Milk in schools: an experiment in nutrition education

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1. An experiment was conducted with 4600 children in nine schools, in which an attempt was made to persuade a greater number of children to take school milk. The proportion taking the milk before the experiment ranged from about 25 to 65 %.

2. Four methods of nutrition education were used: posters, lectures and films each in two schools, and pamphlets in one school. The remaining two schools acted as controls.

3. The material was used for one term in all seven 'experimental' schools, and again for the following term in one of the schools receiving each of the different forms of education.

4. Although it appears that there was a small increase in the number of children that said they would take milk, there was no significant increase in the number that did in fact do so, in either the first or the second term.

5. The analysis of the possible causes for this failure to increase milk consumption suggests that nutrition education does not affect dietary behaviour if the factors that limit consumption are sufficiently strong.

Nutrition education aimed at members of the public has as its objective not merely an increase of their nutritional knowledge but an increase of the nutritional value of their diet. Although a great deal has been said and written on the subject of nutrition education, very little has been published that has attempted to assess its efficacy in terms of improved nutritional behaviour (McKenzie & Mumford, 1965). Much of that which has been published has consisted of experiments that have been poorly designed and poorly evaluated; what remains certainly does not confirm that nutrition education is very successful in improving the diet that people eat.

The chief criticisms by McKenzie & Mumford of work previously done in this field were threefold: most of the experiments in nutrition education did not attempt any evaluation of their effectiveness; when evaluation was attempted, it often measured improvement in nutritional knowledge or in nutritional attitudes, and not in nutritional behaviour; when evaluation was attempted in terms of nutritional behaviour, it was often carried out within a very short time after the end of the period of education, so that one does not know how permanent were the effects.

In this paper we describe an experiment devised both to assess the efficacy of nutrition education in behavioural terms, and to compare the relative efficacy of four different types of propaganda.

EXPERIMENTAL

Methods of education

For our experiment, we chose to assess the effects of nutrition education through four different media upon the consumption of milk in schools during autumn 1965 and spring 1966—the first two terms of the 1965–6 school session. We used posters,

films, lectures and pamphlets, all the well-known methods of nutrition education except perhaps group discussion.

Posters. Two posters were put into each classroom and others were displayed prominently in public corridors. The posters remained in both schools for the whole of one term, and were then taken down in one school; in the other school they were replaced by different posters for the second term. Two of the posters contained material referring to the nutritional quality of milk; the others were those used for the usual advertizing of the National Dairy Council and included 'Good sports need lots of milk', 'In case of thirst, remove top and quench', 'Fight colds and 'flu with milk'.

Pamphlets. In the first term each pupil received a pamphlet entitled 'Good Looks Ahead', which was specifically written for teenage girls, and examined many aspects of health and hygiene of interest to them. It gave simple information about diet and made specific reference to milk. In the second term the girls were given another pamphlet entitled 'Health and Wellbeing—the nutritional value of milk'. This described the various nutrient requirements and the way milk could satisfy them.

Lectures. These were given to groups of about fifty children by one of the Dairy Produce Advisors employed by the Milk Marketing Board. The talks lasted about 20 min and were followed by 15–20 min of questions and answers. The lectures particularly described the ways in which milk might be used and how it helped to maintain health.

Films. In the first term two films each lasting about 20 min were shown. These were entitled 'Consider your Verdict' and 'Milk and Nutrition'. 'Consider your Verdict' was a humourous film based on a court case against somebody who was wasting milk. The story developed with the prosecution trying to show the value of milk and the defence counsel bringing up many of the arguments suggested as to why people do not drink much milk. 'Milk and Nutrition' dealt with the more technical aspects and described the various nutrients, why they are required and how milk supplied them. In the second term a film called 'Milk for the Nation' was shown in one school. This was of an historical nature and examined the way in which milk consumption had changed over the years. It also discussed pasteurization, sterilization, and milk hygiene generally.

Procedure

The experiment was planned to consist of several stages in order to assess first the comparative effects of the different methods of nutrition education, secondly the duration of these effects, and thirdly the usefulness of a further, reinforcement, course given 3 months after the initial one. The stages were:

Stage 1, basic information: measurement of milk consumption before institution of educational courses.

Stage 2, programme: institution of courses in five pairs of schools; four pairs received one of the four types of educational material, and the fifth pair acted as controls.

Stage 3, short-term effect: measurement of milk consumption for 5 weeks after the course of education began.

Stage 4, medium-term effect: continuation of measurement during the following school term, that is from about 3 months after the course began.

Stage 5, reinforcement: re-introduction of the same type of educational material into one of each pair of schools, in order to compare the subsequent milk consumption both with consumption before the second course of education, and with consumption in the school not undergoing the second period of instruction.

In the event, it proved that none of the types of education had resulted in significant change in milk consumption, so that we did not pursue our original intention of continuing assessment over a longer period.

With the help of the National Dairy Council, and the Reading and Berkshire Education Authorities, we found ten schools that volunteered to participate by allowing us access to all their pupils, whose ages ranged from 11 to 19 years. Before we began, however, one school restricted us to pupils in the 1st and 2nd years. After we had begun, we found the degree of co-operation in another school so slight that we have not included our findings there in our assessment of the results of the experiment.

Our study was thus carried out in nine schools with a total of 4637 pupils; six of the schools were co-educational and three were for girls only.

We began by measuring the consumption of milk in each of the schools for 2 weeks. We then introduced the four different types of educational material into four pairs of schools, keeping the fifth pair of schools as controls. The material was that routinely used by the National Milk Publicity Council throughout Britain. It was one of the schools receiving the pamphlets—school 8—that we have excluded because of lack of co-operation.

In order to assess the amount of milk consumed, the schools had to modify their usual method of measuring supplies and consumption.

Usually, the children are asked by the teachers at the beginning of each term whether they wish to take milk. The teachers then inform the school secretary, who places orders with the milkman for the required number of crates, each containing thirty bottles of $\frac{1}{3}$ pint (about 90 ml). Theoretically a new order is placed each week, but in practice no change is made unless the secretary feels that the amount ordered is excessive or, less commonly, inadequate.

For our experiment, the children were asked by the teachers each week whether they wanted milk. One teacher at each school passed this information on to us as well as to the secretary. The amount consumed was constantly checked and the order changed if necessary each week so that there was a surplus of about one crate of milk each day. This procedure was introduced into the schools during the summer term of 1965 in order to give time for the new method to become established. The amount consumed was obtained from the monthly returns made by each school to the local education authority of the amount taken into the school from the dairymen. The experiment itself was carried out during the autumn term in 1965. It was repeated in the following term in one school of each pair (and in the one school receiving pamphlets) in order to assess the effect of reinforcement.

The change in the system of ordering milk proved to have been necessary, because there was initially a very high demand for milk by the children, which was, however, not reflected in the amount consumed.

The figures for demand express only the pupils' intentions, and not whether they did in fact drink the milk. On the other hand, the figures for consumption reflect reasonably well the total milk consumed, since the amounts ordered were changed if there was obvious excess or obvious shortage. They do not, however, give an accurate number of consumers since there are always some children who take two bottles, although this is against the rules. Nevertheless, we are satisfied that significant change in the number of children taking milk would be reflected in significant change in the number of bottles ordered.

It proved to be impossible to obtain all the information desired from all the schools. One of them, school 4, had information of consumption only for the whole school, although our experiment had to be confined to the 292 girls in the 1st and 2nd years; we can thus give only the figures for milk ordered. On the other hand, during the first term we were not able to obtain satisfactory demand figures from control school 9, or for the last 2 weeks from school 6. During the second term, we continued to receive no figures for demand from either of these schools and they were joined in this by school 2, and, for 1 week, by school 4.

The reasons for the incompleteness of our results no doubt lies in the fact that our experiment was conducted in a climate of revolt by the teachers against extra-curricular duties, which included and were often symbolized by the distribution of milk. Before our experiment was concluded, one national conference of teachers had voted for the abolition of free school milk. Nevertheless, we believe that the results of our experiment, though based on less complete information than we should have liked, are not thereby invalidated.

RESULTS

In order best to be able to compare the consumption of milk in different schools, and the effect of different forms of educational propaganda, we have expressed the results as percentages of the total number of pupils in each school, or in the appropriate classes in school 4. The dates upon which the four types of propaganda were begun in the schools differed somewhat, so that the figures for demand and consumption are given for the weeks numbered before or after the introduction of the educational courses.

Comparison of the figures for the milk ordered during the week before the beginning of the course with those for the first week or two after it ended indicates its effect on attitude. In the first term, the only effect was a very small increase in ordering by the pupils of the two schools where films were shown, but this did not last for more than 1 or 2 weeks. One of the same schools (school 4) showed a repetition of this small increase when the films were shown again in the following term; in this instance the increase became somewhat greater towards the end of the 5 weeks of observation after the end of the course. There was also an apparent increase in milk ordered in school 5 although the unusually low figure of 49% for only 1 of the 2 weeks before the beginning of the course suggests that it was unrepresentative of true demand. All these differences are so small that it is most likely that they do not represent a real change in attitude.

For our purpose, the more relevant figures are those for milk consumed before and

after the course of instruction, that is, the change in percentage of children in the school or group who are presumed to have taken milk. The only possible instance of increase was in school 2 during the first term, when it seemed that consumption increased by 5% during the 4th and 5th weeks after the posters were shown.

Table 1. *Effect of nutrition education on milk consumption in schools in the autumn term*, 1965

(Number of bottles of milk expressed as a percentage of the number of pupils)

Type of propaganda	School	No. of pupils	Assessment	Weeks before course began: 2	Weeks before course began: 1	Weeks after course ended: 1	2	3	4	5
Posters	1	563 (mixed)	Ordered	47	47	46	44	44	46	47
			Consumed	46	46	46	44	44	44	44
	2	567 (girls)	Ordered	67	66	65	66	65	64	65
			Consumed	48	48	48	48	48	53	53
Films	3	448 (mixed)	Ordered	53	52	58	55	53	50	48
			Consumed	51	45	45	45	45	45	45
	4	292 (girls)	Ordered	—	58	62	62	59	57	56
			Consumed			Not available				
Lectures	5	371 (mixed)	Ordered	70	72	68	67	68	63	66
			Consumed	66	66	66	66	66	66	66
	6	684 (mixed)	Ordered	26	27	28	29	29	—	—
			Consumed	18	22	22	22	22	22	22
Pamphlets	7	608 (girls)	Ordered	60	55	54	57	57	54	56
			Consumed	41	44	44	44	44	44	44
None (controls)	9	536 (mixed)	Ordered			Not available				
			Consumed	67	67	67	67	67	67	61
	10	568 (mixed)	Ordered	48	48	53	47	44	43	41
			Consumed	60*	49	49	49	49	49	44

* School 10 always indents for large quantities of milk at the beginning of term, and later adjusts to consumption.

DISCUSSION

We must conclude from these results that neither posters, nor lectures, nor films, nor pamphlets were more than marginally effective in increasing the consumption of school milk by children, in the circumstances of our study. The simplest and most obvious explanation is that nutrition education was ineffective. This, however, is an excessively superficial assessment, and we need to examine the possibilities more closely.

One possibility was that the children did in fact take more milk at home, though not in the schools. This would have been very difficult to assess, and was not within the facilities that we commanded. Whilst it cannot be ruled out, it seems to us unlikely that the effect of our courses of nutrition education would have carried over into the home whilst showing no effect in the schools.

If we assume that there was no change in milk consumption in the home, our courses of nutrition education might have failed for one of several reasons. The first is that they were inadequate and that a different programme might have been effective.

A second possible reason is that nutrition education in whatever form would have been ineffective, and that there are factors that result in a static consumption that have nothing to do with a lack of appreciation of the desirable nutritional qualities of milk; it may be that all children are already adequately aware that milk is 'good for you'. One factor preventing increased consumption might then be that all the children who could be persuaded to take milk were already doing so, and that nothing could persuade the remaining children. But the fact that there is such a wide variation in

Table 2. *Effect of nutrition education on milk consumption in schools in the spring term,* 1966

(Number of bottles of milk expressed as a percentage of the number of children)

Type of propaganda	School	Assessment	Weeks before course began		Weeks after course ended				
			2	1	1	2	3	4	5
Posters	1	Ordered	51	48	45	46	47	46	48
		Consumed	42	42	42	42	42	42	42
	2	Ordered			Not available				
		Consumed	51	51	51	51	51	51	51
Films	3	Ordered	42	37	37	42	41	41	39
		Consumed	22	22	22	22	22	22	22
	4	Ordered	46	41	—	50	55	51	57
		Consumed			Not available				
Lectures	5	Ordered	—	49	55	53	57	53	52
		Consumed	52	52	52	52	52	52	52
	6	Ordered			Not available				
		Consumed	23	23	23	23	23	23	23
Pamphlets	7	Ordered	55	59	56	56	55	56	56
		Consumed	44	44	44	44	44	42	42
None (controls)	9	Ordered			Not available				
		Consumed	60	60	60	60	60	60	60
	10	Ordered	36	35	36	33	37	34	34
		Consumed	35	35	35	35	35	35	35

consumption in the different schools makes this unlikely. What we may call 'saturation' in persuasion could perhaps have existed in schools where 65% or 70% of the children took milk, but is unlikely in schools where only 25% or less took it. We must then look for a different factor that sometimes limits the number to such a low proportion.

We chose to study school milk because we were assured of a fairly stable population, and because we were able to assess consumption by objective and reasonably simple methods. But the controlled situation that makes the schools an appropriate place for seeking reliable statistical information in such a study may also impose restraints on the distribution of milk that hinder or prevent change. It has long been known that such physical factors as the time of distribution, the distance from the classroom, and the place where the milk is to be taken have a considerable influence on the number of children that take milk (National Dairy Council, 1962). One can also think of other factors such as the amount of time available and the existence and nature of competing

interests or activities during the same period. These factors are likely to have accounted in large part for the considerable differences in the number of children taking milk in the different schools visited in our studies; consumption in school 7 was twice as high, and in school 5 three times as high, as in school 6.

If these suggestions are correct, our conclusion is not simply that nutrition education is ineffective in changing eating behaviour. It is rather that nutrition education may not change eating behaviour if there co-exist strong factors that militate against the change. Theoretically a course of nutrition education would overcome these other, inhibitory, factors either if it could be adequately strengthened, or if the inhibitory factors could be adequately weakened. With our present poor knowledge of how to induce change in eating behaviour, we cannot suggest ways that will achieve these objectives with certainty. We can only stress how great is the need for further attempts to assess the effectiveness of different methods of persuasion, and if possible, to measure the relative values of factors that make change easier or more difficult.

One practical consequence emerges. There is in Britain a considerable and continuing effort being made to increase the consumption of milk in schools. Our experiment suggests that the expense and effort that goes into a programme of nutrition education may be largely or entirely wasted if there are overriding factors that will prevent change. It is then worth considering whether some of the expense and effort would be better devoted to a more fundamental study of the problem of persuasion in relation to patterns of food consumption.

We are glad to have this opportunity of thanking the National Dairy Council and the administrative and teaching staff of the Berkshire and Reading Education Authority for the considerable help they gave us and without whose support this experiment could not have been undertaken.

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