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Stickers: A popular health promotion resource, but do they have any effect?

Print materials such as brochures, booklets, pamphlets, posters and stickers (an adhesive label or notice, generally printed or illustrated) are frequently used as health promotion resources in order to improve knowledge and promote healthy attitudes and behaviours (Holt, 2000; LaPier, 2000; Paul, Redman, & Sanson-Fisher, 2003). Printed items form the basis of many social marketing interventions as they provide a platform for providing targeted, stylised information on mass (Shieh & Hosei, 2008; Farmer et al., 2008; Holt, 2000; Horner, Surratt, & Juliusson, 2000). Social marketing collateral such as stickers, brochures and so forth, are portable (can tuck in a pocket, stick to a window), malleable (can be altered, drawn on) and static (the message remains constant). For at least these reasons, health promotion has drawn upon marketing methods to shape the views and perceptions of consumers (Vallance et al., 2008, Kroeze, Oenema, Campbell, & Brug, 2008; LaPier, 2000). However, the evidence in favour of behaviour change as a result of social marketing messages alone is inconclusive (Farmer et al., 2008; Lancaster & Stead, 2005; Paul et al., 2003).

Despite the arguably small benefit, the use of print materials may play a reinforcing (rather than catalytic) effect, compared with no material at all (Lancaster & Stead, 2005). This perspective has driven the continued development and distribution of social marketing resources (Campbell, Goldman, Boccia, & Skinner, 2004). However, reviews of print materials' effectiveness have focused on brochures, booklets, pamphlets and posters, with almost no literature on the effectiveness of stickers, despite their frequent use as part of health promotions campaigns (Berhane & Pickering, 1993; Horyniak et al., 2010; McDonnell, 2010). For example, a 2005 campaign aimed at increasing injecting drug users' awareness of overdose risks involved the distribution of posters, wallet cards and stickers featuring several key messages (Horyniak, et al., 2010). An evaluation of the campaign revealed that needle and syringe program clients considered the stickers to be the most useful resource. However, most of the other campaigns which have used stickers as part of their printed media materials do not evaluate the effectiveness of the stickers in particular, but rather address the effectiveness of all printed materials as a general category.

The current study assessed the reach and perceived effectiveness of health education resources developed as part of an intervention targeting Māori and Pacific parental smoking behaviour and attitudes to reduce smoking initiation among intermediate (middle) school children in South Auckland, New Zealand. The intervention utilised a variety of health education resources, including a DVD ("Our Choice, Their Future"), a website and a variety of print materials such as smokefree stickers, promotional flyers and newsletters.

Method

The data reported in this paper were drawn from the Keeping Kids Smokefree study (KKS) - a quasi-experimental intervention from 2007-09. The rationale, design and implementation for KKS have been explained elsewhere (Glover, Scragg, Nosa, Bullen et al., 2010). Briefly, KKS involved four South Auckland schools for children aged between 10 and 13 years from

families predominantly of lower socioeconomic status and mostly of Māori and Pacific Island ethnicities. Two schools received the intervention, while the other two acted as controls. The intervention used a variety of educational and health promotion events which included: smokefree art competitions that included the design of stickers, an informative DVD which starred local celebrities urging parents to take practical steps to reduce their children's risk of taking up smoking, and regular communication with parents.

In September 2008 and in June 2009, letters were sent home to all parents at the two intervention schools (N = 934). This intervention was the cessation support component of the intervention and offered information on the free national phone Quitline and on free cessation support available from a local Māori health provider. Enclosed with the letter were two stickers, (Figure 1 and Figure 2 below), developed from student artwork entered in the art competitions held in year 1 (2007) and year 2 (2008) of the intervention. The annual art competition was designed to engage students in the intervention and to stimulate their thinking about smokefree themes and messages. The winning artworks were used in KKS questionnaires, newsletters and other communication and promotional materials. Stickers were developed from winning artworks and were sent to parents promoting a smokefree house, a smokefree car and a smokefree New Zealand. One intervention School's families received at least one sticker designed by a student and the other intervention School's families another designed by a student. In Year 2 (2008) 1,275 stickers with associated letters were sent to parents of Year 7 and Year 8 students. In Year 3 (2009) 547 stickers with letters were sent to Year 7 parents only, as Year 8 parents had received them in the prior year.

Supplementary questions

In both 2008 and 2009, supplementary questions were included in the KKS parents' follow-up questionnaire asking about awareness of KKS activities, such as the 'Sponsor to Win' quitting competition and the use of KKS educational resources: the newsletters, the DVD, the KKS website and the smokefree stickers. Specifically parents were asked: "Do you remember receiving any of these stickers made from student's artwork?" They could tick "Yes" or "No". The second question was: "If so, what did you do with them?" The respondents could answer either "Displayed in house or car", "Lost or thrown out" or "other". If they responded with "other", there was a free text space where they could write an answer. The final question was: "Are these stickers a good way of labelling your house/home/car smokefree?" Response choices were: "Yes", "No", "I like them but people just ignore them" or "other comments". Again, there was a free text space to write comments. A newsletter was also sent out to parents in 2008. A follow-up question asked whether they remembered seeing it and, if they had, did they read any part of it?

Figure 1. Example of a sticker displayed in the home

Figure 2. Example of a sticker displayed in the car

Statistical Analysis

The results from the years 2008 and 2009 were combined into one dataset so that any discernable patterns would be more apparent. SAS software v 9.2 (Cary, NC, USA) was used for data merging and analysis. A p-value of less than .05 was deemed significant. We used PROC FREQ with the Chi-square test of equal proportions option to test the hypothesis: "Are these stickers a good way of labelling your house/home/car smokefree?" However, we combined "I like them but people just ignore them" with those who answered "No" because we were interested in actual outcomes rather than any like or dislike of the stickers for aesthetic reasons. This gave 608 participants who answered "Yes" and 117 answered "No". We also applied the Fisher Exact Test when necessary (i.e. one or more cell counts less than five) invoking Monte Carlo simulation to speed up calculation of the p-value.

Response rate

The questionnaire was completed by 305 intervention school parents out of 638 (48%) in Year 2 (2008) and 629 out of 1,129 parents (56%) in Year 3 (2009) - a response rate of 53%. Twenty-five parents answered the survey for both years. We included only their latest (i.e. 2009) response.

Results

Of the 934 parents who completed the follow-up questions about the stickers (2008-2009 combined), the majority were Pacific 398 (43%) followed by Māori 360 (39%), European/Other 94 (10%), Asian 42 (4%) and Indians 40 (4%). Just over two thirds of respondents remembered the stickers (N = 638, 68%) and 503 of them (81%) displayed them in their house or car (see Table 1 below). All ethnic groups found the 'smokefree' stickers memorable (N=934). No particular ethnic group was more likely to recall receiving them than any other group $\chi 2(4,N=934)=4.85$, p=.30. Pacific people (87%) were more likely to display the stickers in their house or car than any other ethnic group (Māori 77%, Asian 77%, Indian 77%, and European/Other 72%) Fisher's Exact Test using Monte Carlo simulation (N=621), p=.022.

Free text responses indicated that the fridge and the front door were common sites to adhere a sticker. Ten percent (N=62) thought the stickers had been lost or thrown out. Free text explanations reported that children placed the stickers on clothes they were wearing that day, on their school books, their school or bedroom furniture or they were ripped up or not delivered home at all. Nine percent (N=56) had used the stickers in other ways, for example, the stickers were given away to family or friends who smoked, or taken to work. Seventeen did

Table 1. Recall, Use and Perception of Stickers (2008 and 2009) by Ethnic Group.

	Total	Māori	Pacific	Euro /other	Asian	Indian
Remembered receiving stickers						
Yes	638 (68%)	236 (66%)	281 (71%)	60 (64%)	30 (71%)	31 (78%)
No	296 (32%)	124 (34%)	117 (29%)	34 (36%)	12 (29%)	9 (22%)
Sticker use[1]						
Displayed in house/car	503 (81%)	179 (77%)	237 (87%)	41 (71%)	23 (77%)	23 (77%)
Lost or thrown out	62 (10%)	28 (12%)	16 (6%)	9 (15%)	4 (13%)	5 (17%)
Other	56 (9%)	25 (11%)	18 (7%)	8 (14%)	3 (10%)	2 (7%)
Stickers good labelling method						
Yes	608 (82%)	232 (83%)	269 (85%)	56 (79%)	21 (62%)	30 (86%)
I like them but people just ignore them	82 (11%)	26 (9%)	35 (11%)	7 (10%)	10 (29%)	0 (0%)
Other	12 (2%)	2 (1%)	4 (1%)	4 (6%)	1 (3%)	4 (11%)
No	35 (5%)	20 (7%)	9 (3%)	4 (6%)	2 (6%)	1 (3%)

Note. Counts with column percentage shown in brackets. Column percentages may not add up to 100% because of rounding errors.
1. There were 17 missing values

not respond to this question. Those who recalled the stickers also reported that they were useful in labelling areas as 'smokefree' $\chi 2(1,N=725)=332.53$, $p<.001$. As one participant wrote:

"Of course these stickers are a great way of encouraging people who smoke to keep it out of our homes, cars, schools for the safety of our kids, our friends and our families."

Some participants thought the stickers were a good reminder for their children, for instance one participant wrote:

"As warning signal to our children every day not to smoke."

Some participants held a contrary position, that is that they didn't like to put stickers on their house or car, or they said the stickers were redundant since they did not smoke or all visitors knew the house was smokefree and respected that without a sign being visible. One participant said that they already had both Māori and English language smokefree signage.

Compared to other resources sent home for parents, the smokefree stickers were similarly disseminated. The DVD was the most likely to be recalled, with 72% (661 out of 921) of respondents saying they had received it. Of those that received the DVD 69% (458 out of 661) reported to have watched it. The KKS newsletter was also a highly recalled resource with 71% of respondents indicating that they remembered seeing it, and of these, 85% claimed to have read at least some of it. About 10% of respondents had accessed the KKS website and 55% had seen a notice about the "Sponsor to win competition".

Discussion

The student-designed smokefree stickers were a serendipitous success arising from the KKS intervention. They were originally designed to simultaneously engage and maintain contact with parent, while also espousing the smokefree message to children. The sticker designs had intrinsic integrity as they were designed by students for students, with the winning student art work used in a meaningful way - on the website, in the questionnaires, in the production of greetings cards, stickers, and a back of a bus advertisement - enhanced the reward for the winners. It was also a way of giving back to the schools and community for their participation in KKS. This is an important Maori and Pacific cultural requirement – to reciprocate and return benefits to research participants and their communities in recognition for what they were giving us (Smith, 1999).

The results from our analysis of reach and perceived effectiveness of the stickers found high acceptability and use of the product, particularly to delineate smokefree areas. The use of student artwork personalised the message. Furthermore, the stickers were likely to be aesthetically acceptable as the students were encouraged to incorporate culturally salient design elements to ensure appeal to the largely Pacific and Māori target audience. Design characteristics (such as the repeated use of bright colours, an easy to follow format and illustrations) may have increased appeal and recall of this resource (Glover, Bullen et al., 2009). For Māori and Pacific groups, research has shown that the incorporation of cultural content and design elements increases levels of acceptability (Eyles et al., 2009; Koloto, 2005). Resources which are easy to read and understand are more likely to deliver the message with greater reliability (that is, less likely to be misinterpreted) and therefore increase salience (Vallance et al., 2008). The KKS stickers featured familiar language, minimal text and engaging imagery (Hill-Briggs et al, 2008).

For a school- and family-based intervention aimed at lower socio-economic indigenous and mixed minority ethnic groups, KKS achieved high participation rates at baseline and follow-up survey points (baseline response rate 83%). Maori have significantly higher smoking rates than all other ethnic groups in New Zealand. Oversampling for Maori ensures that we are able to detect differences between ethnic, and also socioeconomic status, two key determinants of smoking uptake.

However, the study has some limitations. Firstly, there was no randomisation of provision of stickers to respondents. The stickers were bundled with other strategies being delivered as part of the intervention and effects of each component cannot be determined separately. This analysis was observational in that we supplied stickers and asked about their use, but we can not in any way infer effectiveness of the stickers to support behavioural change. The families in the study already had high rates of smokefree homes (Glover, Scragg, Nosa, McCool, Bullen in preparation). Rather than

promoting behavioural change, the stickers may have been more useful at branding KKS which was important for promoting participant retention. (Glover et al, 2009). Our study provides encouraging evidence that in the face of growing ambivalence towards the use of social marketing for smoking prevention, the use of the sticker, as messenger, was a cost effective means of engaging young people in smokefree environments. Parents appreciated the use of locally developed resources that spoke the language, used the colours and imagery of their young. This methodology is counter to standardised smokefree resources which reflect the mainstream New Zealand smokefree branding and insignia.

Our findings from this analysis invite further questions; specifically, we wonder whether there is a significant difference between the generic and bespoke stickers. And second, are stickers that incorporate content and design characteristics identifiably belonging to local or ethnic cultures more valued and thus kept and used more than stickers using graphic design elements typical of the dominant-culture? We would encourage further research into the relative impact of indigenous imagery and colours on smokefree social marketing and media messaging.

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References

Berhane, Y., & Pickering, J. (1993). Are reminder stickers effective in reducing immunization dropout rates in Addis Ababa, Ethiopia? *Journal of Tropical Medicine and Hygiene*, 96(3), 139-145.

Campbell, F. A., Goldman, B. D., Boccia, M. L., & Skinner, M. (2004). The effect of format modifications and reading comprehension on recall of informed consent information by low-income parents: a comparison of print, video, and computer-based presentations. *Patient education and counselling*, 53(2), 205-216.

Eyles, H. C., & Mhurchu, C. N. (2009). Does tailoring make a difference? A systematic review of the long-term effectiveness of tailored nutrition education for adults. *Nutrition Reviews*, 67(8), 464-480.

Farmer, A. P., Legare, F., Turcot, L., Grimshaw, J., Harvey, E., McGowan, J. L., et al. (2008). Printed educational materials: effects on professional practice and health care outcomes. *Cochrane Database of Systematic Reviews* (3), CD004398.

Glover, M., Scragg, R., Nosa, V., Bullen, C., McCool, J., & Kira, A. (2009). Keeping Kids Smokefree: rationale, design, and implementation of a community, school, and family-based intervention to modify behaviours related to smoking among Maori and Pacific Island children in New Zealand. *International Quarterly of Community Health Education*, 30(3), 205-222.

Glover, MP, Bullen, C., Nosa, V., Erick-Peleti, S., Scragg, R., Paynter, J. Does Colour Make a Difference? (2009). Māori and Pacific Island parental response to and completion of colour vs. black and white questionnaires, pp 12. *Australasian Journal of Market and Social Research* 17(2), 19-29

Hill-Briggs, F., Renosky, R., Lazo, M., Bone, L., Hill, M., Levine, D., et al. (2008). Development and pilot evaluation of literacy-adapted diabetes and CVD education in urban, diabetic African Americans. *J Gen Intern Med*, 23(9), 1491-1494.

Holt, C. L., Clark, E. M., Kreuter, M. W., & Scharff, D. P. (2000). Does locus of control moderate the effects of tailored health education materials? *Health Education Research,* 15(4), 393-403.

Horner, S. D., Surratt, D., & Juliusson, S. (2000). Improving readability of patient education materials. *Journal of Community Health Nursing*, 17(1), 15-23.

Horyniak, D., Higgs, P., Lewis, J., Winter, R., Dietze, P., & Aitken, C. (2010). An evaluation of a heroin overdose prevention and education campaign. *Drug and Alcohol Review*, 29(1), 5-11.

Koloto, A.H. (2005). Pacific Peoples' Access to ACC Services and Entitlements. Final Report Prepared for the Accident Compensation Corporation. Koloto & Associates Ltd, Auckland.

Kroeze, W., Oenema, A., Campbell, M., & Brug, J. (2008). The efficacy of Web-based and print-delivered computer-tailored interventions to reduce fat intake: results of a randomized, controlled trial. *Journal of Nutrition Education and Behaviour*, 40(4), 226-236.

Lancaster, T., & Stead, L. F. (2005). Self-help interventions for smoking cessation. *Cochrane Database of Systematic Reviews* (3), CD001118.

LaPier, T. K. *"Evaluating content and suitability of written patient education materials."* (2000). Cardiopulmonary Physical Therapy Journal. Cardiovascular & Pulmonary Section, APTA. HighBeam Research.

McDonnell, T. E. (2010). Cultural objects as objects: materiality, urban space, and the interpretation of AIDS campaigns in Accra, Ghana. *American Journal of Sociology*, 115(6), 1800-1852.

Paul, C. L., Redman, S., & Sanson-Fisher, R. W. (2003). Print material content and design: is it relevant to effectiveness? *Health Educ Res*, 18(2), 181-190.

Shieh, C., & Hosei, B. (2008). Printed health information materials: evaluation of readability and suitability. *Journal of Community Health Nursing,* 25(2), 73-90. doi:792795066 [pii] 10.1080/07370010802017083

Smith, L. T. (1999). *Decolonizing methodologies : research and indigenous peoples*. New York Dunedin: Zed Books; University of Otago Press.

Vallance, J. K., Taylor, L. M., & Lavallee, C. (2008). Suitability and readability assessment of educational print resources related to physical activity: implications and recommendations for practice. *Patient Educ Couns*, 72(2), 342-349.