Impact of a health promotion magazine on employee’s health-knowledge

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Background
Health promotion initiatives are an important element of occupational medicine practice but evaluating success is complex. The publishers of a quarterly health promotion magazine asked an aluminium smelting company if it would consider providing the magazine to its employees.

Aims
To evaluate the possible benefits to employees of receiving a health promotion magazine.

Methods
Three issues were distributed by post over a 9 month period to employees at an aluminium smelter. Pre- and post-distribution questionnaires were mailed to employees and their partners, asking questions about health knowledge and behaviour. Statistical analysis was undertaken using chi-square and Fisher’s exact test.

Results
Overall 243 of 640 employees (38%) responded to the initial questionnaire and 129 (20%) to the final questionnaire. Pre-existing knowledge about preventive health issues was high; 61–100% of employees selected the correct answer to questions about diet, smoking and exercise. Following distribution of the magazines, there was an increase in employees’ knowledge of sugars in ‘fat-free’ foods ($P < 0.05$), the benefits of fish oil ($P < 0.01$) and in how often health was considered when buying food ($P < 0.05$), as well as an increase in partners’ knowledge of dietary fats ($P < 0.001$). Overall 84% of employees and 87% of their partners who returned the final questionnaire and indicated they had read the magazine showed enthusiasm for continued delivery.

Conclusions
The results suggest that the pilot intervention was beneficial; however, the findings must be interpreted with caution given the modest response rates.

Key words
Evaluation; knowledge and behaviour change; occupational health promotion; questionnaire.

Introduction

The traditional scope of occupational medicine practice has gradually widened from the prevention of work-related diseases and accidents to include health promotion. Occupational health practitioners can potentially reach vulnerable groups, target their efforts according to the employees’ needs and offer services that are accessible and free of charge to all employees [1].

The World Health Organization (WHO) definition of health as ‘a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity’ is generally well known. Health promotion is an activity that usually contributes to the primary prevention of a variety of diseases as well as enhancing a positive feeling of health and vigour. It is a process of enabling people to increase control over, and to improve, their health (Ottawa Charter for Health Promotion 1986 [2]). This has relevance to the workplace in terms of improving the health and well-being of employees, productivity, absenteeism and injury rates. Research in manufacturing employees has found an association between body mass index (BMI) and acute traumatic injury [3] and a case–control study of railway workers suggested an association between individual factors such as physical inactivity and injury frequency [4]. An elevated BMI has been associated with greater risks of job disability in firefighters and heat exhaustion in underground miners [5,6]. Obesity has also been associated with more frequent and longer duration absenteeism [7].

The WHO has produced recommendations for the evaluation of health promotion activities [8]. Evaluating health promotion activities is complex and requires evaluation of the process, the impact and the outcome [9].

In 2007, Alcoa of Australia was approached by the publishers of a health promotion magazine (Healthy
and Heartwise, www.heartwise.com.au) to ask if the company would be interested in circulating the quarterly publication to its employees. We thought the content was interesting and appropriate and the editorial panel included well-qualified health professionals. As providing knowledge and raising awareness is seen as a precursor to changing behaviour (WHO) [8], we decided to undertake a pilot study at Portland Aluminium, an aluminium smelter in coastal South West Victoria, Australia, with ~640 employees, and to evaluate by questionnaire if there were benefits to this proposal.

Methods

A pre-distribution questionnaire was sent to all Portland Aluminium employees. The package was posted to the employee’s home address and included an information sheet, a questionnaire for the employee, a questionnaire for the employee’s partner and a stamped addressed envelope for anonymous return to the investigator.

Three issues of the quarterly magazine were subsequently posted to the employee’s home address.

A post-distribution questionnaire was sent to the same employees and their partners 6 weeks after the three issues of the magazine had been circulated. These questionnaires firstly assessed the process (Was the magazine received?, Was it read?, Was it kept/thrown away?, Interest in continuing to receive the magazine?, How useful were the recipes?) and secondly the impact, in terms of change from initial level of health knowledge (see Figure 1, available as Supplementary data at Occupational Medicine Online), and any change in lifestyle behaviours such as diet, exercise and smoking.

A reminder was sent by site-wide e-mail distribution 2 weeks after the questionnaires were sent out.

The statistical significance of differences between pre- and post-distribution scores was assessed using the $\chi^2$ test and Fisher’s exact test. All statistical analyses were undertaken using SPSS 12.0 for Windows.

The research was approved by the Human Research Ethics Committee of Curtin University (Approval number SPH–0030–2006).

Results

A total of 243 employees (38%) and 201 partners returned the initial questionnaire. The total number of employees’ partners is unknown. Most (78% of employees and 81% of partners) had not read the magazine before. A total of 129 employees (20%) and 124 partners returned the second questionnaire.

Of those who read the magazine and returned the second questionnaire (101 employees and 108 partners), 85 employees (84%) and 94 partners (87%) were ‘quite’ or ‘very’ interested in continuing distribution of the magazine (see Table 1).

<table>
<thead>
<tr>
<th>Question</th>
<th>Employee</th>
<th>Partner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Received magazine</td>
<td>126/129 (98%)</td>
<td>122/124 (98%)</td>
</tr>
<tr>
<td>Read magazine</td>
<td>101/126 (80%)</td>
<td>108/122 (89%)</td>
</tr>
<tr>
<td>Kept magazine</td>
<td>77/110 (70%)</td>
<td>79/108 (73%)</td>
</tr>
<tr>
<td>Continuing distribution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(quite or very interested)</td>
<td>85/101 (84%)</td>
<td>94/108 (87%)</td>
</tr>
<tr>
<td>Recipes useful (quite or very useful)</td>
<td>59/101 (58%)</td>
<td>64/108 (59%)</td>
</tr>
</tbody>
</table>

Pre-existing levels of health knowledge were high among questionnaire responders (see Table 2). For example, 92% of employees were aware that diabetes can cause heart disease and 100% were aware that smoking increased the risk of stroke. Subsequently, statistically significant increases were seen in employees’ knowledge of sugars in fat-free foods ($P < 0.05$) and the benefits of fish oils ($P < 0.01$). Partners showed increased knowledge of dietary fats ($P < 0.001$).

With respect to healthy behaviours, there were no changes in smoking or exercise levels during the study period. However, there was an increase in how often employees considered health when buying food ($P < 0.05$; see Table 3).

Discussion

This study showed that pre-existing knowledge of health issues was high among responding employees and their partners. This may in part reflect the benefit of previous health promotion activities in the workplace. Of those employees who returned the final questionnaire, 80% had read the magazine and this was seen as a modest success. Following distribution of the magazines, there was an apparent increase in employees’ knowledge of sugars in fat-free foods and of the benefits of fish oils. There was also an apparent increase in how often employees considered health when buying food and in partners’ knowledge of dietary fats. There was enthusiasm for continued delivery of the magazine among those who returned the final questionnaire and indicated they had read the magazine. Given the interesting and relevant content, the relatively low cost, the apparent improvement in knowledge and behaviour and the enthusiasm for continued distribution, we decided to commence distribution to all employees of Alcoa of Australia.

Our study has a number of limitations, particularly, the modest response rate with the potential for bias. Health promotion is critically dependant on engagement and we don’t know the reasons for the low response rate: whether or not employees and their partners were overloaded with surveys, disinterested or disengaged. A common problem...
with health promotion initiatives is poor engagement by those at highest risk. We attempted to provide the magazine to all employees, including those with any risk factors for chronic disease. However, engagement was still dependent upon the employee’s own enthusiasm.

We did consider the use of an e-mail- or web-based programme for the questionnaire but had evidence from the workplace that a substantial number of employees do not access e-mail regularly. We also thought that lack of anonymity might adversely affect the response rate. We also considered distributing the questionnaires when employees attended for their medical reviews but wanted to evaluate the magazine in isolation from other initiatives and also had concerns that responses might be influenced by discussing the questions with fellow employees.

Edwards et al. [10] undertook a systematic review of interventions to improve response rates to postal questionnaires that identified several factors associated with increased response rates, including monetary incentives, sending the questionnaires by recorded delivery and by first class post, short questionnaires, coloured ink, personalized letters, follow-up contact and second copies. Questionnaires including questions of a sensitive nature and those from commercial as opposed to university sources were less likely to be returned.

It is possible that the responders to the questionnaires have a greater interest in health matters than the non-responders and the results may not therefore be applicable to all employees and their partners. The apparent level of support for the magazine should therefore be interpreted with caution. In addition, we have no way of knowing whether the employees and partners responding to the second questionnaire were from the same group that returned the initial questionnaire. There is also the possibility that other community health promotion activities during the study period may have had an impact, so that the outcomes were not attributable entirely to the magazine. In addition, the study does not assess any long-term benefits; for example, although employees increased their consideration of health when buying food, there has been no evaluation of whether this is sustained and translates into beneficial health effects. We could potentially circulate the final questionnaire again in future to see if the observed changes are sustained.

A paper by Crimmins and Halberg [11] earlier this year considered how to measure success in creating a ‘culture of health’ within an organization and it may be that the measurement of employees’ attitudes towards health improvement may prove a more effective way of tracking the benefits of health promotion activities in the workplace.

**Table 2.** Knowledge of employees and partners: responses to initial and final questionnaires

<table>
<thead>
<tr>
<th>Question</th>
<th>Employee correct response (initial Q) n (%)</th>
<th>Employee correct response (final Q) n (%)</th>
<th>Significance</th>
<th>Partner correct response (initial Q) n (%)</th>
<th>Partner correct response (final Q) n (%)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Diabetes/heart</td>
<td>220 (92)</td>
<td>108 (95)</td>
<td></td>
<td>177 (90)</td>
<td>101 (95)</td>
<td></td>
</tr>
<tr>
<td>2. Diabetes/obesity</td>
<td>240 (99)</td>
<td>96 (96)</td>
<td></td>
<td>199 (100)</td>
<td>106 (98)</td>
<td></td>
</tr>
<tr>
<td>3. Diabetes/frequency</td>
<td>232 (96)</td>
<td>98 (98)</td>
<td></td>
<td>193 (96)</td>
<td>107 (99)</td>
<td></td>
</tr>
<tr>
<td>4. Smoking/stroke</td>
<td>241 (100)</td>
<td>98 (98)</td>
<td></td>
<td>198 (99)</td>
<td>107 (99)</td>
<td></td>
</tr>
<tr>
<td>5. Smoking/heart</td>
<td>241 (100)</td>
<td>99 (99)</td>
<td></td>
<td>199 (99)</td>
<td>106 (98)</td>
<td></td>
</tr>
<tr>
<td>6. Smoking/medication</td>
<td>198 (83)</td>
<td>90 (90)</td>
<td>*</td>
<td>169 (85)</td>
<td>97 (92)</td>
<td></td>
</tr>
<tr>
<td>7. Fat-free foods/sugar</td>
<td>145 (61)</td>
<td>76 (76)</td>
<td>*</td>
<td>125 (65)</td>
<td>70 (70)</td>
<td></td>
</tr>
<tr>
<td>8. Oily fish/heart</td>
<td>191 (79)</td>
<td>91 (93)</td>
<td>**</td>
<td>171 (86)</td>
<td>97 (92)</td>
<td></td>
</tr>
<tr>
<td>9. Dietary fats</td>
<td>209 (88)</td>
<td>91 (93)</td>
<td></td>
<td>103 (53)</td>
<td>96 (93)</td>
<td>***</td>
</tr>
<tr>
<td>10. Exercise</td>
<td>221 (91)</td>
<td>91 (91)</td>
<td></td>
<td>182 (91)</td>
<td>102 (94)</td>
<td></td>
</tr>
<tr>
<td>11. Balanced diet</td>
<td>207 (86)</td>
<td>89 (90)</td>
<td></td>
<td>189 (94)</td>
<td>102 (95)</td>
<td></td>
</tr>
</tbody>
</table>

*P < 0.05, **P < 0.01, ***P < 0.001.

**Table 3.** Behaviour of employees and partners: responses to initial and final questionnaires

<table>
<thead>
<tr>
<th>Question</th>
<th>Employee initial Q n (%)</th>
<th>Employee final Q n (%)</th>
<th>Significance</th>
<th>Partner initial Q n (%)</th>
<th>Partner final Q n (%)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-smoker</td>
<td>205 (85)</td>
<td>76 (77)</td>
<td></td>
<td>170 (85)</td>
<td>91 (86)</td>
<td></td>
</tr>
<tr>
<td>Exercise level (&gt;3/week)</td>
<td>115 (48)</td>
<td>47 (48)</td>
<td>*</td>
<td>99 (49)</td>
<td>54 (51)</td>
<td></td>
</tr>
<tr>
<td>Consider health when buying food</td>
<td>164 (68)</td>
<td>78 (79)</td>
<td>*</td>
<td>167 (83)</td>
<td>93 (88)</td>
<td></td>
</tr>
</tbody>
</table>

*P < 0.05.
However, more work may be needed to monitor how attitude translates into demonstrable health benefits.

In the future, occupational medicine services are likely to be under increasing pressure to provide health promotion activities that are evidence based and cost effective. Evaluation of such activities may be challenging, however, if participation in surveys cannot be improved.

### Key points
- Workplace health promotion is an expanding and important area of occupational medicine.
- Such programmes will need to be evidence based and cost effective.
- Evaluation of health promotion initiatives is complex and challenging.

### Funding
Alcoa of Australia.

### Conflict of interest
None declared.

### References