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Visualising Deteriorating Conditions

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Abstract

The research aims were to investigate the difficulties ward staff experienced in detecting deterioration and how these were resolved. The emphasis within the literature tends to be on identifying premonitory signs that may be useful in predicting deterioration. Changes in respiratory rate is the most consistent of these (Fieselmann et al. 1993; Sax and Charlson 1987; Schein et al. 1990; Smith and Wood 1998) but in common with other signs, it lacks sensitivity and specificity. The sample consisted of 44 nurses, doctors (Interns) and health care support workers from a general medical and surgical ward. Data were collected by means of non-participant observations and interviews, using grounded theory as originated by (Glaser and Strauss 1967) and (Glaser 1978). As data were collected, the constant comparative method and theoretical sensitivity were used as outlined in grounded theory. A core category of "visualising deteriorating conditions" emerged, together with its sub-core categories of "intuitive knowing", "baselining" and "grabbing attention".

The main concern in visualising deteriorating conditions is to ensure that patients suspected of deterioration are successfully referred to medical staff. The aim is to convince those who can treat or prevent further deterioration to intervene. Through intuitive knowing they pick up that patients have changed in a way that requires a medical assessment. To make the referral more credible, nurses attempt to contextualise any changes in patients by baselining (establishing baselines). Finally with the backup of colleagues, nurses refer patients by providing as much persuasive information as possible in a way that grabs attention. The whole process is facilitated by knowledge and experience, together with mutual trust and respect.

Background

Mortality from shock of whatever aetiology remains depressingly

high, and avoidable components are contributing to physiological deterioration (McQuillan et al. 1998) often resulting in cardio-respiratory arrest (Rosenberg et al. 1993). Of all patients undergoing resuscitation75% will not survive more than a few days (George et al. 1989) with a survival rate to hospital discharge of 10% to 15% (Peterson et al. 1991; Schultz et al. 1996). Out of 9% of patients discharged from hospital having survived cardiopulmonary resuscitation, 4.3% were in a vegetative state, signifying severe neurological damage (Franklin and Mathew 1994). In an effort to detect shock early, a number of parameters have been measured. Blood pressure, heart rate, respiratory rate, temperature, conscious levels, shock index, central venous pressure, blood gases, blood lactate, pulmonary artery blood pressure, cardiac index, all correlate poorly with physiological deterioration and severity of shock (Rady et al. 1994). Early detection of physiological deterioration remains elusive. A further difficulty is that there are over two hundred normal physiological reflexes that affect the pulse and respiratory rate (Shoemaker et al. 1988).

Current emphasis in the literature is on the early detection of physiological deterioration either through premonitory signs such as changes in respiratory rate (Fieselmann et al. 1993; Franklin and Mathew 1994; Goldhill et al. 1999; Sax and Charlson 1987; Schein et al. 1990) or more recently an early warning score (Department of Health 2000; McArthur-Rouse 2001). The latter attaches a score to changes in such variables as blood pressure, pulse rate, respiratory rate and temperature as a means of detecting early signs of physiological deterioration. The greater the score, the greater is the risk of physiological deterioration. To date these variables lack sensitivity and specificity. The current study is an attempt to redress the continued emphasis on physiological variables by exploring the nature of this complex phenomenon.

Methodology

The research aims in relation to deterioration were to investigate the difficulties ward staff experienced in detecting deterioration and how these were resolved. The study was conducted on a surgical and general medical ward of an inner city University teaching hospital. Theoretical sampling was used and data collected until saturation was reached (Glaser and Strauss 1967). A total of 44 participants were interviewed, nurses (n=30), doctors (n=7) and health care support workers (n=7). The length of interviews varied

between 30 minutes and 1 hour 20 minutes approximately with a mean length of 55 minutes. Interviews were conducted in a quiet area off the ward. In keeping with the inductive nature of grounded theory, the initial themes for the interviews were generated through spontaneous conversations with participants on the surgical ward. These were supplemented with observations lasting between 3 and 8 hours, over a period of eleven months. Following an initial period of participant observation, the stance of non-participant observer was adopted. It involved the routine of watching what was going on and accompanying nurses if felt appropriate. No participant refused to be observed.

Ethical approval was sought and granted from the Local Research Ethics Committee and the University Ethics Committee. All potential participants received a letter informing them of the study, with an invitation to participate. Verbal consent and agreement was sought before the period of observation, while consent forms were signed prior to each interview. In any event, I observed very little deterioration while on the wards. This had not been anticipated, but may well reflect the subtle and progressive nature of much of the deterioration that patients experience (McQuillan et al. 1998).

Data were analysed concurrently with data collection and in turn this was guided by theoretical sampling (Glaser and Strauss 1967). The content of each interview was analysed as soon as possible and coded line by line (Glaser 1978). Its aim was to generate an emergent set of categories and their properties which fit, work and are relevant for integration into a theory. This led to the initial generation of some 83 categories and sub-categories. Writing theoretical memos leads to further theoretical sampling and the generation of more categories and their properties. These were integrated through constant comparison leading to the generation of a core category and three sub-cores.

Visualising Deteriorating Conditions

The main concern in visualising deteriorating conditions is to ensure that patients suspected of deterioration are referred successfully to medical staff. The aim is to convince those who can treat or prevent further deterioration to intervene. This needs careful management by whoever is making the referral, which in the context of this study is the nurse. It means presenting evidence of the deteriorating condition in a convincing and credible manner, a way that invokes a

response. It is based on knowledge of the situation, however subtle, personal knowledge of the person involved, exercising judgement, as well as knowledge and experience. Establishing trusting relations based on mutual trust and respect with those who can intervene greatly facilitates the process. In this study, the sub-core categories of intuitive knowing, baselining and grabbing attention emerged as the processes involved in visualising deteriorating conditions.

Intuitive Knowing

Intuitive knowing is the first stage of detecting deteriorating conditions. Far from being vague, nurses know exactly what they are picking up when they are detecting deterioration in a process I term visualising. Intuitive knowing is dependent on nurses knowing patients, having knowledge and experience of their specialist area of practice, as well as understanding the nature of illness. Nurses rely on intuition as a means of detecting deterioration.

Visualising

If someone looks unwell, then they are unwell. This is categorised as visual pickup. It is considered a more holistic basis for visualising deteriorating conditions since subtle indicators such as mental status, mood, making eye contact and reduced motivation are accepted as evidence of deterioration. Initially nurses notice if patients look unwell. This look is different for each patient and is difficult to describe to someone else. An unwell look is characterised as physiological and psychological. For example, patients can be pale and clammy, slumped in a chair or withdrawn. All are considered evidence of a deteriorating condition. Among the first signs is a change in colour. This can be anything from pale or grey, to blue or sweaty. There is no one particular colour associated with deterioration but rather any change in colour from patients' usual one. Patients might be confused or withdrawn, not themselves in terms of how they interact with others. Nurses and doctors notice gross changes such as in mood and confusion but the more well known patients are, the more likely it is that subtle changes will be picked up. Nurses spend a greater amount of time with patients and so come to know them better than other members of the multidisciplinary team. Consequently they have a greater appreciation of any changes in patients, however subtle, and accept them as evidence of deterioration. Visual pickup will prompt further investigation such as recording of vital signs to confirm suspicions.

If patients are not progressing then they are deteriorating since ward staff have a mental picture of how they should be progressing given their diagnosis, age and underlying pathology. Again this is experience dependent. Failure to progress is associated with any number of factors such as vomiting, continued use of oxygen, drowsiness, pain, abdominal distension, not eating, not drinking, reduced motivation, not getting out of bed, and any neglect on the patient's part. Visual pickup is based on experience and formal knowledge. It is through caring for deteriorating patients that the condition is recognised.

Doctors generally do not accept subtle indicators as evidence of deterioration but need more convincing evidence. This is usually in the form of objective, physiological change such as in vital signs (blood pressure and pulse rate) conceptualised here as hard pickup. They are used by nurses to get the attention of doctors and convince them that patients are deteriorating. They provide objective evidence of deterioration in what is conceptualised here as hard pickup,

> *Sometimes they're a good way of actually grabbing medical staff's attention* (No. 10- Sister 7 years).

It is more usual for nurses to use changes in vital signs to confirm what they already suspect rather than as the primary way of picking up deterioration and as a means of making their referral more credible. There is an appreciation that acting on visual pickup alone is insufficient,

> *…I think it's just a way of formalising....what you do know and what you can observe but you can't write that down* (No. 5- Staff Nurse 2 years).

Observations are also used to get the attention of doctors in getting patients reviewed and are used by them to confirm that something is wrong rather than accepting the more holistic evidence that nurses do.

There are occasions when nurses just know when patients are deteriorating. This is so subtle that often they cannot articulate what they are picking up in a process of intuitive knowing. They are drawing on things that remain outside of conscious awareness and for this reason they are difficult to describe. It is that element of knowledge and experience that cannot readily be articulated. It is invariably described as instinct or gut feeling,

> *I don't know. I think some of it is instinct (No. 12- Sister 14 years).*

Experience in this context is essentially dealing with patients in the same or similar situations over a period of time. Intuitive pickup is a matter of seeing and remembering, the making of a connection between knowledge and experience. It is a type of pattern recognition, where something is remembered from past experience that enables recognition that cannot readily be articulated. It is then extrapolated to the new situation which bears a similarity to the past one. Similar cases have been seen before and participants recognise this in the new one,

> *I'm not sure that it's just good old pattern recognition and you're giving it a different label* (No. 42- Sister 8 years).

Knowledge is an essential element of intuition but only when put into context by experiencing situations that it is consolidated and can form the basis for intuition. Although based on some experience, it has the potential to develop fairly quickly,

> *So in reality intuition is actually based on past experience, it's just you can't find the verbal tool to express it. You recognise something but you're still waiting for the old memory cells to produce an awareness* (No. 27- Staff Nurse 4 years).

Intuitive knowing is similarly dependent on knowing patients in that the better the patient is known the more likely that it will be used to detect deterioration. Given time, investigating further has the potential to support the initial gut feeling that patients are deteriorating by uncovering objective evidence. This is consistent with the belief that the evidence is there and simply has to be discovered through further investigation,

> *I think you can, working around the problem, you probably come up with the reasons why (No. 18- Staff Nurse 11 years).*

There is a sense in which intuition is not any particular thing but rather a collection of things that are so subtle that nurses may not often be aware of what they are picking up and so find the concept difficult to articulate. When considered together rather than in isolation, these subtle changes are a cause of concern and are the initial trigger for further investigation. Intuitive knowing is inherently difficult to articulate because often nurses are unaware of how they make decisions or what those decisions are based on. Consequently, when patients are referred based on intuitive knowing alone this results in vague reporting. The language may not exist to adequately describe what it is they are picking up. Changes may

be sufficient in themselves to convince nurses to refer patients to doctors. However there is no guarantee that patients picked up in this way are in fact deteriorating. Intuitive knowing can simply be wrong, misled by the changes that are being picked up.

Being with patients for prolonged periods of time facilitates a nurse's knowing and therefore helps in detecting the more subtle physical and psychological changes associated with deterioration. Although subtle changes are difficult to articulate in clinical practice, there is little difficulty in describing them, particularly in relation to looks. Appreciating the significance of any changes detected, particularly in relation to looks is based on knowledge and experience and is a learned process. The properties of the category of visualising are: visual pickup, hard pickup and intuitive pickup.

Experiential Knowing

This is defined as knowing through the integration of knowledge and experience. It forms the basis of intuitive knowing because they share some indicators as both are based on knowledge and experience. Experiential knowing is so fundamental and important that it underpins many of the processes that are used in detecting and reporting deterioration. It is based on formal and informal knowledge. The former is invariably based on knowledge of physiology, pathophysiology and knowledge gained from clinical practice which is situational since it is determined by the clinical speciality. Nurses rely greatly on knowledge gained from or consolidated in clinical experience. This is developed by caring for patients in different situations and with differing conditions. It is of necessity gained over time and there is a reciprocal relationship between experience and knowledge in that experience enables a connection to be made between formal knowledge and its clinical application,

> *I think once you've experienced something once you're ok. You put in your knowledge file* (No. 36- Staff Nurse 1 year).

While experience is a prerequisite in having the knowledge to deal effectively with deteriorating conditions there is no guarantee that knowledge will come with experience. It is difficult at times to appreciate the influence that formal knowledge has in detecting deteriorating conditions simply because of its reciprocal relationship with experience in that it is so embedded in practice that it is often taken for granted making it difficult to articulate what knowledge

is being used. A lack of formal knowledge may result in increased stress since participants may not know what to do in particular situations or be unable to assess patients effectively,

> *I think knowledge is the thing that decreased your stress and tensions a lot because you know what you're going to do* (No. 33- Staff Nurse 2 years).

Also they underestimate the skill, knowledge and experience that is predicated on knowing when something is wrong with patients,

> *I can't describe it. I can't ..... don't know, you just know. You know when somebody is sick* (No. 3- Sister 13 years).

If physiology and pathophysiology are not emphasised in education and drawn on explicitly in clinical practice this leads to problems in articulation and application of that knowledge. It is important to keep up to date in the ever changing clinical environment. Clinical work takes precedence over all else and if individuals are not supported in a formal way by organisational support then keeping up to date is problematic.

> *I did want to keep on top if it but I find that when you're here it's just like this is work, work, work isn't it*

Creating an environment that encourages and supports life long learning is essential in enabling individuals to keep up to date with clinical practice. This is more likely where there is organisational support for continuing education and where there is ready access to educational material in the form of books and journals at clinical level.

Functional Relations

As discussed earlier, knowing patients is essential in detecting deteriorating conditions. Nurses attempt to know patients by establishing functional relations. This is based on personal contact achieved through communication. It is a function of proximity and time in that the closer the proximity to patients and the longer the time spent with them the greater is the perception of knowing them. This makes it easier to detect deterioration,

> *But when you see patients that you know nothing about, it's quite difficult to know where to start* (No. 20- Doctor 10 months).

Knowing patients enables the establishment of a baseline as to

how patients normally are. This can be social, psychological or physiological, but usually is a combination of all three. It is used to determine if patients are deviating in any way from their established norm and to evaluate its significance, enabling subtle changes to be detected and is inextricably linked to the process of visualising and baselining.

There is a sense that this is a functional relationship rather than an interpersonal one. The intention is to build up a picture of patients' normal condition and behaviour rather than to get to know them on a personal level. Talk is not social but has the function of patients' norm,

> *Not going into detail with their social lives but just his or her medical condition* (No. 26- Staff Nurse 3 years).

Establishing functional relations is facilitated by a constant presence. The expectation is that patients will respond to and develop a relationship because this. It enables them to be known in a social as well as a medical sense and helps in establishing a baseline as to how patients are responding to their illness. To facilitate functional relations, information is sought from a number of sources such as patients themselves, relatives, other personnel, formal reporting, charts and records. This further facilitates the gathering of baseline data. Any serious deviation is taken as a sign of deterioration as well as facilitating the pickup of subtle signs of deterioration.

Through visualising, experiential knowing and establishing functional relations nurses begin to pick up on deteriorating conditions in a process conceptualised here as intuitive knowing. It is the integration of knowledge, experience and knowing patients in the realisation that something has changed, that the patient is somehow different. Initially these changes are so subtle as to be very difficult to articulate. By establishing how patients are in terms of their interaction and progression that any changes can be contextualised. How this is done will be discussed next.

Baselining

This second stage in visualising deteriorating conditions is concerned with establishing norms. It is the process of establishing a patient's usual condition to enable any changes to be contextualised in deciding if patients are deteriorating. Nurses do this by establishing how patients are in terms of their vital signs (e.g. blood pressure,

pulse rate), their response to any treatment, their progression and how they generally interact with staff. This is done by establishing a baseline against which any changes can be compared in a process termed baselining. How this is done will now be outlined.

Vigilising

Nurses in particular are keen observers of patients. They assess patients both formally and informally by being continuously vigilant or what is conceptualised here as vigilising. It seems that every opportunity is used to observe patients in establishing a baseline,

> *Every time that you're in a bay near patients, you need to be looking at them and observing them to some degree or another. I don't think you can just do it when it's blood pressure time* (No. 5-Staff Nurse 2years).

To facilitate the process of vigilising nurses need to assess patients to establish patients' baseline and also to pick up on any deviations from it. This enables changes to be contextualised. Like so many elements of deterioration, nurses in particular are often unaware of how they assess patients or make clinical decisions. However in patients presenting with obvious signs of deterioration, assessment is done very quickly. Unlike doctors, nurses differ from each other in how they assess patients. One way is to have a systematic approach whereby nurses use a predetermined series of questions or ways of looking at patients. This can help them to more effectively prioritise care ensuring that nothing is missed and provides a framework for assessment. Developing such an approach is a function of experience and developed over time and not every nurse uses this but instead have what can best be termed an idiosyncratic approach in that it is particular to the individual,

> *Newly qualified will do it in another way; someone who's been here 3 or 4 years do it another way* (No. 33- Staff Nurse 2 years).

Despite not sharing a common way of assessing patients, nurses go through a similar process of looking at patients, asking a series of relevant questions either of patients or of themselves to account for the problem as well as measuring vital signs but not necessarily in any order in a process of seeking confirmation. These are the steps in determining if patients are deteriorating while at the same time ruling out obvious causes such as blocked urinary catheters being responsible for poor urine output. Once an assessment has been

made and all relevant information gathered it is pieced together, as an artful interpretation, in deciding if patients are deteriorating. In this context the focus of the assessment is on the likely problem and its cause,

> *We tend to concentrate on the area we think there's a problem and then spread out from there….gathering as much information as possible for them to make a diagnosis* (No. 12- Sister 14 years).

A deficit in knowledge leads to a poor assessment of patients, something that is recognised in practice. Therefore a prerequisite for a good assessment is a sound knowledge base. The greater the knowledge and experience the more effectively and confidently an assessment is carried out. Assessment relies on baseline data in order to establish if there have been any changes and to place those changes into some context, particularly changes in physiological variables. The way nurses assess patients is therefore modifiable with time and experience. Less experienced staff rely on keeping charts up to date in an effort to exert some control over what is happening and as a means of dealing with uncertainty,

> *It was so much based on: if your charts were right your patients were well looked after because you had seen them each hour making sure they were ok* (No. 2- Staff Nurse 9 years).

A more holistic assessment facilitates the contextualising of the findings. The less the experience, the more the concentration on individual tasks and the more difficult it is to contextualise the information gathered. As confidence grows with experience and familiarity with the work of the ward, this changes and nurses are able to assess patients more effectively and understand the significance of their findings. Also it is a matter of learning how to apply their knowledge in a more effective way, essentially linking it to practice. This is done through exposure to patients and experiencing patients with different conditions. It further reinforces the reciprocal relationship with intuitive knowing.

Routinising

Having a routine is another way of vigilising. This is needed to reduce the uncertainty of missing something vital. Routine is a way of organising work, particularly that of more junior nurses and support workers. It provides structure and security. One example is the frequent measurement of vital signs. Its importance in relation

to deterioration is to ensure that nothing is missed while monitoring patients for how they respond to treatment,

> *I think you need routine ones 'cause otherwise they'd just never get done and people would get missed* (No. 11- Staff Nurse 3 years).

Importantly they provide a baseline against which patients are ultimately judged to be deteriorating or not, a permanent record of how patients are progressing. Routinising the observations also has the benefit of freeing staff from the need to constantly review how often they need to be done. It also avoids the confusion that may arise out of different decisions being made about the same patients regarding the frequency of monitoring vital signs. It is difficult in practice, particularly when busy, to differentiate between a conscious decision to reduce frequency and a simple omission. One way this is dealt with is by getting on with the work reducing the need for constantly referring to someone else. There is a tension however between the time consuming nature of doing observations routinely and their sometimes limited application. Currently there is no strategy for reviewing how frequently these measurements should be made,

> *So I would reduce if I felt that people would do them properly and would discriminate on who needed 4 hourly observations and* stuff (No. 12- Sister 14 years).

However, routinising observations gives no guarantee that abnormalities will be detected or reported as it depends on many factors such as who is measuring the vital signs as well as how busy the ward is. In addition, staff need some knowledge and experience to enable them to interpret what they are picking up. As a result, something could be missed. As with any routine, measuring vital signs can become an end in itself with the emphasis on the task. This could result in nurses becoming desensitised to any changes. The trained nursing staff try to overcome these problems by counter checking, sometimes while doing other things such as drug rounds. The paradox remains that if changes in vital signs are relied on as the only indicator of deterioration, then nurses will not pick up on more subtle indicators or investigate other causes such as bleeding from surgical wounds.

Mechanicalising

In order to overcome the time consuming and routine nature of

"doing the observations" ward staff mechanicalise the process by use a machine (dynomap) which automatically measures blood pressure, pulse rate temperature and oxygen saturation. It offers both convenience and quickness in dealing with this problem. However mechanicalising results in the loss of valuable information, such as the detection of cardiac arrhythmias, since the pulse is not palpated. The only touch required is to apply the blood pressure cuff. Other problems include deskilling,

> *that's taken all the skills out nursing hasn't it* (No. 40- Staff Nurse 10 years*).*

Despite worries about its accuracy, vital signs are seldom manually check, unless there is a convincing reason for doing so simply because it is too time consuming and often the task is delegated to health care support workers. However nurses are becoming deskilled not only in the task of measuring blood pressure manually but in failing to pick up the vital information gained by palpating pulses and the close physical contact with patients that this entails. Touch alone has the potential to provide valuable information about patients' condition.

No one sign has the sensitivity or specificity to detect deterioration but together with other signs and symptoms are used to contextualise deterioration. Nurses deal with this lack of sensitivity and specificity by focusing on patients' diagnosis in evaluating any changes in vital signs and also by emphasising general changes such as the more subtle changes picked up in the process of intuitive knowing. However, with education and experience both nurses and doctors come to understand the significance of any alteration in respiratory rate and its sensitivity in relation to other observations. This is especially so where the early warning score has been introduced to aid detection of deterioration.

Constraining Professional Factors

Both nurses and doctors face practical difficulties in dealing with patients who are deteriorating. These centre on interacting with each other, dealing with patients and lack of knowledge and experience. Disagreement between nurses and doctors about the appropriate treatment for patients is one source of professional difficulty. To enable a complete assessment of their condition to be made, patients must be active participants in that examination. If they are unable to co-operate in any way, for example through confusion,

being poor historians, then it is likely to lead to an incomplete assessment and a missed or inappropriate diagnosis resulting in possible delays in treatment,

> *So co-operation of patients really to make it more of a team effort* (No. 21- Staff Nurse 4 months).

A lack of education or knowledge and experience is a constraining factor in detecting deterioration. This may result in a failure to understand the seriousness of the deterioration and a failure to act on the information. For example, there is often confusion about when to refer patients to the critical care team or seek appropriate expertise and when or how to intervene,

> *But I think the more advanced step I think our teaching's probably quite poor in terms of recognising when you need to get someone else involved* (No. 23- Doctor 10 months).

There are occasions when staff simply do not know how to deal with the situation that faces them provided they recognise its significance to begin with. Consulting with others is a means of overcoming a lack of knowledge and experience, provided limitations are acknowledged.

Constraining Organisational Factors

Time constraints are a problem for many staff since often there is not enough time to do what is needed. This may result in an inadequate assessment particularly when dealing with complex signs and symptoms and lack of opportunity to consult with others. For example, nurses are sometimes unable to attend ward rounds with resulting in a loss of opportunity for them to contribute to and influence care in a meaningful way. It diminishes the role of nurses, making it seem as if they have little to contribute. The ward round is after all the forum where patient care is discussed and decisions made. The organisation of medical work is problematic in that the greater the geographical spread of patients and the greater their number, the less likely doctors will respond promptly to referrals from nursing staff, particularly when referrals are based on intuitive knowing, particularly when this is not backed up with objective evidence. It also makes it difficult for nurses to appreciate the work of doctors. Doctors attempt to deal with these constraining factors by trying to prioritise care. At times, this leads to delay in seeing patients as well as frustration and misunderstanding,

> *Sometime if you don't get there fast enough, and even if*

> *you've explained it to them, they will start getting a bit ratty with you; it's difficult for them to appreciate because you know that you've not stopped working since the morning* (No. 25- Doctor 10 months).

Distraction tasking is time consuming and is anything that is not directly related to patient care. It is a significant source of frustration for all and involves staff dealing with things that could more appropriately be dealt with by someone else. For example, trying to find essential equipment that is not readily available is both time consuming and frustrating. Distraction tasking also includes convincing others to carry out investigations that are needed to confirm a medical diagnosis. This leads to more time wasted on negotiation or argument, time that could be spent on direct patient care. Co-operation is essential in detecting deterioration since team work is essential for its detection. Currently, diagnoses can rarely be made in isolation and need the confirmation of laboratory investigations as well as other tests,

> *It's like arguing with radiographers and biochemists in the middle of the night, echo technicians. It's like why do you have doctors if you're not going to believe us?* (No. 24- Doctor 10 months).

For nurses distraction tasking includes essential housekeeping matters that ensure the smooth running of clinical areas. Examples of these include organising television rental, serving meals and unnecessary paper work. Distraction tasking is wholly inappropriate for professionally and academically prepared personnel to engage in. Where adequate support is provided by giving as much relevant information as necessary and being readily available to assist, the task of assessment and treatment is made much easier.

Hierarchical Intervening

Once physiological deterioration is established the next step is to intervene whether to prevent further deterioration, reverse the current trend or both. This is done through hierarchical intervention. Nurses act either to prevent further deterioration, reverse the deterioration or both. If the situation is judged not to be immediately life threatening, than nurses will intervene within their capabilities and then reassess patients as to its effectiveness. However there is a professional boundary that nurses will not cross therefore they only intervene within their scope of practice rather than within their capabilities.

Junior nurses however exercise excessive caution. They are less likely to act autonomously,

> *Yes, as long as I have been given appropriate instruction to and it had been charted, prescribed as such* (No. 14- Staff Nurse 9 months).

Senior nurses are willing to take actions in situations they judge to warrant immediate intervention even if in their opinion they are in conflict with their regulatory body and hospital policies governing practice. However nurses need the tacit approval of nursing management and permission from doctors to support what on the face of it appear to be autonomous, independent actions. They are willing to take verbal instructions via the telephone and act on them. Initiating treatment is a matter of pragmatism since it ensures prompt intervention given the geographical spread of doctors' work. Nursing intervention is therefore characterised by seeking backup and cautious intervention.

If problems persist then patients are referred to doctors. If patients continue to deteriorate despite nursing intervention or do not respond to therapy, nurses refer patients to doctors. It is a matter of recognising the limitations of what they can achieve by their interventions. However in life threatening situations nurses refer patients immediately while they support patients in whatever way they can. Hierarchical intervention therefore comprises of a series of steps. Following an assessment, nurses intervene within their capabilities and professional regulations to prevent further deterioration. If patients do not respond then they are referred to doctors except where it is life threatening, in which case, referral is immediate.

The aim of baselining is to establish patients' usual condition so that any changes can be contextualised. The routine of baselining is accomplished by vigilising, routinising and mechanicalising. When deterioration is detected, it is dealt with through hierarchical intervention. Constraining professional and organisational factors detract from the early detection of deterioration. For a referral to be successful, it must be presented in a way that grabs the attention of doctors. How this is done will be discussed next.

Grabbing Attention

This final stage in visualising deteriorating conditions is the process

that nurses engage in when presenting evidence of deterioration to doctors. It is how they make a convincing referral, one that ensures medical assessment and intervention. Its categories will now be presented.

Legitimising

When nurses are convinced that patients are deteriorating whatever its basis, they attempt to refer patients to doctors. This conviction is often based on subtle changes as well as objective, quantifiable changes such as in vital signs. Nurses want patients to be reviewed when they suspect deterioration but face the difficulty of convincing doctors, especially if they refer based on intuitive knowing only, since doctors often only respond to quantifiable evidence. They overcome this difficulty feed doctors information in such a way as to ensure a credible referral. Their strategy is to legitimise their worries any way they can. Nurses consult with others in order to legitimise their concerns as well as seeking general support for any proposed action including making a referral. This is in situations where they are worried about patients but are unsure as to the significance of those changes. Nurses are prepared to consult with anyone who knows the patient involved. These include relatives as well as other nurses. Also they seek advice on what else to do particularly if they are less experienced. Discussing matters is also a means of supporting less experienced nurses and to provide them with guidance, ensuring that they benefit from the experience of others as well. This legitimises their actions and the decision to refer patients.

Referrals have to be persuasive if they are to be successful. This is more likely if nurses present factual information that is contextualised within patients' baseline state so that the relevance of any deviations from that can be more easily established. If doctors are well known to nurses, then this information is reinforced by personal opinion. When they do not respond in a way that nurses consider appropriate, they persist in contacting doctors until they do. If they are reluctant to come and review patients, nurses use emotionalised inflection of their voice as a strategy. This helps to convey the urgency of the situation and the expectation that something needs to be done. It complements the persistence strategy.

In situations where nurses are convinced that a patient needs to be reviewed and they cannot convince a doctor, nurses do not hesitate in threatening to contact a more senior doctor. Generally this is done

in an assertive way,

> *Perhaps you would like to come and review this patient or perhaps I can speak to your SHO or perhaps I'll speak to the Registrar* (No. 18- Staff Nurse 11 years).

If a doctor is perceived as being obstructive or difficult then the individual is referred to more senior nursing staff in the expectation that they will deal with the situation and convince those reluctant to attend the patient. If nurses are unsure about whether to refer patients to doctors or not, they usually err on the side of caution even if subsequently proved wrong rather than take the risk of further deterioration. This is similar to the cautiousness that is characteristic of nursing intervention. In referring patients there is an element of opportunism in that if doctors are readily available on the ward nurses take advantage of this and ask them to see patients irrespective of their seniority. This has the effect of ensuring that things are done for patients that otherwise might not be and also nurses can reinforce and further legitimise their referral to junior doctors by invoking the authority of more senior ones,

> *While I'm passing I'll just have a look because they can say: right get the house officers to do this, this and this and then the house officer can't argue really* (No. 11- Staff Nurse 3 years).

Presenting quantifiable evidence of deterioration convinces doctors of the need to review patients. Vague reporting by nurses makes it difficult for doctors interpret what is happening to patients. Despite this, if convenient they will come and assess patients. Quantifiable changes are used by doctors to prioritise workload and judge the serious nature of illness. However factual information has to be contextualised and trends reported thereby linking this to the process of baselining presented earlier. For example, using the early warning score doctors need to know why patients are triggering. Factual information also enables doctors to start thinking of a diagnosis or the likely cause of the problem and possible interventions before they see patients. With vague reporting or reporting based on intuitive knowing alone, doctors often find it difficult to interpret what is happening to patients since they have not changed in any quantifiable way making it difficult to know what to treat. The vital signs effectively package deterioration in that they provide a succinct way of communicating deterioration and its degree.

To be convincing nurses need to present factual information in a

particular way. Referring speech itself must be convincing. This is sometimes problematic since nurses use intuitive knowing in detecting deterioration making it difficult to articulate subtle changes. Another problem is not being able to use medial language in an articulate and confident way to convey deterioration,

> *The junior nurses don't know what words to use to get their patient reviewed. I think that's part of the problem* (No. 44- Sister 5 years).

Nurses take time to understand and develop confidence in using such language. Convincing reporting is indicated by familiarity with medical language and the confidence to use it. If nurses lack the confidence in using medical language then they use lay terms because they are afraid of looking stupid or being undermined and ridiculed if terms are used out of context, running the risk of not being able to legitimise their concerns,

> *Whereas you wouldn't say to them (doctors) - the man in bed whatever, his saturation's are this and his respirations are that. You'd just say- his breathing's gone off If you think about it that way it is more of a social sort of speaking mode* (No. 36- Staff Nurse 1 year).

Packaging

With confidence and education, nurses are able to draw together their clinical findings and present them much more convincingly. They learn how to package deterioration convincingly**.** The more confidence and experience, the more likely is the use of medical language. There is a sense that nursing students are being socialised into this use of non-medical language rather than being educated in its use, simply because it is the way nurses speak to each other. Disadvantages associated with it include nurses undermining themselves and their knowledge base since the use of language is linked to credibility. This makes them seem inarticulate, increasing the possibility of ridicule. Even where there is an objective scoring system such as that for assessing consciousness (Glasgow Coma Scale), nurses tend not to use it but instead continue to report using subjective terms. Doctors take time to understand this use of lay language and understanding develops as they get to know nurses better. Often they have to seek further clarification and information resulting in nurses becoming antagonistic because they think that doctors are looking for an excuse not to come. This is less of a problem where nurses and doctors have good relations.

The early warning scoring system has improved communication between nurses and doctors and compliments the reporting of vital signs. Doctors are obliged to act on it and nurses derive their empowerment and confidence from this. It provides nurses with a precise, concise and unambiguous language to communicate deterioration to doctors. It enables doctors to focus quickly on the problems identified by nurses. For both therefore, it provides a way of assessing patients in that it guides them to identify problems commonly associated with deterioration. It provides commonly agreed criteria against which deterioration can be measured. It has changed practice since it has made nurses more aware of deterioration and particularly the significance of measuring respiratory rate.

Trusting Relations

Trust is fundamental in convincing doctors to come and see patients. It is something that has to be worked at and gained. When it is present, things run a lot smoother and people get on better together. Trust is indicated by listening, discussing and mutual decision making. Likewise, where these are lacking, there is no trust and relations are poor. If doctors respect nurses' judgement, then less quantifiable evidence is needed to convince them to review patients. As it develops nurses and doctors learn to trust in each others' judgements so that the greater the trust the less the evidence and this trust is based on how experienced nurses are. Trust is so powerful that even doctors on call will respond to vague reporting. It is also based on social interactions, simply how well nurses and doctors interact with and know each other,

> *If you get along with them socially and you can have a laugh with them then you learn to trust them* (No. 7- Doctor- 10 months).

Where there is mutual trust nurses can express themselves more freely and with more confidence in getting patients reviewed. Communication is therefore less inhibited and much more effective. Simple measures for developing trust and maintaining good relations include being mutually supportive, ensuring that doctors are familiar with the way the ward operates by using experience to guide those with less experience to enable them to do their job more effectively and to help them to establish priorities. Where there is mutual respect between nurses and senior doctors, then it is more likely that junior doctors will respond likewise. This sets the tone of relations

between nurses and doctors.

The essential basis of trust is a matter of having confidence in the thoroughness of the assessment that competence in dealing with situations, intervening within remit and referring appropriately,

> *So there is that influence from above where they do, the senior ones listen to the nurses* (No. 12- Sister 14 years).

Other factors influencing good relations include having ward based teams of doctors, informal social gatherings and shared facilities. All promote effective communication about patients since nurses and doctors are more likely to meet informally, providing the opportunity to discuss patients. This tends to be done spontaneously. Establishing and maintaining trust and good relations is all about promoting team work. However there is nothing done at an organisational level to promote this. However good relations are difficult to establish and maintain when doctors move wards regularly and when the workload is heavy.

Negotiated Intervening

This is the process of intervening effectively to treat patients in physiological deterioration. It is where nurses and doctors come to a mutual decision about any interventions that are appropriate while trying to maintain each others professional integrity by trying not to undermine credibility. It includes giving treatment time to make a difference to patients, essentially seeking evidence of improvement. If there is no improvement then nurses will suggest alternatives. Keeping options open and appealing to protocols are effective strategies in dealing with any disagreement about treatment and avoids alienation. An undertaking to review treatments, explaining interventions and generally listening to concerns and suggestions ensures that everyone feels that their point of view has been acknowledged and nobody feels undermined. If disagreements persist nurses will refer patients to more senior doctors. Provided this is done assertively rather than subversively, this is relatively unproblematic. The partnership approach to decision making is much more effective in ensuring that the right decision is made,

> *They don't trust you, they don't trust your decisions….You feel undermined, you feel incompetent and you feel what's the point* (No. 24- Doctor 10 months).

Trust plays a major part in maintaining self-confidence. The

uncertain nature of physiological deterioration means that nurses sometimes refer patients inappropriately. As a result nurses have a fear of being ridiculed. One way of overcoming this fear is by having their findings and worries confirmed by some external source, usually a more senior nurse or even a protocol. Confidence is a function of time and personality. Confidence can develop fairly quickly and is linked to experience. The more experience gained the more likely individuals will be confident in their ability to detect deterioration. It also depends on personality in that the more assertive the personality the more confident will be the referral.

Non-Responding

There are times when doctors do not respond. The more a referral is judged to be inappropriate, the more likely it is that doctors will not respond to future referrals. This includes contacting doctors for more routine work such as replacing IV cannulae as well as inappropriate referrals such as patients with nothing obviously wrong with them. Inappropriate referrals are time-consuming to deal with. There are times when despite clear quantifiable evidence that patients are deteriorating doctors still do not respond. Workload, geographical spread of work, reluctance to refer to more senior doctors, inexperience and lack of knowledge are considered common reasons for not responding. However a more compelling reason may be simply that doctors do not know what to do w and instead of referring patients they simply ignore what is happening in what is termed here as problem avoidance behaviour,

> *It was pure and simple he didn't know how to deal with it. It scared him so he didn't deal with it* (No. 24- Doctor 10 months).

Grabbing attention is the final step in detecting deteriorating conditions. It is based on legitimising suspicions of deterioration and presenting the evidence in a way that results in a successful referral. Trusting relationships are a significant factor in ensuring an effective referral and when present facilitates mutual respect and cooperation. Negotiated intervening means that where there is mutual decision making and where different points of view are acknowledged and accommodated, then professional integrity is maintained. This facilitates the management of deteriorating conditions.

Discussion

Visualising deteriorating conditions is a three stage process.

Through intuitive knowing, nurses pick up that patients have changed in a way that requires a medical assessment. To make the referral more credible, they attempt to contextualise changes by baselining that is, establishing how patients are in terms of their progression and vital signs through vigilising. Finally, grabbing the attention of doctors is facilitated by nurses seeking the backup of colleagues, and providing as much persuasive information as possible in a way that most effectively packages deterioration. The whole process is facilitated by knowledge and experience, together with mutual trust and respect. Cautiousness characterises each step.

Nurses report that they just know when patients are deteriorating. They primarily rely on subjective evidence in its detection, particularly on how patients look. Cioffi (2000b) describes similar changes in patients such as “not right”, colour, agitation and changes in observations. Others refer to changes in mood and reduced eye contact as neurological alterations (Goldhill et al. 1999). The subjective nature of nurses’ initial detection of deterioration is well supported in the literature (Daffurn et al. 1994; Grossman and Wheeler 1997; Rich 1999; Sax and Charlson 1987; Schein et al. 1990; Smith and Wood 1998). In a study of triage in accident and emergency nurses, Gerdtz and Bucknall (2001) comment on how little objective physiological data were collected when deciding urgency.

To get to know patients nurses must spend time with them. This enables them to detect more subtle physical and psychological changes associated with deterioration. This is similar to the findings of Taylor (1997), Chase (1995) and Cioffi (2000b) and is supported in this study by nurses establishing functional relations with patients. In the present study, knowledge and experience emerged as important factors in picking up deterioration. Taylor (1997) also found that knowledge and experience form the basis of cue acquisition in that the greater the knowledge and experience the more effective the assessment. Nurses attempt to corroborate their subjective awareness of change with objective evidence and has been described by Smith (1988) and Cioffi (2000b) also. Pattern recognition as the basis of intuition is widely supported in the literature (Benner 1984). This process has been conceptualised in the current study as intuitive knowing.

The more knowledge and experience nurses have the more likely it is that they will have a systematic approach to assessing patients. Having some routine in place enables the acquisition of multiple cues

and that knowledge leads to the recognition of signs and symptoms (Taylor 1997). King and Macleod Clark (2002) also report increased vigilance in response to worries about patients and maintain that nurses with more knowledge and experience have a more analytical approach to assessment, the ability to look beyond the initial trigger. By this they mean that experienced nurses look for further evidence of deterioration to substantiate their worries. This is consistent with the sub-core category of baselining conceptualised in the current study.

There are similarities between the sub core category of "grabbing attention" and persuasion or argument theory. Van Eemersen et al. (1987) defines an argument as a social, intellectual, verbal activity serving to justify or refute an opinion consisting of a series of statements and directed at convincing someone of something. Simons (1976) defines persuasion as communication designed to influence others by modifying their beliefs, values or attitudes. The more someone is known the better prepared the persuader is to select persuasion strategies that work (Reardon 1991). However there is no consensus at present about how relationship influences persuasion outcomes and the process of gaining compliance (Boylan 1993) but emerged as very significant in this study since mutual trust and respect form the basis of good working relationships resulting in less inhibited communication.

In grabbing attention, there is always the fear that nurses will be ridiculed for referring patients inappropriately, a similar finding to Smith (1988) and Cioffi (2000a). One way of overcoming this fear is by having their findings and worries confirmed by some external source such as a more senior colleague or by protocols. This has the effect of increasing confidence in referring patients. It is termed collaborative decision making, evident when nurses are unsure about diagnosis (Cioffi 2000a). Similarly Smith (1988) found that nurses consulted with other nurses and reassessed patients when they became subjectively aware of changes. Clinical judgements are almost made in a group context, involving other nurses and doctors (Chase1995). This has been conceptualised in the current study as legitimising.

Limitations

- Few incidences of physiological deterioration were observed therefore it is always possible that there are more categories

to emerge.

- The study was limited to doctors of house officer (intern) grade. It is possible that the inclusion of more senior doctors would have generated more categories.
- Theoretical sampling could have been carried out elsewhere such as critical care areas, medical or surgical specialities and in other substantive areas in an effort to further elaborate the emerging theory.

General Theoretical Implications of the Theory

The concepts generated from the study are unique. No other research has generated them but instead rely on descriptive categories such as looks (Cioffi 2000b) as well as changes in mood and reduced eye contact (Goldhill et al. 1999; Rich 1999; Schein et al. 1990; Sax and Charlson 1987). The study focuses on the complexity of detecting deterioration, rather than on describing the signs and symptoms usually associated with this phenomenon. With further theoretical sampling in different substantive areas, this theory could be generalised to all situations of deteriorating conditions and not just to hospitals patients. As the findings stand, it has the potential to be used by ward staff to understand the complexity of deterioration, how they make decisions, the importance of trust, and the steps involved in making a successful referral.

Conclusion

This is the first study to attempt to place the detection of physiological deterioration within the context of clinical practice and the difficulties faced in making a successful referral, rather than concentrating on any one particular aspect such as subtle indicators (Cioffi 2000a; Cioffi 2000b; Grossman and Wheeler 1997) or vital signs (Davis and Nomura 1990; Hill et al. 1995; Schumacher 1995). Early detection of physiological deterioration is inherently difficult. To date no sensitive or specific sign has been identified that reliably predicts deterioration. The early warning score is an attempt to address this difficulty, although its sensitivity and specificity has not been established. The role of staff at ward level in the process of detection, its reporting and the difficulty they face has not been previously evaluated. The findings confirm the complex nature of this phenomenon and reinforces the importance of teamwork in the detecting deteriorating conditions.

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