Analgesic effects of branding in treatment of headaches

A BRANTHWAITE, P COOPER

Abstract

The effect of branding—that is, the labelling and marketing—of a well-known proprietary analgesic used to treat headaches was studied in a sample of women given a branded or unbranded form with either an inert or an active formulation. The sample was also divided according to whether the subjects were regular users of the brand or users of other brands. The findings showed that branded tablets were overall significantly more effective than unbranded tablets in relieving headaches. Differential effects were observed: the effects of branding were more noticeable one hour after the tablets were taken compared with 30 minutes; in the women given the placebo; and in the users of the brand compared with the users of other brands.

It is hypothesised that these effects are due to increased confidence in obtaining relief with a well-known brand, and that branding has an analgesic effect that interacts with the analgesic effects of placebos and active ingredients.

Introduction

The effects of psychological factors on the experience and relief of pain have been shown in many studies.[1 2] Patients' expectations that medication will help them increases the likelihood of response, as do the beliefs of doctors administering treatments.[3 4] Such expectations and beliefs are influenced by non-active aspects of the medication, such as colour, taste, dosage, and size of tablets.[5-7] Placebo effects also provide extensive evidence that expectations of cure affect pain relief—for example, in double-blind studies of aspirin in the treatment of pain placebos account for substantial relief.[8]

A further factor that may be expected to influence relief of pain in self-medication is branding—that is, the labelling and marketing by manufacturers of their preparations for sale over the counter to the public. We therefore hypothesised that when people have conviction in a particular brand from, say, past experience, hearsay, advertising, etc, they may experience greater relief from taking that brand than the same active ingredients unbranded or another brand. We tested this hypothesis by investigating the effects of a well-known analgesic (325 mg aspirin) in branded and unbranded forms with both active and inert formulations among users of the brand and users of other brands.

Self-medication plays an important part in the treatment of minor illnesses. For example, in one study 41% of people aged 20 years and over reported having taken aspirins or other pain-killers in the previous two weeks, and 14% in the previous 24 hours.[9] The most common complaint for which these analgesics are taken is headaches. They are mainly bought over the counter,[10] only a small proportion (6%) being taken on prescription. According to trade estimates,[11] branded advertised analgesics account for 66% of analgesics bought over the counter.

The active dose in the product we used in this study has been shown[8 12-14] to be effective in the treatment of headaches and other pain compared with placebos; the question here was whether the branding contributes anything to pain relief.

Subjects and methods

We used a two-by-two double-blind design to separate the effects of (*i*) inert from active formulations and (*ii*) unbranded from branded presentations.

A total of 835 women who claimed to use painkillers to relieve headaches at least once a month took part in the study. Roughly half claimed to use the test brand as their regular brand of analgesic, and the other half used other brands of over-the-counter analgesics. Women who were allergic to aspirin, had a history of asthma, gastric upsets, or ulcers, were pregnant, or were receiving medication from their doctor were excluded.

Eligible subjects were randomly assigned to one of four groups (table I) by allocating them in sequence to each group A to D. Initial contact and screening were done and a questionnaire administered by trained interviewers, who had been instructed to recruit eligible subjects on a door-to-door basis in urban areas throughout the country. Subjects were asked to participate voluntarily and received no incentives. No more than two or three placements were made in any one street, and at least 10 houses separated each placement. Each interviewer recruited 12 subjects. Subjects were told that the study was on behalf of a well-known manufacturer of medicines, who was comparing the effectiveness of different brands of headache tablet currently on sale. Interviewers, subjects, and data analysts were unaware of the ingredients of the four test stimuli.

TABLE I—*Numbers of subjects in each group*

	Formulation	
	Placebo	Active analgesic
Unbranded (plain pack)		
Group	A	C
No of subjects	209	215
Brand users	102	110
Non-users	107	105
Branded (standard pack)		
Group	B	D
No of subjects	206	205
Brand users	107	109
Non-users	99	96

In each group the standard 50-tablet canister of the analgesic was used. The outward appearances of the branded packs (groups B and D) were the same and were identical with those available over the counter in the United Kingdom. The brand tested is one of the most popular, non-soluble aspirin-based analgesics in the United Kingdom and has been widely available for many years and supported by extensive advertising. The unbranded, plain packs (groups A and C) were labelled "analgesic tablets" with the same instructions for use and tablet contents as the standard branded pack. The tablets in the branded packs were endorsed with the manufacturer's design and those in the unbranded packs were plain. The active ingredient in groups C and D was 325 mg aspirin per tablet; the tablets in these two groups had the same formulation and in-vitro and in-vivo release characteristics. Placebo and active tablets were the same size, shape, colour, and weight, although they were not specifically matched for taste following normal practice in trials with non-soluble products.

University of Keele, Keele, Staffordshire ST5 5BG
A BRANTHWAITE, BSC, PHD, lecturer in psychology

London WC2
P COOPER, BSC, ABPSS, consultant psychologist

After screening each subject was given the canister corresponding to one of the four groups, together with instructions to take two tablets for any headache she had over the following two weeks. Subjects were asked to fill in a short self-completion questionnaire each time they took tablets, noting the number of tablets taken and the severity of headache. After 30 minutes and again after one hour they indicated their pain relief on a six-point scale by ticking one of the following categories: pain worse, the same, a little better, quite a lot better, considerably better, completely better.

Most subjects used the test product at least once during the two weeks. Those who did not were asked to continue with the trial for a further two weeks. On this basis the 835 subjects in table I completed the trial. A further 34 did not complete the questionnaires satisfactorily and were excluded from the analysis.

Results

EFFECTS OF BRANDING

Table II shows the pain relief obtained for all headaches after one hour in each of the four groups. The average number of tablets taken for each headache was two (2·02), corresponding closely to the test instructions, and varied little between the four groups. Subjects given the two branded preparations reported more headaches (2·11 and 2·15) than subjects given the unbranded preparations (1·96 and 1·92) (table II). This difference is significant at the 5% level ($F=5·53$, $df=1,827$). There were no differences in the severity of headaches between the four groups. In the absence of other indications the difference in the number of headaches between the groups given unbranded and branded preparations may suggest that subjects were more willing to take the branded tablets because they were well known.

TABLE II—*Pain relief after one hour for all headaches in all groups (results expressed as numbers (%) of headaches)*

	A (unbranded placebo) (n = 209)	B (branded placebo) (n = 206)	C (unbranded active) (n = 215)	D (branded active) (n = 205)
Degree of pain:				
Worse	36 (9)	16 (4)	6 (1)	3 (1)
The same	72 (18)	79 (18)	50 (12)	44 (10)
A lot better	75 (18)	61 (14)	67 (16)	65 (15)
Quite a lot better	61 (15)	61 (14)	59 (14)	68 (15)
Considerably better	55 (13)	84 (19)	78 (19)	98 (22)
Completely better	111 (27)	134 (31)	153 (37)	166 (37)
Total No (%) of headaches	410 (100)	435 (100)	413 (100)	444 (100)
Average No of headaches/subject	1·96	2·11	1·92	2·15

Table II shows that the unbranded placebo preparation (group A) afforded some degree of relief in 73% of headaches; in 40% the pain was considerably better or completely better. Taking 40% as the baseline value, there was an improvement in pain relief in each of the other groups of +10% of headaches (branded placebo), +16% (unbranded active), and +19% (branded active). These findings are consistent with the hypothesis that branding increases pain relief but are not amenable to satisfactory statistical testing as they are based on non-independent data since the same subjects reported several headaches.

To test the differences between groups for statistical significance each of the six points used for reporting pain relief was assigned a numerical value ranging from −1 (worse) to +4 (completely better). The means for each group were obtained by first calculating the average pain relief for each subject for all their headaches and then averaging over all subjects. This was done to represent each subject equally, thereby avoiding any bias that might have arisen owing to subjects reporting differing numbers of headaches, especially between the subjects given branded and unbranded preparations. In effect each subject was represented in the analysis in terms of her overall experience with the tablets, however many headaches she had had. The mean pain relief after one hour for each group calculated in this way was: group A (unbranded placebo) 1·78, group B (branded placebo) 2·18, group C (unbranded active) 2·48, and group D (branded active) 2·7.

Before analysing these means it is worth noting that they are different from those obtained using the mean pain relief per headache, calculated from table II, which are 1·86, 2·19, 2·46, and 2·58 for groups A to D respectively. The main difference is that these pain relief scores produce smaller differences between the groups since the means per headache for the unbranded placebo (group A) and branded active preparation (group D) are less extreme. The reasons for this are related to the variation between subjects in the number of headaches reported (which ranged from one to seven). In group A subjects who reported more headaches obtained relatively more relief to start with compared with those with fewer headaches, but the relief declined over subsequent trials of the test tablets. Thus the contribution of those with more headaches raises the mean based on all headaches relative to the mean based on giving each subject equal weight. In group D those reporting more headaches experienced less relief to start with but again their relief declined on subsequent trials. Thus in this group the mean based on all headaches is depressed relative to the subject mean. These findings are interesting in their own right since they imply that people who have headaches relatively frequently and those who have them relatively infrequently differ in how they respond to placebos and well-known products. These different methods of calculating the means do not, however, materially affect the results or the conclusions that would be drawn. This was checked by analysing the data from only the first headache reported by each subject, which avoids the problem of repeated headaches altogether. The findings from that analysis were consistent with the results reported below.

The pharmacologically active formulations (groups C and D) conferred greater pain relief than the inert placebo. Analysis of variance indicates that this difference was statistically significant at the 0·1% level ($F=40·96$, $df=1,827$). Also, the branded preparations conferred greater pain relief than the corresponding unbranded preparations. The influence of branding on pain relief was significant at the 0·1% level ($F=18·84$, $df=1,827$). Furthermore, the interaction effect in the analysis of variance was not significant ($F=0·82$, $df=1,827$). From this we conclude that there was no difference in the improvement in pain relief due to branding between the active and placebo tablets, although the effect of branding appeared more obvious with the active tablets.

The mean pain relief per subject in each group was less after 30 minutes than after one hour, being 0·98 in group A, 1·09 in group B, 1·31 in group C, and 1·34 in group D at 30 minutes. Although the difference between the placebo and pharmacologically active preparations was less pronounced after 30 minutes than after one hour, it was nevertheless significant ($F=13·57$, $df=1,827$, significant at the 0·1% level). The differences between the subjects receiving branded and unbranded preparations were not significant at 30 minutes, although they were in the expected direction, with slightly more pain relief in the groups receiving the branded preparations.

BRAND USERS V USERS OF OTHER BRANDS

The possibility that branding may have different effects according to the degree of conviction in it was investigated by comparing the responses of regular users of the brand with those of users of other brands. Table III shows the pain relief after one hour in each group for users and non-users.

TABLE III—*Mean pain relief after one hour in each group for users of test brand and users of other brands*

	A (unbranded placebo)	B (branded placebo)	C (unbranded active)	D (branded active)
Users of test brand	2·03 (n = 102)	2·25 (n = 107)	2·48 (n = 110)	2·77 (n = 109)
Users of other brands	1·53 (n = 107)	2·10 (n = 99)	2·48 (n = 105)	2·62 (n = 96)

Users of the test brand obtained more relief generally ($F=4·54$, $df=1,827$, significant at the 5% level), taking all the groups together, than users of other brands, who were particularly unresponsive to the unbranded placebo. This may suggest that the users of the test brand included a higher proportion of people who responded to placebo[15] compared with the users of other brands.

Users of the test brand obtained more pain relief from the branded than the unbranded active preparation ($t=1·57$, significant at the 6%

level, one-tail test). Users of other brands showed the same tendency but the difference was not significant. Thus the indications are that branding influences the sample as a whole, and that women who use a particular brand regularly are somewhat more likely to obtain more relief from it.

Discussion

The results of this study support the hypothesis that the branding of tablets used in self-medication significantly affects the relief of headaches. Branding appeared to supplement both the inert placebo and the active ingredients to produce more relief than either placebo or active ingredients alone. The effect of branding was less than that of the active ingredients (325 mg aspirin per tablet) but significant at the 0·1% level for the study as a whole and for the two sets of subjects studied—that is, users and non-users of the test brand. In relative terms the pharmacologically active ingredients would appear to account for some two-thirds to three-quarters of the pain relief, and branding for one-quarter to one-third, over and above that obtained with the unbranded placebo. While the effects of branding were apparent in the study as a whole, they were more noticeable for pain relief after one hour compared with 30 minutes; with placebos, although the effect was evident with both placebo and active ingredients; and among users of the brand compared with users of other brands.

One hypothesis is that the effect of branding acts through psychological and cortical means in a way similar to, but not necessarily identical with, the placebo effect. Taking branded tablets, which people believe from past experience, hearsay, advertising, etc, are likely to relieve their headache, may divert attention from the headache or its sources, encourage a sense of wellbeing and coping, and therefore accelerate recovery. In support of this people who were regular users of the brand and may therefore be expected to have had more confidence in it obtained somewhat greater pain relief than users of other brands. Nevertheless, the branding was effective for non-users as well as users, which may suggest that the particular brand tested has a general reputation for efficacy; possibly, too, any known and reputable branding is beneficial. These alternative possibilities require further investigation to determine the range and differential effects of brandings. The findings also prompt questions about the potential effects of branding in other forms of self-medication and prescribed medicines.

Another hypothesis is that branding works by supplementing the analgesic effect of placebos, which are mediated by the release of endorphins,[16] although the linkages in this process are complex and may not be exactly the same for branding. The mechanism may be different since the effects of placebos are prominent at both 30 minutes and one hour, whereas the effect of branding is much more apparent at one hour. If so, this may suggest that the pain-suppression systems involved in endorphin release for placebo and branding (or other non-active aspects of medication[5-7]) may be subject to cortical control of different kinds. To examine the precise characteristics of the branding effect further studies are required that would investigate the effects more accurately over time and in relation to different levels of pharmacological activity.

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ONE HUNDRED YEARS AGO The art of giving requires to be learnt not less than the art of getting. It is not everyone, even amongst those who are so happy as to have acquired the love of giving, and to have cultivated the sympathies which make it a chief pleasure in life, who have learnt how to give, where to give, and what to give. An East-end clergyman, sadly experienced in the wants of the poor, and wisely discriminating in his lifelong and devoted study of a ministration to those wants, has often said to us that "foolish money" is sometimes superabundantly offered; but that, for the deeper, less apparent, and less pathetic, wants of the poor, he finds the greatest difficulty in collecting the necessary funds. "Foolish money" may be taken to be the money which rains in upon a given district when a sudden cry of inundation, or of pathetic accident, or sensational distress, is put forth: the money which is thrown into the lap of the loudest petitioner, without investigation of his machinery for giving, or his test of fitness of the recipients; without adequate inquiry as to the funds already contributed, or to the intended means of preventing imposition and dealing with surplus; money which pours in from "strongly worded" hospital appeals, and which is tossed into the hands of the vicarious beggar, without personal interest or inquiry into the way in which it has been used. This is the easy tribute which soft characters readily pay to any tale of physical distress. Sensible money and sensible gifts are those which are given to the less obvious but the deeper wants of the unsensational poor; pension funds, convalescent funds, well regulated loan-committees, and administrators of systems such as those which have been set on foot in London by Miss Octavia Hill, Miss Emma Cons, Mrs. Barnett, and others, on the Elberfeldt system, in which inquiry precedes giving, supervision continues throughout the disposal of the gifts, and care is taken that the donation is one really suited to the real requirements of the petitioner, and is not the means of abuse or incitation to continuous pauperising begging. If those who support our charities and special hospitals were more largely of this discriminative and intelligent character; if people were more willing to give themselves as well as their money, smaller funds would do much more good than is now done with the enormous benefactions so largely abused. Even in small things, this want of care is visible. Nothing is in a small, but by no means unimportant way, more acceptable to hospitals than timely gifts of flowers, and books for adults, and toys for children. But a hospital superintendent writes to complain, and justly to complain, that the flowers are often crushed into a hamper, carelessly packed, and reach the hospital faded and useless; the toys are broken and out of gear; and the books are the mere unreadable residue of overloaded bookshelves, or scattered waifs of a careless household. Such gifts are often made with what are superficially called "the best intentions"; intentions cannot, however, be accepted as the best unless they spring from a somewhat deeper source, and are guided by more thoughtful intelligence. The giver needs to remember that, in his gift, his character, his thought, and himself are reflected; and, for the sake of self-discipline, as well as for the sake of those to whom the gift is proffered, it should indicate the intention of something more than the careless and thoughtless tossing away to the poor of a residue unvalued or easily dispensed with by himself. (*British Medical Journal*, 1881.)