RAK Medical and Health Sciences University

Ras Al Khaimah, UAE

RAK COLLEGE OF NURSING
(AY 2019-2020)

NHB 203 HUMAN BIOCHEMISTRY ASSIGNMENT

A. Description. One of the requirements of this course is to complete **two (2)** assignments and this assignment is the second. Please keep the following expectations in mind:

1. Each assignment is worth 100 points.
2. Read instructions carefully and be sure to complete all aspects of the assignments.
3. Be thorough and complete in your work.
4. The assignment was developed to correspond to chapters/topics that we will be studying throughout the term. You will need to turn in your work by the deadlines designated in your syllabus and on the assignment sheet. No late assignments will be accepted.
5. All written assignments must be typed and double-spaced.
6. Please use APA rules of citation.
7. The deadline of submission is on April 2, 2020.
8. All students must submit a soft copy either in word or pdf format. Please use your ID numbers as the file name of your assignment submission.
9. You must submit your assignment using the following heading: Assignment 2 – *xxxxxx (your ID number)*
10. All assignments must be submit to arnel@rakmhsu.ac.ae

B. Purpose*:* This assignment is related to your class in Biochemistry

C. Type/Length of activity: Academic Article Reading and Review

D. Instruction. Read the article entitled**, *"Getting it right: An exploration of issues relating to the biological sciences in nurse education and nursing practice"*** Then prepare a 1500 – 3000 words essay/critique about the mentioned article. The assignment must contain the four components identified the assignment format.

E. ASSIGNMENT FORMAT: ***(Please see the attachment)***

F. HOW WILL YOUR ASSIGNMENTS BE GRADED? ***(Please see the attachment)***

Article Review Guidelines

Dr. Arnel Bañaga Salgado

General Instructions:

1. The article review must be submitted in the format given below. The report not in the prescribed format will not be accepted.
2. The article must be reviewed by self. There should not be plagiarism.
3. Number of words for each section in clearly mentioned in the format. Submit the report accordingly. Report not in the prescribed format will not be accepted.
4. If any section is not applicable, kindly mention it below the particular section.
5. It is mandatory to submit the original article along the article review.
6. Marks split up for each section of the article review is clearly given below for your reference.

Article Review Evaluation Criteria - 2019 – 2020

Criteria	Marks Split up	Overall Marks
Format		
Introduction	5	**35**
Article Summary	5	
Review of Literature	5	
Article Structure	10	
Conclusion	10	
Article Critique		
Authority	5	**35**
Accuracy	5	
Currency	5	
Relevance	5	
Objectivity	5	
Stability	5	
Analysis of Graph/Image/Table	5	
Updating With Recent Research	15	**15**
References		
Relevance	5	**15**
Format	5	
Authority	5	
Total Score	**100**	**100**

ARTICLE REVIEW FORMAT

Source

The source from where the journal article has been taken has to be mentioned clearly.

Introduction

In 200 to 250 words give a brief introduction about the areas on which you are going to review the article.

Review of Literature 300 to 350 words

Article Summary

Give the summary of the article in 200 to 250 words.

Article Structure

Review on the presentation of the content and the alignment and the format of the article in about 250 to 300 words

Article critique

Authority:

Review on the author - 100 to 150 words

Accuracy:

Accuracy of the article – 100 to 150 words

Currency:

Whether the article is old or the current – 100 to 150 words

Relevance:

Review on the relevance of the content of the article to its title – 100 to 150 words

Objectivity:

Whether the information in the article is developed objectively or not – 100 to 150 words

Stability:

About the stability of the article based on its publication – 50 words

Analysis of graph/Image/Table

Brief analysis of the graph/image/table – 100 to 150 words

Recent Advances Related to the Topic

Briefly explain about the recent advances related to the particular topic – 300 to 350 words

Conclusion

Give your conclusion about the article and suggestions if any - 200 to 250 words.

Reference

The references must be quoted in the APA format (Sample given below) – Minimum 15 references related to the topic.

(Name of the Author, Initial., (Year), Name of the Article: Volume/Source, Page Number. URL of the Journal Home Page)

Sample of an article:

Sillick T.J., & Schutte, N.S. (2006). Emotional intelligence and self-esteem mediate between perceived early parental love and adult happiness. *E-Journal of Applied Psychology, 2*(2), 38-48. Retrieved from http://ojs.lib.swin.edu.au/index.php/ejap

Sample of other References:

For book, monolog, internet and other reference format please check the link - http://courses.semo.edu/library/infolit/apastyle_articles.htm

SAMPLE ARTICLE REVIEW

(For Reference Only)

Source

Jackson, FM 2002, 'Considerations for community-based research with African American women', American Journal of Public Health, April, vol. 92, no. 4, pp.561-5, viewed 12 February 2007,http://www.ajph.org/cgi/content/abstract/92/4/561

Introduction

This review critically reviews the article 'Considerations for community-based research with African American women'in the journal American Journal of Public Health. The review will first summarise the article. Secondly, it will briefly analyse the effectiveness of the article's structure, investigating how the information is set out and whether the reader can access it efficiently. Thirdly, the review will critique the article, evaluating its authority, currency, accuracy, objectivity and coverage. The review will also analyse the graph before finally judging the article's accessibility and credibility. Overall the article was well written, clear and relevant.

Article summary

The purpose of the article is to explore the need and advantages of conducting community based research with women of color in the United States. The authoritative knowledge that these women can provide about their lives and their health could form the basis of collaboration between researchers and participants and lead to successful strategies to improve the health of African American women. The article provides the goals for improving African American women's health before investigating the issues related to cultural sensitivity, reciprocity, accountability and authoritative voices in order to argue that the research on these women and their health must be attuned to the multiple identities the women possess that are associated with race, gender and class.

Article structure

The article was introduced with an abstract, which provided the stance or thesis developed by the article as well as a brief overview of main points. The rationales for the article and for the research it describes were also included. The paragraphs in the body were short and therefore the information in each paragraph was easy to access, however there were only 3 body headings, which meant that there was a lot of quite detailed information contained under each heading. As the article described a research study that was conducted by the author, the article contained the conventional information normally provided in such a study. For example there are sections related to the background and significance of the research, a review of the literature and the methodology as well as the data collection and analysis techniques used. The findings and conclusions were developed towards the end of the article however the conclusion was

very short, lacking a comprehensive summary of the main points covered by the article. However the short conclusion did develop future policy and research directions. References were cited in-text and set out clearly in the literature cited section. The article's structure was logically developed overall, with the use of short paragraphs helping the reader access the main points more easily. The article was HMLT rather than a scanned PDF document and included many links, which helped to make the information accessible. There were links to author, journal, subjects, citations and references which allow the reader to evaluate the articles worth more effectively; however linked headings and subheadings may have allowed the reader to move through the paper more quickly.

Article critique

Authority:

The journal, the American Journal of Public Health, is a publication of the American Public Health Association, which is an objective unbiased public organization. It was found on the scholarly Academic Search Premier through EBSCOhost, which is a highly credible research database.

The author's credibility was established in a number of ways. These included her PhD; the fact that the article was a peer reviewed article; the fact that the author is an academic working at the School of Public Health, Emory University in Atlanta; the fact that the research described in the article was supported by an ASPH/CDC/ATSDR Cooperative agreement and a grant from the Ford Foundation; and the links to the author's other articles in the Reference section.

Accuracy:

The source of the information in the article was a current research project. It was also backed up and supported by a comprehensive, recent reference list with these sources cited in-text to support both the literature review and the research itself. The strict editorial and refereeing processes also contributed to the article's accuracy as did the links to other expert sources (the journal for example).

Currency:

The journal was published in April 2002, while the article was accepted for publication in December 2001. The research it describes was current and the article cites up-to-date references in the body of the text (ranging from 1990-2001). Therefore the article is current.

Relevance:

This was an academic journal on an academic database, which has high credibility in an academic context. It was written to inform researchers and students rather than to entertain or advertise. It would be relevant to both these groups but particularly any academic interested in nursing innovations and in health generally. It could be a difficult article to read and understand and therefore would be less relevant to first year nursing students.

Objectivity:

The information was objectively developed, well supported with a current research base and with all evidence acknowledged and referenced. There was no evidence of bias, a fact that was reinforced by the recognition that the article documents research, which followed the rigorous research processes, and the necessary ethical considerations demanded of such community-funded research. The article acknowledged the complexity of the issues discussed in a number of ways. For example, the literature review provided explanations of the key terms discussed (for example'gender' and 'identity') and supported their research decisions with references to the appropriate and relevant literature. The participants were clearly defined – a sample of 545 African American women living in Atlanta - with the findings relevant to other African American women and would also be able to inform research conducted in other countries, for example indigenous women in Australia.

Stability:

The article, with its source an academic journal on an academic data base is stable as a resource.

Analysis of graph

(Not Applicable)

Conclusion

This review has both summarized and critically reviewed Jackson's article 'Considerations for community-based research with African American women'. The content, structure, strengths and limitations of the article were analyzed and critiqued. The article has contributed to the literature in terms of its valuable critique of current research study on African American women and their health issues and the implications provided for both health interventions and future research collaborative possibilities.

Getting it right? An exploration of issues relating to the biological sciences in nurse education and nursing practice

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Getting it right? An exploration of issues relating to the biological sciences in nurse education and nursing practice

Concerns have been expressed that bioscience education is not meeting the needs of nursing students in the UK. This paper explores the situation further by comparing student perceptions with those of experienced practitioners (Part One of the study) and also evaluates the confidence of staff nurses in explaining the rationale for care applied to a common but specific disorder (influenza; Part Two). Questionnaires were used. Responses were elicited from DipHE Nursing (Project 2000) adult/child branch students ($n = 153$) from two universities and from adult/child care staff from their local clinical placements ($n = 171$ in Part One of study; $n = 266$ in Part Two). The questions asked followed two themes: (1) confidence in understanding biological science and (2) issues of teaching and learning. Most questions utilized a rating scale from 1 to 10; this scale provides no central value and a vertical line was drawn to encourage respondents to identify which half of the scale their responses came under (basically, a negative or positive viewpoint). The significance of the data distribution either side of the midline was analysed statistically (simple sign test), as were any differences in distribution between the groups (chi-square test). Median values were also determined. The data do not provide support for views that the biosciences are being significantly diminished by modern curricula, but also show no evidence for a great improvement in the bioscience knowledge base in recent years. What was surprising was the lack of confidence expressed by staff nurses: one illuminating finding was the lack of confidence in articulating their knowledge to patients and, even less so, to other health

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professionals. The paper reiterates a need for a national teaching and learning strategy for pre- and postregistration education in the biosciences. In particular, a means to raise the level of understanding of staff nurses must be identified urgently so that the mentoring of students in these subjects is improved.

Keywords: bioscience, education, nursing perceptions, student nurses, staff nurses, preregistration, postregistration

INTRODUCTION

A knowledge of biological sciences is essential for nursing competence (Clarke 1995, Torrance & Jordan 1995) and an understanding of them should form a substantial part of the knowledge base of nurses (United Kingdom Central Council for Nursing Midwifery and Health Visiting 1988). The emphasis for education is on providing the conceptual links between the biological sciences and nursing practice: the positive impact that applied physiology can have on practice is evident (Jordan & Reid 1997). Student nurses appreciate the importance of human biological sciences (Courtenay 1991, Sutcliffe 1992), but have major difficulties in learning the topics (Race & Holloway 1992, Sutcliffe 1992, Chapple *et al.* 1993, Nicoll & Butler 1996). The problem is not new; in particular work by Akinsanya (1985, 1987) during the 1980s highlighted the need for a more structured 'bionursing' approach to education in the biosciences. The situation has been further complicated by a shortfall in lecturers on nursing programmes who have the necessary background to apply the material (Courtenay 1991, Nicoll & Butler 1996).

One current area of concern is that the position of the biological sciences within educational curricula does not seem to reflect the importance attached to them (Brand *et al.* 1998). Recent years have seen the advent of new philosophies of nursing with a shift towards a holistic approach to care that incorporates biological, psychological, sociological and spiritual aspects in depth. There is a view, however, that the biosciences are taught in addition to, rather than as a part, a holistic approach to care (Wynne *et al.* 1997, Clancy & McVicar 1998). Whilst the biological sciences can be incorporated into interactional models of health care (Brown & Seddon 1996, Clancy & McVicar 1998, McVicar & Clancy 1998), there is a suggestion that they are regarded as being reductionist and are equated with biomedical models more applicable to medicine than nursing (Jordan 1994). A number of writers have expressed concern that the biological sciences have been devalued in the shift towards the behavioural sciences (Gould 1990, Downs 1993, Trnobranski 1993, Clarke 1995, Torrance & Jordan 1995).

Most studies have considered the biosciences generically, but Wharrad *et al.* (1994) studied the teaching of individual bioscience subjects (anatomy, physiology, immunology, biochemistry, etc.) within 15 universities and highlighted the inconsistencies in time allocation and approach taken. Their study perhaps most clearly identifies the need for national debate to 'get it right' by identifying the most appropriate means of structuring the biosciences within the curriculum and the teaching and learning strategies required.

The problems associated with the teaching and learning of the biological sciences is worrying. Various authors have lamented the lack of guidelines regarding the teaching of biological sciences (Gould 1990, Courtenay 1991, Wharrad *et al.* 1994) and new ways of meeting the needs of students within existing curricula must be identified. In doing so it is important to evaluate not only the outcomes of preregistration education, but also to relate these to the views of practitioners who provide role models. Experienced practitioners might be expected to recognize more clearly how the biological sciences relate to their practice, yet the positive impact that programmes of continuing education which contain biological science components can have on practice (Jordan & Reid 1997) implies deficits of understanding in practising staff and supports much earlier findings that practitioners are frequently unable to relate biological science to their work (Wilson 1975, Powell 1989).

Accordingly, the study reported in this paper has surveyed the perceptions of preregistration students and of staff nurses who work in similar clinical specialities and within the same Trusts, with the objective of obtaining a broader picture of the situation. The study had two aims:

- To compare the perceptions of preregistration students and staff nurses regarding the biological sciences.
- To extend the exploration into the perceptions of staff nurses of the biological science underpinning care of patients with a specific disorder.

THE STUDY

Methods

The study was carried out within three centres of nurse education, from two universities. Within these centres, the biological sciences are taught by staff members of the

respective health schools; the authors are members of the teaching teams.

Overview

There were two parts to the study.

1 Part One sought the perceptions of preregistration students and of staff nurses from clinical directorates in which students were placed for practice, on generic issues relating to the biosciences in education and practice. The participants were drawn only from those working within adult and child care (students from adult and child branches) as the emphasis placed on the biological sciences is likely to be strong in these areas.
2 Part Two sought to explore further the issues raised in Part One by identifying the viewpoints of staff nurses regarding the biological sciences in relation to a specific clinical problem. The influenza crisis in late 1998/early 1999 provided an excellent opportunity to explore confidence in knowledge of the rationale underpinning care for a disorder which, though nominally medical, is common, widespread and well documented in the media (which at the time provided an extensive coverage).

The study was evaluative and utilized two questionnaires developed by the researchers and piloted to identify any ambiguities. A quantitative approach was used as the study intended to elicit group data from staff and students which could either be compared to identify differences or could be analysed to provide a measure of strength of response to the questions and statistical analysis helps to increase the confidence of data interpretation in this type of study.

The questionnaires were distributed personally by the authors to the participants whilst they were attending the educational centres. Ethical issues centred on confidentiality and a possible lack of privacy in completing the questionnaires and so participants were encouraged to complete them some time during their classes, thus allowing completion to take place during a break time when privacy could be obtained if desired. Anonymity was ensured by asking the participants to fold their completed questionnaires and to place them into a large envelope provided by the door to the classroom as they left. Only then did the researchers have access to them.

Each questionnaire included an Introduction which explained why the study was being performed, who the researchers were, the voluntary nature of participating and the anonymity of responses. Both students and staff nurses were keen to take part and this was reflected in the near complete return (overall 96%) of the questionnaire.

STUDY DESIGN

Part One: generic questions

The samples

Preregistration students. One factor in determining the views of preregistration students will be the education received. Although the sample was drawn from two universities, the curriculum content for the common foundation programme (in which most of the biological science was taught) and for specialist nursing branch was broadly similar in the respective schools. The schools also operated a similar admissions policy and had a similar student profile.

The target population of students was those who were in the second or third year of their adult or child branch studies for the Diploma in Higher Education (Nursing). Targetting the students at these stages of their education ensured that all had clinical experience; this was important if their perceptions were to be compared with those of staff nurses. Pooling the two branches meant that there were 160 preregistration students within the centres who could be accessed at the time of the study. All were presented with the questionnaire (see below) and 153 complete replies were obtained, giving a response rate of 96%.

Staff nurses. The target population for staff nurses was those who worked in clinical areas related to adult and child care (i.e. clinical placements for students). Staff nurses were approached whilst on continuing education programmes within the universities; such convenience sampling has the disadvantage that the respondents represented only a small proportion of the number of staff working in those clinical areas and the sample was not necessarily a cross-section. However it was considered that accessing staff nurses involved in postregistration education programmes provided a better assurance that they would be highly reflective regarding practice issues and therefore could be relied upon to provide an objective viewpoint. The nurses who participated worked within various specialities within adult and child care.

One concern was that perceptions of staff nurses might be influenced by the length of time since qualifying. To obtain a sample size that was comparable with that of the preregistration students it was necessary to access as many staff attending the centres as possible and this made restricting sample selection difficult. To evaluate the variation the staff nurses were asked on the questionnaire to indicate the period since qualification. This showed that the staff nurses had been qualified for at least 5 years (mostly 5–10 years). Accordingly it was considered that the group was on the whole experienced practitioners and so the group data would be a reasonable representation of

the views of staff nurses. A total of 174 nurses took part and this represented 97% of those who received the questionnaire.

The questionnaire (= Questionnaire 1)

The questionnaire was comprised of structured and semi-structured questions and was designed to be completed within a few minutes. The construction utilized appropriate guidelines (Frankfort-Nachmias & Nachmias 1996) and was piloted to ensure clarity and lack of ambiguity. Initial questions asked students to identify the branch that they were in and asked staff to identify broadly within which clinical area they worked and the length of time since their qualification: 0–5, 6–10, 11–15 and >15 years. There were nine further questions, identified in Table 1: questions 1–4 related to the theme of biological sciences in practice, whilst questions 5–9 explored teaching and learning issues.

Questions 1–7 utilized a rating scale from 1 to 10 to explore the strength of view held, with a positive viewpoint being indicated by a high score, a negative one by a low score. A scale from 1 to 10 has no middle numeric value and so respondents had to consider within which half of the scale their response should lie, i.e. 5–1 would be associated with increasingly negative views and 6–10 with increasingly positive ones. This was further facilitated by clearly marking with a line the separation of the two halves of the scale, giving a 'virtual midpoint' at '5·5'. Statistical comparison between responses and this reference point was then used to provide an indication of the strength of views expressed by each group. The final two questions on the questionnaire (Q8,9) were closed questions and offered respondents tick boxes to indicate their views.

Part Two: influenza-specific questions

This part of the study was carried out several months after Part One. As outlined earlier, it arose from findings relating to the responses provided by staff nurses in Part One and sought to explore staff nurse viewpoints on the biological basis of a specific example of care; in this instance the survey was carried out at the height of the influenza outbreak of winter 1998–spring 1999. This part of the study was performed along similar lines to Part One.

The sample

As in Part One, the views of staff nurses were canvassed whilst they were on continuing education programmes within the institutions. The staff nurses worked within adult and child care in a number of National Health Service (NHS) Trusts which supported preregistration students of the universities. A total of 271 staff nurses took part in the study.

The questionnaire (= Questionnaire 2)

The questionnaire was distributed during a 2-week period at the height of the influenza crisis whilst the participants were attending the educational centres. The procedure was as in Part One and addressed ethical issues in the same way (formal ethical approval was obtained for this part of the study as it was more directly related to practice activities). Once again staff were keen to take part. However, five questionnaires were spoilt leaving a return of 98% ($n = 266$).

The questionnaire was comprised mainly of structured and semistructured questions and utilized guidelines for construction (Frankfort-Nachmias & Nachmias 1996). Initial questions requested demographic information; the remaining questions were largely related to those in Questionnaire 1, but were on the whole more specific because they centred on a particular clinical condition. This also enabled the study to include some questions related to the rationale for clinical interventions and so Questionnaire 2 consisted of 14 questions (compared with 9 in Questionnaire 1). The questions are shown in Table 2.

Questions 1–2 and 4–9 utilized a rating scale from 1 to 10 to explore the strength of view held. A positive viewpoint was indicated by a high score, a negative one

Table 1 Extract from Questionnaire 1 used in Part One of the study. Presented to preregistration students ($n = 153$) and staff nurses ($n = 174$)

Questionnaire 1	
Q1	In your view, how important is a knowledge of human biology (i.e. physiology, anatomy, etc) to your practice?
Q2	How confident are you that you can explain the biological basis of your practice?
Q3	In relation to any drugs administered, do you feel that you have a good understanding of the biological basis of their actions?
Q4	How often do you wish that you understood more about the clinical condition of a client/patient?
Q5	To what extent was the importance of a sound knowledge of biological science emphasized during your training?
Q6	What was the level of input of the biological sciences during your training in comparison with that of the behavioural or social sciences (i.e. psychology and sociology)?
Q7	How aware are you generally of the risk factors which might have precipitated the clients' conditions?
Q8	How often do you consult published literature regarding the basis of a client's condition and/or treatment?
Q9	Do you feel that more educational support regarding the biological sciences would be of benefit to you?

Table 2 Extract from Questionnaire 2 used in Part Two of the study. Presented to staff nurses ($n = 266$)

Questionnaire 2	
Q1	In your view, how important is knowledge of immunology (and pharmacology) to your care of a person with influenza?
Q2	How aware are you of the routes of transmission of the influenza virus?
Q3	Do you wish that you understood more about the life cycle of the influenza virus?
Q4	How confident are you that you can explain the biological basis of the signs and symptoms associated with the influenza virus to (a) a patient (b) a physiology lecturer and (c) a doctor?
Q5	How aware are you of the thermoregulatory role of the hypothalamus, which explains why a patient feels shivery and then hot and sweaty when experiencing pyrexia associated with influenza?
Q6	How confident are you that you can explain the biological basis of the following care provision to a patient with influenza: (a) the biological importance of bed rest, (b) the biological importance of maintaining the ideal tonicity of body fluids? (c) the biological importance of eating light meal?
Q7	In relation to paracetamol and antibiotic administration to a patient with influenza do you feel that you have a good understanding of their pharmacological actions?
Q8	How confident are you that you could explain to a physiology lecturer why a cure for influenza has not yet been discovered?
Q9	How confident are you that you can explain the immunological reasoning of the 'flu jab'?
Q10	How often during the influenza 'crisis' did you consult the published literature regarding the basis of a client's: (a) signs and symptoms of influenza? (b) treatment rationale? Please identify either: No consultations, Daily or During the last fortnight.
Q11	Have you received any educational support during the recent influenza crisis? If so from whom?: (a) link teacher (b) teacher-practitioner (c) doctor (e) ward sister (d) colleague or (e) other health service personnel.
Q12	Has the current media (television, radio and newspaper) coverage enhanced your knowledge of the rationale of care for a patient with influenza?
Q13	Did your nurse training provide adequate theory provision on: (a) the life cycle of the influenza virus? (b) the signs and symptoms of influenza? (c) the rationale of care for a patient with influenza?
Q14	Do you think it is necessary for further educational support in the biological sciences associated with common disorders?

by a low score. As in Questionnaire 1, the 'midpoint' of '5·5' was clearly indicated to encourage participants to consider which half of the scale that their answers would fall within. Questions 3 and 10–14 were closed questions and offered respondents tick boxes to indicate their views.

Statistical analysis

Data were initially analysed using the software package SPSS Version 6·1·3 for Windows; (SPSS Inc., Chicago, USA). In Part One of the study, the responses of the groups of students and staff were compared by nonparametric means using a chi-square test (Siegel 1956). In both Part One and Two of the study it was also important to investigate the strength of view expressed by each individual group. This was ascertained by:

1 Identifying median values, which provide a more meaningful measure of central tendency than do mean values when data are not normally distributed.
2 Analysing the deviation of group responses from the 'midpoint' of 5·5 using a simple sign test (Siegel 1956). Although this test does not give a measure of how far values deviated from the reference point, it does give an indication as to the probability of group data demonstrating significant responses within the positive or negative half of the scale. Thus, values significantly greater than 5·5 indicated a positive or affirmative response, whereas values significantly lower than 5·5 reflected a negative response.

Statistical significance for all analyses was identified at the $P < 0{\cdot}05$ level.

RESULTS

Part One: generic questionnaire

Theme: biological sciences in relation to practice

Both students and staff nurses felt very strongly that the biological sciences are important to their practice: 92·1% of students and 92·5% of staff indicated a score of 8 or over in answer to Q1. Frequency distributions of the responses were similar for the two groups (chi-square not significant). In contrast, responses to Question 2 were significantly different between the groups (Figure 1; χ^2 $P < 0{\cdot}001$) and indicated that staff felt more confident than the students that they could explain the biological basis of their practice. However, the median value of 6 indicates that the staff were not strongly confident of their knowledge base.

Similarly, the students were not particularly confident of their knowledge in relation to the basis of drug actions (Q3): the median value was 5 and was significantly ($P < 0{\cdot}001$) lower than the '5·5' reference point. The

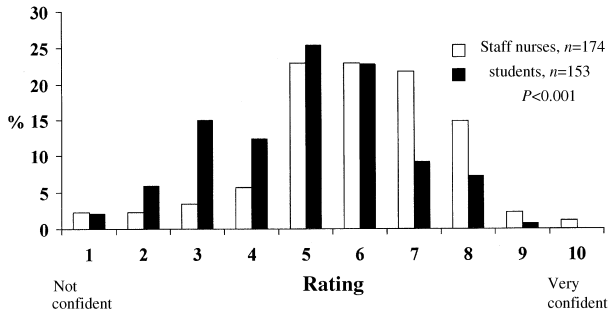

Figure 1 Responses of student nurses and staff nurses to the question 'How confident are you that you can explain the biological basis of your practice?'.

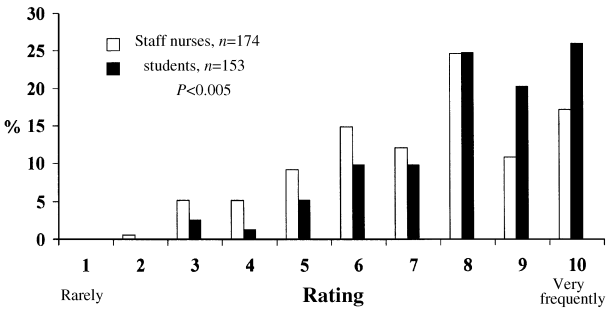

Figure 3 Responses of student nurses and staff nurses to the question 'How often do you wish that you understood more about the clinical condition of a client/patient?'.

median response for staff was 6 (not significantly different from the reference point) and this suggests that they too were unsure of their knowledge of drug actions. However, frequency distributions of responses to this question were significantly different between the two groups (Figure 2; χ^2, $P < 0{\cdot}001$) and this suggests that, whilst they were not on the whole very confident of their understanding, the staff were slightly more confident of their knowledge than the students were.

Both groups responded very positively to Question 4 suggesting that many of the participants frequently felt a need to understand more about the clinical condition of a patient: the median values were 8 for both students and staff and 90·8% of students and 82·8% of staff scored higher than 6. However, although the median values were the same for the two groups the frequency distribution of responses was slightly but significantly different between the two groups (Figure 3; χ^2, $P < 0{\cdot}05$) and the indication was that students collectively expressed a slightly greater wish to understand clinical conditions better.

Theme: teaching and learning

Students felt that a reasonable, although not strong, emphasis had been placed on the importance of biological sciences during their educational programmes (Q5). The median value for the group was 6 and the data were significantly ($P < 0{\cdot}001$) within the 'positive' half of the scale. The median value from staff was also 6 for this question, but an analysis of the frequency distribution for the two groups suggests that the staff recollection of the emphasis placed on biological sciences during their training was that it was less than that perceived by the current students (χ^2, $P < 0{\cdot}01$).

Median response to Question 6 was 5 for both groups suggesting that the time spent on biological science was generally considered to be similar to that of psychology and sociology. However, the frequency distributions were significantly different between the groups (χ^2, $P < 0{\cdot}01$) and indicated that, collectively, the students perceived that the level of input was less than that recalled by staff when they trained.

Question 7 related to health education. Staff nurses felt very aware of risk factors in disorders: the median response was 8. The students also felt quite aware as the median value was 6 and significantly ($P < 0{\cdot}001$) greater than the reference point of 5·5. However, the chi-square analysis of frequency distribution (difference $P < 0{\cdot}01$) suggested that the students were slightly less aware than the staff (Figure 4).

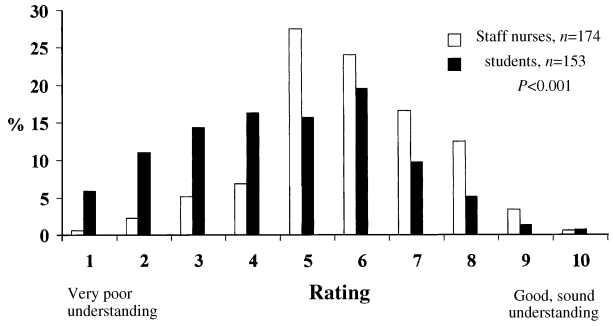

Figure 2 Responses of student nurses and staff nurses to the question 'In relation to any drugs administered, do you feel that you have a good understanding of the biological basis of their actions?'.

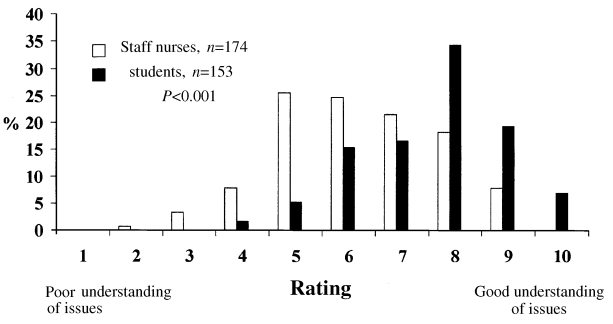

Figure 4 Responses of student nurses and staff nurses to the question 'How aware are you generally of the risk factors which might have precipitated the clients' conditions?'.

Table 3 Consultations of literature by participants in Part One of the study

	Daily (%)	2–3 times per week (%)	Once per week (%)	Once per fortnight (%)	Once per month (%)	Less than once per month (%)	On placements (%)	As required (%)
Staff	2	12·4	31·1	19·8	19·8	13·6	–	1
Students	5·3	18·8	32·2	13·9	11·5	11·1	7·2	0

Table 4 Preferences expressed by participants in Part One of the study as to the means of providing additional educational support in the biological sciences

	Study days (%)	Day time seminars (%)	Evening time seminars (%)	Short 'off the cuff' tutorials on the ward (%)	More coverage by nursing journals (%)
Staff	66·7	53·4	47·1	42·5	39·7
Students	37·9	39·2	17·0	34·0	2·6

Respondents could indicate more than one preference: row totals therefore exceed 100%.

Regarding self study, the consultation of literature (Q8) varied widely in its frequency (Table 3). Approximately half of the respondents in each group referred to literature at least once per week. Almost all respondents felt that more educational support in the biological sciences would benefit them: 97·6% of students and 98·3% of staff answered 'yes' to Question 9. When asked how this might best be achieved, with selection from a list of possible methods, the most popular option for staff was through study days but all options attracted a reasonable number of responses (Table 4). For students, study days, daytime seminars and short ward-based 'off the cuff' tutorials were preferred, but not evening time seminars. A striking difference between student and staff responses was the lack of enthusiasm from the students for more coverage by nursing journals.

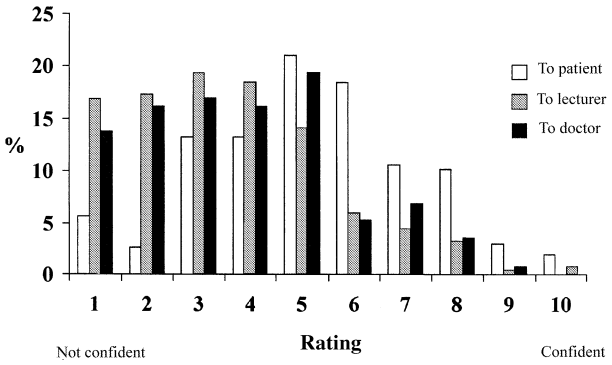

Figure 5 Responses of staff nurses to the question 'How confident are you that you can explain the biological basis of the signs and symptoms associated with the influenza virus to (a) a patient (b) a physiology lecturer and (c) a doctor?' (staff nurses; $n = 266$).

Part Two: influenza questionnaire

Theme: biological sciences in relation to practice

The prevailing view was that a knowledge of applied biological science was important to the care of someone with influenza (Q1). Thus, 91·7% of the staff nurses indicated a score of 6 or over (difference from 5·5; $P < 0·001$), whilst 61% scored 8 or above. The majority also felt reasonably confident in their knowledge of the routes of transmission of the influenza virus (Q2) as 72·9% of the sample expressed a score of 6 and over. A closer look at the data from this question, however, reveals that the median value was 6 and so the level of confidence was not especially high. Indeed, the majority (86·7%) of respondents said that they would welcome more information regarding the life cycle of the virus (Q3).

This lack of confidence in the nurses' knowledge was reflected in the following findings:

1 The responses to the three parts to Question 4 exhibited the frequency distributions illustrated in Figure 5. The median values to the three parts of this question were 5, 3 and 4, respectively and only 44, 14 and 17·4% of the sample, respectively, expressed a degree of confidence in explaining the symptoms of influenza to a patient, doctor and lecturer (i.e. scored 6 or more). The group response to the first part of the question (re: patient) was significantly lower (χ^2, $P < 0·001$ in each case) than the responses to the other parts (re: doctor and lecturer), indicating an even greater lack of confidence in addressing these other health-care professionals.
2 There was a rather negative response to the question concerning the role of the hypothalamus in pyrexia (Q5): most of the nurses (67·1%) scored 5 or less. The median value was 4 and the group data for this question were significantly ($P < 0·001$) lower than the 'midpoint' reference value of 5·5.

Question 6 related to three aspects of caring for someone with influenza: the importance of 'bed rest', of 'eating

regular meals' and of 'maintaining hydration'. The median values of 5, 6 and 5, respectively, regarding their confidence in explaining the rationale such care to a patient were not significantly different from the reference point of 5·5, thus reflecting the spread of responses. The proportions of responses that were 5 or below (54·4, 53·1 and 47·4%, respectively) suggests that approximately half of the sample were generally not confident that they could explain the biological basis of the care they provide to a patient with influenza.

In relation to the pharmacology associated with treating a patient with paracetamol or antibiotics (Q7), many nurses (44·6%) were unsure of their understanding of the actions of these drugs (i.e. scored 5 or less). Responses were varied but the median value of 6 was not statistically different from the reference point of 5·5.

The group also responded negatively when asked (Q8) concerning their confidence in explaining the lack of a cure for influenza: 78·7% of the participants scored 5 or less, whilst only 3% of the sample scored 9 or more. The overall lack of confidence was reflected in the median value of 4. Similarly, responses to Q9, which asked them to consider their confidence in being able to explain the basis of vaccination, showed that 66·7% of the nurses scored 5 or below (difference from 5·5; $P < 0·001$) and 18·7% scored 2 or less. Only 3% scored 9 or above.

Theme: teaching and learning

It was clear from responses to question 10 that the consultation of literature during the influenza crisis was not a common occurrence amongst the sample of nurses surveyed: 77% of the sample did not refer at all to relevant literature, only 2·3% consulted it daily and the remainder at least once during a fortnightly period. In addition, only 28 (11%) of the respondents said that they had received educational support during the influenza crisis (Q11). Of these, 18 respondents received support from doctors, whilst 10 were supported by other health service personnel and nonhealth service personnel; of these, two nurses had support from their ward sister, one from colleagues and one from clinical link teachers. Also, nearly three quarters of the sample (73·8%) said that the media's attention during the influenza crisis had not improved their knowledge of the illness (Q12).

Question 13 asked the group to reflect upon their training and 78·9% indicated that their training had not placed adequate emphasis on influenza and related patient care. Almost all respondents (97·7%) felt that further educational support in the biology of common illnesses is necessary (Q14).

DISCUSSION

The questionnaires were designed to complement each other and accordingly the findings are discussed here in respect of the two major themes under which questions were constructed. The two parts of the study are considered together, although specific points are identified where appropriate.

Biological sciences in practice

Many of the responses by students in Part One could be anticipated considering their lack of experience. Thus the students were not as confident as staff that they could explain the biological basis of their practice, they wanted to understand more about the clinical conditions they meet and they were more unsure of their knowledge of drug actions. In relation to the latter, Courtenay (1991) identified pharmacology as being particularly difficult for students to grasp. However, the students strongly perceived that understanding of the biological sciences is important to nursing practice, in line with findings elsewhere (Sutcliffe 1992, Clarke 1995, Torrance & Jordan 1995). Of interest is that the students had as strong a view as experienced staff nurses. It is possible that the views expressed by the students reflected those impressed on them by lecturers, but it also seems likely that, in spite of changes in curriculum design in recent years, the role of the biological sciences in nursing care is readily appreciated by students from their experiences during placements.

Of all of the subjects that students have to learn, the biological sciences appear to be amongst the most difficult and anxiety-provoking for them (Race & Holloway 1992, Sutcliffe 1992, Chapple *et al.* 1993, Nicoll & Butler 1996). Whilst difficulties in mastering a 'hard science' undoubtedly contribute to the anxiety (Rutishauser & Stephenson 1985), the strength of opinion expressed in this study suggests that the perceived necessity to understand the material for their practice is also a complicating factor.

Although the staff in Part One of this study were more confident of their knowledge base than were the students, the median values and the distribution of responses to the questions suggest that they were not as confident as might be expected from their position as experienced practitioners. This was highlighted further in Part Two of the study where participants attached importance to understanding the biology of the influenza virus as a basis for care, but demonstrated a lack of confidence in relation to explaining to others the basis of the signs and symptoms of influenza, to the cause of the pyrexia and to the pharmacology of antibiotics and paracetamol (even though these drugs are widely used in this and other situations). It is of concern that the majority of respondents had low confidence in their understanding of the rationale for the care they practice when looking after people who have influenza.

The answers to question 4 in Questionnaire Two are particularly illuminating and showed that experienced

practitioners felt unable to satisfactorily explain to patients the basis of the symptoms of influenza. This supports much earlier studies (Wilson 1975, Powell 1989) that practitioners frequently cannot relate biological science to their work and the present findings therefore suggest that little has changed in the intervening period. Interestingly, the nurses' confidence was even lower when considering explaining the signs and symptoms to a lecturer or doctor, in other words to professionals who might be expected to be 'in the know'. What this study did not assess was the actual knowledge of the respondents and it is possible therefore that the data also reflect a genuine communication issue in that nurses may not feel able to articulate the knowledge they do have.

This is an issue which would be worthwhile pursuing further. The literature identified in the Introduction concerning the biosciences within the preregistration curriculum focuses on problems of knowledge acquisition and perhaps an element of raising the confidence of students to articulate knowledge (in bioscience or other topics) should also be considered. However, the overwhelming request by participants in both parts of the study for more educational support suggests that knowledge deficit remains an important factor. This raises the question as to how preregistration students can be expected to learn the biosciences effectively if the knowledge of their mentors in practice may only be slightly better than their own?

Teaching and learning

In her study of preregistration students, Courtenay (1991) found that students had perceived a shift in emphasis away from the biological sciences in their programmes of study, yet also felt that they did not have a sufficient background in anatomy and physiology to understand the phenomena they faced. In the present study, students identified that the need to have an understanding of biology had been emphasized during their course, although the median value of 6 implies that the message they received was not especially emphatic. However, they also felt that the educational input on biology had been only slightly less than that of psychology or sociology and this does not in itself lend support to the concerns expressed by various writers (Gould 1990, Downs 1993, Trnobranski 1993, Clarke 1995, Torrance & Jordan 1995) that the biological sciences are at risk of being severely undervalued in curricula. Perceptions of the emphasis placed on these subjects was not greatly different to that recalled by staff nurses.

Nevertheless, the perceptions that students had of the time spent on the biological sciences does not seem to agree very closely with the value they ascribed to their importance to practice and nurses in Part Two of the study felt strongly that the biology of common illnesses had not been covered adequately in their training. This problem of reinforcing the importance of the subjects seems to be long-standing and the situation today, although not apparently worse than it was several years ago, seems to have been little improved by recent curriculum developments.

This need for further educational support was explored by ascertaining how respondents felt that this might best be achieved. The findings suggest that more coverage by the journals was not a popular means of support for the students. What is also surprising is the apparent lack of benefit that nurses obtained from the expansive media attention to the influenza crisis. The results of this survey suggest that study days and daytime seminars would be the most popular means for educational support rather than additional material in the press. It would be interesting to know if this reflects a reluctance of nurses to read about professional issues of this nature or is a view on the lack of effectiveness of literature as a learning tool. Both groups also expressed a wish for more 'off the cuff' tutorials on the wards, presumably to explain phenomena as and when they are encountered and to help them to integrate their learning with practice. Interestingly, very few of the staff nurses in Part Two of the study received such support during the influenza outbreak.

Perhaps what is most important here is for educationalists and clinical supervisory staff to identify how best to correct the situation. Various authors have lamented the lack of guidelines regarding the teaching of biological sciences, particularly in preregistration curricula (Gould 1990, Courtenay 1991, Wharrad *et al.* 1994) and a variability amongst institutions of the material covered by their curricula (Wharrad *et al.* 1994) illustrates the lack of a coherent policy on education in these subjects. It remains disappointing that, more than 10 years after publication of the 'Project 2000' initiative (United Kingdom Central Council for Nursing Midwifery and Health Visiting 1988), curricula may still not meet the needs of students, nor staff, in this important area.

Further work

This study identifies four main areas for further research.

Firstly, it would be interesting to ascertain the extent to which present data reflect a national situation. A much larger scale study would provide the information necessary for the development of national guidelines by identifying good educational practice. Such a study should also take into account the needs of staff nurses who mentor Project 2000 students during their specialist branch studies.

Secondly, a useful follow-up to this study would be to ascertain how much of the present data reflects the extent of knowledge deficit and how much the lack of confidence in communicating existing knowledge. It would therefore be useful to extend the findings using qualitative methods

to provide respondents with an opportunity to expand upon their feelings and views.

Thirdly, it was advantageous for the study to combine participants from child and adult care areas (or branches). Although this was carried out on the basis that a sound knowledge of biological science would be anticipated in these specialisms, the actual knowledge relates to patients of different age groups. It would be interesting to identify if there is any difference between these groups. This was not possible in the current study because of the relative differences in numbers of students/staff recruited from the two specialisms.

Fourthly, students entering the mental health and learning disability branches receive a preponderance of teaching in the psychosocial sciences within their branch curricula. Accordingly, it would be interesting to survey the views of students entering these branches and of nurses working in these areas of practice, to compare their perceptions of bioscience with those expressed by participants in this study.

CONCLUSIONS

1 This study was in two parts. Part One surveyed the opinions of nursing students regarding the biological sciences and compared them with those expressed by experienced staff nurses, whilst Part Two extended the study by asking staff nurses to respond to questions during the influenza crisis of late 1998/early 1999.

2 Students and staff ascribed a similar high level of importance to the role of biological sciences in practice but, as might be anticipated, students were generally less confident than staff in their understanding of the subjects. What was apparent, however, is that experienced staff are also not particularly confident of their knowledge base, including in relation to common illnesses such as influenza and some 98% of both students and staff nurses expressed a wish for more educational support in the biological sciences.

3 There is a large population of nurses in practice who are unsure as to the nature of clinical disorder, the rationale for the biological aspects of care and the actions of drugs and their side-effects.

4 Many staff nurses are reluctant to articulate their knowledge to patients and are even more reluctant to enter into discussion with other professionals. The latter situation risks undermining confidence in knowledge still further.

5 The data indicate that curriculum developments during the last decade have contributed little to improve the bioscience knowledge base of nurses. Educationalists and the professional bodies of nursing have not 'got it right' regarding this important area of nurse education.

6 National guidelines are required urgently to identify good educational practice in the biological sciences and address issues such as time availability and teaching and learning strategies. In particular, education must raise the confidence and understanding of staff nurses as they act as mentors for preregistration students during significant portions of their programmes.

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