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ENVIRONMENTAL HEALTH IN SCHOOLS
IMPLICATIONS FOR HEALTH EDUCATION

by

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Schools - stand*

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Public health engineers hold the belief that it is impossible for people to enjoy good health if they are living, working and learning in an unsanitary environment. There are few who will disagree with this apparent truism. Over the past 35 years many billions of dollars have been invested in developing countries to provide facilities for water supply and sanitation. Indeed, the International Drinking Water Supply and Sanitation Decade has set the target of "safe water supply and adequate sanitation for all by the year 1990" - a target that has awesome implications for investment. Health improvements from such investments have rarely been impressive and this has caused those who guide development investments to question the efficacy of water supply and sanitation as promoters of health. The general consensus now is that, although good health is not possible without water supply and sanitation facilities, the mere provision of facilities is not a guarantee of good health. Health improvement is dependent on the hygienic and regular use of facilities together with the adoption of consistent practices of personal, domestic and community hygiene. To achieve this requires first that facilities be reliably available for use and second that changes in behaviour be adopted with respect to the use of those facilities. The first requirement can be quickly and easily accomplished providing that adequate resources are available for the necessary work. The second requirement is more difficult and usually can only be accomplished after several years of sustained effort in health education. The need for behaviour change or modification is even more difficult with adults whose behaviours are sustained by the social and cultural milieu with which they are familiar. It may be more cost-effective in the long run to concentrate the bulk of health education effort on children in the expectation that they will be more amenable to changed behaviour.

For children, the school appears to be a logical and easy place to attempt to implement a health education programme. And, in fact, children seem to be good at spreading the "healthy word". Children who acquire good health behaviour at school - knowledge of vaccines, personal hygiene refinement, etc. - may pass the news on to their siblings, parents and eventually to their own offspring, thereby changing health habits within one generation, ideally. As former United States Health Education and Welfare Secretary, Joseph Califano, remarked, "Effective health education early in life can help prevent the major diseases in adulthood" (1).

Upbeat as this may sound, in reality health education programmes are very successful in increasing knowledge, somewhat successful in improving attitudes, but often less successful

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at creating permanent life-style changes. Health education cannot only be taught as would be spelling or history, employing rote or cognitive learning approaches. Potential contributors to health education learning include social psychology, behavioural psychology, sociology and social anthropology (2). Hence, current didactic approaches must be expanded.

Health education programmes can be one of two classes of behaviour change: that involving one time or infrequent use of health services (dental examinations, immunizations, family planning, etc.), and that resulting in changed daily personal health habits (using a latrine, washing hands after defaecating, boiling water, etc.). According to Bartlett (3) the first type of behaviour change is relatively easy to accomplish. However, the latter often must compete with long-standing, ingrained, and habitual practices. And, of course, it is the latter that is the goal of health promoters and educators.

Environmental health facilities

Etzioni (4) has said "Changing people is more expensive and usually less productive than approaches that accept people as they are and seek to mend, not them, but the circumstances around them". Where personal hygiene is concerned, it seems unlikely that humanly acceptable environmental conditions could be developed that would eliminate any need for changes in human behaviour. It is clear, however, that careful consideration to the built environment can first of all reduce or eliminate the risk of environmental hazards and second, provide facilities that simplify sanitary practices with minimum requirements for changes in behaviour. In the school environment it is therefore essential to provide easy access to sanitary facilities.

The minimum sanitary facilities required in schools are those for water supply and for excreta disposal, both of which need to be safe and adequate for the protection of health as well as for convenience.

A safe water is understood to be water free of chemical substances and microorganisms in concentration which could cause illness. An adequate water supply is one that provides safe water in quantities sufficient for drinking, for the personal hygiene of school staff and students and for other water uses on the school grounds. These "other uses" will vary from school to school but might include, for example, food preparation, the watering of school gardens, cleaning of building or for uses in school laboratories. The water supply should provide a sufficient quantity on a reliable, year-round basis and should be available on the school property close to the major points of use.

Facilities for excreta disposal are safe when they restrict or prevent the possibility of excreta (a) coming into direct contact with people, (b) contaminating ground or surface water, (c) being accessible to animals or insects, (d) coming into contact with food and (e) creating a public or private nuisance. Adequate excreta disposal is when the school has sufficient facilities to serve the needs of the students and the staff. Separate facilities should be provided for boys and girls, if at all possible, except in very small schools of fewer than about 40 pupils. In larger schools there should be one toilet for every 35 to 50 girls. For boys the number of toilets can be fewer - one for each 40 to 60 boys - provided that urinals are installed with one space for each 40 boys. Separate facilities are usually provided for teachers.

A hand-wash basin or wash rack is essential and should be located near to the toilets so that hand washing after toilet use can be facilitated. This requires that the water supply be adequate, as noted earlier and further requires that provisions be made for the disposal of waste water. In the simplest arrangement waste water could be discharged to a soakaway pit while in urban settings the sewer system is the logical disposal point. Waste water from hand washing may also be collected and used for irrigation of school gardens and planted areas.

The hand-washing area may be a logical location for a drinking-water tap if the school is served from a piped supply. If the supply is from a well or handpump, the pot or other container for drinking water is more liable to be kept within the school building. It is difficult to be precise about the number of drinking-water points that are needed since the demand on their use will vary with climate - both temperature and humidity - as well as on the physical activity of the children at recess or during physical education sessions. One drinking-water point for each 100 pupils should be the minimum.

A great many existing school buildings lack adequate sanitary facilities and, unfortunately, much new construction repeats old errors. Wealthy districts do not necessarily have good school buildings with good sanitary facilities, and some poor areas have failed to proportion their limited funds in order to secure the maximum possible health benefits. Wherever bad construction, poor ventilation, lack of washing facilities, insanitary toilets, or similar deficiencies exist, children will be absorbing wrong ideas and learning harmful habits which may never be eradicated. It is essential that the advice of public-health authorities be sought in the planning of new school buildings or the remodelling of old ones.

Water supply, excreta disposal and hand-washing facilities are the minimum sanitary facilities required in schools. Additional facilities may be required depending on the extent of other services offered. If the school has an active programme of vigorous athletes, showers should be provided. Some schools provide mid-day meals for their pupils and, where this is done, kitchen and dining areas will be needed, including all of the sanitary installations required for food storage, dish washing and refuse disposal. Detailed information on the appropriate sanitary requirements is contained in the WHO/EURO publication "Mass Catering" (5).

Rural schools, and indeed some urban schools, often draw pupils from areas sufficiently distant that some pupils are unable to go home for lunch. This situation is more likely to occur with secondary schools than with primary schools. A lunch room should be provided although often one or more of the classrooms may be used as lunch room. Lunch rooms need to be supervised by a teacher or by senior students to ensure order in the room and the sanitary disposal of any wastes that are produced.

School sanitation depends on the size of the school, whether it is in a rural or urban area, the age range of the pupil in attendance and the availability of health services from agencies other than those provided by the school administration. Standards for school sanitation are the responsibility of the Ministry of Health while it is the responsibility of educational authorities to apply these standards. The Ministry of Health is also responsible for consultative services which may be necessary under unusual or difficult circumstances.

Siting

Selection of an appropriate site for a new school will have an effect on many of the subsequent environmental factors which relate to health and safety. Suitable sites may be easier to obtain in rural than in urban areas, although in the urban setting land-use planning should foresee the need for schools and land should have been reserved for this purpose. The minimum land area should be one hectare for a school with 100 or fewer pupils at the elementary level and double that size for a secondary school. An additional half hectare should be provided for each 100 pupils. School sites should have good natural drainage and be free from hazards such as bluffs, ravines and proximity to major roads and railways. Adjoining properties should not be conducive to the breeding of rodents or insects since disease vectors have no respect for property boundaries. Where water supplies, excreta disposal and wastes disposal are to be provided on the school property as opposed to piped water and sewerage, larger properties may be necessary depending on the soil conditions and the proximity of the ground-water table to the surface.

Elementary schools should be within easy walking distance for the pupils; a maximum of two kilometres or 30 minutes' walking time should not be exceeded. Secondary schools usually draw their students from larger areas and students may have to travel for as much as one hour in each direction. A maximum walking distance of five or six kilometres may not be possible to achieve in rural areas of developing countries and this introduces the problems of either arranging for transportation or of establishing boarding schools. Access by road or street is essential but major high speed highways should be avoided.

Schools should be sufficiently distant from industrial installation that noise, smoke, fumes and heavy traffic do not interfere with classroom activities or create any health hazards.

Building design and construction

Many of the features of school buildings are a response to the local community and climate conditions in relation to the intended functions. Classrooms should, ideally, provide a total floor space of about two square metres per pupil. This amount of space allows for the teacher's desk, bookshelves and storage space as well as for the pupils' desks and the aisles between the rows of desks. Overcrowding detracts from the learning atmosphere and appears to be instrumental in the transmission of respiratory diseases and lice (6).

The materials used for school construction will usually be those locally available and commonly used for other buildings. Insofar as is possible, durable materials with a smooth finish should be chosen. Durable materials help to extend the useful life of the school building while smooth finishes simplify the work of cleaning and maintenance.

The choice of colour and finish on the interior walls and ceilings of classrooms affects the brightness of the room and can also affect the alertness of the room's occupants. Cool colours - green or blue - are preferred for sunny rooms, while warm colours - yellow, orange or red - are better for sunless rooms. Non-gloss finishes prevent glare, while light colours increase the amount of reflection of light and help to brighten the room. Clashing colours and brilliant shades of colour are reported to produce nervousness among both pupils and teachers.

Natural light in school buildings often needs to be supplemented with artificial light. The amount of artificial light that needs to be installed will depend on the visual tasks of the children. Material written in pencil and poor quality printed material require higher levels of illumination than are required for good quality printed matter. The minimum desirable level of illumination in school classrooms is 300 lumens per square metre. This level needs to be doubled or tripled for difficult seeing tasks such as sewing, drafting and similar vocational work.

Promoting healthy behaviour

Much can be done to create a healthy environment by the careful design and construction of school buildings. This is the "mending of the circumstances around the people" referred to earlier. In the final analysis, however, the very best facilities can be destroyed by careless use and inadequate maintenance. Any potential health benefits can then be rapidly lost. This is especially true for the sanitary facilities in schools and points out the need to promote the behavioural changes that can lead to improved health. School health education is, therefore, a necessity - not a luxury.

The school has an advantage over most other milieus for encouraging hygienic behaviour because the educational effort can be reinforced by discipline. Education, especially in the earliest years of schooling, goes hand in hand with discipline. The learning of, for example, the alphabet or number symbols, depends more on the repetition and practice of drawing or identifying the various symbols than it does on logical deduction. Similarly, in order to maintain reasonable levels of order in the classroom, rules must be established and the teachers must ensure their enforcement.

In schools with more than one classroom, one teacher will have administrative as well as teaching duties; larger schools often have a full-time principal or administrator. These people have the responsibility of managing, among other things, the work of staff who do maintenance and cleaning of the school property. Thus, a second level of discipline is needed to ensure that the staff is doing adequate work in the maintenance and cleaning of the school's sanitary facilities.

The importance of hygienic conditions in school sanitary facilities was studied in 14 primary schools in Cali, Colombia (6). This study showed a highly significant correlation between unhygienic and/or inadequate school toilets and the prevalence of diarrhoea and vomiting among the more than 8000 students who participated in the study. Confounding factors were believed to be minimal since socioeconomic factors in the community were reasonably uniform. All but one of the schools were under the same school system and the variation in hygienic conditions resulted from historical accident or from the interest of individual directors in the maintenance and cleanliness of their school's sanitary facilities. Calculations made with the data led to an estimation that diarrhoea prevalence

could be reduced by 44% if the level of hygiene in all schools was equivalent to that of the two schools with the relatively most hygienic facilities. As with so many facilities intended for the benefit of the public, the technology per se appeared to be of lesser importance than its proper operation and maintenance.

The role of discipline in ensuring proper operation and maintenance on school property was obvious two years ago when one of us had the task of inspecting the sanitary facilities at 23 schools in a country where some unusual incidents of illness had been reported. Seventeen of these schools had been originally equipped with flush toilets of more or less the same good standard of construction. All of the schools were multi-classrooms, each school had a headmaster or headmistress in charge and each had servants whose task was to clean the school buildings. The conditions of cleanliness of the sanitary facilities varied from poor to excellent. In those classed as poor, doors of the cubicles were broken, toilet traps were plugged, faeces were on the floor of the cubicles, on the floor in other places and in some cases on the ground outside the building, and walls, floors and windows were filthy. Clearly, students did not use these facilities in a hygienic way and staff responsible for day-to-day cleanliness and maintenance did not do their jobs properly.

The "excellent" facilities were all in operating order and were spotlessly clean. Between the two extremes were a number of classified as fair or good which, although dirty and untidy to varying degrees, were in operating condition.

The inspection of these facilities did not (and was not intended to) detect a correlation between hygienic conditions and the prevalence of communicable disease among the students. What did emerge from the inspections and discussions with school staff was that hygienic conditions were not an accident. "Excellent" and "good" conditions resulted from the insistence by the headmaster or headmistress that students use the facilities in a hygienic way and that cleaning staff do their jobs properly and regularly. Discipline of both students and staff was therefore the key ingredient to good hygiene.

Conclusion

The design and construction of schools can be done in such a way that environmental conditions which adversely affect health can be prevented or minimized. This will require that ministries of health and ministries of education collaborate in the preparation of guidelines or standards for all those aspects of school facilities that can affect the health of the children. Once the schools are built the onus is on school administrators to assure that maintenance is satisfactory and that the facilities are properly used. The role of the teacher is to train and to educate, a process that includes the imparting of correct information, the setting of a good example and the application of discipline to the extent necessary to ensure that the correct information is properly used and the good example is being followed by the pupils.

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