

Changing concepts of health and illness among children of primary school age in Western Kenya

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Abstract

This paper examines changes in children's concepts of health and illness following an action-oriented health education intervention in Bondo district of Western Kenya. The study is a feasibility study exploring a specific educational approach, and it combines elements of health education research and anthropological research. Forty primary schoolchildren aged 10–15 years of age underwent a 2-month intervention and were thereafter enrolled as health communicators in a longitudinal study for an additional period of 12 months. Data were collected before, during and after the intervention using in-depth interviews and the draw-and-write technique. Students' actions and their active participation were key elements in the intervention. Although the intervention from the beginning focused on two specific diseases (malaria and diarrhea), the students were involved in developing their own ideas and visions about which changes to make, which actions to carry out and which target groups to approach. Data showed that children had acquired new concepts of health, some of which incorporated elements of the old ones. More

action-oriented health concepts were identified and a general change from an external locus of control towards an internal locus of control was found. The study concludes that students can modify and broaden their concepts of health and illness through action-oriented health education. Key factors are the development of students' ownership through active and participatory teaching and learning approaches.

Introduction

This paper aims at exploring changes in children's health and illness concepts due to a health education intervention in Bondo district, Kenya. The word 'health' is not a precise concept and defining the concept in local languages is often a problem. Among the Luo in Western Kenya, the word *ngima* is used in reference to health, but it also implies life and general well-being. Illness is translated as *tu* and disease can be specified in terms of the form of illness or of symptoms, e.g. *tu mar ahonda* meaning the 'illness for coughing' (Onyango-Ouma, 2000). In other words, the local language embraces a number of words that each covers the different dimensions in the WHO definition: 'a complete state of physical, social and mental well-being and not merely absence of disease and infirmity' (WHO, 1946).

Health education

Health education is taught in Kenyan school subjects like science and home economics (Republic of Kenya, 1994). Since the fieldwork

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was conducted, a new curriculum has been introduced in which health and environmental education are taught under science (Republic of Kenya, 2002). Formal learning about health is characterized by the use of didactic teaching methods and poor communication relationship between teachers and pupils. The knowledge hierarchy is quite clear and teaching is a top-down, one-way process directed by the teacher (Bishop, 1986; Fountain, 1993; Bruner, 1996; Onyango-Ouma, 2000). In addition to this, teachers as well as pupils consider the curriculum as extremely crowded. Under these circumstances, pupils are left with very few possibilities for developing ownership of the knowledge they receive in the classroom.

In a review of literature on health education in the Third World, Tjeldvoll and Holmesland (Tjeldvoll and Holmesland, 1994) identified some of the difficulties in implementing programmes as inadequate pedagogical approaches and over-reliance on traditional and didactic methods. Concerns have been raised about teaching approaches that overemphasize learning facts and passing exams (Hubley, 1993). This growing criticism of the traditional approaches has led to a shift in focus towards participatory approaches that encourage students' own exploration and discovery, and relate the information presented to everyday life of children (Hawes, 1988, 1997). Also, at a more general level, including European countries, a strong tendency to work in action-oriented and participatory ways in both health and environmental education has been identified [see, e.g. (Jensen *et al.*, 2000)].

A number of studies deal with children's concepts of health and illness (Campbell, 1975; Natapoff, 1978; Bird and Podmore, 1990; Jensen, 1991; Shiloh and Waiser, 1991; Geissler, 1998; Normandeau *et al.*, 1998). Nevertheless, questions of *how* children acquire ideas about health and illness have received little attention. It is generally assumed that there is a developmental trend in which children acquire and develop their concepts as they mature and grow up. Campbell (Campbell, 1975), for example, concluded that as children move toward adulthood their fund of knowledge

becomes enlarged, organized and repeatedly transformed. The developmental perspective presupposes that ideas about health and illness are determined by the general society, and are acquired through the gradual process of achieving general social orientations.

However, a society's ideals, being products of history, may be inconsistent with contemporary issues surrounding health and illness in the same society. Thus, in view of emerging health problems, concerted efforts must be made to impart knowledge, confront attitudes and develop skills through health education in schools. During these activities children might acquire concrete and specific health and illness concepts that would otherwise be considered sophisticated for their age.

Recent studies have shown that children are not only passive recipients of other people's care and interventions, but agents who interpret symptoms and engage in self-medication (Prout, 1992; Christensen, 1998; Geissler *et al.*, 2000). Attempts to provide health education to schoolchildren have—generally speaking—only been linked vaguely to considerations about their views on health and illness. However, it is essential that such interventions take children's ideas into consideration, if they are viewed as consumers of health information in their own right (the 'ethical' argument). Interventions that are meaningful within children's own frame of reference will furthermore—everything else being equal—increase the impact of health education (the 'efficiency' argument).

The concept of perceived locus of control (Rotter, 1966) influenced the development of health locus of control (Kirscht, 1972; Wallston *et al.*, 1976; Wallston and Wallston, 1978). Both concepts relate to the extent to which individuals believe they and their health are controlled by 'internal' or 'external' factors. When faced with a problem situation, 'internals' see the situation as one in which their efforts will make a difference and will help them resolve problems. 'Externals', on the other hand, will act on the basis of their expectations that chance or other uncontrollable factors are critical and will therefore behave

accordingly. ‘Health externals’ are people who believe that health or illness is due to fate, luck or chance. Health internals, on the other hand, believe they have some control over their health or illness.

The present article explores the dynamics of the ways in which students’ views on health and illness changed when exposed to a health education intervention. It focuses on the processes of how children acquire new concepts, how they change or modify previously held views and how these change from an external to an internal locus of control.

The intervention

The intervention consisted of action-oriented and participatory health education as well as a follow-up phase, in which students worked as health communicators in the school, in the local community and in their families. The health education activity, which was carried out by teachers, focused on prevalent health problems (malaria and diarrhea) and related hygiene issues. During the activity, teachers used participatory and active learning methods. Teachers were trained to use these methods before the intervention by a group of local resource persons possessing appropriate professional skills.

The intervention applied an action-oriented and participatory teaching and learning approach in order to ensure the development of pupils’ ownership and to facilitate processes leading to concrete change. It is an integrated part of this teaching approach that the pupils should take action aimed at influencing ‘real-life’ conditions as part of their learning processes. These conditions could be health issues related to their classroom, the school, their family, the local community as well as their own behavior.

The action-oriented teaching approach is a well-defined educational approach developed among other places within the Danish network of health promoting schools (Jensen, 1997, 2000). In brief, an action is targeted at change (e.g. in pupils’ own

lifestyle) and it should be decided upon by those carrying out the action (here, the pupils).

The concepts of action and participation are interrelated, but even though action requires active pupil participation, the opposite is not necessarily true. A project would only become action-oriented if the pupils also decide which actions they want to initiate—and then implement them. In the present study, students were active in deciding the changes they wished to bring about, in working out potential problem-solving strategies and in deciding which concrete actions to carry out.

The whole intervention was inspired by the Child-to-Child approach to health education (Hawes and Scotchmer, 1993) as well as the ‘IVAC’ approach (Jensen, 1997). As an alternative approach to health education in primary schools, the Child-to-Child approach aims to involve children in active learning to build their capacities for health action (Hawes *et al.*, 1992; Pridmore, 1997). It promotes a methodology that links children’s living places with their learning environment through a series of six steps (Bailey *et al.*, 1992):

- (1) Choosing the right idea and understanding it well
- (2) Investigating and finding out more
- (3) Reporting, discussing and planning
- (4) Taking action (individually and together)
- (5) Discussing the results of the action
- (6) Doing it better and sustaining the action

In our study, students did not have the opportunity to ‘become involved in choosing the right idea’ (Step 1 above), but the reasons for choosing the issues were explained to them and they agreed that they were important. For instance, malaria and diarrhea were the leading causes of childhood mortality and morbidity in the study area.

The intervention was also inspired by the IVAC approach. The IVAC approach is very much linked to the ideas behind the Child-to-Child as it emphasizes that students work with four perspectives as part of action-oriented teaching: (1) *Investigations* of the health issues, (2) developing their *Visions* and taking (3) *Action* to (4) facilitate *Change* (Jensen, 1997). Rather than being viewed

as steps in a certain order, the four perspectives in the IVAC approach are suggested as a mental framework that teachers and pupils might use as a steering tool in action-oriented teaching. Among other things, the IVAC model emphasizes the vision phase as an addition to the Child-to-Child approach. Developing visions implies that students imagine how the conditions that they would like to change would look like in future and come up with their own suggestions. The development of visions makes students committed to taking and sustaining actions since they have developed their own ideas of which changes to anticipate.

The duration of the teaching period was 2 months. It included preventive measures for malaria and diarrhea as they relate to everyday practices; aspects of etiology and recognition of symptoms and the management of diarrhea using oral rehydration solution, and treatment of malaria using antimalarials obtained from government health posts. Hygiene was based on everyday practices about body and clothing care, household maintenance, food preparation, sanitation, refuse disposal, water safety, and how they impact on people's health. The main focus of the intervention was health promotion and prevention through everyday practices.

The intervention involved both student participation in the learning process and in the subsequent concrete actions (e.g. boiling water for drinking). The intervention was constructed in the belief that when children participate actively in the learning process and in taking actions individually and together with others, they learn better. During the intervention, students worked at acquiring a broad and action-oriented knowledge, which they themselves were to use as educators or communicators in the following stages.

Although the intervention has been described mainly as the teaching activity, it might also be viewed in a broader sense embracing the stage (lasting for an additional 12 months), in which students acted as health communicators by disseminating information and encouraging action taking at school and at home. By acting as health communicators, the children engaged in processes

that could be described as 'learning by teaching' activities when they were teaching their peers, their siblings and their parents. These processes were crucial factors for the development of students' ownership of the whole project, of the conceptual changes and of their further commitment.

Methodology

Study area and population

The study was conducted in two primary schools in rural Western Kenya among the Luo people living in Bondo district. Subsistence agriculture and fishing are the main occupations, while labor migration to urban centers is common. Children in the community are introduced to work tasks at a tender age, and engage in productive tasks (e.g. fetching water and herding animals) and self-care activities such as bathing and washing their own clothes. The majority of children attend primary schools.

The study schools and students were selected on the basis of purposive sampling. The schools were typical, rural schools which expressed their interest in the project when approached. The schools were approximately 2 km apart. The selection of the students was strictly based on their consent and that of their parents/guardians. Although purposive samples have their own limitations (including lack of representativeness), our intention was to develop an approach to health education that could be scaled-up to all children in all schools with similar conditions. This necessitated a small sample that could be studied intensively.

In each of the two study schools, 20 consenting students in Standard (Grade) 5 were enrolled in the study. This gave a total study population of 40 children (22 boys and 18 girls) aged between 10 and 15 years. The age distribution did not differ from an average class in the area. This group of students participated in a health education activity, which continued for 2 months (approximately 6 hours per week), to prepare them to act as health communicators at the school, in the community and in their respective homes.

Design

A quasi-experimental design was adopted in which a health education intervention was set up in two schools without a control for comparison purposes. The decision to exclude control schools was partly based on the fact that a strong ethnographic element was incorporated in studying the intervention. We acknowledge the limitations of this design, but we also share the developing concern with regard to the use of control groups (let alone randomized control trials) in understanding the process and impact of health education and promotion initiatives. See, for instance, a WHO working group's assertion that '...the use of randomized control trials to evaluate health promotion initiatives is, in most cases inappropriate, misleading and unnecessarily expensive' and the group recommends to use a '...wide range of qualitative and quantitative methods that extend beyond the narrow parameters of randomized control trials' [(WHO, 1998), p. 11].

Although the study is more a feasibility study than an evaluation of a specific approach, the design did include assessments of children's concepts of health and illness before and after the intervention. Alongside these, a system of follow-up was put in place for monitoring developments that took place which could be related to the intervention. The data were primarily collected through in-depth interviews and draw-and-write technique.

Data collection methods

Children were interviewed individually before and after the intervention on the concepts of health and illness. Some of the questions focused on what the word 'health' meant to them and how they felt when they were healthy. On illness they were asked a series of questions on how they would differentiate between whether they were ill or not. The interviews were conducted in the local language within the school settings, but outside the classrooms, by a team of four trained field assistants. The team worked under close supervision of the main investigator who also conducted some of the interviews.

Using the draw-and-write method (Pridmore and Bendelow, 1995) students were asked to make drawings and then explain their drawings in writing. Students were given two tasks: (1) to think of all the things that they did or could do to make or keep themselves healthy and (2) to think of all the things that could make them ill. Then they were asked to draw-and-write. Drawing sessions were done in classroom settings where children were provided with newsprint, pencils and crayons.

This study exemplifies the benefit of triangulation of methods of data collection (Hammersley and Atkinson, 1995). Triangulation offered us the benefit of comparing data dealing with the same phenomenon (e.g. health) collected through different methods (in-depth interviews and draw-and-write technique).

The use of the draw-and-write method in exploring children's views of health and healthiness has been criticized by Backett-Milburn and McKie (Backett-Milburn and McKie, 1999) for not taking into consideration societal and contextual influences of data construction. Their arguments suggest that the drawings so produced by children may not reflect their own personally meaningful views and feelings, but rather dominant public discourses. We find their critique of the method valid. On the other hand, based on our experience, we suggest that the use of the draw-and-write method in combination with other methods can shed light on societal and contextual issues that might not be discernible from the drawings. By triangulating data, the weakness of one method is cross-checked by the strength of another method. The strength of conclusions drawn in this study regarding children's conceptual changes partly draws from this process of triangulation.

Data analysis

Trained field assistants translated verbal, qualitative data from in-depth interviews collected in the local language into English. The data were then read and organized using the QSR NUD*IST software for qualitative data analysis. Relevant categories were developed and responses from different informants grouped together through an

index coding system allowing the data to be summarized along common themes. This made it easy to collate different responses to one question. The index coding system permitted the quantification of responses given in Tables I and II.

Table I. Responses to the questions ‘What is the meaning of the word health?’ and ‘how do you feel when healthy?’

Concepts	No. of children reporting each concept before intervention [n (%)]	No. of children reporting each concept after intervention [n (%)]
Do wanted things	23 (58)	21 (53)
Being happy	19 (48)	22 (55)
Lack of pain	16 (40)	17 (43)
Being active	14 (35)	10 (25)
Feeling good	10 (25)	12 (30)
Health-promoting actions	9 (23)	25 (63)
Strong body	6 (15)	7 (18)
Disease concept	5 (13)	20 (50)
Peaceful mind	2 (5)	5 (13)

N = 40. As the children could give more than one answer, the sums are greater than 40 (100%). Identical questions were asked with a 12-month interval before and after the health education intervention.

Table II. Responses to the question ‘How would you differentiate between whether you are ill or not?’

Concepts	No. of children reporting each concept before intervention [n (%)]	No. of children reporting each concept after intervention [n (%)]
Sensation states	26 (65)	24 (60)
Moods and attitudinal states	15 (38)	13 (33)
Altered conventional role	10 (25)	12 (30)
Objective signs	6 (15)	17 (43)
Increased sick role behavior	6 (16)	5 (13)
Visible external signs	3 (8)	20 (50)
Diagnoses and causes	2 (5)	22 (55)

N = 40. As the children could give more than one answer, the sums are greater than 40 (100%). Identical questions were asked with a 12-month interval before and after the health education intervention.

The data from the draw-and-write exercises was manually organized by matching the visuals drawn and the accompanying explanations given for purposes of comparison. Drawings that were unclear were discarded. Similarities and differences were then compared between the pre- and post-intervention periods.

The main investigator analyzed the two sets of data for both periods. Data from both sources have been used to support one another in drawing conclusions regarding children’s conceptual development.

Results

Children’s ideas constituting the concept of health

Children were asked, ‘What is the meaning of the word health? How do you feel when you are healthy?’. As mentioned earlier, getting a precise definition of the word health in local languages is often a problem. Developing a common understanding becomes even more difficult when dealing with people who cannot grasp the concept in its English form. In our interviews we realized that children tended to think about health in practical terms. For instance, a number of them equated health to be able to carry out various health-promoting actions (e.g. related to hygiene). This illustrates that a number of the children relate a person’s ‘Action Competence’ or empowerment as one important dimension of being healthy.

The answers were categorized according to the following:

- Perform key tasks: performing everyday activities like fetching firewood or water and engaging in play activities like running.
- Being happy: not sad and harboring bad feelings, happy face.
- Lack of pain: ‘there is no pain in the body’.
- Being active: in the sense that the physical functions of the body are normal. In this case one is able to talk, walk, play, eat, excrete and breathe without difficulty.

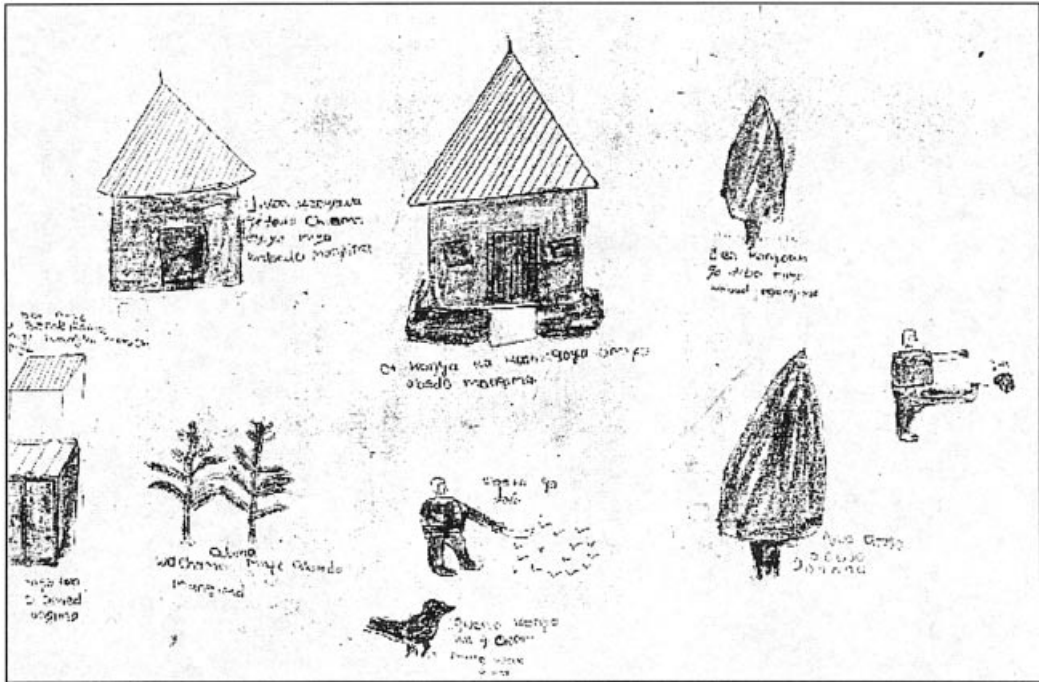


Fig. 1. Pre-intervention health drawing (boy, 11 years old).

- Feeling good: the body being fine/free, flexible and generally feeling good all over the body. [NB. Being fat was considered as part of feeling good and to be healthy!]
- Health promoting actions: maintaining good personal hygiene, cleaning the home, preparing food in a hygienic way, improving the school ground, sleeping in a clean place, a clean body and clean clothes.
- Strong body: in the physical sense of not being weak.
- Disease focus: presence or absence of diseases, disorder in the normal functions of the body.
- Peaceful mind: psychosocial states like absence of worries, and feeling relaxed and mentally stable.

First of all, the results show that the students generally possess a multidimensional concept of health. They include different aspects of well-being as well as more disease-focused aspects. In the pre-intervention period children saw health as

being strongly associated with being able to do wanted things (58%), being happy (48%), lack of pain (40%) and being active (35%). After the intervention more students mentioned action-oriented aspects (from 23 to 63%) and disease-oriented elements (from 13 to 50%). The process of conceptual change is marked by movement from simple, direct concepts like being able to do wanted things to complex explanations involving hygiene and disease elements.

There were similar changes in the findings from the draw-and-write technique, which was conducted before and after the intervention. An example serves to illustrate this. Figures 1 and 2 are pre- and post-intervention drawings from a boy aged about 11 years. (Readers wishing to gain clarification or have further details about the illustrations are invited to contact the authors of the article.) Figure 1 shows illustrations of a kitchen house for cooking, a living house for safety, a dish rack with no dishes, trees, maize

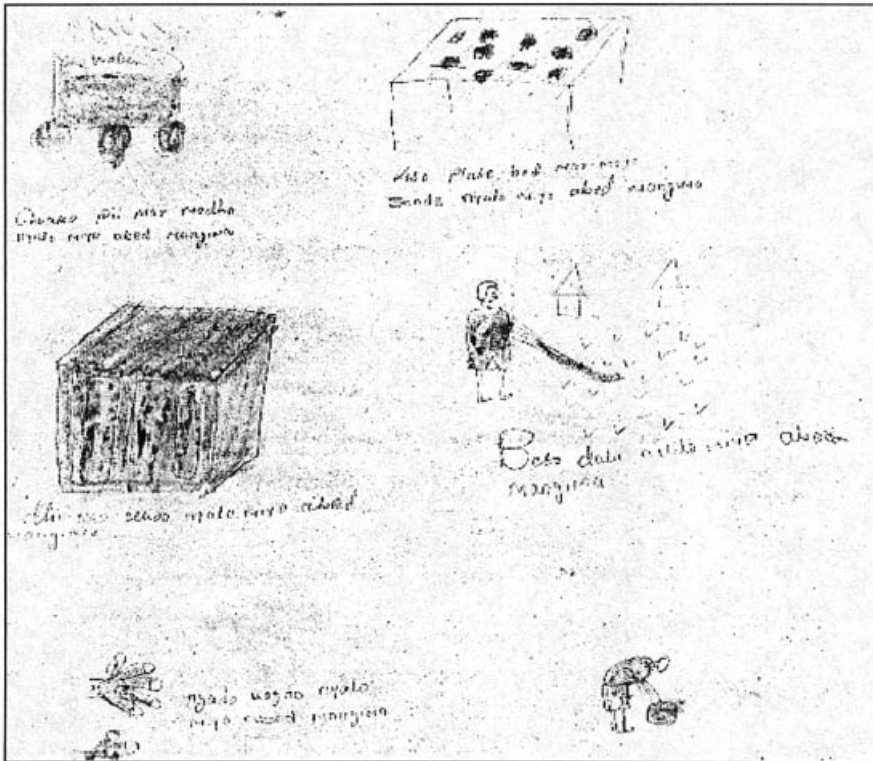


Fig. 2. Post-intervention health drawing (same boy as Figure 1, 12 months later).

plants, a person cutting grass, a hen and a person playing with a ball. Figure 2 together with the attached comments illustrate boiling water, a dish rack with dishes, a clean latrine, a person cutting grass in the compound, short fingernails and a person fetching water in clean containers.

Drawings made by other students reflect the same pattern shown in Figures 1 and 2. Before the intervention there were illustrations of houses, a car for going to the health center, an axe for cutting trees, a road leading to health center and hoes for digging. Post-intervention drawings had illustrations of dish racks, clean food, people filtering or boiling water, people washing hands after going to the latrine and people using bed nets.

Before the intervention, drawings from the children dealt with physical and material objects

outside their control. After the intervention, drawings clearly reflected a more action-oriented health concept and many of the illustrations focused on, among other things, various hygiene improvements. A clearer understanding of diseases—and the causes behind them—was prevalent.

Children’s ideas constituting the concept of illness

Responses to the question ‘How would you differentiate between whether you are ill or not’ were designed to illustrate the children’s concept of illness.

The answers were categorized according to the following:

- Sensations: including generalized states like feeling bad, non-localized but specified like

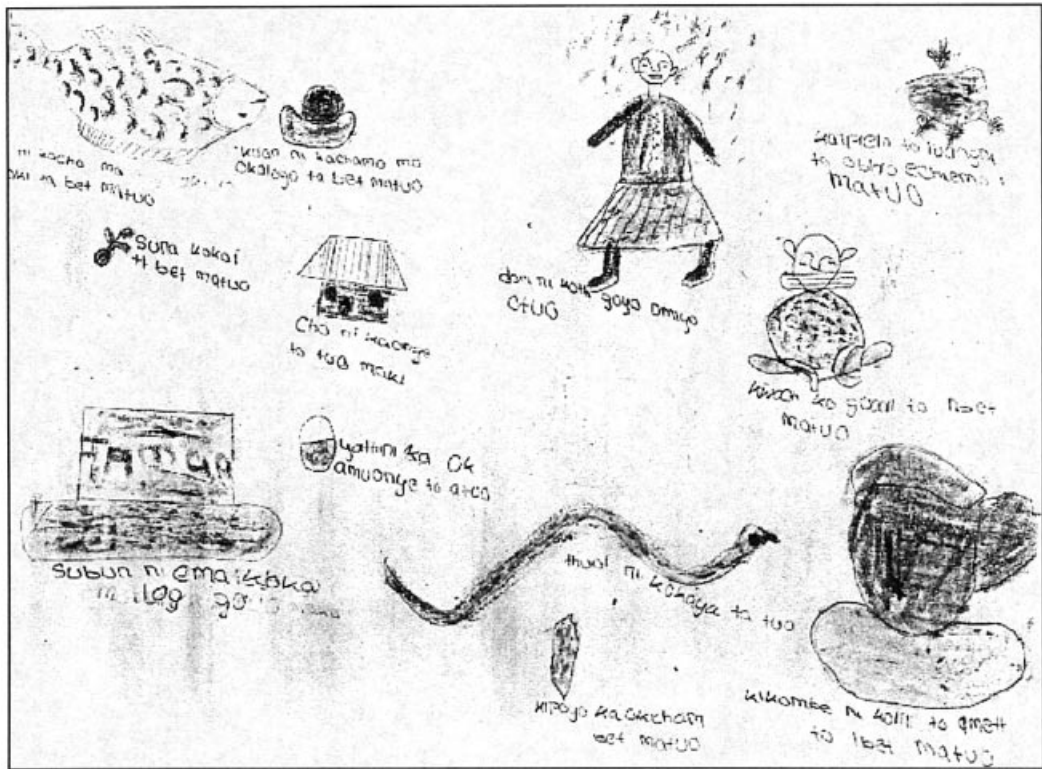


Fig. 3. Pre-intervention illness drawing (girl, 13 years old)

feeling pain, being tired, weak, feeling cold or dizzy; and specified and localized somatic feelings, mostly stomach ache and headache.

- Mood and attitudinal states: 'when you are sick you become sad, angry, gloomy and withdrawn'.
- Change in normal practices: inability to play, run errands, perform daily tasks and even walk properly.
- Objective signs: not immediately visible, changes in body temperature especially when it is high, loss of appetite and breathing complications.
- Increased 'sick role' behavior: sleeping longer than usual, difficulty in waking up and basking in the sun for long hours.
- Visible external signs: including vomiting, weak body joints and changes in body appearance.

- Diagnosis and causes: mainly malaria and diarrhea. Linking specific signs and symptoms with causes.

The results in Table II indicate that before the intervention children felt that 'sensations' (65%), 'moods and attitudinal states' (38%) and altered conventional roles (25%) were the main indicators of illness. While 'sensations' (60%) and 'mood and attitudinal states' (33%) still remained high after the intervention, there was a remarkable change regarding 'diagnosis and causes' (from 5 to 55%), 'visible external signs' (from 8 to 50%) and 'objective signs' (from 15 to 43%). Children's conceptual development was marked by movement from external states (e.g. being sad) to how the body becomes infected (specific diagnosis and the attendant signs).

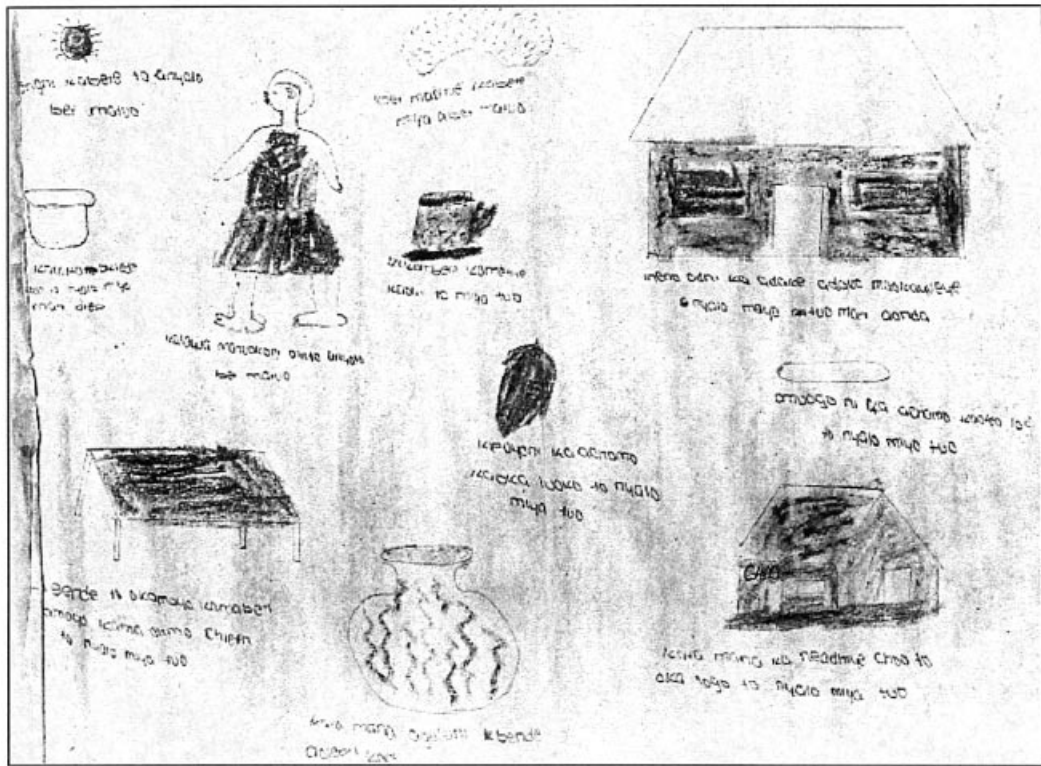


Fig. 4. Post-intervention illness drawing (same girl as Figure 3, 12 months later).

Data collected using the draw-and-write method before and after the intervention also recorded changes in children’s concepts of illness. The examples shown in Figures 3 and 4 serve to illustrate this.

The pre-intervention drawing shows illustrations of a fish, a woman in the rain, flies from feces, a mosquito, a latrine, a leopard, soap, a snake and a dirty mug. The post-intervention drawing illustrates the sun, rainfall, a dirty mug, a girl with dirty clothing, a dirty house, dirty food (cassava and paw paw), a dish rack not in use, a dirty water pot and a dirty latrine.

Before the intervention other students drew a car, a bicycle, people standing in the rain and a snake biting a person, thereby confirming the tendency illustrated by the drawings shown in this article. The same pattern is evident in post-

intervention drawings where the students drew people standing in the sun or rain, people eating unwashed mangoes and dirty latrines.

As shown in the health drawings, before the intervention, physical and material objects generally tended to dominate illness drawings (children’s ideas of things that could make them ill). Furthermore, things outside ones own control were frequent (falling, hit by a car, etc.). In the post-intervention drawings, the same trend that was observed in the health drawings was evident with hygienic actions and disease concepts being more represented. However, some drawings combined both hygiene and disease concepts with physical objects and natural phenomena. It is obvious that children hold inconsistent views about health and illness simultaneously.

Drawings clearly depicted changes in children's concepts of health and illness towards conceptual modification and acquisition. This was clearly illustrated by the drawings as well as the attached comments made by the pupils.

Discussion

The process of conceptual changes

In this study we find children's views multifaceted and encompassing both the negative and positive aspects of health. Children's concepts of health as presented in Table I are inclined to a holistic view of health embracing among other things feeling good, happiness, being able to perform, lack of pain, a disease dimension as well as hygienic issues. Their concept of health is not a unitary one and includes a variety of dimensions.

The reporting of health-promoting actions, as well as of disease-cause dimensions, were greatly enhanced during the health education intervention as documented in the post-intervention data from both interviews and drawings. The participatory nature of the intervention, which emphasized individual and mutual action taking at school and at home, seemed to increase students' awareness in relation to hygiene and disease concepts. We argue that children's concept of health changed during the intervention to include the germ theory of disease causation (implicit in hygiene) leading to a more appropriate action perspective.

Post-intervention view of health reflects a shift from a passive to an active approach to health. In the post-intervention period pupils themselves took individual responsibility for doing things themselves and together with others, e.g. having clean clothes, cutting nails, improving the school ground and preparing food in a hygienic way.

The intervention enabled most children to modify their concept of illness to incorporate a specific disease diagnosis linked to causes, visible external signs and objective signs, as shown in post-intervention results (Table II). This was directly related to the content of the intervention, especially those aspects of teaching focusing on malaria and

diarrhea. During the process of teaching, pupils were taught the signs and symptoms of malaria and diarrhea, which included visible external signs and objective signs. On the other hand, many students themselves developed a knowledge system that enabled them to link symptoms and their causes specifically relevant to malaria and diarrheal conditions. One explanation of this could be that students—via their roles as health communicators—were encouraged to develop a system linking effects, symptoms and causes in order to facilitate action and change processes among families and peers.

Before the intervention the focus on illness causation was on natural phenomena (like rain and sun), physical objects (like a bicycle and a vehicle) and living things (like a snake and a leopard). The germ theory of disease causation was absent in many drawings and interviews. At this pre-intervention stage children saw illness as resulting mainly from things that impose physical threats to their life by causing harm either directly, like snakes or bicycles from which they could fall, rather than hidden things like germs. Children viewed illness as something external and often related to destiny, where there were no opportunities for themselves to take action.

Causal factors were clearly shown in post-intervention drawings, which portrayed illness resulting from germs through dirt and contaminated food or water. This showed that children had acquired a broad scope of illness causation theories that included germs. From a pedagogical perspective, the linking of germs and diseases is the first step towards understanding root causes of health problems, which again is a necessary precondition for developing student-initiated health-promoting actions.

On the whole, changes in health and illness concepts in the present study reflect a move from external to internal locus of control. Originally, children perceived health and illness as being the result of external forces beyond their control. Health was something that they just experienced (e.g. feeling good or being happy), while illness was mainly due to physical objects, living things

and natural phenomena. A lot depended on luck, destiny and nature. Conceptual changes after the intervention show the development of a belief in internal locus of control. Children now clearly believed they could do something to maintain and improve their health by taking personal action. Most of the study children became ‘health internals’ rather than ‘health externals’.

The observation that children’s ideas about health and illness mature with age cited in the literature [see, e.g. (Campbell, 1975; Natapoff, 1978)] is no doubt correct. The present study, however, adds a new dimension by showing that an appropriate health education strategy might enhance conceptual development irrespective of age. For instance, no age-related differences were found with regard to conceptual changes in our study sample of mixed age group (10–15 years) 1 year after the health education intervention. In addition, all the children held inconsistent views combining both lay and biomedical knowledge in their health and illness concepts.

Despite the powerful influence of action-oriented knowledge it did not completely overshadow, but blended into children’s existing knowledge as seen in some responses and drawings where naturalistic causes still appeared after the intervention. Children’s concepts of health and illness showed the influence of both local and biomedical knowledge. The dominant trend was that of associating illness causation to the natural forces of the sun and rain.

This raises the issue of the effectiveness of action-oriented health education in changing people’s belief system especially where a multiplicity of etiologies and therapies is pre-existing. This is a great challenge since such ideas are embedded within children’s historically and culturally bound ways of reasoning and making judgments about what afflicts them. Our study indicates that they accept the new knowledge, but use it alongside what they already know—leading to inconsistent views. The new knowledge does not necessarily supercede existing knowledge, and may be used only if it makes sense in the local belief system and is consistent with individuals’

different constructions of reality and frames of understanding.

Beyond conceptual changes

In addition to the conceptual changes reported here, there were also physical changes in the school and home settings, which further attest to the potential of action-oriented health education. At a personal level, the study children showed improved personal hygiene in contrast to non-study children in the two study schools (Onyango-Ouma, 2000). They engaged in health actions such as constructing hand-wash facilities (so-called ‘leaking tins’) and burning refuse. Teachers reported increased class participation among study children during ordinary lessons. In the home settings, the study children engaged in health actions which brought changes such as improved compound hygiene, sanitary practices and household hygiene. Physical changes in the school and home environments are indications of how conceptual changes were successfully translated into physical changes following participatory and action-oriented health education. These aspects of the intervention, however, are beyond the scope of this article and will be dealt with in a separate publication (in preparation).

Conclusion

The findings of this study have shown how an action-oriented health education intervention enabled children to undergo conceptual changes regarding health and illness issues. Children acquired an action-oriented knowledge, which they integrated with previously held views. The germ theory of disease causation with implications for both health and illness was evident in the post-intervention views held by children. Furthermore, they developed ownership of the emerging concepts, which contributed to perceptions of internal locus of control.

This study has demonstrated that children’s health and illness concepts can be re-organized and transformed through children’s participation in action-oriented health education interventions.

Action-oriented health education emphasizes children's participation and action, which in effect might produce conceptual changes that can be translated into health-protective actions.

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