

Why do some hospitals achieve better care of severely malnourished children than others? Five-year follow-up of rural hospitals in Eastern Cape, South Africa

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Staff at 11 rural hospitals in an under-resourced region of Eastern Cape Province, South Africa, participated in an intervention to improve the quality of care of severely malnourished children through training and support aimed at implementing the WHO case-management guidelines. Despite similar intervention inputs, some hospitals reduced their case-fatality rates by at least half, whereas others did not. The aim of this study was to investigate reasons for this disparity. Two successful and two poorly performing hospitals were purposively selected based on their case-fatality rates, which were <10% in the successful hospitals and >30% in those performing poorly. Comparative data were collected during June to October 2004 through structured observations of ward procedures, compilation of hospital data on case-loads and resources, and staff interviews and discussions related to attitudes, teamwork, training, supervision, managerial support and leadership.

The four study hospitals had broadly similar resources, infrastructure and child:nurse ratios, and all had made changes to their clinical and dietary management following training. Case-management was broadly in line with WHO guidelines but the study revealed clear differences in institutional culture which influenced quality of care. Staff in the successful hospitals were more attentive and assiduous than staff in the poorly performing hospitals, especially in relation to rehydration procedures, feeding and the recording of vital signs. There was a strong emphasis on in-service training and induction of incoming staff in the successful hospitals and better supervision of junior staff and carers. Nurses had more positive attitudes towards malnourished children and their carers, and were less judgmental. Underlying factors were differences in leadership, teamwork, and managerial supervision and support. We conclude that unless there are supportive structures at managerial level, the potential benefits of efficacious interventions and related training programmes to improve health worker performance can be thwarted.

Keywords Severe malnutrition, case management, clinical guidelines, child mortality, quality of care, leadership

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KEY MESSAGES

- Clinical guidelines and external training are valuable but may be insufficient to ensure quality of care.
- Self-sustaining programmes of induction, in-service training, supervision and audit are also needed.
- Parallel interventions for senior managers are required to foster leadership and teamwork.
- For the WHO guidelines to succeed, tasks have to be performed assiduously and consistently.

Introduction

Poor health worker performance is widespread in low and middle income countries and most interventions concentrate on training (Rowe *et al.* 2005). Since 1998, the University of the Western Cape (UWC), the London School of Hygiene and Tropical Medicine, and the Eastern Cape Department of Health (EC DoH) have been working with paediatric staff at 11 hospitals in former region E to improve their quality of care through a process of training and support around the World Health Organization (WHO) case-management guidelines for severe malnutrition (WHO 2000). Pre-intervention, typically 30% of severely malnourished children died during treatment in these hospitals, due largely to inappropriate case-management. Hospital staff participated in the intervention process, which included an initial assessment of case-fatality rates and treatment practices, development of clinical guidelines based on those of WHO but slightly adapted to local capabilities and resources, advocacy meetings to engage hospital and district managers, and a programme of training workshops and intermittent support provided by UWC and the Regional Nutrition Coordinator (Puoane *et al.* 2004).

All hospitals have received the same UWC/EC DoH training and support, yet some perform consistently better than the majority and have reduced their case-fatality rates by at least half, whereas others have not. The aims of this research were to explore the reasons for this disparity in outcome and to identify factors that constrain or enhance the quality of care. Two successful and two poorly performing hospitals were therefore purposively selected based on their case-fatality rates, and compared in relation to case-load, teamwork, supervision, managerial support, leadership and other parameters that might influence quality of care. Although the clinical and dietary requirements for successful rehabilitation are well-established, there is limited experience in how best to achieve and sustain 'best practice'. This paper is significant because it identifies important social and organizational structures underlying good quality care that are not addressed by knowledge- and skill-based training.

Setting

In South Africa, severe malnutrition is a major cause of paediatric in-patient death. Former region E of Eastern Cape Province is one of the country's poorest regions and has a weak health system and a shortage of personnel. For many years there has been reliance on expatriate doctors, often on short-term contracts, and more recently on newly qualified

South African community-service doctors. Treatment for children is free. HIV prevalence is high amongst pregnant women but the prevalence among severely malnourished children is not known as there is no routine testing.

UWC/EC DoH training workshops took place off-site for 5 days and were attended primarily by senior paediatric nurses and matrons. They were interactive and included group work, practical exercises, role plays, key messages and action plans, and have been described previously (Puoane *et al.* 2004). Post-training support was provided mainly by a UWC facilitator who visited each hospital for 1 day approximately every 2 months and helped to monitor case-fatality rates. Death-review meetings were also arranged by UWC/EC DoH: these rotated among the 11 hospitals approximately every 3 months and each was invited to send two nominees, usually a doctor and nurse.

The four hospitals selected for this study are similarly remote and serve similar populations. Hospitals A, B and C are district hospitals, and D is designated as a regional hospital. While hospital D is larger than the other three and notionally a 'referral' hospital, its infrastructure, facilities and staffing mix do not differ qualitatively from the district hospitals. Very few paediatric patients were referred to hospital D from lower-level hospitals as there was no paediatrician there despite its 'regional' status. The case mix on the paediatric wards was similar in all four hospitals in terms of both pattern and severity. Three of the hospitals had received training in November 1999 and the fourth in March 2000. Table 1 shows the percentage of severely malnourished children who died in hospital in 1999 before the training programme was introduced, and the percentage who died post-training during 2002–04. Hospitals A and B achieved substantial reductions in their case-fatality rates and attained rates of less than 10%. Hospitals C and D reduced their case-fatality rates initially but the reduction was less than that achieved by hospitals A and B and was not sustained. We shall refer to hospitals A and B as successful, and hospitals C and D as performing poorly.

Methods

Data were collected during June to October 2004 and had three elements: the first focused on structured observations of ward procedures, the second on quantitative measures of the hospital environment, and the third on in-depth staff interviews and focus group discussions related to staff attitudes, teamwork, training, supervision, managerial support and leadership.

Table 1 Case-fatality rates in 1999 (before training) and in 2002–04 (after training)^a

Hospital	1999	2002	2003	2004
A	30%	13%	8%	6%
B	45%	14%	8%	6% ^b
C	34%	22%	32%	30%
D	36%	26%	36%	33%

^aThree hospitals received training in November 1999 and the fourth in March 2000.

^bFigure excludes period in unsanitary temporary accommodation (January–March).

Structured observations

Ward procedures were observed over a period of 3 days in each hospital, including day and night shifts. Observations included feed preparation and feeding, medicine rounds, recording of vital signs, nursing handovers, doctors' rounds, and tasks performed by caregivers. Relationships between nurses and caregivers, and between nurses and children, were observed, as well as interactions among staff. Communication with other departments and the presence of managers on the ward were noted. These observations were analysed to identify themes that needed further investigation. A grounded theory technique was used in which each strand of information leads to further investigation of behaviours and activities (Strauss and Corbin 1998). Opportunistic observations of ward practices on subsequent days and review of case notes for the last 10 severely malnourished admissions in each hospital were used to validate the structured observations and provide more detailed information on feeds prescribed and recorded, medications prescribed, and micronutrient supplements given.

Hospital environment

Data were collected on paediatric admissions, staffing levels, ratios of children per nurse, numbers and grades of nurses trained by UWC/EC DoH to improve case-management, staff turnover, and the availability of drugs and essential equipment during the preceding 6 months.

In-depth interviews and focus group discussions

Interviews were semi-structured and aspects explored included:

- induction and in-service training in the management of malnutrition;
- supervision, support and leadership;
- teamwork, interaction and communication;
- monitoring of performance and perceived reasons for low/high case fatality;
- attitudes towards work, the children and their mothers;
- managers' awareness as to progress in implementation and perceptions of their role.

In each hospital, interviews were carried out with matrons (by author TP) and the superintendent (by DS), and with doctors, the sister-in-charge or her deputy, and selected professional nurses and enrolled nurses (by KC). Eight focus group discussions (two in each hospital) were held with different categories of nurses (by TP) and discussions were continued

until saturation was reached. Interviews and discussions took 45–60 minutes and were audio-taped and transcribed verbatim. Word codes were assigned to the text and the data were then categorized into themes. Data from different sources were triangulated to further enhance validity. The main themes were illustrated with direct quotes from participants.

Ethics

Both WHO and UWC Research Ethics Committees gave ethical approval. Hospital staff gave written consent. There were no refusals but all knew they could withdraw at any time without giving a reason.

Results

Quality of care

Ward observations and review of case notes confirmed that case-management was better in hospitals A and B than in those performing poorly (Table 2). In hospitals C and D, wards were more often cold, oral rehydration and feeds were more likely to be unsupervised and poorly recorded, measurements of vital signs were more likely to be omitted or fabricated, and there was less play with the children. In hospital D, antibiotics were least likely to be prescribed correctly, multivitamins were not given, feeds were prepared incorrectly, and diuretics were prescribed for an oedematous child.

Case-load, staffing and training

We investigated if the poorly performing hospitals were disadvantaged by having more children per nurse and higher staff turnover. No clear difference emerged, although hospital D was much larger than the others and had the highest child:nurse ratio (Table 3). Although the median child:nurse ratio of hospital C was not high, the upper range of night-time child:nurse ratios in hospitals C and D (28:1 and 36:1, respectively) was twice that of hospitals A and B, suggesting differences in nurse allocation. Also on five of the nights sampled in hospital C, there was a single nurse on duty and she was only a nursing assistant:

The problems are at night time. There is often only one nurse on duty. She can't see if the child is dehydrated. We find them dead in the morning. (doctor, hospital C)

Only one of the eight doctors interviewed had received specific training on case-management of severe malnutrition during their medical training. Only one doctor (at hospital C) had received UWC/EC DoH training. Doctor turnover was highest in hospital B and sister turnover was highest in hospital D. During 2002–4, hospitals C and D had a higher proportion of nurses trained by UWC/EC DoH (15/33) compared with the successful hospitals (8/33). Loss of UWC/EC DoH trained nursing staff during this interval showed no clear trend, but was highest in hospital D.

Availability of supplies

There were no differences in availability of drugs and equipment apart from lack of mineral solution and potassium chloride in hospital A. They substituted Slow K for potassium chloride.

Table 2 Indicators of quality of care from observations and record reviews in the four hospitals (June–July 2004)

Practice	Hospital A	Hospital B	Hospital C	Hospital D
Environment				
Clean	Yes	Yes	Cockroaches	Cockroaches
Warm ward	Yes	Yes	Intermittent	Intermittent
Rehydration				
Nurses responsible for dispensing oral fluid	Yes	Yes	No (mothers help themselves)	No (mothers help themselves)
Amount recorded	Yes	Yes	No	No
Diuretics avoided				
	Yes	Yes	Yes	No
Feeds				
Washed hands	Yes	No	No	No
Correct content	Yes	Yes	Yes	No (wrong recipe + overdiluted)
Well mixed	Yes	Yes	Yes	No (oil separates out)
Nurses use feed chart and dispense	Yes	Yes	No (mothers help themselves)	No (mothers tell nurse the volume)
Nurses supervise mothers while feeding	Yes	Yes	No	No
Fed on time	Yes	Yes	Yes	Sometimes
Intake recorded	Yes	Yes	No (or fabricated)	No (or fabricated)
Antibiotics				
Prescribed from day 1	Yes	Yes	Yes	Mostly
Correctly prescribed	Yes	Yes	Yes	No
Given on time	Yes	Yes	No	Yes
Electrolytes/minerals				
Vitamin A high dose	Yes	Yes	Yes	Mostly (but dose often incorrect)
Multivitamins	Mostly	Mostly	Yes	No
K	Yes	Yes	Some doses missed	Yes
Mg, Zn, Cu	None for 4m	Yes	Yes	Yes
Vital signs				
	Yes	Pulse/respirations fabricated	Pulse/respirations fabricated	Omitted except by student nurses
Toys/play				
	Yes	Yes	No	No
Friendly to mothers				
	Yes	Yes	Yes	Mostly
Shift handover				
Thorough	Yes	Yes	Yes	No (some critically ill children omitted)
All nurses attend	Most	Half	One-third	One-third

In-service training, supervision, teamwork

Table 4 shows the themes that emerged from interviews and focus group discussions with doctors and nurses which differentiated the successful hospitals from those performing poorly. Unless a specific hospital is mentioned, the data refer to both hospitals in each column.

Induction of new doctors

Induction on arrival was essential as, with one exception, doctors were not equipped during their medical training to treat severely malnourished children:

Some of us are sent to rural hospitals having done no obstetrics or paediatrics. They assumed we can do paediatrics if we have done internal medicine. (community service doctor, hospital C)

Hospitals A and B excelled in induction, and nurses took responsibility for this and had a very active role. Senior nurses

felt confident and free to guide doctors and take action according to standing orders:

If I'm in doubt or about to make a wrong decision, they (the nurses) correct me . . . (community service doctor, hospital A)

There was little or no induction in hospitals C and D and doctors felt ill-prepared. They relied more on indirect support. In hospital D they had to largely fend for themselves:

I have one Cuban friend who is a paediatrician in Rietvlei so I talk to her . . . what can I do with this patient? (doctor, hospital D)

In-service training of nurses

Hospitals A and B maintained a strong structured programme of in-service training for nurses, including induction of new nurses and opportunistic on-the-job training. Nurses of all grades were expected to be confident with the management of

Table 3 Case-load (January–June 2004), staffing and training in the four hospitals

	Hospital A	Hospital B	Hospital C	Hospital D
Case-load and staffing				
Paediatric admissions (Jan–June 2004)	483	254	338	1238
Admissions with severe malnutrition	45	36	82	149
Children on the paediatric ward (mean/day)	26	20	19	56
Doctors (total for hospital)	5	3	5	5
Nurses allocated to paediatric ward	18	15	11	22
Children per nurse, day-time: Median (range)	4 (3–5)	4 (2–7)	4 (2–7)	5.5 (3–9)
Children per nurse at night: Median (range)	12.5 (11–15)	9.5 (5–17)	8.5 (5–28)	15 (9–36)
Doctor turnover (paediatric ward) (times changed during 2002–04)	1	4	0	0
Sister-in-charge turnover (2002–04)	1	0	0	2
Matron turnover (2002–04)	0	1	0	0
Superintendent turnover (2002–04)	0	1	1	0
Training				
Paediatric ward doctor (June 2004) trained by UWC/DoH	0	0	1	0
Nurses trained by UWC/DoH 2002–04	3	5	9	6
Trained nurses still on paediatric ward	2 (67%)	4 (80%)	6 (67%)	3 (50%)
Grade of nurse trained by UWC/DoH	Sister ENA	Matron Sister EN/ENA	Matron Sister (3) ENA (2)	Sister (2) ENA

UWC: University of the Western Cape. DoH: Department of Health. EN: Enrolled nurse. ENA: Enrolled Nurse Assistant.

severe malnutrition and be willing to work on the malnutrition ward. Training was not limited to health staff:

We must do in-service education...so that everyone is used to it. If that one who is trained is off... (the others) must know how to do it. (sister-in-charge, hospital A)
Structured training following the 10 steps (is) carried out for 30 minutes ... usually about once a week. All staff are involved—sisters, staff nurses, ENAs. The nurses themselves bring along the problems they want to discuss. (deputy sister, hospital B)

In hospitals C and D in-service training appeared to work less well. Many nursing staff lacked confidence and had received little or no effective training. In hospital C the sister had repeatedly tried to schedule in-service training but no-one attended. This led to reliance for care on the paediatric doctor and senior nurses, with poor outcomes when they were off duty:

When we are not here the children are dying, mostly over the weekends. (sister-in-charge, hospital C)
There is no training on the ward at all. We are always busy ... The sister-in-charge says there is no time for training. (enrolled nurse assistant, hospital D)

Audit and discussion of critical incidents formed a focal point for teaching in hospitals A and B, but not in hospitals C and D.

We have ward meetings, especially if there has been a death; we will sit down with the sister-in-charge and she will correct people. (enrolled nurse, hospital B)

Supervision

Senior nurses in hospitals A and B closely supervised their junior staff. They also taught mothers about treatment of their children and supervised them.

We do the whole ward round and then we involve the mothers about what we are doing...so that they must know what is taking place with their children. (sister-in-charge, hospital A)

This was not the case in hospitals C and D where there was a laissez-faire approach and mothers performed tasks unsupervised.

Teamwork and staff attitudes

There were clear differences in teamwork among doctors and nurses (Table 4). Some staff in the poorly performing hospitals had negative attitudes towards working in the malnutrition wards, which adversely affected the quality of care.

They have the understanding but they don't implement. (sister-in-charge, hospital C)
They have an attitude (to working on the malnutrition ward) ... They only go there because sister says they have to; they are not happy there. (enrolled nurse, hospital D)

In the successful hospitals, non-judgmental attitudes towards caregivers and children prevailed, and senior nurses espoused a caring, harmonious culture. The sister-in-charge provided strong leadership that engendered good teamwork and motivation.

Table 4 Comparison of in-service training, supervision by sister-in-charge, teamwork and staff attitudes in the four hospitals

	Hospitals A and B	Hospitals C and D
In-service training on the ward	There is a strong emphasis on in-service training and induction of new nurses and doctors. Senior and junior nurses are confident with case-management. Sister-in-charge takes a lead role in training and problem solving.	There is reliance on external UWC/DoH training. Weak in-service training and induction. Only nurses with UWC/DoH training are confident in case-management. No lead nurse for training in hospital D.
Audit and feedback	Case review and audit are integrated with in-service training and used as tools to improve clinical management. Case review involves the whole team.	No internal case review or audit.
Supervision by senior nurses	Close supervision of staff and caregivers by senior nurses. Attention to detail.	Patchy supervision in hospital C. Little evidence of supervision in hospital D.
Support and leadership	Strong leadership by sister-in-charge who commands respect from the team, and is supported by her seniors. Praise and feedback emphasized.	Good leadership by sister-in-charge in hospital C but lacks managerial support; lacks power. Poor leadership and support in hospital D.
Teamwork	Good teamwork. In both hospitals, nurses actively introduced the programme to improve the quality of care. They distribute guidelines to all new doctors. Nurses use standing orders and often diagnose cases of severe malnutrition that are missed by doctors. Good communication between key nurses and other departments.	Poor teamwork. In hospital C there is dependence on one doctor for treating malnourished children. When he is absent, the other doctors appear to evade applying the guidelines by admitting malnourished children to the general ward. Good communication between key nurses and other departments.
Perceived reasons for prevailing case fatality rate	The decrease in case fatality is attributed to in-service training for the whole team, applying the protocol, and death audits. Some deaths are attributed to HIV/AIDS, late care-seeking and herbal remedies.	The persisting high case-fatality rate is attributed to HIV/AIDS, late care-seeking and herbal remedies. In hospital C, poor management of dehydration was also highlighted as a cause. More UWC/DoH training was cited as a solution to high case-fatality.

UWC: University of the Western Cape. DoH: Department of Health.

The paediatric ward has the best team of nurses in the hospital... The main thing is that the sister-in-charge has a really good relationship with her juniors. (doctor, hospital B)

Managerial style, monitoring and leadership

Table 5 shows the differences between the hospitals in the interactions, support and leadership of the matrons and superintendents. Unless specified, 'matrons' refers to the hospital matron (nursing service manager) and the paediatric matron.

Interaction and communication

In the successful hospitals, matrons and superintendents were confident in their knowledge of the treatment guidelines and of the competence of their staff. They interacted frequently, in contrast to hospitals C and D.

We hold management meetings once weekly... We also have 'extended management' meetings once every 3 months that involve 'transformation teams'—paramedics, nurses etc.' (superintendent, hospital A)

Every Monday and Thursday the (hospital) matron will have a session where she discusses quality with the sisters-in-charge. She will discuss problems. (paediatric matron, hospital B)

There is a shortage of staff. I also belong to the infection control committee. I need to attend regular meetings. We just don't have time for (other) meetings. (ward matron, hospital D)

Monitoring of performance

In hospitals A and B, matrons visited the ward regularly and senior managers were involved in audit and feedback as an

integral part of monitoring. Monitoring was left mainly to UWC in hospitals C and D.

We formed a committee with the paediatric doctor, the paediatric matron and the staff. Whenever there was a death we would sit down and try to find out where we went wrong... We also audit the charts. (paediatric matron, hospital A)

I visit the paediatric ward when Mrs September (UWC facilitator) tells me that implementation of the 10 steps is not done properly. (hospital matron, hospital C).

I think ... they follow Mrs September's advice. (superintendent, hospital D)

Leadership

In the successful hospitals, matrons and superintendents were influential with regard to induction of doctors, in-service training and mentoring.

Induction depends on the type of doctor. For example, with ... community service doctors they rotate through all wards with senior doctors. We give all doctors the standard protocols ... when medical students are here we review certain journals. (superintendent, hospital A)

Every new doctor has an induction. It takes 40 minutes. I have (all information in) a file... I tell new doctor that he must remember that nurses are well-trained. He should not be 'big' but listen to nurses. (superintendent, hospital B)

We make sure all new nurses receive in-service training so that they are comfortable working with children... Everybody is educated. Even the domestics are trained to make up the milk. (paediatric matron, hospital B)

Table 5 Comparison of managerial interactions, monitoring, support and leadership in the four hospitals

	Hospitals A and B	Hospitals C and D
Awareness of progress	Matrons and superintendents are familiar with the treatment guidelines and are aware of the current ward situation. They consider the treatment guidelines effective and can report case-fatality rates (CFRs).	Matrons are vague about progress and uncertain even about the approximate range of CFRs. The superintendent of hospital C vaguely understands the guidelines and considers the high CFR to be an overestimate. In hospital D, the superintendent is unaware of the CFR and considers most deaths are from HIV.
Interaction and communication with staff	The paediatric matron has her office in the ward. She visits her ward daily. The hospital matron visits weekly.	In hospital C, the paediatric matron also oversees the general wards. She visits daily. In hospital D there is no paediatric matron and the ward is supervised by the maternity matron who spends much time in meetings for infection control. In hospital C, the hospital matron visits the ward only when there are problems.
Monitoring	Matrons are approachable and have a strong advocacy role for their team within the hospital. Matrons have regular meetings with the paediatric staff. Case fatality audit is done regularly by staff and the matrons encourage all to attend for feedback.	Matrons are approachable but the paediatric matron in hospital C seems weak and powerless. There are no internal audits. CFRs are calculated by nursing staff and audited intermittently by the DoH, but not by the matrons. Matrons attend external meetings arranged by UWC, but do not implement lessons learned or provide feedback to staff.
Perception of their role	Matrons and superintendents consider themselves to have a responsibility to the paediatric team.	Matrons and superintendents perceive malnutrition management as the responsibility of UWC. They look forward to the facilitator's monitoring visits.
Leadership and support	Superintendents are very supportive and respectful of the nursing staff. Matrons ensure resources are available to implement the guidelines and feel responsible for the team. Matrons have strong leadership qualities and are well-respected. They are knowledgeable about the 10 steps and consider themselves part of the paediatric team. Superintendents are familiar with the 10 steps. Matrons and superintendents show commitment and support for training. They ensure new staff receive in-service training. They praise nurses for their performance in reducing the CFR.	Superintendents say they are supportive but are vague about the type of support. Matrons are unable to overcome internal barriers to access resources needed for implementing the guidelines. Hospital matrons lack leadership qualities. They lack knowledge about the 10 steps and do not regard themselves as leaders in this aspect of management. Superintendents are unfamiliar with the 10 steps. Little commitment by matrons and superintendents to training. Hospital matrons wait for external training to be arranged. They often blame nurses for the high CFR.

UWC: University of the Western Cape. DoH: Department of Health.

There was less managerial responsibility for induction and training in hospitals C and D. The sister-in-charge attempted several times to organize in-service training in hospital C, but was unsupported by senior managers and no-one attended.

The superintendent was at the meeting but there was no action. There was no training carried out. (paediatric matron, hospital C)

We are short-staffed; we can't train nurses in the ward. We need UWC to organize a training workshop. (ward matron, hospital D)

Managerial support and teambuilding

There were clear differences in managerial support and teambuilding. Paediatric matrons in hospitals A and B were proactive, effective and visited the wards daily. The superintendent of hospital B was outstanding, in contrast to hospital C where the superintendent was unsupportive and obstructive, and the paediatric matron was ineffective.

Our matron is a quiet somebody who don't want to talk a lot, so we have to talk for her. (sister-in-charge, hospital C)

Whenever we request something from above, the response is always 'no problem' but in reality nothing is done ... We are told there is no budget. (paediatric matron, hospital C)

Hospitals A and B had activities to promote cohesiveness:

We try to motivate the staff, to talk to them ... We've introduced birthday parties ... All staff on the ward come, including the domestic staff and the doctor. (paediatric matron, hospital A)

We have a competition for cleanliness, attitude and quality of care in the hospital... (paediatric) ward won. (paediatric matron, hospital B)

Motivation was lacking in the poorly performing hospitals, which detrimentally affected quality of care, and there was resistance to change by some of the nurses.

They have an attitude problem working in kwash. Those who have been here a long time ... sometimes they won't do it now, want to do it tomorrow. (paediatric matron, hospital C)

The few nurses who were motivated to improve the quality of care felt unsupported; their motivation and energy waned, and they became fatigued and disillusioned. In hospital C, for example, admission procedures were slow and very ill children arrived on the ward in the late afternoon; their simultaneous arrival overwhelmed the few nurses who remained on duty after the day-shift had left. The sister-in-charge had solutions to suggest, but there was no action; hence frustration, low

morale and job dissatisfaction ensued, and she felt dispirited and not valued by her managers. Similarly, there was no resolution to the many deaths that occurred at weekends and at night when inexperienced nurses and/or locum private doctors were left in charge.

In brief, the main differences were in-service training, induction of incoming staff, and audit in the successful hospitals, and better supervision of junior staff and carers. Underlying factors were differences in leadership and support, teambuilding, and the presence of opinion leaders and champions.

Discussion

Substandard hospital care is widespread, even in rich countries. In a tertiary hospital in the UK, for example, Neale and Olsen (2005) found shortfalls in care in about 25% of cases. Clinical guidelines are generally ineffective for improving quality of care if they comprise the sole innovation, as they fail to motivate or enable actual change to occur (Lomas 1991; Oxman *et al.* 1995; Davis and Taylor-Vaisey 1997; Brugha and Zwi 1998). Our study further shows that the addition of external training, though necessary, is not always sufficient input to ensure correct care for severely malnourished children. Although the training and advocacy initiatives led to adoption of the guidelines for severe malnutrition, we found differences among hospitals in the subsequent internal dissemination and implementation processes that were related to leadership and organizational differences.

First, there was a strong emphasis on *induction* and *in-service training* in the successful hospitals. Senior nurses took the lead in training junior and other staff, and were proactive in introducing the programme to incoming doctors, providing them with guidelines, correcting their case-management as necessary, and involving them when reviewing practices on the ward. This transfer of knowledge and skills by those who had received UWC/EC DoH training helped other cadres of staff become confident in case-management, and the process of being an in-service trainer not only reinforced the knowledge each had acquired but also provided a social role and an opportunity to build relationships and informal communication networks. These social aspects have been linked to greater absorptive capacity for new knowledge and an increased likelihood that an innovation will be assimilated and sustained (Greenhalgh *et al.* 2004a,b). In contrast, the poorly performing hospitals relied on sending a few staff away for UWC/EC DoH training rather than establishing a strong self-sustaining programme of in-service training and induction. Consequently, many staff in the poorly performing hospitals lacked knowledge and skills, which resulted in an extremely low quality of care for some children, especially at night and at weekends.

Second, in the successful hospitals there was better *supervision* and *audit with feedback*. The latter included reviewing critical incidents to pinpoint shortcomings in care and provided an opportunity for staff to learn from mistakes and improve their performance. In their reviews of the literature, Thomson O'Brien *et al.* (2003) and Greenhalgh *et al.* (2004b) found that in-service training, supervision and audit with feedback facilitated adoption of innovations in service organizations.

This appears to be particularly true when strategies are used in combination and when, as in this case, they are directed at daily tasks and problem-solving (Davis and Taylor-Vaisey 1997; Grol 1997; Greenhalgh *et al.* 2004a).

A third difference was in *attentiveness* and assiduousness in the performance of tasks, especially in relation to rehydration procedures, feeding and the recording of vital signs. In the successful hospitals, nurses took personal responsibility for these tasks, whereas there was a lax attitude in the poorly performing hospitals, and the responsibility for rehydration and feeding was passed to the caregiver. Failure to undertake these tasks carefully can put severely malnourished children at risk of dying from dehydration, cardiac failure (from fluid overload or overfeeding), hypoglycaemia (from insufficient intake) and hypothermia (from missed danger signs). Attentiveness may be linked with a better understanding about the significance of certain procedures through better in-service training and supervision, and/or through greater commitment and motivation. In our experience many hospitals claim to follow the WHO guidelines but on close inspection one commonly finds, as in our poorly performing hospitals, that important aspects are overlooked and avoidable deaths occur (Ashworth *et al.* 2004). For the WHO guidelines to succeed, tasks have to be performed fully and consistently. In neighbouring KwaZulu Natal Province, case fatality rates fell to 8% only when special effort was made to be more attentive to tasks and more alert to danger signs (Wilkinson *et al.* 1996).

Fourth, in the poorly performing hospitals, nurses tended to have negative *attitudes*, to be more judgmental, and to interact less with caregivers and their children, which adversely influenced the quality of care. They also tended to attribute high case fatality to external factors such as HIV/AIDS, late care-seeking and the home-use of herbal medicines. Their proposed solutions were also external, namely sending more staff for external training. With a better understanding of the physiological changes in malnutrition and successful application of the guidelines, negative attitudes and feelings of frustration, irritation and resentment have been found to diminish (Puoane *et al.* 2006). Thus positive staff attitudes in hospitals A and B are likely to be a consequence of successful adherence to the guidelines, rather than being inherent traits.

One conceptual framework for the diffusion of innovations depicted by Greenhalgh *et al.* (2004a) is '*let it happen*', '*help it happen*' and '*make it happen*' with different mechanisms operating at each level. Whereas enabling factors such as knowledge transfer are important in *helping* an innovation happen, managerial mechanisms are thought to be influential in *making* innovations happen. Barnsley *et al.* (1998) likewise state that senior managers are key in creating an environment that will motivate staff to use new knowledge. In this regard, clear differences existed between the two sets of hospitals in the *leadership* shown by superintendents and nurse managers, including providing resources, establishing communication channels that fostered teamwork, information-sharing and feedback, and acting as role models by demonstrating a willingness to change, all of which are considered enabling and reinforcing factors in the assimilation and routinization of innovations (Firth-Cozens 1997; Barnsley *et al.* 1998; Greenhalgh *et al.* 2004a).

Although none of the superintendents attended the training workshops on malnutrition case-management, it is clear that the superintendents at the two successful hospitals actively encouraged doctors and nurses to do so, and a relatively well-structured continuing education programme had been instituted at both of these hospitals. It is perhaps significant that the superintendents of the successful hospitals had voluntarily undertaken formal postgraduate study and gained qualifications in Hospital Management since arriving in South Africa. The taking of such initiative may be a reflection of their leadership potential, or the training itself may have developed their leadership qualities.

Lack of support and coordination from superintendents and matrons at the poorly performing hospitals, lack of interest as to progress, and the superintendents' scepticism about malnutrition as a cause of paediatric death, together with a distorted view that malnutrition management was not their responsibility, may have contributed to a lack of commitment. Few driving forces were apparent in the poorly performing hospitals, but all the restraining forces identified by Firth-Cozens (1997) were present, namely insufficient time, low morale, cynicism (referred to as 'double bind' by Firth-Cozens), poor communication and resistance to change.

The presence of *opinion leaders* and *champions* in the two successful hospitals in the early period of dissemination and implementation may also be of note (Firth-Cozens 1997; Greenhalgh *et al.* 2004a). Opinion leaders are persons who have a particular influence on the beliefs and actions of their colleagues, and hospital B had a charismatic Cuban doctor who, after attending a training workshop in 1999, immediately established triage procedures in the outpatient department, reorganized case-management on the ward, and enthused his peers and the nursing staff. Case-fatality rates fell within 3 months, and by the time he left in 2000, staff were committed and compliant. Champions include transformational leaders who harness support from others, particularly within their social network. In all four hospitals the paediatric matrons who had been trained during the early phase of the project had left by 2002, but those who had been at hospitals A and B established a routine of good quality care and instilled enthusiasm and commitment which persisted after their departure. At the successful hospitals, matrons and superintendents used their influence to aid dissemination and implementation of the guidelines. In contrast there was a lack of driving forces at the poorly performing hospitals. In addition, hospital D had the largest case-load, the highest number of children per nurse, especially at night, and lacked a paediatric matron. These are likely to influence the quality of care adversely, but better roster management would have avoided situations where inexperienced nursing assistants were left in charge.

What is the external validity of our findings? Although only four hospitals were studied, their main differentiating features are also those that have been reported in systematic reviews as strongly or moderately influential in changing behaviour in service organizations, and are in keeping with current thinking that leadership and management skills are essential if shortfalls in health care are to be averted (Olsen and Neale 2005; Rowe *et al.* 2005; Walmsley 2005).

How then can we intervene more effectively in the future? Grol (1997) suggests that different strategies may be needed at different phases of the change process, and that organizational and coercive approaches seem to be particularly effective for maintaining desired performance. These approaches include creating the necessary organizational conditions for change, such as teambuilding, enhancing leadership, and providing resources and incentives. We hold to our view that clinical guidelines, training and post-training support are essential for improving hospital treatment of severe malnutrition, but our findings suggest that for some hospitals additional input is needed to engage nursing service managers and superintendents more effectively. The literature is plentiful in relation to strategies related to adoption of innovations, but virtually devoid of strategies to assist in establishing them as routine (Greenhalgh *et al.* 2004b). The following approaches, directed at hospital managers, might serve as driving forces for routinization of the malnutrition guidelines—a package of some or all of these measures could be tested as part of a research agenda to improve health worker performance in this programme area:

- motivate for change (e.g. academic detailing);
- formalize the guidelines as policy and as a standard;
- develop informal and formal internal structures and processes (e.g. discussion of critical incidents) to improve communication among staff with the aim of resolving problems, overcoming obstacles, and teambuilding;
- suggest ways of information sharing and teambuilding to develop motivation and trust so that all staff have a shared understanding and commitment, and confidence that their opinions can be heard;
- exchange ideas about how to provide in-service training to doctors, nurses and ancillary and incoming staff in a busy ward, and ways of easing the burden (e.g. scheduled short slots, printed materials, job aids, standing orders, task-related teaching, mentoring);
- formalize in-service training and supervision (e.g. designate responsibility to specific individuals and include these in their job description);
- consider how to reward staff for improved quality of care (e.g. incremental certification, career progression, remuneration).

In settings where successful hospitals already exist and local opinion leaders can be identified, interaction between successful and less successful hospitals could be the main intervention channel. In other settings, where training has yet to start, training for doctors and nurses may need to be accompanied by parallel interventions for senior managers, using external personnel.

There are few reports of interventions to implement and sustain improved quality of paediatric care in poor countries (WHO 2001), but experience suggests that fostering leadership, motivation (showing early impact), teambuilding, and peer support and supervision are priority needs. Molyneux and Weber (2004) describe how trainees in paediatric medicine in Malawi adopted district hospitals and worked with designated staff to identify good and bad practices, provide remedial training and monitor progress, and a sense of commitment to each other developed. In these hospitals the focus was on emergency care which, like severe malnutrition, is often poorly

managed (Nolan *et al.* 2001). Although there is a need to improve care for all children, the process of improving performance in one domain can be a trigger for further improvements and benefit the care of other children.

I think this project helped management of malnutrition in particular, but also in general improved management in paediatric wards. (superintendent, hospital A)

Conclusions

Clear differences in institutional culture emerged between hospitals with low case-fatality rates and those with higher rates. The differences that affected quality of care were primarily in-service training, induction of new staff, attentiveness and assiduousness in the performance of tasks, supervision, teamwork, and audit and feedback systems, and, in these, ward sisters played a key role. Underlying factors were differences in leadership and management including team-building, support, and opportunities for interaction and information-sharing. Thus in the successful hospitals there was a conjunction of favourable factors which provided the environment within which knowledge- and skills-based training could be assimilated. In the poorly performing hospitals, lack of leadership led to frustration, low morale and persistence of restraining factors. The policy implications are that when intervening to improve quality of patient care, the institutional environment must be addressed so that it is receptive and capable of responding. Such an insight has important implications for the approach that is currently dominant in programme design and implementation, namely a focus on the development of tools and guidelines. This research reinforces similar findings in other programme areas that, while tools and guidelines are necessary and valuable, their successful application depends crucially on the context and, in particular, the management and leadership of both personnel and the institution in which they practice.

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