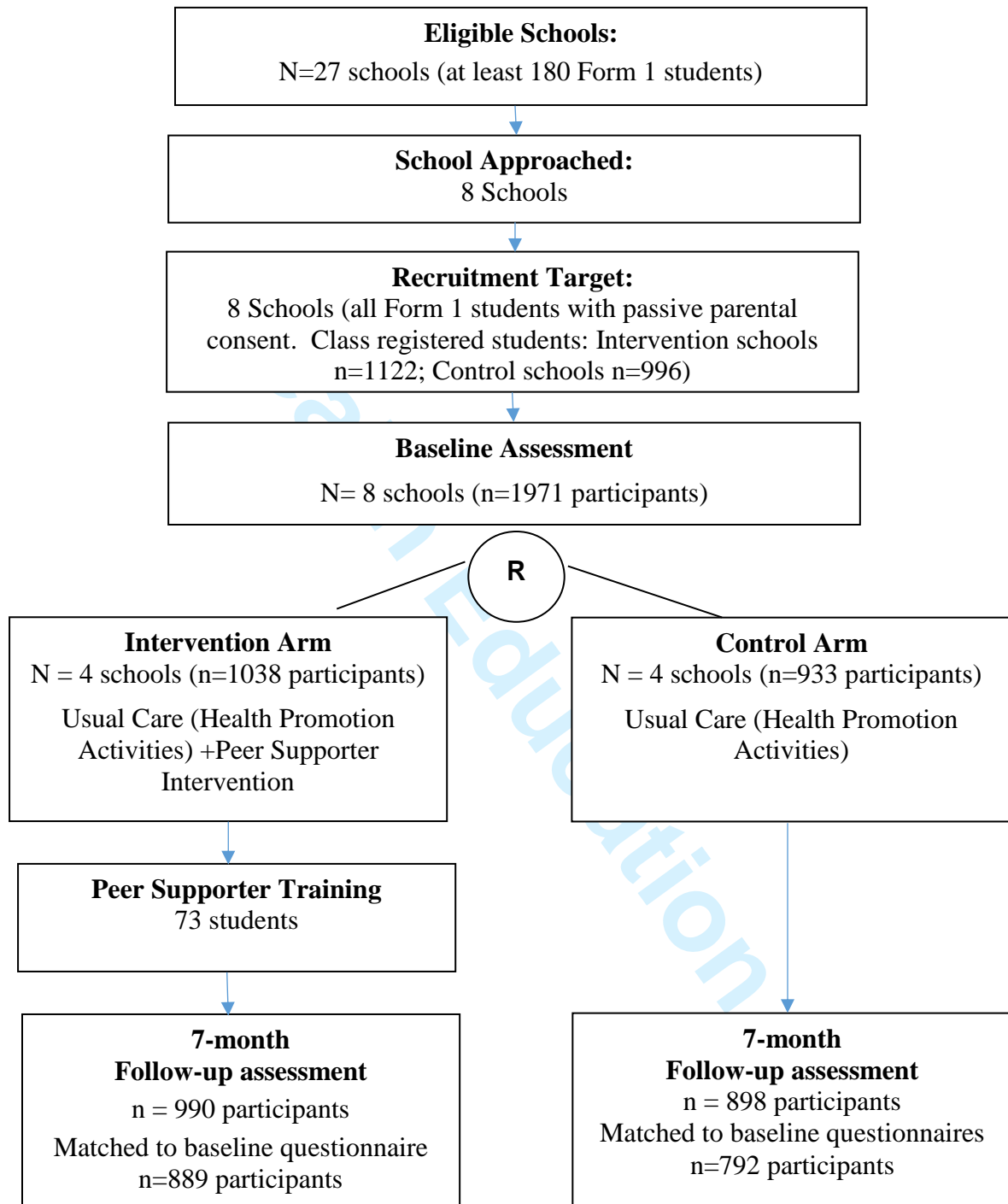


Figure 2 A logic model of how the intervention works (drawn from Ajzen 1991, Bandura 1986, YPEER 2003, IPPF/WHR 2004, Peace Corps, Malaysian PROSTAR 2004)

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