Epistemology is the theory of knowledge, and a veterinary nurse’s (VN) knowledge underpins all of their actions on a daily basis in practice. A VN is a source of knowledge for others, and as such must be accountable for the issues and topics she/he is acting as an authority on. Feldman (1998) explains that nursing knowledge comes from a variety of sources including trial and error, tradition, intuition and research. As the profession is becoming autonomous and self regulated it is imperative that a VN knows exactly what they are doing, but more importantly why. This is where research comes to the fore; evidence-based, gold standard nursing practice is what all VNs should be striving to utilize or implement in order to maximize job satisfaction with regards to providing the best standards of care to patients and their owners (Polit and Beck, 2004).

As the VN profession progresses, and with the establishment of a variety of higher education (HE) courses for VNs, such as Bachelor of Science degrees, Foundation degrees and the Diploma of Higher Education, the VN’s awareness and utilization of research and evidence-based nursing practice to guide their clinical work is on the increase. As part of these undergraduate or postgraduate HE qualifications, VNs must source a variety of materials to support and justify their academic work, which in turn directly links into and affects their work in clinical practice. Depending on their level of study at HE the VN may even be undertaking a small scale piece of empirical research, which should be applauded and encouraged to increase the evidence base within the profession. Mulhall (1998) states that research has been used as a way to legitimize the human nursing profession, with their education being dramatically reformed to reflect the need for a research base, which is also evident within the veterinary nursing profession.

What is research in nursing?

LoBiondo and Haber (2002) discuss that research is a way to link theory, education and practice, and that theoretical concepts supported by research findings create the foundation for theory-based nursing practice. Research involves systematically observing a phenomenon, generating new theories in an attempt to explain a phenomenon, or systematically testing new theories that have been generated (Newell and Burnard, 2006). Scientific knowledge can be differentiated from other forms of knowledge because it is:

- Empirical, or observable
- Objective, or free from bias
- Can be generalized, or be applied to more than one situation.

Polit and Beck (2004) outline that nursing research is a systematic inquiry, which uses strict methods to either answer questions one has about a phenomenon or to potentially solve specific problems. This will ultimately benefit the patients treated, which is supported by Heitkemper (2007), who highlights that the future for nursing research and the direction it will take should be dictated by nurses aspiring to

Abstract

The veterinary nursing profession has progressed towards autonomy and self regulation over the past decade and in April 2010 will have fully achieved this regulated, professional status, whereby its members must adhere to and maintain certain professional standards as stipulated by the awarding body. With these advances comes the need for veterinary nurses (VN) to take ownership of their nursing, responsibility for their actions and become truly accountable for their day-to-day activities in veterinary practice.

An inevitable part of this progression is the need for all VNs to source, read, understand and utilize the most current research available to justify their decisions based on best practice; evidence-based practice. With the introduction and development of a variety of higher education courses for the VN there has been an increase in the number of undergraduate and postgraduate VNs conducting research into many subject areas via different methods. This level of participation in research should hopefully continue into the future, building on the knowledge-base of evidence available for VNs.

This article initially explores what research actually means before moving on to veterinary nursing research and the issues surrounding this concept. The research process is explored before moving on to the basics about research methodology and methods a VN may consider when undertaking a research project in veterinary practice.

Key words: evidence-based practice, nursing research, research methodology, research methods, research process

Claire Bloor
MA Ed BSc (Hons) RVN PGCE
Cert VN (Dent) MBVNA MiFIL is Veterinary Nursing Lecturer at Myerscough College, Myerscough Hall, Bilsborrow, Preston PR3 0RY, UK
have the best understanding of their actions, thus improving the care of the patients they serve. Thus, the author can summarize nursing research as being a systematic search for new information and ideas that can be implemented into, or used to guide and influence practice protocols.

It is imperative that research in the profession continues to increase the quality of nursing care provision, to create future directives for the future of veterinary research, to educate VNs with regards to best practice and ultimately to increase the accountability and autonomy of all VNs.

The research process (RP)

If VNs are to undertake research in practice or as part of their academic studies it is imperative they have a good working knowledge of some of the fundamental theories and principles that underpin research. The RP is a good place to start, as this provides a framework to follow from the initial research idea through to the completion of the project. Newell and Burnard (2006) refer to the research process as a cycle consisting of a number of stages, which have been diagrammatically represented in Figure 1 to emphasize its cyclical nature.

Any VN undertaking research must be aware of the RP, which Newell and Burnard (2006) appropriately described as a cycle, before they begin planning their study. The cycle begins with the research questions, which are the general ideas the VN has about what topic or area of practice they wish to investigate. These initial ideas tend to need focusing down to manageable and realistic hypotheses or a set of research questions, which form the aims of the study. The RP ends with the dissemination of the research findings to whoever the target audience is.

The VN must be aware, however, that all of the stages in between the first and last do need completing but that they may not end up occurring specifically in that order, and the process may not be as clean cut as simply moving through the project one stage at a time; some of the stages may need revisiting, for example your choice of sample or indeed the overall approach to the research. Cohen et al (2007) state that ‘there is no single blueprint for planning research’, and further discuss that the researcher must identify a set of issues to be addressed by the research in the planning stages if the results are to be credible and legitimate. The order of completion of these in-between stages largely depends on the type of research being performed: tightly controlled, quantitative scientific studies would typically follow the cycle in Figure 1 rigidly, whereas more exploratory, qualitative studies may revisit many of the preceding stages of the cycle throughout the course of the project.

Green (2008) considers that it is not always possible for a researcher to determine during the planning stages of a research project, whether their data collection and methods of analyzing it are going to yield the information required to answer the research aims. Thus, Green (2008) summarizes that in some research studies, especially qualitative ones that are exploratory in nature, the data collection phase and its potential for unearthing unexpected results, may cause the researcher to have to re-think the research questions or revisit their plans for the overall conduct and design of the study. Neither of these outcomes are incorrect or inappropriate in terms of research, and the VN must not become disheartened and see it as a backwards step if things do not quite go to plan, and earlier stages do need revisiting during the process.

Research methodology

Some initial considerations for a VN wanting to undertake a research project, which could also be deemed as barriers to overcome, include time factors, financial constraints, informed consent from the practice for the project to be performed, informed owner consent if they or their pets are to be involved in the

Figure 1. The research process is a cycle consisting of a number of stages. Adapted from Newell and Burnard (2006).
project, numerous ethics issues, and the prospective researcher’s experience. Ethical approval is usually sought from either the either the Government’s Home Office, or initially seeking advice from The National Research Ethics Service who will advise about the official procedures to follow according to your project, and/or the institution where the VN is studying, depending on the context of the research. Ethics is an immensely important topic to consider at all stages of a research study, and when one is designing and planning a project it is a key area for considerable research and extra reading, a comprehensive discussion about which is outside the remit of this article.

Having focused down from the broad area of interest, the VN can then begin to think about the methodology of their research project. There is a lot of technical terminology associated with research that can become a little overwhelming at times, which is why the VN should have a good working knowledge of these terms and understand their associated concepts. Figure 2 outlines some of these terms, which will be explored in a little more detail.

**Quantitative vs qualitative**

It is generally accepted that there are two main research paradigms or theoretical frameworks; quantitative (deductive reasoning) and qualitative (inductive reasoning) (Gilbert, 2008). Feldman (1998) states that qualitative or inductive research involves observations of a particular phenomenon in order to develop conclusions or theories about it. For example, observing the daily life of an owner caring for a pet with diabetes mellitus to explore or try and understand, draw conclusion about or generate theories regarding the challenges they face and/or their experience of the situation. The researcher will take into account all aspects of their daily life, routine and behaviours with the aim of analyzing the data collected in a manner that will facilitate a deeper and more meaningful understanding of such an experience.

Quantitative or deductive research involves beginning with a hypothesis drawn from existing theory, and then follows with the investigation of two or more variables experimentally to establish relationships between the variables, (Feldman, 1998). For example, if a drug manufacturer wants to prove which of two medications is most effective at reducing blood pressure they will have to control or standardize as many variables as possible, such as the patients’ age, weight, gender, previous medical history, current medication and so on. They do this so they know that the blood pressure measurements they take in the data collection process are a direct result or reflection of the effects of the medications.

Many researchers believe that when planning a research study the researcher should be designing either an inductive study or a deductive study, however, there is definitely a place for using a combination of elements from both, as discussed by Gilbert (2008). For example, a VN may decide to investigate the clients’ thoughts about the products in the waiting room in order to link this to profits made in this area. Thus, the VN could initially gather numerical data from the clients regarding the number of products bought, how much money was typically spent, how many items were bought at once and how frequently visits were made to the practice. From there the VN could go on to explore the reasons why products were bought from the practice, the clients’ expectations of the practice and its supply of products, their motivations for coming to the practice and not a pet shop, and what dictates their choice of purchases.

Having gathered these data one would calculate some basic (quantitative) statistics from the numerical data, and have some more in-depth data about the qualitative aspects of the scenario to analyze. Following analysis, some recurring themes may be identified about what makes the clients purchase products from the practice, which can then be used to implement changes to product marketing, layout and advice for example to increase the practice profits relating to waiting room sales. This is a very simplistic example to use, but it illustrates that as a researcher it is acceptable to use a mixture of quantitative and qualitative research elements to achieve the aims of a study.

**Methodology**

Research methodology is the overall approach to a research project; the way one designs it. Punch (2009) discusses that there should be as close a fit as possible between the research questions (devised from and relating to the aims of the study) and the chosen research methodology, and to achieve this one must make methodological decisions having first pondered the research questions. Punch (2009) goes on to emphasize that the achievement of a good ques-
tion–methodology match is pivotal to the success and ultimately the validity of a research study.

Examples of methodological approaches to research, as discussed by Cohen et al (2007), include experimental, survey, case study, action research, grounded theory, phenomenology etc. If a VN is planning some empirical research they must decide which methodological approach is most suitable with regards to collecting the type and quantity of data needed to achieve an outcome from the study. This in itself takes a lot of time and research to ensure the most appropriate approach is selected, and also to justify why other methodologies have been rejected or deemed unsuitable for the purpose of the study.

**Methods**

Methods are different to methodology, and Silverman (2006) makes this distinction by outlining that methodology defines how ones approaches the study of a phenomenon, while the methods are specific research techniques employed to gather data; the instruments of data gathering in order to answer the research aims. As with the research question–methodology match, there needs to be congruence between the overall methodological approach to the research and the methods used to collect the required data (Silverman, 2006). There is no point, for example, trying to gather in-depth information regarding the thoughts and feelings a person has about a particular topic by giving them a questionnaire constructed of closed questions, where all they have to do is answer either yes or no.

In a quantitative study one method could be the use of a questionnaire that will provide a lot of numerical information to analyze, to identify trends for example. Most people from time to time receive questionnaires through the post where they have to tick boxes in answer to questions; this is a method of data collection used by companies to gather large amounts of data from a wide population or sample size in a relatively efficient and cost-effective way. In an experimental study the data collection instrument could be something more specific, such as a blood pressure monitor or a person with a stethoscope counting and recording heart rates; this will also provide numerical data for analysis, which is less subjective than the use of a questionnaire to collect such data.

In a qualitative study however, the aforementioned methods would not be appropriate to gather rich, in-depth and revealing data. Questionnaires, to a degree, can gather data of a qualitative nature if the respondents are given room to provide written answers, however this is not adequate solely in a qualitative study (Gilbert, 2008). Thus, methods more appropriate to qualitative inquiry, in conjunction with certain types of questionnaires for triangulation purposes, would include interviews, focus groups and observation, where lots of data can be gathered from the subjects relating to the phenomenon being researched. These methods of data collection are not so restrictive and allow the people being researched to open up and elaborate as much or as little as they want to about the topics being discussed, which ultimately provides the researcher with a considerable volume of deep, rich and textual data to analyze and begin to draw key themes from (Silverman, 2006).

Researchers must be able to justify their choices for methodology and methods, argue why their chosen approaches are most suitable to answer their hypothesis or research aims, and be able to articulate why other methodologies and methods were deemed unsuitable. This does take a considerable amount of time and research but must be done because it influences the reliability and validity of the research, and affects how the findings can be generalized to the wider population. Consumers or readers of the published research will be asking these questions as they critique the study and the claims that have derived from it.

**Sampling**

Another key consideration when undertaking a research study is that of sampling; who is being researched, and how the researcher chooses an appropriate sample of this population. Marshall (1996) highlights that choosing an appropriate sample size for a research project is an important step as it is hardly ever going to be feasible or ethical to study an entire population; the aim should always be to draw a representative sample from the population so the results of the research can be generalized back to, and used by, that population to inform their practice. Quantitative studies tend to recruit the largest number of participants possible to reduce the chances of bias being introduced, and to ensure the results obtained are not because of the play of chance. In some qualitative studies, for example case studies, depending on the context of the research it is entirely feasible for a whole research project to be based on one subject, (Cohen et al, 2007). When a VN decides to design a research project they must do a lot of further research and reading around this topic, as there is a plethora of sampling types and methods available for use, and again this choice should be made considering the overall methodological approach and research aims.

**Analyzing your data**

The final part of research methodology as a whole entity is analysis of the data collected. This in itself is a
massive topic area but forms a major part of research planning as the analysis technique must be appropriate to the type of data that have been gathered; it is not possible, for example, to statistically analyze textual data from an in-depth interview.

Conclusion
This paper has briefly explored what research and nursing research is, potentially why more VNs are becoming involved in research and why VNs should be involved in research. Having examined the research process and research methodologies it is evident that research is quite complex and can be difficult to understand, which may be a barrier to VNs becoming more actively involved. However, this paper has attempted to clarify the key terminology relating to research, and given a general overview of the process from start to finish, which will hopefully inspire VNs in practice to start thinking a little more about research and what an evidence-based approach to practice life and patient care could do for them.

Key Points
- Evidence-based veterinary nursing practice should be the aspiration of all VNs in order to provide the best possible care and service for their patients and clients based on research findings.
- The research process is an essential part of planning a research study, and one which potential researchers must devote a lot of time to in the initial stages and utilize throughout the entirety of the project.
- Potential or novice researchers must spend time prior to conducting a research study doing considerable amounts of research into the key concepts discussed in this article, including paradigms, methodologies, methods, analysis strategies, ethics, sampling etc. if they want to produce credible, reliable and valid results.

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