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Measurement of Change in Nursing Students' Attitudes Towards Biochemistry in a Clinically Relevant Course

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Background

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- Biochemistry has traditionally been viewed as a difficult course by nursing students

- Perception of relevance to nursing practice has been shown to affect attitudes

- These attitudes have been correlated with performance in science classes

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Background continued

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- It is important to ensure that nursing students have a solid foundation in science

- This is because improved patient care has been linked with knowledge of science

- But unfortunately nursing students often fail to see the relevance to practice

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Study Objective

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Because of the link to better patient care and that of attitude with performance, attitudinal changes due to highlighting the applicability of biochemistry to clinical practice were investigated

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Research Question

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Will nursing students' attitude towards biochemistry change when the content of a course is made relevant to clinical practice?

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Level 1 Biochemistry for Nursing

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- The nursing biochemistry course was previously delivered as an online, self-directed course, accompanied by weekly tutorials

- This year the course was taught face-to-face for the first time

- Several practices were implemented to make the course more relevant for health practitioners

Changes in Course to Introduce Relevance

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- A medical biochemistry book was adopted
- Clinical cases were added to the end of each lecture related to the content
- Tutorials used cases from the PBL/PBL nursing courses

Methods

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- Ethics approval was first sought for all 3 sites of the Collaborative Nursing BScN Program (McMaster University, Mohawk College, Conestoga College)
- A paragraph stating why biochemistry was important in nursing was solicited from Nursing Faculty and students (from levels 2, 3, and 4)
- The paragraphs were assembled with student answers grouped together and faculty paragraphs together

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Methods continued

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- Due to the newness to qualitative data analysis, we researched methods and proceeded as instructed in " A Method of Analyzing Interview Transcripts in Qualitative Research" by Philip Burnard (*Nurse Education Today* (1991)11, 461-66)
- Researchers analyzed the data separately, highlighting various themes in different colours
- We then met to discuss the themes that had emerged and attain consensus

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Sample of Qualitative Analysis

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Survey Development

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- To develop the statements for the survey we reviewed the literature for any existing instruments
- We modified statements from published reports and also thought it was important to add a few statements on self-efficacy because of its link to attitude and performance

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Instrument Validation

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- Experts on qualitative data analysis within the School of Nursing were consulted for feedback and a small pilot test was done to ensure readability
- Phase I survey development was presented in December 2010 as a poster at:

Research on Teaching & Learning: Integrating Practices

Survey Contents

- The survey questions were further adapted based on expert guidance

- The final instrument consisted of 13, 7-point Likert style questions, where 1 is strongly disagree and 7 is strongly agree

- In addition we asked demographic questions

Survey Delivery

- Our finished instrument was administered through Lime Survey; emails were sent to approximately 440 students requesting participation
- A chance to win 1 of 3 bookstore gift certificates was offered in exchange for completing 2 surveys

Timeline

- Surveys were opened for completion at the beginning and again at the end of the 2nd semester course
- 124 surveys were completed in the first 2 weeks of January
- 65 surveys were completed in April after the conclusion of the course

Data Analysis

- Data was analyzed in Microsoft Excel and pie-charts were used to illustrate shift in opinion
- Answers were categorized as negative (1, 2, or 3), neutral (4) and positive (5, 6, or 7)
- Statistics were done in Excel as well, comparing initial answers with final by 2-tailed T-test using $p < 0.05$ to establish significance (data was unpaired)

Results

- All answers moved in the correct direction (more negative or more positive depending on the nature of the question)
- Answers to 3 of the questions changed significantly after completion of the course
  - Q9 - Biochemistry knowledge helps me to understand rationale for patient treatment
  - Q10 - Knowledge of biochemistry helps me to explain the importance of exercise to patients
  - Q12 - I do not expect to use biochemistry much for patient education

(Results continued)

- Change in attitude to greater agreement was evident looking at the graph of Question 1 – "Biochemistry helps me understand the chemical processes of the human body", but the data did not reach statistical significance

Question 1 - Initial | Question 1 - Final

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Slide 1
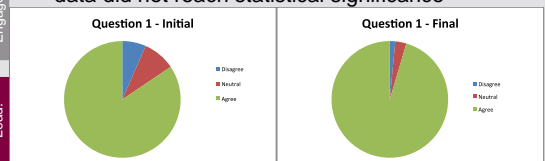
- Results were similar for Question 4, but less dramatic – "Much of what I learn in biochemistry will be useful in my nursing practice"

Question 4- Initial | Question 4- Final

Disagree
Neutral
Agree

Slide 2

- Question 13, about self-efficacy asked – "I am confident that I can do well on biochemistry tests" and showed a positive shift, but again this was not a significant change

Question 13- Initial | Question 13- Final

Disagree
Neutral
Agree

Slide 3

Discussion

- As mentioned, change in attitude always shifted in the correct direction, but did not always reach statistical significance
- Although the questions were constructed using qualitative data from students about the importance of biochemistry in nursing, the changes in attitude can be mapped to course learning outcomes

Slide 4

Learning Outcomes

- Q9 - Biochemistry knowledge helps me to understand rationale for patient treatment
- Learning outcomes that map to this question are:
  - Recognize normal values for metabolites in healthy individuals from laboratory results
  - Apply knowledge of basic principles to assess what processes may be deranged when laboratory values differ from normal

Slide 5

- Q10 – Knowledge of biochemistry helps me to explain the importance of exercise to patients
- Learning outcomes that map to this question are:
  - Understand the link between
    - Biochemical processes and where they occur in the body
    - Nutrient classes and metabolic processes
  - Describe the different macromolecules and in what bodily processes they are involved

Slide 6

- Q12 – I do not expect to use biochemistry much for patient education
- Learning outcomes that map to this question are:
  - Describe the different macromolecules and in what biochemical processes they are involved
  - Apply knowledge of basic principles to assess what processes may be deranged when laboratory values differ from normal

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Study Limitations

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- One of the limitations of study was the low number of respondents, especially on the second survey
- Answer sets from the two surveys were not be paired due to the way the Lime Survey was set up
- The first survey was completed in the first two weeks of the course, would have been better to have the survey completed before the beginning of the course

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Conclusion

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- The study showed that attitudes of nursing students towards a course such as biochemistry can be changed by demonstrating the relevance to their future profession
- This work provides a contribution to future curriculum development

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Funding provided for this study by:

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