Responding to uncertainty in nursing practice

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Abstract

Uncertainty is a fact of life for practising clinicians and cannot be avoided. This paper outlines the model of uncertainty presented by Katz (1988, Cambridge University Press, Cambridge, UK, pp. 544–565) and examines the descriptive and normative power of three broad theoretical and strategic approaches to dealing with uncertainty: rationality, bounded rationality and intuition. It concludes that nursing research and development (R&D) must acknowledge uncertainty more fully in its R&D agenda and that good-quality evaluation studies which directly compare intuitive with rational–analytical approaches for given clinical problems should be a dominant feature of future R&D.

1. Introduction

This paper discusses the issue of uncertainty in nursing, and how nurses attempt to gain control over clinical uncertainty in order to make judgements and decisions. Specifically it highlights different forms of uncertainty, and examines how rational and intuitive approaches to judgement and decision making might prove useful in making sense of, and therefore coping with, uncertainty in clinical practice. It is suggested that the entire issue of uncertainty within nursing practice needs to be discussed in more detail as a cornerstone of efforts to ensure that research and development (R&D) aimed at improving nursing practice reflects and addresses the clinical reality of the choices nurses face.

2. Uncertainty: the one variable in healthcare which is certain

Uncertainty is an inescapable and omnipresent fact of decision making in societies. Pitz and Sachs (1984) suggest that:

A judgement or decision making (JDM) task is characterized either by uncertainty of information or outcome, or by a concern for a person’s preferences, or both. Unlike other tasks, there may exist no criterion for determining whether a single choice or judgement is correct, since the response is based in part on personal opinions or preferences. (p. 140).

Human beings however, have difficulty in both accepting this uncertainty within their daily lives, and integrating it into their judgement and decision making processes (Katz, 1988). In health care, as in other areas of human activity, judgement and decision tasks are uncertain. Characteristically, a patient’s diagnosis is probably accurate, the treatment and interventions they receive will probably work and the patient will probably get better.

Baumann et al. (1991) suggest that this uncertainty occurs at more than one level, employing the terms micro and macro (un)certainty to refer to the bi-dimensional nature of the concept. For them micro (un)certainty refers to the level of confidence expressed by an individual about his or her decision, reflecting...
individual variation. Macro (un)certainty is the extent to which these decisions vary across individuals, reflecting variations in practice.

In contrast, Katz (1988), following on from Fox (1957), highlights three different types of uncertainty which, it is suggested, affect how clinicians make judgements and decisions. The first type of uncertainty results from an individual having incomplete or imperfect knowledge of the area; the second from limitations in current empirical knowledge; and the third is a derivative of the first two: there is difficulty in distinguishing between personal ignorance and the limitations of current knowledge.

These two different approaches to uncertainty can be combined. For instance, a nurse may have incomplete knowledge with which to make a judgement or decision but a high level of confidence in the decision taken — the first type of uncertainty highlighted by Katz (1988), together with micro (un)certainty defined by Baumann et al. (1991). This can often lead to a practitioner having over (or under) confidence in their judgmental abilities. Alternatively, there may be incomplete empirical evidence to support a particular treatment intervention, and variations in whether that treatment is used according to the hospital a patient attends — the second type of uncertainty identified by Katz (1988) together with macro (un)certainty defined by Baumann et al. (1991). In some instances the patient may receive a treatment, which the practitioner has little knowledge of, and for which there is little supporting empirical evidence. In this instance it is unclear where the uncertainty regarding the treatment arises: it may not work because of the practitioner's limited knowledge (a situation easily rectified by asking a knowledgeable nurse to deliver it); equally, it may not matter who delivers the intervention as its lack of effectiveness may be masked by the limited empirical evidence to support its use.

Uncertainty therefore is an unavoidable characteristic of clinical practice. However, the key dilemma for practitioners, policy makers and — most importantly — healthcare recipients, is how practitioners make judgements and decisions when faced with the reality of these uncertain clinical situations. In this paper broadly rational and intuitive strategies to judgement and decision making are examined utilising the framework of uncertainty proposed by Katz (1988). The relative utility of the different approaches in helping practitioners cope with the uncertainty inherent in clinical situations is examined and proposals for future research suggested.

3. Rationality in dealing with uncertainty

Dahl and Lindblom (1992) suggest that an action is rational to the extent that it is 'correctly designed to maximise goal achievement, given the goal in question and the real world as it exists' (pp. 38,39). Where more than one goal exists, which is often the case in clinical environments, then responses will be rational to the extent that they are correctly designed to maximise net goal achievement.

For simple clinical decisions rational responses are relatively easy to isolate. The following critical care scenario can be used as an example: a nurse observes a patient collapse, establishes he has no pulse and is not breathing. Having diagnosed (correctly) a cardiac arrest she begins cardiopulmonary resuscitation (CPR).

In this instance the nurse's actions can be regarded as entirely rational. The intervention being chosen as the means of achieving the goal of restarting the patient's heart and re-establishing circulation. However, if the nurse's first action had been to administer antibiotics following the identification of cardiac arrest, then the action would be less rational. Antibiotics have little discernible effect on the electrical activity of the heart and the circulatory system and are therefore a poor way of achieving the goals previously mentioned.

In more complex clinical situations, with multiple dimensions of uncertainty, the implications of Dahl and Lindblom's approach are that all parties involved must agree on the goals to be achieved, match their assumptions about the nature of the reality involved, and appreciate the consequences of their actions given this shared reality. Where the decision involves multiple stakeholders then the process is necessarily complex. The professional and patient may differ fundamentally on the value (utility) of desired outcomes and the means to arrive at them. This is obviously problematic in real life clinical situations and is a major limitation on the descriptive and normative power of a wholly rational theoretical position. Although it should be noted that efforts are being made to build multiple stakeholders' values and utilities into the rational frameworks of computerised healthcare decision support models. For example the decision analysis in routine treatments (DARTS) study at the University of Newcastle Upon Tyne, UK (Robinson and Thomson, 1999).

In the nurse decision making literature there are a number of studies which have sought to test, operationalise, or extend rational approaches to dealing with uncertainty (Hammond et al., 1967; Aspinall, 1979; Panniers and Kellogg Walker, 1994). What each of these studies proposes is a narrow, 'purist' and normative conceptualisation of rationality in decision making. They derive from formal probability theory and expected utility (EU) theory (Pitz and Sachs, 1984), and assume a rational choice of the process and outcome which maximises benefit and minimises costs to the decision maker (Le Breek, 1989). Typically the probability of each possible outcome occurring is assessed quantitatively, together with the value or utility of each.
outcome for the decision maker. These values are then combined to provide a value for the expected utility of each outcome, with the rational choice being the alternative that has the highest expected utility (Le Breck, 1989). These normative approaches, often in the form of decision analysis and decision support systems, are becoming more popular with the advent of evidence-based health care and increases in computing power, portability, and accessibility (Lilford et al., 1998).

The rational approach has benefits when considering the different types of uncertainty highlighted earlier. Decision models based on decision analysis (utilising decision trees) explicitly highlight the probability of a certain intervention or treatment leading to a specific outcome. Ideally, these probabilities should be derived from existing empirical evidence regarding the effectiveness (or not) of the intervention in question. If this evidence does not exist, then it is apparent in the decision model, and other forms of probability estimation have to take place. This often involves an estimation of the probability of a particular treatment or intervention having an effect based on practitioner knowledge of the situation. In both cases, not only are the estimates of the uncertainty in the situation explicit (in the form of given probabilities), but also the source of the uncertainty is explicit (either from empirical evidence, professional knowledge or both). If, at a later date it is apparent that the estimation of probability is inaccurate, it is possible in this model to identify where the error lay, dealing with the third (combined) type of uncertainty highlighted by Katz (1988).

Decision models, therefore, can be a very effective way for practitioners to deal with the uncertainty in clinical situations. They explicitly integrate this uncertainty into a decision problem, and highlight the source from which the uncertainty is derived. However, this normative approach to decision theory fails to capture the reality of most decision situations in nursing and health care. Decisions in health care, and nursing in particular, are characterised by incomplete knowledge of all available alternatives, a lack of reliable probabilistic data of the consequences of these alternatives and few readily applicable techniques for reliably gauging patient utility.

One might also argue that in the continuum of health care delivery the majority of nurses' work is not yet amenable to the technical rationality of quantitative-research-based theory, an issue which is highlighted by Schon (1988).

In the varied topography of professional practice, there is high, hard ground where practitioners can make effective use of research-based theory and technique, and there is a swampy lowland where situations are confusing ‘messes’ incapable of technical solution. The difficulty is that the problems of

4. Bounded rationality

As implied, it will be abundantly clear to most readers that the requirements of pure rationality do not permit accurate description of the behaviour of individual agents in healthcare settings. In response to this (although speaking about society generally rather than healthcare specifically) a number of commentators propose that rationality can be imperfect yet still remain rational by recognition that it is ‘bounded’ (Simon, 1982; Cherniak, 1986).

Proponents argue that individual agents are limited in their ability to process information rationally. Individuals seeking rational solutions are expected to engage with and develop future scenarios, and consider all alternative actions. However they tend to consider only a few future scenarios and often neglect obvious alternatives, lacking awareness of the importance of these omissions (Fischhoff et al., 1978). Appraisal of alternatives is also often seriously limited and further compromised by hindsight bias: the phenomenon whereby individuals claim to ‘have known it all along’ or use hindsight to exaggerate what was known about the decision prior to having to choose a course of action (Fischhoff, 1975). All of these limitations mean that individuals (and social groups) will make judgements which are more often than not simply satisfactory rather than optimal, a process known as satisficing. Individuals’ judgements can still be considered rational but within the limits of those cognitive parameters which
act as boundaries for that rationality. This view of rationality as bounded has been applied to such diverse areas as computing and artificial intelligence (Russell and Norvig, 1995), philosophy (Cherniak, 1986) and economics (Simon, 1982).

With the recognition that rationality will always be bounded comes a higher degree of descriptive validity for rational approaches to dealing with the three types of uncertainty outlined previously. If nurses consider only a few future scenarios and appraise a limited number of possible alternative actions, this could be explained as being due to a lack of individual knowledge regarding other possible courses of action and possible scenarios —Katz’s (1988) first type of uncertainty. Alternatively, they may be utilising all the available empirical knowledge that exists to construct scenarios and alternative actions, but that knowledge is limited and therefore only contributes to greater uncertainty. As before, the uncertainty of appropriateness of actions could be due to a combination of lack of individual knowledge and gaps in wider empirical evidence upon which to base actions.

In contrast to the normative approach which pervades discussions of rationality, theories of bounded rationality attempt to describe how individuals may make judgements and decisions in a rational way, with reference to the ‘real world’ of social actions, of which clinical practice is a part. However, sources of uncertainty may not be completely acknowledged, as individuals may not be aware of the cognitive boundaries and limiting strategies (heuristics) they are subject to and which act to frame decision tasks and the rational consideration of uncertainty and options. With this in mind, and given the ‘swampy’ (Schon, 1988) nature of much nursing practice, many nurses draw on intuitive approaches to dealing with uncertainty and gut instinct as a guiding force.

5. The role of intuition

Intuition, as a process of reasoning, has been defined in various ways:

- ‘understanding without rationale’ (Benner and Tanner, 1987),
- ‘a perception of possibilities, meanings and relationships by way of insight’ (Gerrity, 1987),
- ‘knowledge of a fact or truth, as a whole; immediate possession of knowledge; and knowledge independent of the linear reasoning process’ (Rew and Barron, 1987),
- ‘immediate knowing of something without the conscious use of reason’ (Schrader and Fischer, 1987),
- ‘[a] .... process whereby the nurse knows something about a patient that cannot be verbalized, that is verbalized with difficulty or for which the source of knowledge cannot be determined’ (Young, 1987),
- ‘the decision to act on a sudden awareness of knowledge that is related to previous experience, perceived as a whole, and difficult to articulate’ (Rew, 2000),
- ‘deliberate application of knowledge or understanding that is independently distinct from the usual, linear, and analytical reasoning process (Rew, 2000).

Intuition is characterised by a lack of ability to explain or understand how or why judgements and decisions have been arrived at. This makes it difficult to communicate the basis of intuitive decisions. Theorists claim that intuitive reasoning is indicative of a recognition of the complexity of clinical challenges. However, because of the opaque nature of intuitive thought there is no way of knowing if the sophisticated conceptualisations implied by this argument are actually being used in the cognitive methods individuals deploy. Indeed, evidence suggests that sophisticated constructs and messages derived from ‘scientific’ enquiry may not actually find their way into nurses’ thought processes as nurses often fail to recognise the distinction between scientific and experiential knowledge ( Luker and Kenrick, 1992). Intuition is also context specific, leaving little possibility that anyone other than nurses grounded in a single clinical context can ever translate their skills to other areas of clinical work. This is highlighted in a study by Fischer and Fonteyn (1995) where even the domain specific skills of intensive care unit (ICU) nurses vary depending on the specific context in which they work (specifically, uncertainty was heightened even when placed in a different form of ICU). If, as some nursing theorists imply, nursing can lay claims to being a high-order body of knowledge that transcends clinical boundaries, then such specificity should play less of a role in shaping decisions. All of the above points represent important objections to the role of an intuitive ‘reaction’ to clinical challenges as the sole basis for professional action.

Despite these objections it is intuitive thought carried out in ‘real time’ (within the immediate context of the decision situation) which dominates nursing judgement and decision making. A process referred to by Benner as ‘thinking in action’ (Benner et al., 1998). From observations and interviews with nurses making decisions carried out by researchers at the University of York, it was clear that time is a very real factor in the decision making process, with decision types fitting into a ‘continuum’ ranging from a short time scale with little control over the process (the level at which intuitive response dominates) to longer time scales and greater control over the decision process (lending itself to more
rational or analytical modes of thought), a finding supported by other research into decision making (Kim, 1983; Joseph et al., 1988). Moreover, this pattern reinforces the idea of the cognitive continuum framework proposed by Hamm (1984). As many of the decisions made in practice are of the rapid operational type (cf. Benner et al., 1998), one has to yield to the possibility that intuition may be a better mode of cognition for decision making in clinical areas than more rational or analytical approaches — if only by virtue of its popularity.

Intuition has been seen as a useful way of dealing with the inherent uncertainty within clinical practice (Rew, 2000). Nursing, as an occupational group, has not yet learned to work with the kinds of research data and findings which help in the calculation of objective probabilities, which, as has been shown, are a necessary condition for rational approaches to decision making. Indeed there is considerable evidence that nursing practice seldom makes use of research findings at all and that the quality of much of our research knowledge base is poor (Hicks, 1995; Luker and Kenrick, 1995; MacGuire, 1990; Mulhall, 1995; Pearcey, 1995; Bostrum and Suter, 1993). If nurses did suddenly decide en masse to utilise more analytical approaches, the probabilities and subjective utilities used would be based on significantly flawed, or even absent, assessments. Moreover, the kinds of research results the nursing research industry produces are not amenable to this form of cognition, with the majority of evidence published in nursing journals being qualitative and descriptive in nature (Thompson, 1999).

A further benefit of intuitive cognition arises as a result of the complex and hands-on nature of nursing itself. When faced with complex practical tasks, individuals are often able to develop competence far in advance of the ability to articulate the cues or patterns associated with the task — they act intuitively before being able to act rationally (Berry and Broadbent, 1984; Lewicki et al., 1992; Reber, 1993). This runs counter to the dominant arguments of proponents of intuitive expertise, a vision which posits intuition as the zenith of professional achievement achieved only after years of systematic training and experience and when you have ‘worked through’ the confines of rational systematic responses. However, several authors suggest that sophisticated agents (experts) are well able to articulate intuitive judgements post hoc often under the guise of validation (Young, 1987; Dreyfus and Dreyfus, 1986; Rew, 2000). This involves nurses essentially rationalising their judgements against experience, knowledge or some other cognitive waymark. Nurses often work in highly stressful environments, where patients present with very complex clinical problems and challenges. Masters (1992) has shown that under such conditions of stress and high uncertainty individuals who try to utilise conscious rationality perform worse than those who continue to operate intuitively.

It has been suggested that intuitive thought is an effective way for experts to make decisions (Benner et al., 1998) and in so doing they are assumed to automatically utilise a large amount of personal knowledge and experience to inform such decisions. They may also be integrating large amounts of empirical data into the processes which inform their decisions. However, an inherent difficulty with individuals using intuitive thought is their inability in most cases to actually explain how they arrived at a particular judgement or decision (by default, often an explanation of intuition). It is therefore difficult to ascertain whether and where the uncertainty in such decision situations arises from.

Very recent work by Rew (2000) does little to reassure us. Rew recognises that intuition involves synthesising empirical, ethical, aesthetic and personal knowledge. Moreover, she vehemently supports the idea that intuition constitutes ‘a cognitive skill useful to nursing’. However, her work — whilst undoubtedly capturing the concept of intuition — fails to reveal whether intuitive modes of thought are more accurate or effective when compared to rational decision styles, or again, at which point uncertainty is addressed. Her scale items (aimed at measuring the role of intuition in decision making) include such statements as

I am inclined to make decisions based on a sudden flash of insight. There are times when I feel that I know what will happen to a patient, but I don’t know why

There are some things I suddenly know to be true about some of my patients, but I am unable to support this with concrete data. (Rew, 2000 p. 103)

It seems to us that these statements are ideal representations of the sorts of expressions delivered from practitioners just prior to demonstrating the overconfidence, hindsight and anchoring biases or heuristics so common to us all.

6. Conclusion

This paper has highlighted the rational and intuitive schools of thought in dealing with the inherent uncertainty which is a component of the complex clinical decisions faced by nurses and other health care workers. It is generally assumed that perhaps the best way to deal with such uncertainty is to recognise it and to build it into rational models, such as those represented by formal decision analysis. By recognising the inherent variability in decision situations (through the use of probability assessment), uncertainty can be ‘controlled’ and therefore the decision which is subsequently made can be seen to be the most rational.
However, this paper has also highlighted that this may not be appropriate for much of nursing practice, where clinical situations need rapid responses, and much of the data needed for a more ‘rational’ approach do not exist. Intuitive judgement can offer much in terms of enabling nurses to deal with the uncertainty of the situations they face, and provide a coping mechanism for dealing with the contextual factors over which nurses have little control (stress, limited time to make decisions, and a relative lack of requirement to explain their choices). As is suggested by Hamm (1984) the context of the decision situation needs to be taken into account, so that the cognitive processes used by individuals match the tasks set them. In this instance, perhaps intuitive judgement is the most practical way for nurses to deal with uncertain clinical situations.

However, whilst there is some evidence to suggest that at the cognitive level and in laboratory tests individuals perform better when drawing on intuition, this level of confidence is missing from pragmatic or real life studies. Few studies address the essential research question, “is intuition versus rational decision support more effective for a given clinical challenge?” They also fail to address where uncertainty in clinical situations may arise, and if it exists how clinical practitioners identify issues which can be sources of such uncertainty, such as their own lack of knowledge, or an adequate empirical basis for their decisions. If nursing is to truly control the quality of its contribution to healthcare then the characteristics of uncertainty in practice must be described and good quality evaluation of cognitive and practical strategies must be designed, carried out and, equally importantly, published — no matter how uncomfortable the results might be for the profession.

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