**The case for targeting community pharmacy-led health improvement: Findings from a skin cancer campaign in Wales**

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**Abstract**

The use of community pharmacies to deliver health improvement campaigns is well established. Cancer incidence is closely related to increasing levels of deprivation.

Because community pharmacies are more prevalent in deprived areas there is potential for them to make an important contribution to health improvement by delivering interventions aimed at reducing cancer incidence amongst those at greatest risk.

*Objectives*

The aims of the study were: to examine the association between high risk behaviour and deprivation and contribute evidence to the case for or against targeting cancer prevention campaigns at specific risky behaviour in areas of high deprivation.

*Methods*

This study has an ecological design and involved retrospective analysis of data derived from 5739 sun-safety quizzes completed by pharmacy users at 714 community pharmacies in Wales during May 2014.

*Results*

Levels of participation in the campaign and high risk sun-safety behaviours were higher in more deprived areas. Respondents from deprived areas had significantly lower sun-safety knowledge. 3802 (66.2%) respondents reported ‘excellent’ or ‘good’ knowledge of behaviours which promote sun-safety but this did not necessarily translate into how individuals behaved. 3787 (66.1%) respondents considered community pharmacies an acceptable location for the campaign and for discussing the signs and symptoms of skin cancer.

*Key Findings*

Results show association between high risk behaviour and geographically defined deprivation adding to the case for targeting cancer prevention campaigns at specific behaviours and geographies.

*Conclusions*

Community pharmacies appear to be acceptable locations from which to deliver health improvement campaigns in terms of participant recruitment, ease of delivery, and pharmacy user feedback.

Key words: community pharmacy, cancer, deprivation, health promotion

**Introduction**

Previous studies have demonstrated the use and potential value of community pharmacies in delivering health improvement campaigns [1-3] and research indicates pharmacists welcome opportunities to promote health and wellbeing.[4] Community pharmacies are highly accessible and approximately 500 million visits are made in England each year.[5] In addition 90% of the population in England live within a 20 minute walk of a community pharmacy. There are more pharmacies per head of population in areas of highest deprivation where inequalities in health are widest [6] and this “positive pharmacy care law” is also observed in Wales.[7] In Wales 714 pharmacies dispensed 71.2 million prescriptions in 2013-14 with many providing additional, locally commissioned, public health services[8] highlighting the potential for community pharmacies as an opportune location from which to deliver health improvement campaigns.

The term ‘skin cancer’ refers both to relatively common non-melanoma cancers, such as basal and squamous cell carcinomas, where prognosis is generally good, to less common, more severe cancers like melanoma where prevention and early detection are required to ensure better outcomes. In the UK around 2000 people die from melanoma each year. In Wales, with less than 5% of the UK population, this figure is around 150 with approximately 700 new cases each year.[9] Between 2000 and 2012 the number of cases of malignant melanoma rose by 75% with incidence doubling in the last ten years. Malignant melanoma is now the seventh most common cancer in Wales.[9] Relative survival rates are closely linked with cancer stage at diagnosis with higher survival rates observed in those diagnosed sooner. In light of this; prevention, awareness, and early diagnosis are vital in order to reduce the morbidity and mortality associated with skin cancer. In Wales cancer diagnoses, including those for melanoma, are linked to deprivation.[10] Cancer incidence is around 20% higher in the most deprived areas of Wales compared with the least deprived, equating to around 80 excess cases per 100,000 population.[11]

Research into cancer prevention shows risk in sun-safety behaviours (any activity that increases a person’s risk of developing skin cancer eg excessive sun exposure and frequent sunburn, and the use of tanning booths) are a major cause of skin cancer,[12,13] Primary prevention strategies have therefore focussed on reducing the prevalence of such behaviours.[14] Previous studies of the association between geographical location, socio-economic status and tanning booth use in Wales havefound the number of tanning outlets per 100,000 population increases in areas of high deprivation.[15,16] In light of this it is particularly important that campaigns to improve public attitude, knowledge and awareness around sun-safety are targeted at areas of high deprivation.

In 2011 the Welsh Government introduced legislation which both banned the unsupervised use of tanning booths and prohibited the use of tanning booths by individuals under 18 years of age in any circumstances; this was supported by research showing those under 35 who used sunbeds were 87% more likely to be diagnosed with skin cancer than those who did not.[17]

Research has shown targeted sun-safety campaigns to be particularly successful at improving knowledge.[18] Although not unequivocal, there is evidence to suggest sun-awareness campaigns have resulted in improved sun-safety practices,[19-23] closing the gap between knowledge and reported behaviours.[24] A previous study into sun safety campaigns, aimed at changing behaviour, argued for campaigns to be targeted at high-risk groups.[25]

In 2014, 714 community pharmacies in Wales participated in a campaign to highlight high risk sun-safety behaviour and give information on reducing it. The campaign was run in partnership with a Welsh cancer charity, Tenovus Cancer Care, and Public Health Wales. The aims of the study were: to examine the association between high risk behaviour and deprivation and contribute evidence to the case for or against targeting cancer prevention campaigns at specific risky behaviour in areas of high deprivation.

**Method**

*The pharmacy campaign*

The campaign was delivered through community pharmacies in Wales during May 2014 and was timed to precede the summer months when it was considered high risk behaviours would become most prevalent. The campaign involved pharmacists and pharmacy staff encouraging pharmacy users to complete a sun-safety quiz sheet which provided the basis for a conversation with a member of pharmacy staff about reducing skin cancer risk. The campaign design and method was guided by similar campaigns that took place between 2011 and 2013.

Campaign materials were designed by the charity, working with skin cancer specialists at University Hospital Wales. Campaign materials included: a poster showing the different types of ‘dangerous’ moles and skin pigments; a sun-safety quiz sheet; and an answer sheet which provided answers to the sun-safety quiz alongside further information on risk reduction.

*The setting*

All 714 community pharmacies in Wales were expected to participate in the campaign. Prior to the campaign pharmacies were sent a letter reminding them of their contractual obligation to participate in public health campaigns. Pharmacists and pharmacy staff were invited to attend training events provided by the Wales Centre for Pharmacy Professional Education during March and April 2014; these were not mandatory. Training described how to use the resources and how to record details of pharmacist customer interactions. This supported pharmacists and pharmacy staff to provide appropriate information and advice on sun-safety.

*Participants*

Pharmacies were asked to offer sun-safety quiz sheets to people visiting the pharmacy who were over the age of 18 and particularly those who displayed high risk sun-safety behaviours (e.g. people seeking advice about sunburn, or who work outdoors). Whilst the campaign was aimed primarily at these individuals no groups were excluded. Participation by pharmacy users was voluntary. Information about individuals declining to complete a quiz was not collected.

Where individuals presented with concerns about changes to the appearance of their skin they were referred to a pharmacist for advice on whether onward referral was warranted.

*Data Collection*

All data were collected from the sun-safety quiz sheets self-completed by pharmacy users. Quiz sheets comprised sixteen multiple choice questions measuring knowledge of skin cancer risk factors, sun-safety behaviours, and feedback on the acceptability of pharmacies as locations for health campaigns. Responses were completely anonymous.

The quiz included a section for pharmacy staff to complete and asked them to describe the prompt for the interaction and provide the pharmacy’s postcode, and also included questions requesting basic demographic information about respondents completed by participants (i.e. age group and gender).

*Data management and analysis*

Pharmacies returned completed questionnaires to Public Health Wales in June 2014, where completed questionnaires were stored in a secure location before being couriered to an external data inputting company. All original copies were input, scanned, destroyed and sent electronically using an encrypted file sent to the charity research team for analysis.

A research team within the charity collected the quizzes and commissioned a private company to input as a CSV file. The charity then cleaned, coded and collated the data for analysis. Full analysis was carried out jointly by charity researchers and an academic researcher and statistician at the University of Wales Trinity Saint David. Data was stored and analysed in SPSS (v.20) [IBM Corp. Armonk, NY, USA].

The relative deprivation of the community served by each pharmacy was determined by matching the corresponding Lower Super Output Area (LSOA), a geographic area in Wales comprising approximately 650 socially homogeneous households, to the Welsh Index of Multiple Deprivation (WIMD) score using the WIMD 2011 overall index scores for each LSOA[26]. It was assumed that the WIMD score of each pharmacy was representative of the people using that pharmacy. Pharmacies were categorised as being rural or urban using the Office for National Statistics *Rural-Urban Classification For Small Area Geographies*.[27]

SPSS (v.20) was used to provide simple summary statistics of the number of pharmacies participating in the campaign (a pharmacy was considered to have participated if it returned at least one completed sun-safety quiz sheet for analysis) and the responses to the other questions. An overall knowledge score was calculated by collapsing ‘correct’ and ‘incorrect’ answers from five questions on sun safety knowledge into a final score that was then ranked on a five point scale from 1 (excellent) to 5 (very poor).. Where inferential statistics were carried out, data were first screened for normal distribution and non-parametric tests carried out where data appeared highly skewed.

The Kruskal-Wallis and Mann-Whitney U tests were used to test the hypothesis: that *tanning booth use is more prevalent among people based in deprived areas than non-deprived areas of Wales.* The explanatory variables were: frequency of tanning booth use measured on a six-point scale ranging from ‘very often’ to ‘never’; WIMD quintile of the pharmacy, from the first (most affluent) to fifth quintile (most deprived), and overall knowledge scores.

This study did not require ethical approval. This was confirmed by the NHS Health Research Authority’s decision tool “*is my study research*?” Good practice in research ethics was adhered to at all stages in the research process.

**Results**

In total 376 pharmacies participated in the campaign (response rate = 52.7%, n = 714). The characteristics of pharmacies returning completed quiz sheets is summarised in table 1.

In total 5739 quiz sheets were returned for analysis the median number of returned quiz sheets per pharmacy was 15, although numbers varied between pharmacies ranging from 1 to 55.

*Respondent Characteristics*

The majority of respondents were female (65.4%, 3752/5739). Distribution of respondents by age group was fairly even with slightly higher numbers amongst those aged 26-35 (18.6%, 1066/5739) and lower numbers amongst those aged over 65 (10.3%, 592/5739). Those aged 26 to 44 made up 36.1% of the sample group which is higher than the 24.6% of 25 to 44 year olds in Wales. Those aged 46 to 65 were 29.1% of the sample group compared with 26.5% of the 45 to 64 year olds in Wales. Finally over 65 year olds came to 10.3% of the sample compared with18.3% of over 65 year olds in Wales. The sample group is therefore slightly younger than the Welsh population. In addition of all age groups those who were 18 to 25 were most likely to use tanning booths very often or fairly often (8.6%, 71/5739).

Pharmacies in the third (25.3%, 1452/5739), fourth (21.4%, 1231/5739) and fifth (24.8%, 1424/5739) deprivation quintiles collected the highest number of forms (Table 2) as did pharmacies in urban areas.

*Deprivation, sun-safety behaviours, and knowledge*

A Kruskal-Wallis test (suitable for non-parametric data on an ordinal scale) revealed variation in tanning booth use across the five deprivation levels (x2 (4, n = 5613) = 26.71, p < 0.001). Post-hoc tests conducted using the Mann-Whitney U test identified a significantly greater use of tanning booths amongst respondents from the most deprived quintile when compared to those in more affluent areas (u=580079, Z=-2.692, p=0.007) although the effect size was small (r=0.06).

A one-way between groups analysis of variance to assess the impact of deprivation category on overall knowledge scores found strong evidence of a difference in knowledge scores across deprivation quintiles(F(4, 5582)=8.69, p<0.001) with those in the lowest deprivation quintiles reporting lower levels of knowledge than those in more affluent areas.

*Sun safety knowledge and behaviours*

In general respondents had ‘good’ knowledge of sun safety behaviours, and around two thirds of respondents (66.3%, 3802/5739) rated their own knowledge of sun safety as excellent or good. Over half of respondents (53.6%, 3075/5739) were aware that an episode of sunburn in childhood is associated with a doubling of the risk of skin cancer. Whilst fewer than half of respondents (33.5%, 2158/5739) correctly identified sun protection factor (SPF) 15 as the minimum factor that should be worn in the sun a further 54.1% (3104/5739) thought a higher level of SPF was recommended. Of these 39.3% (2253/5739) thought SPF 30 and 14.8% (851/5739) thought SPF 50 were the correct protection levels. 43.9% (2525/5739) of respondents correctly identified all signs of skin cancer and of these the majority (79.8%, 4591/5739) knew both sunlight and sunbeds were sources of UV radiation. Only 56 respondents (0.9%, n = 5739) thought neither sunlight nor sunbeds were sources of UV radiation.

Whilst the majority of respondents (59.3%, 3406/5739) had not been sunburnt in the last two years over a third reported at least one episode of sunburn in that period (38.7%, 2222/5739) with 21.3% (1226/5739) reporting having used sunbeds or tanning booths to some degree. Fewer than half of respondents (41.3%, 2372/5739) reported applying sun cream at the recommended frequency when exposed to the sun. Less than a quarter of respondents (24.2%, 1389/5739) reported applying sun cream with the minimum recommended protection of SPF 15 (Table 3).

No significant differences in knowledge of sun safety behaviours were found between those with and without prior experiences of painful sunburn. A Mann-Whitney U test revealed female respondents (Md=4, n=3752) had significantly better overall knowledge than males (Md=3, n=1390), U=2337999, z=-5.92, p<0.001.

2391 respondents (41.6%, n=5739) reported an intention to act on the information given and change their sun-safety behaviours.

*Views of the campaign*

In general, respondents considered the community pharmacy to be an acceptable location for discussing sun safety and skin cancer risks. 65.9% (3787/5739) reported feeling comfortable discussing the signs and symptoms of skin cancer in a community pharmacy with only 2.8% (n=162) reporting that they were uncomfortable doing so. Respondents had positive views of the campaign which would support replicating the campaign model in the future. The quality of information provided was highly rated with 34.8% of respondents considering it ‘excellent’ (1999/5739) fewer than 5% of respondents considered the information poor (4.8%, 281/5739).

**Discussion**

The findings show high risk behaviour to be more common among those attending pharmacies in deprived areas compared with affluent areas. Knowledge of high risk behaviour and of signs and symptoms of skin cancer are also more common among those attending pharmacies in areas of high deprivation. Results also show a positive response to the campaign from participants.

*Strengths*

Results indicate using community pharmacies to deliver a health improvement campaign aimed at reducing skin cancer risk is acceptable to pharmacy users. This was a large study; responses were received from 5739 individuals across 376 pharmacies. Respondent’s characteristics are varied. However, responses by gender and deprivation quintiles are broadly representative of Wales as a population. While the sample group of respondents in younger than the Welsh population, this is seen as a strength because the young age group are more likely to use tanning booths and because raising awareness of risks among young people is a clear advantage in preventing skin cancer. This and the high number of responses, means the study provides a balanced overview of the Welsh public’s sun safety knowledge and behaviour. Delivering the campaign in community pharmacies enabled random and purposive sample selection which was representative of the wider population of pharmacy users.

Using a quiz proved effective in engaging pharmacy users in discussions about sun-safety and facilitating data collection. Most sun-safety conversations were prompted by pharmacy staff using the quiz as a focus for customers purchasing over-the-counter medicines. Results show a higher frequency of responses among customers visiting community pharmacies in areas of higher deprivation. In addition feedback on the acceptability of community pharmacies as delivery vehicles for health campaigns was more positive in areas of higher deprivation, supporting the argument for targeting health campaigns using geographical indicators.

This study indicates that using community pharmacies to deliver the campaign appears to be an acceptable tool to engage the public, measure knowledge, gauge behaviour and prompt pharmacy users to consider behavioural changes which could improve their health. The finding is consistent with existing literature [1-3] particularly in relation to the accessibility of pharmacies.[4] In addition the high proportion of respondents who felt comfortable discussing the signs and symptoms of skin cancer in community pharmacies is encouraging and adds to previous research regarding the benefits of community pharmacies as locations for health improvement campaigns.[4]

*Limitations*

A high proportion of pharmacies (47.7%, 338/714) did not return any completed quiz sheets, whilst the characteristics of these pharmacies are not dissimilar to those that did participate, this may be a source of bias. A possible limitation of the study is the assumption that the deprivation categorisation of the area in which a pharmacy is located is shared by the individuals using that pharmacy. Whilst this assumption may be reasonable we cannot be certain it is true in every case. A further limitation of this study is that it evaluated the effectiveness of the specific campaign materials and was limited to health improvement messages regarding sun-safety. Therefore these results may not be generalisable across other campaigns where the materials and topic may differ. A further limitation is the fact that the number of people who declined to fill in a questionnaire is unknown.

Finally, as with any large dataset, statistically significant findings need to be interpreted with caution when applying them to practice. In addition the perceived individual benefits of high risk sun-safety behaviour (i.e. having a tanned appearance) are largely cosmetic; it can therefore be argued that some individuals view improving their appearance as more important than avoiding risky behaviour regardless of knowledge on the risks and on how to behave safely. This is an important message for skin cancer health campaigners using the research-led assumption that knowledge, education and awareness of sun safety will reduce risks. [21-25, 28, 29]

*Targeted health campaigning*

In response to the first aim**,** awareness of how to reduce risk of skin cancer is lower and risky behaviours higher amongst individuals using pharmacies in deprived areas.

Results showing high levels of knowledge on sun-safety behaviour are not necessarily associated with the adoption of good behaviour by individuals. This implies knowledge does not necessarily reduce risk. It also implies the motivation for high risk behaviours, tanning booth use and underuse of sun protection, overrides awareness of the risks with which they are associated. Whilst there is still evidence to show that improved knowledge can mean improved behaviour, this paper argues for greater acknowledgement of the complexity in this argument and the need to reflect this in intervention delivery. [20, 24, 25]

In response to the second aim, association between deprivation and high risk sun safety behaviour identified suggests future campaigns could be targeted both at specific risk behaviours (e.g. tanning booth use) and at smaller geographies (e.g. LSOAs in the fourth and fifth WIMD quintiles). It is argued that adopting a more tailored approach would allow resources to be deployed more effectively.

Participant feedback regarding the appropriateness of the campaign, and their intention to change behaviour as a result, suggests the campaign was more successful in areas of higher deprivation. However the reasons for this are likely to be complex. Alongside previous research identifying high levels of tanning booth use among people living in deprived areas[8] this study contributes to the case for targeting community pharmacy health improvement campaigns both towards specific risky behaviours and specific, namely deprived, geographical areas. Doing so is particularly opportune given the prevalence of community pharmacies in England and Wales is highest in more deprived areas.

Finally, results showed campaign materials to be well received and nearly half of participants intend to change their behaviour following the intervention. Those living in deprived areas are most likely to report an intention to change their sun safety behaviour.

The findings add to research on understanding risky behaviour, for example research using the Theory of Planned behaviour, and the correlation between risky behaviour and social norms.[30] Implications for future practice and research coming from this are to target health campaigns at deprived areas and at specific areas of risk. Use of community pharmacies in the future is also recommended based on the response rate for this study and on the positive feedback from participants involved.

**Conclusion**

This evaluation presents findings from a cancer prevention campaign delivered through community pharmacies in Wales during May 2014. It addresses two aims: to examine the association between high risk behaviour and deprivation and contribute evidence to the case for or against targeting cancer prevention campaigns at specific risky behaviour in areas of high deprivation. In doing so it contributes to two areas of research: the relationship between cancer incidence and deprivation; and (targeted) public health campaigning. In addition it provides evidences on the effectiveness of community pharmacies in delivering health improvement campaigns

The finding linking frequent tanning booth use with deprivation adds weight to the argument for campaigns to be geographically targeted in future, and more specifically the argument for targeting cancer prevention campaigns in deprived areas where cancer incidence is higher. Finally, the campaign provides a model for successful partnership between pharmacies, public health organisations and the third sector aimed at improving health although more work is required to ensure all pharmacies participate fully.

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**Appendix 1: Tables**

**Table 1:** Comparison of characteristics of participating and non-participating pharmacies in Wales

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | All | | Participating | | Non-participating | |
|  | n | (%) | n | (%) | n | (%) |
| Pharmacy Type |  |  |  |  |  |  |
| Independent | 228 | (31.9) | 128 | (34.0) | 100 | (29.6) |
| Multiplea | 486 | (68.1) | 248 | (66.0) | 238 | (70.4) |
| Rural Urban Classification |  |  |  |  |  |  |
| Urban | 507 | (71.0) | 264 | (70.2) | 243 | (71.9) |
| Rural | 199 | (27.9) | 107 | (28.5) | 92 | (27.2) |
| Not available | 8 | (1.1) | 5 | (1.3) | 3 | (0.9) |
| Deprivation Quintile |  |  |  |  |  |  |
| 1 (lowest) | 94 | (13.2) | 56 | (14.9) | 38 | (11.2) |
| 2 | 96 | (13.4) | 53 | (14.1) | 43 | (12.7) |
| 3 | 174 | (24.4) | 92 | (24.5) | 82 | (24.3) |
| 4 | 180 | (25.2) | 86 | (22.9) | 94 | (27.8) |
| 5 (highest) | 170 | (23.8) | 89 | (23.7) | 81 | (24.0) |
| Total | 714 |  | 376 |  | 338 |  |

a. Pharmacies with five or more branches across the UK

**Table 2:** Characteristics of respondents to sun safety quiz

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | Respondents | | | |
|  | | | | n | (%) |
| Gender | | |  | |  |
| Male | | | 1390 | | (24.2) |
| Female | | | 3752 | | (65.4) |
| Transgender | | | 16 | | (0.3) |
| Prefer not to say | | | 44 | | (0.8) |
| Not stated | | | 537 | | (9.4) |
| Age | | |  | |  |
| Under 18 | | | 97 | | (1.7) |
| 18 to 25 | | | 828 | | (14.4) |
| 26 to 35 | | | 1066 | | (18.6) |
| 36 to 45 | | | 1007 | | (17.5) |
| 46 to 55 | | | 957 | | (16.7) |
| 56 to 65 | | | 710 | | (12.4) |
| Over 65 | | | 592 | | (10.3) |
| Not stated | | | 482 | | (8.4) |
| Rural Urban Classification | | |  | |  |
| Urban | | | 3996 | | (69.6) |
| Rural | | | 1662 | | (29.0) |
| Not available | | | 81 | | (1.4) |
| Deprivation Quintile |  | | | |  |
| 1 (lowest) | 884 | | | | (15.4) |
| 2 | 737 | | | | (12.8) |
| 3 | 1452 | | | | (25.3) |
| 4 | 1231 | | | | (21.4) |
| 5 (highest) | 1424 | | | | (24.8) |
| Not available | 11 | | | | (0.2) |
| Total | 5739 | | | |  |

**Table 3:** Self reported sun-safety behaviour of respondents (selected items)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | | Respondents | | |
|  | | n | | | (%) |
| Episodes of sunburn in previous two years |  | | |  | |
| None | 3406 | | | (59.3) | |
| One | 1431 | | | (24.9) | |
| More than one | 791 | | | (13.8) | |
| Not stated | 111 | | | (1.9) | |
| Frequency of sun cream application |  | | |  | |
| Every two hours | 2372 | | | (41.3) | |
| Every four hours | 1546 | | | (26.9) | |
| Every six hours | 389 | | | (6.8) | |
| Never | 911 | | | (15.9) | |
| Not stated | 521 | | | (9.1) | |
| SPF of sun cream used |  | | |  | |
| 8 | 527 | | | (9.2) | |
| 12 | 201 | | | (3.5) | |
| 15 | 1389 | | | (24.2) | |
| 30 | 20 | | | (0.3) | |
| 50 | 7 | | | (0.1) | |
| Not stated | 3595 | | | (62.6) | |
| Use of sunbeds/tanning booths |  | | |  | |
| Very often | 85 | | | (1.5) | |
| Fairly often | 138 | | | (2.4) | |
| Occasionally | 479 | | | (8.3) | |
| Rarely | 520 | | | (9.1) | |
| Never | 4396 | | | (76.6) | |
| Not stated | 121 | | | (2.1) | |
| Total | | 5739 | |  | |