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Editorial

Welcome to the first issue of the journal for 2008. It is with sadness that we bid farewell to our Editor-in-chief, Prof Nikodem who has left UWC and has joined the ranks of University of Stellenbosch. We wish to thank her for her invaluable contribution made to this journal and hope that she will continue to be a part of the journal in the form of a reviewer for the journal.

As editor I would like to encourage academics and clinicians focusing on health professionals education, interventions as well as prevention strategies to use the JCHS journal as their medium to share the knowledge and information obtained. Taking the risk and putting out your work to be critiqued by others is not easy but I want to encourage you with "The challenges is not in how hard you fall but in the way in which you get up". Consider writing for publication and be a part of contributing to the challenge and excitement of intellectual inquiry.

The next issue of the JCHS journal will be a special issue dedicated to research conducted at the University of the Western Cape relating to youth and youth wellness. This issue will be funded by the VLIR project (Youth Wellness) which is a collaborative initiative between the UWC and Flemish universities.

I would like to thank the editorial assistants and reviewers for their invaluable contribution to this issue.

Prof José Frantz

The JCHS is a peer reviewed journal, published bi-annually. It covers a wide interest in community and health science related topics. The features that make JCHS so unique are:

- *it offers a platform for debate between various disciplines which is essential in helping us to understand and learn from each other.*
- *the editorial team encourage original research but support the publication of scholarly papers and scientific systematic reviews.*
- *it offers a platform for novice researchers to share their research findings. The editorial team offers a platform for novice researches to share their research findings and offers "hands on" assistance with academic writing skills. We thank all the authors for submitting their work for publication and trust that, you, the reader, will find it interesting and gain knowledge from their publications and will want to feel part of the team by submitting your work for publication.*

Prof. Jose Frantz
Editor
Journal of Community and Health Sciences (JCHS)

FACTORS INFLUENCING UTILISATION OF POSTNATAL SERVICES IN KAMPALA, UGANDA

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ABSTRACT

Background:

Maternal, child-health and health education are three major concerns of public health organizations and researchers throughout the world. Over half a million women encounter complications due to childbirth annually and many even die. Health education for mothers is thus a strategy many countries have adopted to improve maternal and child-health.

Objectives:

This study investigated possible factors influencing the use of postnatal services at two hospitals in Kampala-Uganda.

Study Design:

A cross-sectional survey was completed by a convenient sample of women.

Methods:

A structured questionnaire was administered to three hundred and thirty (330) women six to eight weeks after delivery. The participants were selected from a list of all women who delivered in two hospitals in Kampala, Uganda.

Results:

The main barriers to utilisation of postnatal services identified were lack of awareness about postnatal services, distance from hospitals and lack of somebody to take care of the children at home.

Conclusions:

The results from this study reinforce the need for education of women and the communities about the importance of postnatal care.

Key Words:

Postnatal care, Barriers, Healthcare, Mothers, Uganda

Introduction

About 30 million women encounter complications due to pregnancy and childbirth annually of which 1.7% are fatal (Ashford, 2004; de Bernis, Sherrat, AbouZhar & Lerberge, 2003). In addition, approximately 4 million infants do not survive childbirth or the immediate postnatal period. More than 99% of maternal deaths occur in poor countries, and the risk of dying from a pregnancy related complication is about 250-fold higher for these women than those in developed countries (de Bernis, et al., 2003). According to Warren, Daly, Toure and Mongi (2007), in Africa, at least 125,000 women and 870,000 newborns die in the first week after birth. Health education for mothers is thus a strategy many countries have adopted to improve maternal and child-health (Soltani, Sakouhi, Belguith, Salem, Gacem & Bchir, 1999).

According to de Bernis et al. (2003) the increased recognition that women should be assisted by professional health carers during and following childbirth, is evidence of the importance of postnatal care. The Safe Motherhood Report (2002) however confirms that the majority of women in developing countries receive almost no postpartum care after delivery. In very poor countries, such as those in Sub-Saharan Africa, as little as 5% of women could be receiving postnatal care. Warren (2005) however pointed out that the period following birth in Africa is often marked by cultural practices. Some of these practices include keeping mothers and babies indoors for the first month after birth. This therefore leads to a delay in seeking formal health care if the mother or baby should or do become ill.

The maternal mortality ratio of Uganda was 550/100,000 live births in 2005. This ratio is high given that the field of maternal health has received significant attention from government (Ministry of Health, Uganda, 2001). The immediate cause of maternal deaths is the absence, inadequacy or under utilization of the healthcare system (WHO, 2004). The vast majority of maternal deaths can be prevented if women have access to, or use maternal health services during pregnancy, childbirth and the first month after delivery (WHO, 2004; Policy Project, 1999). Warren et al. (2007) reported that many women and their newborns in Africa do not have access to health care during the early postnatal period. The Safe Motherhood Report (2002) pointed out that certain factors prevent women from accessing postnatal services. An understanding of the factors that lead to the under utilization of essential postnatal services in developing countries are thus needed to assist in the development of strategies for action.

Studies have not been conducted in Uganda to ascertain why women do not utilise these essential healthcare services. This study aimed at investigating mothers' knowledge about postnatal services and identification of the barriers to utilisation of postnatal care.

Methodology

A cross-sectional survey was conducted in two hospitals in the Kampala district, Uganda. The first hospital is the largest tertiary hospital in Uganda and has a bed capacity of about 1500 beds. The second hospital is a "private non-profit making" hospital and has a bed capacity of 300 beds. These hospitals were chosen because the majority of people within the Kampala district receive their hospital care of these hospitals. Further more the study investigated postnatal care and services in both private and government hospitals.

The WHO definition of the postpartum period (from delivery until 6 weeks after delivery) was used for

the purpose of the study (WHO, 1998). The study population thus consisted of all women who delivered in the calendar month, approximately 6 weeks prior to the study. According to the hospital registries, each of the study hospitals had approximately 1000 deliveries in a calendar month. Yamane's formula $n = \frac{N}{1 + N(e^2)}$ was used to calculate the sample size as recommended by Israel (1992), where n stands for sample; N for study population and e is equal to 0.05. Based on the aforementioned formula, a sample size of 333 patients was calculated to be appropriate for the study. A list of all the names of mothers who delivered 6 weeks prior the study along with their contact addresses were obtained from the birth registers of each hospital. Out of these lists a convenient sample of 350 women was drawn.

Permission and ethical clearance were first requested and obtained from the Senate Research Grant and Study Leave Committee at the University of the Western Cape. Further permission was requested and obtained from the relevant hospitals' authorities, the heads of Obstetrics and Gynaecology departments. The study was explained to the participants and written consent was sought from participants prior to the administration of the questionnaire. Participants were also assured of anonymity and confidentiality.

A validated structured interview questionnaire was adopted for use in the study. This questionnaire was used successfully in Lusaka, Zambia in the Lusaka women-friendly services project (Mackeith, Murray, Standing, Kumwenda & Ahmed, 2001). The questionnaire consisted of 25 questions in four sections. The first two sections requested for demographic and socio-economic information. It also requested for information on socio-economic factors related to postnatal care. The third section assessed the care seeking behaviour of participants during their pregnancy/ delivery/ postpartum period. Obstacles to seeking care were assessed in the last section of the questionnaire.

Content validity of the instrument was ensured through constructive criticism form two senior physiotherapists, a midwife and a nurse at the National Tertiary Hospital in Uganda and lecturers at the University of the Western Cape (UWC). The staff at UWC had extensive experience in questionnaire construction and the staff from the National Tertiary Hospital in Uganda checked for the perceived authenticity of the questions. Items were revised and improved according to suggestions made. A pilot study was conducted to check for clarity and appropriateness of the questions.

The Statistical Package for Social Sciences (SPSS) was used for the analysis of the data. Descriptive statistics were employed to summarize the demographic data of the study sample. The relationships between awareness, utilization of postnatal services and socio-demographic factors was also investigated and tested for significance using chi-square tests. Alpha levels was set at $p<0.05$.

Results

Of the 350 questionnaires that were distributed, 330 were returned generating a response rate of 94%. The majority of the participants (65%) delivered in the National Tertiary hospital, while 35% of the respondents delivered in the "Private non-profit making" hospital as illustrated in Table 1. Most participants were aged between 25-34 years of age (54.3%) while 6.4% were above the age of thirty-five. Half of the participants (50.3%) had completed secondary school while 30.6% completed primary school.

Overall almost one-third (30%) of the participants were not aware of postnatal services and 42% did not attend these services. Of those that attended postnatal services did so for immunisation (66.7%), for physical examination (17.7%) and family planning (7.9%). More than half of the participants (56.2%) indicated that the services received at both hospitals were good.

Overall 53.9% of the participants in the present study did not attend postnatal services. Reasons for non-attendance of postnatal services included lack of awareness, attending to family matters, and services being to expensive (Fig.1).

Grievances about the service providers included insufficient provision of education on part of service providers, slow and rude midwives and rough examinations as illustrated in Figure 2.

Factors associated with utilisation of postnatal services are illustrated in table 2. A slightly higher percentage of participants (58.4%) attending antenatal services than those that did not attend antenatal services (45.8%) also attended postnatal services. This difference was not statistically significant ($p>0.05$). Significantly more participants aware of postnatal services (81.9%) than those unaware of the services (1.02%) attended postnatal services ($p<0.05$). Furthermore distance from hospital, educational level of participants, employment of self and husband was all significantly associated with attendance of postnatal services ($p<0.05$).

Table 1: Selected socio-demographic characteristics of the study sample (n=330)

Variable	Frequency (n)	%
Hospital		
National Tertiary	213	65
Private “not for profit”	117	35
Distance from hospital		
< 5 kilometres	221	67
> 5 kilometres	109	33
Religion		
Protestant	119	36.1
Roman Catholic	102	30.9
Moslem	58	17.6
Born again Christians	46	13.9
Seventh Day Adventist	5	1.5
Age categories		
15-24 years	130	39.4
25-34 years	179	54.3
> 35 years	21	6.4
Marital Status		
Married	184	56
Cohabitating	112	34
Never Married	23	7
Separated/Divorced	11	3
Live Births		
1-2	221	67
3-4	89	27
> 5	20	6
Level of Education		
None	11	3.3
Primary	101	30.6
Secondary	166	50.3
Tertiary	50	15.2
Missing	2	0.6
Employment		
Yes	149	45.1
No	179	54.3
Missing	2	0.6

Figure 1: Reasons for non-attendance

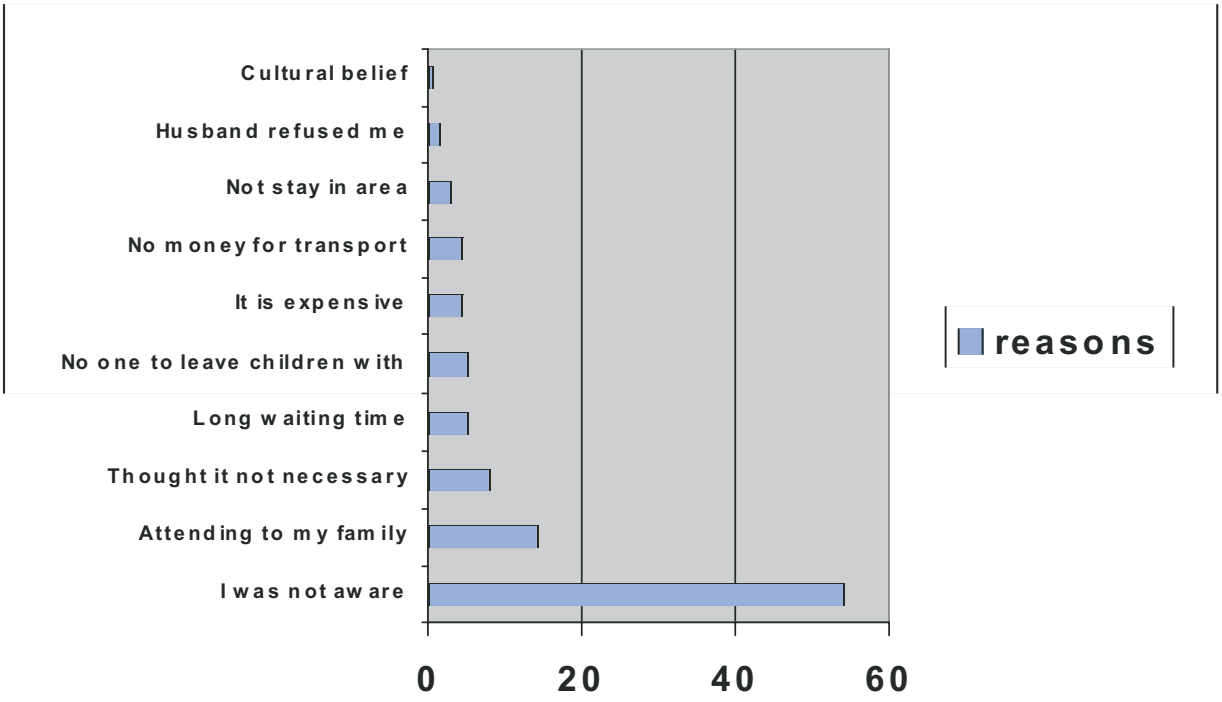

Figure 2: Grievances about service providers

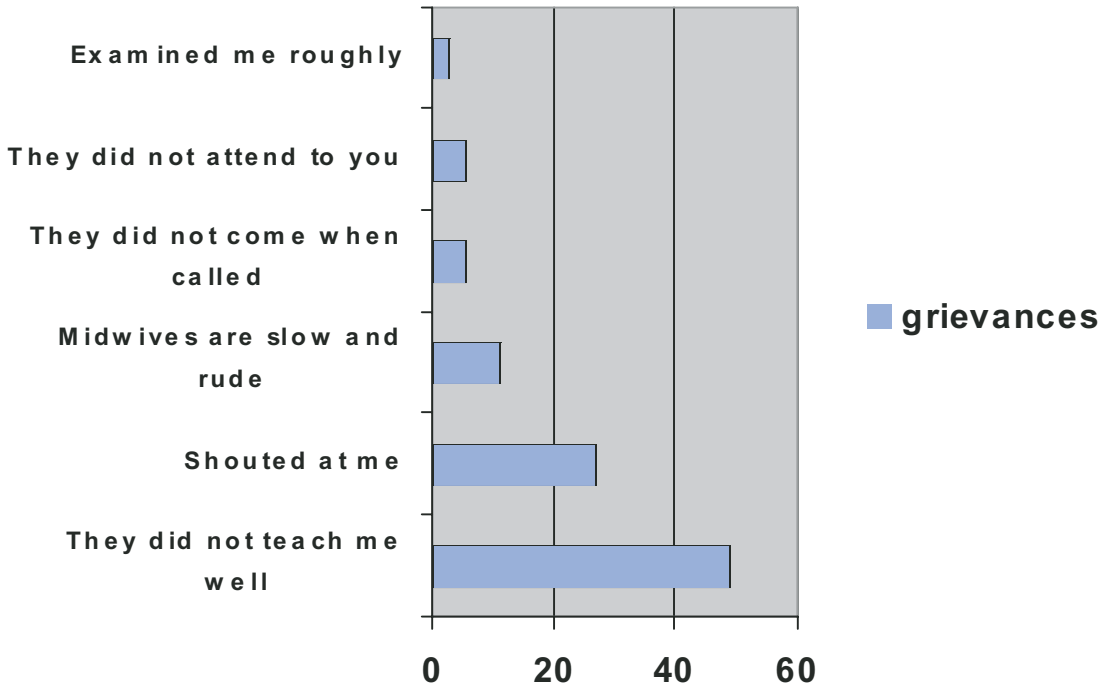

Table 2: Factors associated with utilisation of postnatal services

Variable	Postnatal attendance	n	p
Antenatal attendance		327	0.230
Yes	54.0		
No	38.0		
Awareness of services*		330	0.001
Aware	81.9		
Not aware	1.02		
Distance*		330	0.002
1-5 km	63.8		
> 5 km	45.9		
Educational level*		327	0.003
None or primary	45.5		
Secondary or more	63.8		
Employment*		328	0.001
Yes	72.5		
No	45.3		
Husband's employment*		329	0.003
Yes	62.0		
No	31.1		

* Significant at $p<0.05$

Discussion

"The postnatal period is a neglected period" (Li, Fortney, Kotelchuck & Glover, 1996). Evidence suggests that most maternal and newborn deaths occur during the first week of the postnatal period (Warren et al., 2007). The fact that almost half (42%) of the participants in the present study did not attend postnatal services after birth, is of real concern. The heavy price for not attending postnatal services could be maternal mortality ratio rates of more than 500 per 100 000 births and the struggle to reach the Millennium Development Goal targets (Bhutta et al., 2008; de Bernis et al., 2003).

Several researchers are of the opinion that the use of antenatal services result in return to postnatal services (Stanton, Blanc, Croft, Choi, 2006; WHO, UNICEF, 2003). The large percentage (42%) of participants not attending postnatal services while the majority (92%) attended antenatal services in the present study, is thus surprising. An investigation into factors leading to non-attendance are thus of vital importance.

Although literature has highlighted the cultural practice of a period of seclusion after childbirth in Africa (Warren, 2005; WHO, 2005) the majority (53.9%) of the participants in the present study however indicated that they were not aware of postnatal services in Uganda. It thus seems that opportunities to educate mothers regarding the importance and benefits of postnatal services were not utilized during the antenatal period. According to Bulut and Turan (1995), women perceive childbirth as a major event but they perceive the postnatal period as less important. With adequate

counselling and education during antenatal visits, mothers may become aware of the possible complications and sources of quality health services for treatment of these complications (Chakraborty, Ataharul, Chowdhury, & Wasimul, 2002). Other researchers have also noted that antenatal visits give health workers the chance to educate women about diet and healthy behaviours (Ashford, 2004; Echevarria & Frisbie, 2001). In the Ugandan context however, the availability of adequately trained personnel to provide education during the antenatal period could be an obstacle. Bhutta et al. (2008) reported that the density for nurses and midwives per 1000 population was 0.61 and 0.116 respectively in Uganda.

Quality of services is a vital determinant of all women who seek medical treatment. Quality is defined in terms of what happens once one arrives at a health care facility. One expects that poor care would affect women's willingness to visit a health care facility but if demand for the services is high, it is possible that quality may not turn out to be a crucial factor influencing utilisation. Timyan, Brechin, Measham and Ogunleye (1993) indicated that inadequate quality is a primary cause of women's under utilisation of health services.

The findings of the present study highlight some of the factors that influence the utilisation of postnatal services. Among these factors that were of particular concern were the quality of care received by participants and the behaviour of health workers. Tlebere et al. (2007) confirmed that these factors are consistent with those reported by Petterson, Christensson, Gomes de Freitas and Johansson (2004) in a study done in Angola. The lack of high standards of care of postnatal services offered has been recognised by the World Health Organisation as an international problem and they have recommended improvements in interpersonal and intercultural competence of health care providers (WHO, 2003).

Conclusion

The results from this study reinforce the need for education of women and the communities about the importance of postnatal care. This needs to be done while they attend the antenatal clinics in order to increase their awareness of postnatal services.

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I am grateful to the German Academic Exchange Service (DAAD) for financial support, Professors Julie Phillips and Kristofer Hagglund of the University of Missouri, Colombia, USA for their academic input and guidance, Christine Alengai for the assistance with data collection and the management of Mulago and Mengo hospitals for granting me permission to collect data in their hospitals.

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INVESTIGATING ASSESSMENT PRACTICES AS A STARTING POINT FOR CHANGE: THE CASE OF A HEALTH SCIENCES FACULTY

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ABSTRACT

Introduction:
Compliance to national policy has required shifts in teaching, learning and assessment practices in higher education.

Objectives:
To investigate current assessment practices in a faculty of health sciences as an impetus for change and to identify strategies to support lecturers in policy implementation.

Methods:
The study design was a formative, improvement-oriented evaluation. Qualitative and quantitative data gathering methods were used.

Participants:
Nine departments' examination scripts were included in the sample. Six of the nine heads of department participated in a focus group.

Setting:
A faculty of health sciences in the Western Cape.

Intervention:
The questions in 27 final year examination papers were analysed according to National Qualifications Framework Level 8 competency descriptors as criteria. A focus group interview was conducted with heads of departments for their perspectives on challenges and enablers experienced during implementation of the policy.

Results:
Uneven use of newer assessment practices in the faculty was indicated. Identification of challenges and solutions suggest that assessment practice could only change if teaching practice changed.

Conclusion:
Support for professional development and collaborative action research were identified as possible strategies for implementing change in teaching and learning.

Keywords:
Health science education, assessment, student-centred learning

Introduction

South African educators of health science programmes have had to change their approaches to teaching, learning and assessment to comply with national policy directives as set out in the Higher Education Act (Government of South Africa, 1997) and later consolidated in the Higher Education Qualifications Framework (Government of South Africa, 2007). This paper reports the problems and solutions encountered by one faculty of health sciences in the Western Cape when the policy was implemented. By focusing initially on assessment practices, the faculty hoped to identify strategies to support educators in making the conceptual shifts needed to implement the new policy. An audit of current assessment practices was done by analysing the questions posed in all final examination papers of final year undergraduate students. The questions were analysed according to National Qualifications Framework (NQF) level 8 competency descriptors (Government of South Africa, 2005). In addition, heads of departments were interviewed for their perspectives on the implementation of the framework in their respective departments.

Background

Against the background of transformation in higher education and the emergence of a single national register for qualifications, the Council on Higher Education (CHE) sets out guidelines for framing teaching, learning and assessment in higher education that encourages institutions to adopt an outcomes-based approach. The guidelines to institutions, named *Improving Teaching and Learning for Success* provide a framework for the expected educational change (Council on Higher Education, 2003).

Despite some resistance to the acceptance of a pure form of an outcomes-based approach in higher education, there is acknowledgement that a shift has occurred in the understanding of teaching and learning. The global trend towards student-centred learning is in response to societal changes and demands for new kinds of knowledge (Huba and Jann, 2000). The conceptual framework offered by the Higher Education Quality Committee of the Council on Higher Education (CHE, 2003), provides guidelines to assist lecturers in making such a shift.

However, implementation of the new Higher Education Qualifications Framework (HEQF) policy is not unproblematic. Implementation requires big conceptual shifts from a traditional approach to teaching to the newer understanding in which student learning is emphasised. More than a decade ago, Barr and Tagg (1995) described an emerging shift in higher education as a paradigmatic shift from what they termed an *instruction paradigm* to a *learning paradigm*. The *instruction paradigm* is described as focusing on the provision of instruction, with an emphasis on teaching and covering course content. In this view, summative assessment consisting of traditional tests and exams are the usual means of student assessment (Barr and Tagg, 1995).

At the other end of the continuum, the *learning paradigm* emphasises the learning process and the production of learning. Barr and Tagg view knowledge production as active construction of personal knowledge through the creation of learning environments in which students engage. Assessment is viewed as a developmental event that drives learning. Opportunities to demonstrate a developing understanding are scheduled frequently as formative assessment opportunities. In formative assessments the variety of methods to demonstrate

learning are much wider than traditional tests or exams. In addition, students are provided with prompt feedback of good quality to further their learning.

One of the main features of the 'new' assessments is that assessment tasks are criterion referenced. Thus, assessment criteria provide students with descriptions of required performance that they will need to demonstrate through multiple opportunities and tasks (Barr and Tagg, 1995; Luckett and Sutherland, 2000).

Over the past two decades in South Africa, support for the *learning paradigm* as an educational approach that frames teaching and learning has resulted in the implementation of student-centred learning approaches in health science education, such as problem-based and case-based learning and the outcomes-based approach. The shift to student-centred learning has had an inevitable influence on assessment practices (Barr and Tagg, 1995; Geyser, 2004; Huba and Jann, 2000; Luckett and Sutherland, 2000). In the past, students were assessed mainly on the content that had been covered in a course. Educators are now required to set assessments where students can demonstrate competencies such as the application of principles and theories, problem solving and clinical reasoning abilities. Duncan and Joubert (2006:202) refer to two assessment traditions, namely, the performance assessment tradition and the competence assessment tradition. The performance assessment tradition implies quantities of declarative and procedural knowledge, whereas the competence tradition views knowledge as *'meaning making,' 'thinking about thinking' and arriving at a reasoned understanding of pathways of critical interpretation.* The aim of new assessment practices is to allow students to demonstrate such higher order thinking skills.

In particular, assessment practices have had to change from norm-referenced to criterion-referenced assessments, from traditional tests and examinations to multiple and innovative assessment activities that include more frequent formative assessment opportunities and a variety of assessment tasks (Gravett and Geyser, 2004). Assessment should no longer be viewed as a disparate end-course event. Assessment should drive learning to the extent that students are provided with frequent learning opportunities where they can demonstrate evidence of mastery of competencies (Huba and Jann (2000). The following Higher Education Quality Committee (HEQC) definition of assessment illustrates both the requirement of criterion-referenced assessment and the need for students to have opportunities to gather evidence of mastery of competencies:

In terms of outcomes-based approaches, assessment is a process during which evidence of performance is gathered and evaluated against agreed criteria. As with the principle of triangulating research methods, so with assessment: one has a better likelihood of ascertaining what students can do if a range of different assessment (research) methods is employed and if the research instruments are fit for their purpose. (CHE: ITL, 2003: 3)

Implicit in this change to new assessment practices is the development of a new and different understanding of how students learn. Teaching needs to be adapted to provide multiple learning opportunities in which assessments are an integral part of the learning process, not an additional, stand-alone activity at the end of a module.

Procedure

One faculty of health sciences in the Western Cape that offers professional programmes in health

sciences or social development decided to audit the assessment practices in all final year undergraduate students' final examination papers. The purpose was twofold. Firstly, the audit aimed to establish what types of questions were being posed in final examinations of final year students in order to determine whether the questions assessed the levels of learning that elicited the kinds of knowledge required by the new policy. Secondly, the study aimed to determine which strategies were needed to support lecturerrs in the implementation of the new policy framework by interviewing heads of departments. Informed consent and voluntary participation were obtained.

The audit of assessment practices in the faculty occurred in 2006 and consisted of an analysis of all questions in the 2005 final undergraduate examination papers of all final year programmes in the faculty. The data set consisted of 27 question papers containing 225 questions, some being subdivisions of main questions. To determine whether the questions were aligned to national policy, the NQF level 8 competency descriptors (South African Qualifications Authority, 2005) were used as evaluative criteria.

Level 8 competency descriptors are:

- a well-rounded and systematic knowledge base in one or more disciplines/fields and a detailed knowledge of some specialist areas;
- a coherent and critical understanding of one or more discipline/field's terms, rules, concepts, principles and theories; an ability to map new knowledge onto a given body of theory; an acceptance of a multiplicity of 'right' answers;
- effective selection and application of a discipline/ field's essential procedures, operations and techniques; an understanding of the central methods of enquiry in a discipline/field; a knowledge of at least one other discipline/field's mode of enquiry;
- an ability to deal with unfamiliar concrete and abstract problems and issues using evidence-based solutions and theory-driven arguments;
- well-developed information retrieval skills; critical analysis and synthesis of quantitative and/or qualitative data; presentation skills following prescribed formats, using information technology skills effectively;
- an ability to present and communicate information and opinions in well-structured arguments, showing an awareness of audience and using academic/professional discourse appropriately (SAQA, 2005)

Each examination question collected was evaluated in terms of whether the question required of the student to demonstrate learning described in one or more of the criteria. The questions were evaluated by the researcher in terms of their conformity to the NQF criteria by assigning a yes or no response. Responses were captured and tallied for each paper per department and percentages were calculated.

Results of the audit of examination questions were presented to the faculty. Heads of departments then participated in a focus group interview to explore strategies and plans to support lecturers in professional development. Participants were heads of departments of six of the nine departments in the faculty. The interview was audio-taped and transcribed for analysis. Qualitative analysis for codes, categories and themes was done manually.

Methodologically, the audit was conceptualised as improvement oriented evaluation and specifically as formative evaluation as the purpose was to

improve assessment (Babbie and Mouton, 2001). In this case, 'assessment' was used as a starting point in facilitating change and developing deeper understanding of student-centred learning.

Two sets of data were gathered. The first set of data consisted of an analysis of all final year examination questions and the second set of data was gathered by means of a focus group interview with heads of departments.

Results

Results of the analysis of all examination questions evaluated according to criteria based on NQF level 8 competency descriptors are illustrated in Table 1.

The results provide an overview of the nine departments' examination questions in terms of the kind of learning elicited by the final year examination questions and whether the questions conformed or did not conform to the evaluative criteria. Percentages in bold script indicate areas where questions do not elicit the type of learning promoted by the HEQF. Whereas departments 1, 4, 5, 6 and 9 posed questions in their examination papers that elicited the type of learning advocated by the HEQF, examination questions of departments 2 and 3 do not reflect enough of the type of learning required. Departments 2, 3, 7 and 8 should ask more applied questions and include questions in which students are required to apply theories or principles and demonstrate problem solving.

Furthermore, the results indicate that more of particularly two types of examination questions should be included in final year examination papers, reflected in columns 3 & 4 of Table 1. Assessment of learning should be geared more towards the application of principles or theories and the demonstration of problem solving. The results could assist departments in identifying what types of questions to include in final year examination papers that would allow students to demonstrate the type of learning that is currently valued.

Uncovering challenges and enablers of change

The above results were presented to the faculty, followed by a focus group interview with six heads of departments. The interview turned on departmental heads' perspectives of implementation of the new framework. The findings revealed firstly, the difficulties and challenges experienced during implementation. Secondly, helpful strategies were identified. Finally, action research of implementing change was suggested as a method for professional development of staff.

Challenges

The following challenges were identified:

- Assessment methods were traditional because teaching methods were traditional;
- Teaching was still content driven;
- Design of assessment criteria for specific outcomes was difficult.

The interview revealed the view that assessment methods were still traditional in those departments where lecturers had not yet shifted away from traditional teaching methods. A deeper understanding of new insights into teaching and learning was needed. The view was expressed that complete restructuring of curricula was required to enable lecturers to focus more on student learning.

The problem of teaching being too content driven was raised. The challenge of lecturers having to

Table 1. Final year 2005 exam questions evaluated according to criteria based on NQF level 8 competency descriptors

Departments	Number of papers	Number of questions	1.Questions elicit description of knowledge of the discipline	2. Questions elicit description of concepts, theories and/or principles of the discipline	3. Questions elicit application of theory or principles of the discipline	4. Questions elicit demonstration of problem solving	5. Questions elicit demonstration of academic discourse
1	3	36	100%	94%	69%	69%	100%
2	1	19	100%	**6%**	**0**	**0**	**0**
3	8	75	100%	**40%**	**24%**	**3%**	**11%**
4	1	18	100%	100%	61%	83%	66%
5	1	3	100%	100%	100%	100%	100%
6	4	29	100%	66%	55%	**21%**	59%
7	3	8	100%	100%	**0**	**0**	75%
8	3	17	100%	82%	**18%**	**12%**	65%
9	3	20	100%	80%	80%	**35%**	85%
	27	225					

reduce the emphasis on the content of modules emerged. One participant reported that lecturing staff in her department struggled to move away from using course content as departure point when designing modules, teaching strategies and assessment tasks, despite having developed specific outcomes for the module. She said:

Because you find that most people find it difficult in shifting to OBE. You know when you look at the module descriptor, its written in outcomes-based, but now when people develop course outlines, they always want to focus on the content to develop course outlines… then you are moving back to the old method….

She explained that when module outlines and learning guides were designed with the focus on the outcomes, then teaching and learning would be more aligned to the achievement of competencies.

Solutions

Those departments who had made more progress towards implementation of the new framework had found the following strategies helpful:

- Sharing good practice;
- Obtaining external expertise;
- Support for professional development;
- Provision of exit level outcomes provided by professional bodies that describe the competencies that graduates need [1];
- Overcoming the challenge of writing assessment criteria.

In response to a question about strategies to move the implementation process forward and to provide support for lecturers who were grappling with the concepts that underpin learning-centred and outcomes-based approaches, participants described some of the approaches that yielded

good results. One suggestion was the sharing of good practice. Another suggestion was the use of team teaching and the development of teacher guides. A participant reported:

In my department, because of the big number of students, we do a lot of team teaching. So a team of first year lecturers would have meetings every week and they reflect on their teaching for the week and prepare for the next week. Because we use case-based methodology, each of the six people that are teaching first years, they know, they do the same thing for the students and there are lots of meeting and a lot of depending on each other and it really helps for the newer people to get mentored by the more senior people. In that way, team teaching is really helping the newer members of staff to settle in.

She further explained that when the new teaching methodology was introduced, the department held a series of workshops for all staff to become familiar with the new methods and their underlying concepts. Furthermore, a facilitators' handbook was developed, to enable staff members who joined the department at a later stage to orientate themselves to the new methodology.

The students' handbook also speaks to the methodology of teaching that the department uses, so the students when they come, during orientation, we make that shift to the new approach…..so its all dictated - the student handbook as well as the facilitators' handbook. So when the teacher meets the students they are already on the same page, they know exactly what to expect.

It emerged that departments who had made successful shifts to the learning paradigm and new assessment forms had invested in professional development of their staff.

Another departmental head reported the use of experts from outside to assist staff in making the shift to an outcomes-based approach. A consultant from another institution provided workshops and individual consultations to support lecturers in gaining an understanding of the new approach.

We found that it's really difficult to actually stretch one's outcomes and associated assessment from theory to practice so she's [the expert| *had individual appointments with staff members together with me and then one has to keep following this up and it's a process which sort of never ends really, so I suppose getting outside expertise in.*

Collaborating with peers in the same discipline at other universities was found to be a helpful process by one department.

They are grappling with this and it does help to, sort of, get together across institutions as well.

Experiential learning through practice opportunities in learning to write new course materials was identified as a helpful strategy for one department. The development of a new module for an external agency was helpful for one department. The participant explained:

What has helped my staff is that we got involved with a level four programme …and they've developed learning materials for the [programme]. So if one has to develop learning materials against criteria and develop assessment tasks and it's giving staff also that experience in trying to do that,

[1] All professional bodies of health sciences and social development professions have collaborated with the South African Qualifications Authority in developing exit level outcomes. Each profession established a standards' generating body who developed exit level outcomes for each profession. The exit level outcomes contain descriptions of competencies deemed necessary by the profession for graduates to enter the profession.

which they can then learn, they can then transfer to their teaching.

Departments offering professional programmes where registration on graduation was required by professional bodies found that the professional bodies' parallel process of developing exit level outcomes facilitated the process. Exit level outcomes for professional programmes helped staff to develop new insights into the requirements of outcomes-based curricula.

What helped us was really the exit level outcomes and associated assessment criteria, which were developed by the profession, that you know what students have to achieve from first to fourth year.

The development of assessment criteria for specific outcomes was experienced as a particularly challenging task. One participant described a method that helped her to design assessment criteria. She explained that she had asked herself how she would know that the student is achieving the competency. She reported as follows:

If I walk into the room where this particular outcome is being assessed, how will I know that the student has achieved it? Is it the accuracy that she does it with, is it the speed? …I'll give you an example: if a student gives an intra-muscular injection - that's an important competence in nursing - so if you develop an outcome for an intra-muscular injection, how will you know that the student is competent? Is it if she takes the anti-septic technique of infection control? Does she do it with minimal pain to the patient? Does she do it according to the correct dosage? You know, all that combined will formulate the assessment criteria for this outcome.

Furthermore, she explained that the criteria should discriminate between different levels of competence achieved by the student:

So if you always ask yourself: How will I measure this? What will make me decide? What will separate the two students? Because two students can be competent, they can do it, but what will make me say - she has got ten, he has got five? To distinguish between the two - those criteria will help you.

Research for publication

An opportunity for research and publication was identified. Mastery of the conceptual shift required to restructure curricula into a student-centred educational framework was time and labour intensive. One departmental head suggested that work undertaken by lecturing staff could be structured to culminate in a publication. To this end, action research was identified as an appropriate method. She suggested that the process of learning to implement an outcomes-based approach and to become familiar with student-centred approaches to teaching, learning and assessment provided an ideal opportunity for a research project:

Yes, we have to invest so much in this, can't we work on identifying in the beginning some kind of research project?… that when you're doing this stuff one can actually then be putting things into place for the research?

A participant thought that a research driven approach would motivate staff to engage and participate:

…absolutely ideal if there is a motivation for meeting and then you know everything we have to do is potentially publishable.

Another stated:

… and that is why we should use action research. If everybody does a small bit on action research, if you decide to implement a small change and you document it in a research journal then you could

have a small piece of action research and that collectively and collaboratively becomes huge and very powerful.

Thus, findings from the interview revealed the challenges identified and solutions suggested in implementing the new framework.

Discussion

An audit on final year examination questions in a health sciences faculty revealed an uneven use of the types of questions that would elicit the kind of learning that is currently valued and required by national policy. Some departments posed examination questions that required of students to demonstrate higher order thinking skills in applying knowledge to solve professional problems. Such questions elicited descriptions of the concepts, principles or theories of the discipline; the application of principles or theories of the discipline; problem-solving using evidence-based or theory driven arguments; or the use of professional discourse. Other departments had started to incorporate more of the newer types of assessment questions and a few departments had not yet started to make any shifts in their assessment questions.

Heads of departments identified that teaching practice needed to change to a student-centred approach in order for lecturers to implement alternative types of assessment. A traditional approach to teaching in which a content-driven curriculum was offered, was found to lead to assessment questions that required of students to respond with answers that conveyed mainly factual knowledge.

Those departments who had experienced the implementation of an outcomes-based or case-based approach had identified strategies that were helpful for staff development. Examples of such strategies were modelling of new teaching methods to novice lecturers by experienced staff, attending workshops on educational methods, sharing of good practice examples and access to teaching guides. The advantage of personal professional development through individual consultation with an expert was a method that one department found useful.

Acknowledgement of the fact that new assessment practices are needed within a curriculum geared towards multiple learning opportunities leading to the mastery of competencies is shared by many (Luckett and Sutherland, 2000; Huba and Jann, 2000). At the most basic level, ‘new’ knowledge is applied knowledge. New knowledge demonstrates integration of knowledge, skills and values and elicits a demonstration of what students can do with their capabilities in authentic situations. Whereas Barr and Tagg’s (1995) explication of the two polar opposites of an instruction paradigm versus a learning paradigm offers a useful description of the respective characteristics, Luckett and Sutherland (2000) suggest that the model of a continuum rather than a dichotomy might be helpful to assist lecturers in identifying their current practice. The concept of a continuum may help departments in determining where they are in terms of shifting paradigmatically and provide a way forward in terms of where they are heading.

The conceptual development and writing of assessment criteria for specific outcomes was a particularly challenging task. Challenges in developing criterion-referenced assessment practices are reported in the literature (Rust, O’Donovan and Price, 2005; Stowell, 2004; Woolf, 2004). Woolf (2004) reports an investigation into criteria used in assessing a final year module that

found a lack of shared understanding of the language in which assessment criteria were couched and the ways in which criteria were applied. Similarly, Stowell (2005) reported on assessment practices beset by conceptual confusion. Despite acceptance of the principles and values that underpin criterion-referenced assessment, lecturers were uncertain about what was being assessed. Furthermore, despite using criteria, it was still difficult to decide what the basis for judgements about students' success and failure were. Likewise in South Africa, some academics embrace the philosophical and theoretical underpinnings of accountability, equity and justice towards students in assessment practices that are more transparent through explicitly stated criteria. However, the shift from norm-based to criterion-referenced assessments is difficult.

Learning is at the heart of the learning paradigm. How students learn is viewed by some scholars as emerging from a body of research in pedagogical literature based on work of Biggs (1999), Marton and Saljo, Ramsden and Entwistle (in Marton, Hounsell and Entwistle, 1984) and Prosser and Trigwell (1999). They espouse a model of approaches to learning in which deep and surface learning are identified as predominant approaches to student learning. Deep learning became the desired learning approach to aim for and good teaching was seen as enabling deep learning (Biggs, 1999). Teaching and assessment to elicit deep learning were said to be achievable when lecturers stated the intended learning outcomes upfront, organised learning activities to enable students to achieve the outcomes and assessed whether students had achieved the outcomes. Biggs (1999:29) refers to this model of learning as constructive alignment and views its theoretical basis as emanating from constructivism and phenomenography. The new type of learning is viewed by Luckett and Sutherland (2000) as 'capability', understood to be an integration of knowledge, skills and personal attributes. Huba and Jann (2000) confirm that if students are to master the capabilities identified in outcomes, they should be provided with opportunities to develop mastery of the competencies. Assessment tasks should be derived from real world problems and should elicit students' skills in critical thinking and problem solving.

Professional development in alternative teaching methods is key to the development of alternative assessment practices. It is helpful to view the process as a paradigm shift that develops slowly over time. The conceptual change needed to understand the alternative view of teaching, learning and assessment and its transformatory possibilities implies more than once-off workshops or readings. It will require ongoing support for professional development in the form of small changes to teaching and assessment practices, that are continually supported. A paradigm shift implies that it is not merely a new set of teaching techniques or a new method of designing assessment. It is a completely new way of viewing teaching, learning and assessment and it implies a large amount of staff support for development. Lecturing staff are under pressure to produce publishable articles for academic journals. To this end, a collaborative action research project appears to be a good solution. The following statement supports this view:

To develop new conceptualizations, we must analyze our old ways of thinking and make continuous changes. If our ways of thinking are not analyzed, they remain unchanged (and) *existing patterns continue* (Huba and Jann, 2000:4).

Conclusion and recommendations

An audit of examination questions revealed an uneven use of questions that elicit a 'new' kind of learning. Some departments had started to use questions that elicit currently valued forms of learning, other departments had started to include some such questions and a few departments had not yet started. Heads of departments reported that helpful strategies to move to a newer understanding of teaching, learning and assessment had been the use of modelling teaching, workshops, teaching guides and individual consultations with experts. As teaching staff experience increased pressure to publish academic papers, action research could serve both the purpose of facilitating a shift to the learning paradigm as a framework for alternative assessment practice and culminate in professional development.

Key recommendations

- Identification of current assessment practices may be a trigger for change;
- Implementation of new assessment practices can only occur together with simultaneous changes in teaching practices;
- Ongoing support for professional development is required to achieve a shift to the learning paradigm;
- Action research might be a useful strategy to facilitate change.

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KNOWLEDGE AND PERCEPTION OF CARDIOVASCULAR DISEASE RISKS OF FEMALE UNIVERSITY STUDENTS

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ABSTRACT

Introduction:

Cardiovascular disease (CVD), traditionally thought of as a "man's disease", is the leading cause of death and disability amongst women world-wide. Research demonstrates a lack of knowledge and perceived susceptibility amongst women, especially in the younger age group.

Aim:

To evaluate knowledge and perception of CVD risks of female university students.

Methods:

Four hundred and thirty eight students completed a structured, self-administered questionnaire including items regarding knowledge, risk perception and risky behaviour regarding CVD.

Results:

Overall, 56.8 % of the participants were knowledgeable (≥70% correct answers) of CVD risks, with a mere 6.6% indicating heart disease as the greatest health risk for women. The White population (40.2%) was identified as the race most susceptible to CVD. A significant relationship between risk perception and being informed of the risk of developing CVD (p=.000) and having a family history of CVD (p=.000) was found.

Conclusion:

It is vital to our nation's health that young female individuals are educated regarding the identification and modification of risk factors for CVD. As CVD risk factors may be managed through lifestyle modification, gender- and ethnic-specific lifestyle modification programmes should be directed at altering personal behaviours.

Keywords:

cardiovascular disease, knowledge, perceived susceptibility, risky behaviour, female students

Introduction

Cardiovascular disease is the leading cause of death and disability in women worldwide (Blauwet & Redberg, 2007; Pilote et al., 2007, Long, Waldrep, Hernandez & Strickland, 2005). Traditionally, cardiovascular disease (CVD) has been thought of as a "man's disease", however according to the American Heart Association (AHA) (2003), more than 40% of all deaths in American women are caused by CVD, especially coronary heart disease and stroke. In the past few decades Africa has witnessed increasing urbanisation and changing lifestyles which have raised the incidence of non-communicable diseases, especially CVD amongst both males and females (Leeder, Raymond & Greenberg, 2004). Leeder et al. (2004) furthermore stated that in developing countries, including South Africa, CVD will affect the poor as well as people at a younger age disproportionately, resulting in higher death rates.

Various risk factors exist for CVD with some being gender specific. Although women tend to develop CVD later in life than men (AHA, 2003), a woman's risk of heart disease after menopause is the same as a man's and its effects are greater in women due to specific risk factors that are unique to women, including the use of oral contraceptives, menopause and hormone replacement therapy (Anderson & Kessenich, 2001). Research has suggested that women experience chest pain differently to men. Women tend to dismiss chest pain as insignificant or caused by indigestion and delay treatment, if they seek treatment at all (Canto et al., 2007; Birchfield, 2003; Summers, Cooper, Woodward & Finerty, 2001). Studies have also found that women are more likely than men to be told that their symptoms are due to psychological or stress-related problems (Long et al., 2005; Anderson & Kessenich, 2001).

Ethnic differences also exist with regard to CVD. Birchfield (2003) reported that Black women are more likely to develop CVD, as they are more likely than White women to be hypertensive, diabetic and obese. Furthermore, Cheek and Cesan (2003) found the death rate due to CVD for Black women to be 70% higher than for White women. In South Africa, the highest death rate for CVD is found in the Indian population, followed by the Coloured population, while the Black and White population has the lowest similar rates. However, considerable pattern differences for CVD are reported between the Black and White populations. The White population mainly reflects a pattern of death caused by heart attacks, while the Black population reflects that of death caused by stroke, diseases of the heart muscle and high blood pressure (Norman, Bradshaw, Schneider, Pieterse and Groenewald, 2006).

Knowledge of CVD risks has been found to influence CVD awareness. Meisler (2001) stated that women's lack of knowledge with regard to CVD, may contribute to a higher risk of CVD due to the fact that they might ignore early signs of heart disease. Historically, women's health issues have focused on menopause and breast cancer, which may have led women to believe that CVD is not a significant problem for them (Bedinghaus, Leshan & Dieher, 2001). Previous surveys have indicated that women are oblivious to the symptoms related to heart disease as well as related risk factors involved with CVD (Bedinghaus et al., 2005; Meisler, 2001). Approximately 8% of women reported heart disease and stroke as the largest of all health related problems in contrast to 61% of women that noted cancer to be the greater risk to health (Mosca et al., 2000). Although breast cancer has been identified as the most common cancer in South African females (16.6%) (Vorobiof, Sitas &

Vorobiof, 2001), cardiovascular disease is still claiming more South African women (6%) than cancer of the breast (2.7%) (Bradshaw et al., 2006).

Women of colour and low socio-economic status (SES) seem to be more affected by CVD. Several studies in the United States (US) reported that women of all ethnicity and age groups have inadequate knowledge of CVD risk factors in spite of well-established behavioural and medical routines to lower their risks (Mosca, Ferris, Fabunmi & Roberston, 2004; Birchfield, 2003 and Cheek and Ceesan, 2003). Furthermore, research found that the younger population has some knowledge of behavioral strategies to prevent heart disease, but lack the knowledge to carry out specific prevention methods (Green et al., 2003; Vale, 2000).

It is imperative that young individuals are educated regarding the identification and modification of the risk factors of CVD. The limited research on CVD risk factors in the South African university-aged population contributes to the lack of knowledge and awareness of CVD risks. University is the final bridge between education and the working world into which adolescents become independent and self-sufficient, therefore this is an ideal time for instilling at-risk behavioural changes. Thus, the aim of this study was to determine knowledge and perception of cardiovascular disease risks of female students at a university in the Western Cape, South Africa.

Methods

The study employed a cross-sectional, quantitative design. The population for this study included all current female students at a university in the Western Cape, South Africa. At the beginning of 2008, 15 479 students were enrolled at the university. Of the total number of students, approximately 60% (9 251) were female. Convenient sampling was used for this research. The study sample was calculated using the Yamane formula for sampling n= $\frac{N}{1+N(e)^2}$ where n stands for sample, N for study population and e is a constant equal to 0.05 (Israel, 1992). According to this formula, a minimum of 390 students had to be selected in order to be able to generalize the results to female students at the participating university.

Data were collected by means of a structured, self-administered questionnaire consisting of three sections. Questions from the validated *Check your Healthy Heart I.Q Survey* used by Long et al. (2005) in their study of CVD risks in women, as well as the validated instrument used by McMahan, Cathorall and Romero (2007) in their study of cardiovascular disease risk perception and knowledge were included in the questionnaire. The *Check your Healthy Heart I.Q Survey* instrument was developed and published by the National Heart, Lung and Blood Institute of the National Institutes of Health (2004). This survey is an educational health risk assessment tool that was utilized to evaluate knowledge of CVD among women. The instrument used by McMahan et al. (2007) evaluated the students' perceived susceptibility to CVD risk. The adapted questionnaire was piloted on fifteen (15) female students to assess face validity and applicability of all the items for this population as well as the time it took to be completed. A twenty-four (24) item questionnaire was used for this study. Ten (10) items determined the demographic data of the participants; ten (10) items assessed the knowledge relating to CVD and four (4) items determined perceived susceptibility to CVD. The following criteria for evaluating knowledge regarding CVD risks were used: ≥70% correct answers = knowledgeable of CVD risks and <70%

correct answers = not knowledgeable regarding CVD risks (Long et al., 2005).

Six hundred (600) questionnaires were administered to female students. The library, cafeteria, residence entrance halls, lecture halls and adjoining buildings were targeted. Ethical clearance was obtained from Senate Research Grants and Study Leave Committee of the participating university as well as the Registrar. Signed, informed consent was obtained from all participants. An information sheet explaining the purpose of the study was attached to every questionnaire. If there were any queries, the research assistants were available at all times to answer them immediately. Information obtained was handled with complete confidentiality. Participation was voluntary and participants were informed of their right to withdraw from the study at any time with no impunity.

Data obtained from the questionnaire were analyzed using the Statistical Package for the Social Sciences (SPSS) version 16.0. The data was subjected to both descriptive and inferential statistics. Demographic data were expressed as means, standard deviations and percentages. Data analysis included cross-tabulations using the Chi-square test for association between knowledge of CVD, risk perception and socio-demographic variables. Alpha level was set at $p<0.05$.

Results

Four hundred and thirty eight (438) female students completed and returned the questionnaires. Thus, the overall response rate was 73%. The study sample had a mean age of 22 years (SD=5.0). More than half of the study sample (53.7%) classified themselves as Coloured and almost 30% as African/Black. More than 80% of the study sample was younger than 25 years, 14.3% between 25 and 44 years and 0.2% 45 years and older. No significant association were found between race and knowledge of CVD risks, age and knowledge of CVD risks as well as year of study and knowledge of CVD risks ($p>0.05$).

Overall, 56.8% of the study sample was classified as knowledgeable of CVD risks. Almost 71% of the participants identified breast cancer as being the greatest health risk for women with a mere 6.6% indicating heart disease. (Table 1).

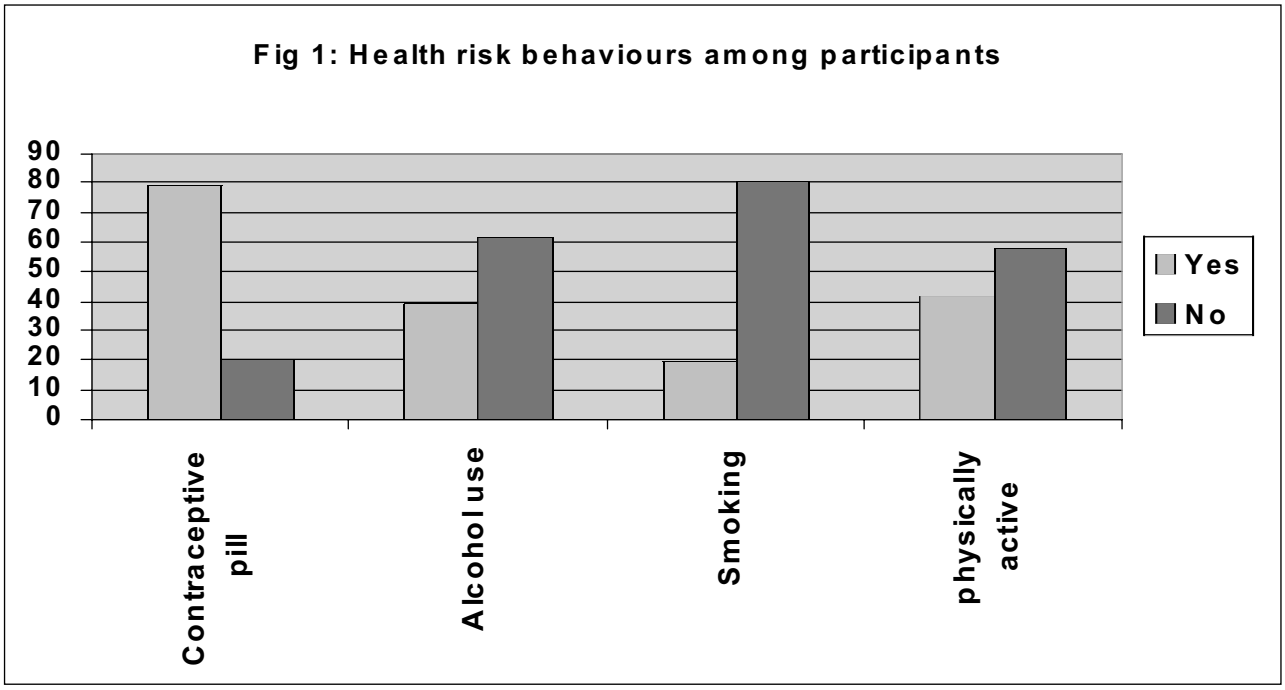
Table 1 Distribution of knowledge of CVD risks

	YES		NO		MISSING	
Question	**n**	**%**	**n**	**%**	**n**	**%**
Risk factors related to heart disease that you can control:						
High blood pressure	348	**79.5***	84	19.2	6	1.3
Family history	171	39.0	253	**57.8***	14	3.2
Smoking	304	**69.4***	127	29.0	7	1.6
Race	176	40.2	259	**59.1***	3	0.7
Risk factors related to heart disease that you cannot control:						
Age	262	**59.8***	173	39.5	3	0.7
Gender	272	**62.1***	164	37.4	2	0.5
Physical inactivity	118	26.9	393	**89.7***	6	1.3
Previous heart disease and stroke	295	**67.4***	182	41.6	5	1.1
Racial group most affected by heart disease in South Africa (Indian/Asian)	73	**16.7***	365	83.3	-	-
Disease females are most at risk of getting (heart disease)	**2**9	**6.6***	409	93.3		

*correct answer

Among the participants, the White population (40%) was identified as the race most susceptible to CVD, with 32%, 17% and 11% classifying the African/Black, Indian/Asian and Coloured population respectively. None of the participants who classified themselves as African/Black (30%), rated the African/Black population as being most affected by CVD.

Approximately 51% and 84% of the study sample reported having a family history of CVD and having been informed of their risk of developing CVD, respectively. Significantly more Indian/Asian (64%) and White individuals (63%) reported having a family history of CVD (X^2 = 14.268, p=0.003). Significantly more students with a family history of CVD reported being informed of the risk of developing CVD (X^2 = 11.552, p=0.001). More than 75% of the study sample did not perceive female university students as susceptible to the onset and risk of CVD. The results also showed that approximately 58% of the participants did not perceive themselves at risk of developing CVD. The prevalence of perceived susceptibility to the onset and risk of CVD varied significantly by having a family history of CVD and whether participants were informed of their risks. A highly significant relationship was found between risk perception and being informed of the risk of developing CVD (X^2 = 17.7820; p = 0.000) and having a family history of CVD (X^2 = 17.7820; p=0.000).



The participants engaged in a number of other behaviours that could increase their risk of developing CVD (Fig 1). Almost 20% of the study sample smoked and used the contraceptive pill whereas almost 40% reported alcohol use. Furthermore, 58% of the participants indicated that they are physically inactive, with a mere 12.0% exercising twice a week. No significant associations were found between socio-demographic variables and perceived risk for developing CVD ($p>0.05$).

Discussion

This study aimed to determine female students' knowledge and perception of cardiovascular disease risks. The results suggested that 43.2% of female university students were not knowledgeable regarding CVD risks. It therefore supports McMahan et al. (2007), who found that there are important opportunities to educate college students about CVD risk and perception.

The current results are of concern and coincide with research claiming that women are not knowledgeable regarding their risks of developing CVD (Long et al., 2005; Bedinghaus et al., 2001; Meisler, 2001). Researchers have found that women's lack of knowledge regarding CVD may contribute to a higher risk of CVD, as women tend to focus on menopause and breast cancer, therefore ignoring specific risk factors that could lead to CVD (Long et al., 2005). Meisler (2001) found that 80% of women were unaware that CVD is the single leading cause of death and disability among women. This could be due to the fact that women are unable to identify their most important health concern and are therefore found to be less knowledgeable than men about CVD (Gettleman & Winkleby, 2000).

Furthermore, this study identified a need for increased knowledge and awareness regarding certain risk factors that contribute to the development and misdiagnosis of CVD, as more of the younger population needs to be aware of the atypical signs and symptoms of CVD (Epping-Jordan, Galea, Tutuitonga & Beaglehole, 2006; WHO, 2005). Primary prevention in the form of education and prevention regarding physical activity, smoking cessation and obesity prevention

is needed to target CVD prevention in the younger population, as university students has been identified as a population participating in unhealthy behaviours. It is an imperative step toward instilling healthy lifestyle habits that can be carried through life.

A further concern is the fact that breast cancer was identified as the greatest health risk for women by the majority of the study sample with a mere 6.6% indicating heart disease. This low perceived risk of women for developing heart disease represents an alarming trend which is consistent with other international studies (Collins, Dantico, Shearer & Mossman, 2004; Mosca et al., 2000). The reasons for this are unclear. As Collins et al. (2004) stated: 'It is possible that the fear of cancer actually stems from concern over the side affects of the disease or its treatment'. This misperception of cancer as the leading cause of death is important because it epitomizes a misconceived notion of the risk for chronic illnesses such as heart disease. Students may also feel that the possibility of developing heart disease lies too far in the future to incite concern, while breast cancer could pose a more immediate health risk.

Differences also exist with regard to female students' perception of CVD risk by ethnicity. Current results are confirmed by Birchfield (2003) and Anderson and Kessenich (2001) who also found that participants perceived Black women to be more at risk than White women to develop coronary artery disease or suffer a stroke. This is of great concern, as Norman et al. (2006) reported the highest death rates for heart and blood vessel diseases in South Africa to be found in the Indian population, followed by the Coloured population, while the White and Black/African populations have the lowest rates.

When asked to compare the likelihood of developing CVD with people of their age, more than half of the study sample (57.5%) did not feel that they were at risk. These results are in line with findings by Green, Grant, Hill, Brizzolara & Belmont (2003) who indicated that college students do not accurately perceive their risk of developing heart disease, because of the lack of perceived seriousness of the disease. Perceived susceptibility was determined to be an indicator of an individual's willingness to participate in risk-reduction behaviours for the prevention of heart disease (McMahan et al., 2007; Collins et al., 2004). The lack of perceived risk for CVD among women could impact on preventative behaviours practiced by females. Certain risky behaviours such as excessive alcohol intake, smoking and unhealthy diet are often exacerbated in the university environment. Female students are therefore more likely than women in general, to participate in these risky behaviours. The misconception that CVD is primarily a disease that affects men, furthermore contribute to women not perceiving themselves susceptible to CVD. Therefore, female university students need to be informed of their own susceptibility of developing CVD.

Vale (2000) found that students had some knowledge regarding risk management strategies but did not have the knowledge to carry out specific prevention methods. Results from the present study clearly show that some of the participants do practice risky behaviours such as smoking, physical inactivity and using the contraceptive pill. Women predisposed to CVD risk factors such as hypertension, obesity and smoking have an increased risk of heart disease when used in conjunction with oral contraceptives (Anderson and Kessenich, 2001). These findings coincide with studies that found that people with a low-risk profile

have a much lower incidence of cardiovascular disease (CVD) than those with one or more single risk factors (Khot et al., 2003), and the lowest incidence of heart disease appears to be among those who adhere to multiple risk-reducing behaviors (Stamler et al., 1999). While smoking is clearly associated with heart disease, a growing body of literature demonstrates that exercise and increased fruit and vegetable intake can reduce the risk of CVD (Bazzano et al., 2002).

Study Limitations

The study sample was non-randomized, therefore generalization of the findings is restricted to female students of the participating university. The small number of some ethnic minorities in the study sample may limit the degree to which the findings can be generalized. Furthermore, content validity and reliability of the instrument was not addressed.

Conclusion

Although more than 50% of the participants in the study were knowledgeable regarding risk factors for CVD, it is still evident that women, specifically the younger population, should be made aware of their risk of developing CVD. Because many heart disease risk factors may be managed through lifestyle modification, public education directed at altering personal behaviours remains the most effective strategy for reducing disease risk. Programmes that focus on primary prevention need to be developed to promote healthy lifestyles that are cultural and gender appropriate for the university population. It is vital to our nation's health that young female individuals are educated regarding the identification and modification of risk factors for CVD, an illness traditionally thought of as a "man's disease". Although heart disease is manifested primarily in older age groups, pathogenesis begins early in life. Therefore, risk management strategies implemented at a young age may have a significant impact on CVD progression. As Lipp, Deane and Trimble (1996) concluded: "Interventions must begin in early life if heart disease is to be prevented for the reason that behaviours learned at young ages are most likely to be carried on to reduce CVD".

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A KNOWLEDGE ASSESSMENT QUESTIONNAIRE RELATING TO RISK FACTORS FOR CHRONIC DISEASE OF LIFESTYLE FOR HIGH SCHOOL LEARNERS: VALIDITY AND RELIABILITY

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ABSTRACT

Objective:

The author aimed to develop a valid and reliable questionnaire that would measure the knowledge of learners relating to risk factors for chronic disease of lifestyle such as stroke, diabetes and hypertension. The questionnaire was intended to be used as part of a health education programme aimed at improving the knowledge of learners as it relates to risk factors for chronic diseases of lifestyle.

Method:

The development of the questionnaire was guided by Williams' nine steps of questionnaire design and was influenced by the national curriculum of education's life orientation programme and literature. A 31 item questionnaire was designed and presented to an expert panel. Content validity was done by the expert panel and face validity was tested through informal discussions with high school learners. Reliability testing was done using the test-retest method and Kappa co-efficient was used to test stability of the items. The questionnaire was administered to 40 high school learners but only 30 did the test the second time.

Results:

The questionnaire yielded a reliability analysis that revealed internal consistency with a Cronbach's alpha of 0.897. The average score obtained by learners using this questionnaire was 14.

Conclusion:

The questionnaire can be used for learners with a grade 10 education. The questionnaire also highlighted that learners had a moderate knowledge relating to risk factors for chronic diseases of lifestyle and the need for appropriate information interventions was emphasized.

Key words: knowledge, questionnaire, chronic diseases, risk factors

Introduction

Non-communicable diseases (NCD's) are the leading cause of death in the world (WHO,2003). In Africa it is increasing to the levels of communicable diseases causing a

double burden of disease. In the Western Cape, South Africa, non-communicable diseases (NCD's) are the leading cause of death (Bradshaw, Schneider, Norman and Bourne, 2006). The diseases identified included cardiovascular disease (stroke), diabetes and obesity. These can be identified as chronic diseases of lifestyle influenced by factors such as globalization and urbanization. Surveys conducted in schools in the Western Cape revealed the existence of a high prevalence of risk factors for non-communicable diseases among adolescents and young people (Frantz, 2006). Research has indicated that adolescents are at the vulnerable age of engaging in risky behaviour without realizing the consequences of their actions. Various research has shown that by addressing the risk factors for non communicable diseases, this will assist in decreasing the incidence of NCD's (Nissen, Berrios and Puska, 2001). Risk factors include physical inactivity, alcohol use, smoking, unhealthy diet over a long period and psychosocial stresses. The question that arises is how do we address this problem as South Africa is facing a triple burden of disease with infectious diseases such as HIV/AIDS, violence related injuries and now the increasing NCD's. Large scale interventions have been conducted in developing countries including South Africa to address the growing prevalence of NCD's (Doak, 2001) and it was concluded that there is a need to focus on programmes that address the needs and concerns of specific communities and then use culturally appropriate interventions. Chronic disease such as stroke, hypertension and diabetes are preventable diseases of lifestyle and should be prevented at an early age.

Education of the population on the risk factors of these chronic diseases can assist in controlling and preventing escalation of these diseases. Health professionals play a role on the education of these populations to assist in reducing the effect of these diseases. Physiotherapy is central to patient education and plays a role at all levels of health care. Schools are one setting where health professionals such as physiotherapists can play a role in advocating for the prevention of non communicable diseases and more specifically diseases of lifestyle. In order to implement effective health education programmes one need to measure client knowledge prior to an intervention and following an intervention. The primary aim of this study was to design, validate and test the reliability of a questionnaire for young people regarding diseases such as hypertension, stroke and diabetes. The questionnaire designed would be used as an assessment tool for knowledge prior to the implementation of health education programme relating to risk factors for chronic diseases such as diabetes, hypertension and stroke. It is important to have clear objectives, a research question and target population before designing the questionnaire (Williams, 2003). Piloting of a questionnaire is essential to determine if it will work for the desired population and assisting in identifying administrative and analytical problems (Boynton,2004).

Methods

Nine steps in the designing of the questionnaire have been defined and these are reflected in Table 1. The current study followed these guidelines in formulating the questionnaire. The aim was to design a questionnaire that was able to measure

the knowledge of grade 10 – 12 high school learners as it relates to risk factors for chronic diseases of lifestyle such as stroke, hypertension and diabetes. The questionnaire design was based on literature (Williams, 2003; Evans & Oakshott; 2003). The original questionnaire comprised of demographic data, 5 general knowledge questions relating to chronic diseases of lifestyle; 5 questions on hypertension; 11 questions on diabetes and 10 questions on stroke. A total score of 26 could be obtained for the knowledge questionnaire. Specific areas covered in the questionnaire included lifestyle changes, risk factors and signs and symptoms. The questions were simple for easy understanding.

Table 1: Stages of questionnaire design (Williams, 2003)

Define research question and study population
Decide how questionnaire will be administered
Formulate your questions
Formulate the responses
Design the layout
Pre-pilot the questions and layout
Pilot study to test for validity, reliability and acceptability
Design coding scheme
Print questionnaire

The questionnaire was presented to health professionals and educators who dealt with education of the clients regarding chronic diseases of lifestyle. This aided in testing content validity of the questionnaire. These participants provided comment on the clarity of the questionnaire and content in terms of appropriateness for the level of learners it is aimed at. Face validity was assessed through informal discussions with a convenience sample of grade 11 and 12 learners.

Reliability testing was done using three stages. One form of testing reliability of a questionnaire is to test for stability and this involves administering the questionnaire to the same group on two separate occasions with an adequate time interval. The questionnaire was thus tested on 40 grade 12 learners and then re-tested 2 weeks later on the same group to assess reliability of the questionnaire. Reliability of the questionnaire can also be assessed for single items using the Kappa agreement and finally for summary scores for the complete questionnaire to determine internal consistency. Cronbach's alpha was used to assess the internal consistency of the questionnaire. Alpha values above 0.70 were considered good. To assess the test-retest reliability of the questionnaire an intraclass co-efficient (ICC) with 95% confidence interval was calculated. An ICC above .75 was considered excellent reliability; between 0.4 and 0.75 indicates fair to good reliability and an ICC below 0.44 indicates poor reliability.

To prepare for data analysis, questions were scored so that high values reflected high knowledge. Scoring for the knowledge scales was on a scale of 1-3 with 1=yes; 2=no and 3=I don't know. Kappa co-efficients was used for dichotomous answers and categorical data. Analysis of the Kappa was presented as 0.81-0.99 = almost perfect agreement; 0.61-0.80 = substantial agreement; 0.41-0.60 = moderate agreement; 0.21-0.40 = fair agreement and 0.01-0.20 = slight agreement and <0 = less than chance agreement. The scores of each section and the final scores were classified into three categories namely poor knowledge (<50%), adequate knowledge (51-70%) and good knowledge (>70%). Ethical approval was obtained from the University of the Western Cape and informed written consent was obtained from the school principal and all participants.

Results

The initial questionnaire was administered to 40 high school learners and the retest two weeks later was presented to the same group. However, the response rate on the second round was only 75% (30/40). Of the respondents 43% (13) were male and 57% (17) were female. The average age of the participants was 17.4 with a range of 16-18. Basic demographic data of the participants is presented in Table 2 below.

Table 2. Characteristics of participants (N=30)

Variable	*n (%)*
Gender	
Male	**13 (43%)**
Female	**17 (57%)**
Age	
16 years	**1 (4%)**
17 years	**15 (50%)**
18 years	**14 (46%)**
Heard of chronic diseases of lifestyle	
Yes	**20 (67.%)**
No	**10 (33%)**
Heard of stroke	
Yes	**26 (87%)**
No	**4 (13%)**
Heard of diabetes	
Yes	**27 (90%)**
No	**3 (10%)**
Heard of Hypertension	
Yes	**20 (67%)**
No	**10 (33%)**

Validity

The questionnaire was tested for content and face validity. Content validity refers to the subject matter of the instrument and considers how appropriate the items are in covering the subject. On the other hand face validity refers to how reasonable the items and overall questionnaire are for its target group from the perspective of the expert panel. The panel consisted of 2 life orientation teachers, a questionnaire development expert and a researcher familiar with the content area. Ten learners from a local high school were used to test the questionnaire for clarity, understanding of the questions, readability of the individual items and the overall questionnaire and this contributed to the face validity of the questionnaire.

Reliability

Of the 31 items, 26 items were subjected to the Kappa test to assess the magnitude of agreement between test and retest on knowledge questions. Five items had poor agreement with a Kappa co-efficient below 0.20. These questions were rephrased following the validity testing of the questionnaire and this rephrasing impacted on the outcome of the agreement of these questions. One question still yielded a Kappa of 0.2 and it was decided to exclude it from the final questionnaire leaving only 10 questions in that section (diabetes). The majority of the items (16) had a Kappa co-efficient between 0.45 and 0.60 yielding a moderate agreement. Seven (7) items yielded a substantial agreement between 0.61 and 0.8 and one (1) item had an agreement of 0.81. The kappa agreement for each item per section is presented in Table 3. The questions with low Kappas (0.45-0.6) were discussed with the expert panel and a statistician to assess the reason for weak agreement and to decide whether to exclude those questions. It was decided to leave the questions as the knowledge of the participants could have influenced the outcome.

The reliability of the questionnaire based on summary scores from each subject was excellent. Table 4 reflects the ICC for each section and the overall score.

The internal consistency for each section demonstrated a Cronbach's alpha of 0.73 for hypertension; 0.868 for diabetes and 0.874 for stroke. Mean knowledge scores from the pilot

study showed an overall mean score of 14.2 for all participants. The mean score for males was 14 (8-23) and for females was 14.35 (7-23). The classification of the knowledge for each section for both tests is presented in the Table 5 below. Most learners tended to be classified as having 50-70% of the knowledge.

Table 3: The Kappa agreement for each question

Question	Item	Kappa
10	Hypertension is another name for high blood pressure	0.56
11	The following blood pressure is considered to be high 130/80	0.58
12	Hypertension can be treated with medication, exercise & weight loss	0.70
13	Lifestyle changes such as stopping smoking and weight loss can decrease blood pressure	0.56
14	Damage to the kidney is a sign of high blood pressure	0.64
15	Diabetes is commonly known as “sugar” sickness	0.81
16	The following is normal blood glucose levels 3.8-7.7	0.49
17	Eating to much sugar and other sweet foods is a cause for diabetes	0.58
18	Diabetes can be cured	0.59
19	Shaking and sweating are signs of high sugar levels	0.77
20	The kidneys produce insulin	0.60
21	The usual cause of diabetes is lack of effective insulin in the body	0.75
22	Diabetes causes poor circulation	0.58
23	Medication is more important than diet and exercise in controlling diabetes	0.45
24	There are 2 types of diabetes namely Type 1 and Type 2	0.54
25	**Diabetes can damage my Kidneys**	**0.23**
26	The most common type of stroke is when the blood supply to the brain is blocked	0.48
27	Another name for stroke is cerebrovascular accident	0.66
28	Signs of stroke include blurred vision, paralysis on one side of the body and severe headache	0.56
29	You are at risk of getting a stroke if you are obese	0.48
30	The most common known risk factor for stoke is high blood pressure	0.45
31	If you drink alcohol you are less likely to get a stroke	0.47
32	To reduce the risk of stroke you need to eat well and exercise regularly	0.66
33	Right arm paralysis could be a physical disability of stroke	0.48
34	If you stop smoking you can decrease the risk of having a stroke	0.74
35	Diabetes and stroke are closely linked	0.70

Table 4: Reliability of summary scores for the questionnaire

Section	ICC	95% CI of the ICC range
Hypertension	0.73	0.67-0.87
Diabetes	0.87	0.72-0.94
Stroke	0.87	0.74-0.94
Overall score	0.89	0.78-0.95

Table 5: Classification of knowledge

Section	< 50% T1	T2	50-70% T1	T2	>70% T1	T2
Hypertension	9(30%)	8 (27%)	**15(50%)**	**16(53%)**	6 (20%)	6(20%)
Diabetes	11(37%)	11(37%)	**16(53%)**	**16(53%)**	3(10%)	3(10%)
Stroke	6(20%)	5(17%)	**16(53%)**	**16(53%)**	8(27%)	9(30%)
Overall Score	10(33%)	8(27%)	**17(57%)**	**20(67%)**	3(10%)	2(6%)

T1=Test 1
T2= Test 2 (2 weeks later)

Discussion

There is a growing interest of health care providers and researchers in the prevention of chronic diseases of lifestyle and this highlights the need for appropriate intervention programmes. However, the success of information based intervention programmes is dependent on the evaluation of the programmes to assist in improving the programmes and thus the need for valid and sensitive outcome measurements. The study presented here is intended to contribute to this effort by attempting to provide a valid and reliable tool to assess knowledge relating to risk factors for chronic diseases. Great care should be taken when designing questionnaires or outcome measurement tools and it has been highlighted that critiquing of questions is important (Rosen and Olsen, 2006). In addition, reliability and validity of a questionnaire is of equal importance for evaluating its generalisability.

It is important to note that when designing an assessment instrument the target population as well as the objectives of the study is important considerations. The reliability of this questionnaire was assessed using temporal stability and internal consistency. This is similar to other studies which developed knowledge questionnaires for physical activity (Verbunt, 2008); nutrition (Whati et al. 2005); rheumatoid arthritis (Hennell et al 2004); diabetes (Fritzgerald et al 1998) and HIV (Carey et al 1997). All the studies used Cronbachs' alpha to measure internal consistency although the Pearson correlation to measure test-retest stability was also used (Carey et al 1997). In this study test-retest reliability based on summary scores for each section was excellent (ICC= 0.73-0.874) using the intra-class correlation. When looking at each individual item's agreement, there was a large majority of items which yielded only moderate agreement using the Kappa co-efficient

Validity of this questionnaire has been shown through a process of appropriate testing. The procedures outlined in the methods section including the consultation with experts in the area and the compilation of literature regarding risk factors for chronic diseases of lifestyle ensured the content validity of the questionnaire. The questions were found to be understood by learners who have and do not have a Biology background.

The questionnaire has shown a variation of final scores ranging from 7–23 and most of the learners had between 50 and 70% knowledge. This is an indication for the need to evaluate knowledge and implement successful interventions. Knowledge interventions are effective as a tool to access clients understanding of conditions in order to implement appropriate interventions or health education programmes. These interventions aimed at improving knowledge could ultimately contribute to compliance in disease management and prevention.

A limitation of the study is the sample size for test-retest as well as the moderate response rate during the second round. In addition, this questionnaire was designed around the possibility of the implementation of a health questionnaire focused in risk factors for chronic diseases of lifestyle and specifically hypertension, diabetes and stroke. This questionnaire can however facilitate assist in determining knowledge levels and be used as an instrument against which to evaluate improving knowledge and creating awareness among an at risk population about risk factors for chronic diseases of lifestyle.

Clinical Implications

When using this questionnaire to assess knowledge it needs to be remembered that the questionnaire was designed with the specific aim to use it as a assessment instrument prior to a health education programme. Health professionals must realize that improvement of knowledge does not necessarily translate into behaviour change.

Conclusion

The development of this questionnaire was aimed at assisting health professionals advocating for prevention of non communicable diseases and specifically chronic diseases of lifestyle such as hypertension, diabetes and stroke to assess the knowledge of the targeted population prior to implementing effecting preventive strategies. Reliable and valid assessment of knowledge will allow for “more precise evaluation of programmes designed to reduce risk-conferring behaviours” (Carey et al 1997).

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PERINATAL ACTIVITIES AND SYMPTOMS FREQUENCY AND SEVERITY

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ABSTRACT

Objective:

The first aim is to present descriptive non-medical data on perinatal variables. The second is to investigate the frequency and severity of symptoms during and after pregnancy.

Methods:

This retrospective cohort study used a self-designed questionnaire consisting of 52 items among 489 puerperae

Main outcome measures:

Perinatal data and symptoms during pregnancy at 6 months postpartum.

Results:

In preparation for their pregnancy, 52% were referred to a physiotherapist. Before pregnancy, 18% smoked, 61% of whom quit smoking during pregnancy. In relation to the place of birth, 88% stayed 5 to 7 days in hospital. During the first stage of labour, 59% used tools like bath or ball. The supine position was the most popular posture during labour. The prevalence of breast-feeding was 80%. Urgency, mood disorders and backache were the most frequent symptoms during pregnancy. Painful breasts, mood disorders, backache and urinary incontinence were the most frequent symptoms after pregnancy. Pelvic girdle pain was the most distressing symptom before and after birth. Urinary incontinence, backache and mood disorders still showed high frequencies at 4 to 6 months postpartum (13%, 22% and 19% respectively).

Conclusion:

This study draws attention to non-medical perinatal data like pregnancy preparation, smoking habits, place of birth, time spent in the maternity hospital, posture and tools used during labour and breast-feeding. Urgency, mood disorders and backache were the most frequent symptoms during pregnancy. Painful breasts, mood disorders and backache were the most frequent symptoms after pregnancy.

Key words: symptoms, postpartum, pregnancy

Introduction

In the last 3 decades, there has been an increase in the development of antenatal, obstetrical and postnatal care. The prevalence of descriptive non-medical data like pregnancy preparation, smoking habits, place of birth, time spent in maternity hospital, tools like bath and ball used during labour, posture during labour and breast-feeding has been reported minimally. Information about these data reflect important changes in a society which values health and well-being. Prevalence of pregnancy preparation by physiotherapists or midwives has been rarely described although a lot of studies reflect on the importance of preparation (Chalmers et al. 2008; Whitfield et al. 2007).

Many studies have presented the disadvantages of smoking during pregnancy. Pregnancy seems to represent a period when smoking cessation activities are effective, and physicians, midwifes and physiotherapists are encouraged to advise pregnant women, leading to a reduction in the number of pregnant women smoking (Colman & Joyces, 2003; Odlind et al. 2003; Kvalvik et al. 2008). Regarding the place of birth, Wiegers et al reported a home birth rate of approximately 30% in the Netherlands (Wiegers et al. 1996).

A lot of help is available to decrease the pain and discomfort women experience during the first stage of labour. The most described tool was the use of a bath to reduce maternal pain but no prevalence rates have been described (Cluett, Nikodem & McCandish, 2004). Odlind et al reported that the time spent in maternity wards at the hospital decreased from three days in 1973 to two days in 2000 (Odlind et al. 2004). In a review concerning the body position during the first and second stage of labour, Gupta et al concluded that the upright or lateral position in the second stage of labour reduced the duration of labour but increased the risk of blood loss. Women adopting the upright posture for delivery experienced less pain, perineal trauma and fewer episiotomies than those who delivered in the supine position (Gupta & Nikodem, 2000; Gupta & Hofmeyer, 2004). Concerning breastfeeding, prevalence rates were reported around 70 % in the early postpartum and 21% to 33% six months after birth (Jacknowitz et al. 2007; Roske et al. 2008).

Prevalence and severity of symptoms during pregnancy and postpartum

Normal pregnancy is accompanied by a range of physical and psychological symptoms. There is an apparent lack of information on the wide range of symptoms during pregnancy and also postpartum. Two studies reported on the prevalence of a wide range of health problems during pregnancy (Koh et al. 1973; Zib et al. 1999). Three articles were found on the prevalence of symptoms after childbirth (Brown & Lumley, 1998; Zib et al. 1999; Thompson et al 2002). None of them reported the severity of symptoms. However, several studies exist on the prevalence of one or two conditions during pregnancy and the puerperium.

The aim of this study was to present descriptive non-medical data on maternal, obstetric and postnatal variables or activities. The second aim was to investigate the prevalence and severity of symptoms of a large number of women during pregnancy and the puerperium

Participants and Methods

Four hundred and eighty-nine Belgian women were included in the study and completed a self-administered questionnaire on descriptive perinatal data. All the women were contacted by physiotherapy students of the University of Leuven who were instructed to contact one or two women in their neighbourhood. Inclusion criteria for all women were those giving birth to their last child between 6 and 12 months before the time of inclusion into the study and those speaking the Dutch language.

During a home visit, the student explained each question in a 52-item questionnaire to the woman. After the explanation, each woman filled in the questionnaire independently. All women gave their informed consent and agreed to re-answer the questions again on the telephone to ensure the reliability of the questionnaire. Twenty women were telephoned one month later and were asked the same questions again by one interviewer (KG). The 52 items of the questionnaire were related to health outcomes of antenatal, obstetrical and postnatal data. To check a fair representation of the study group for all women in Flanders, women in the study group were asked 6 questions about parity, epidural analgesia, age at the first birth, the type of birth, foetal position and the use of episiotomies. Each year, the Study Centre for Perinatal Epidemiology collects these data from all maternity hospitals in the Flemish region and Brussels-capital region of Belgium (16).

In the next 9 questions, more specific information was collected about pregnancy preparation, smoking habits, place of birth, tools used during labour, posture during the two stages of labour, breast-feeding and its duration.

In the last part, 37 questions were asked about frequency and severity of symptoms for each trimester of pregnancy and during the postpartum period 6 months after delivery. Severity of symptoms was scored on a visual analogue scale (VAS) ranging 0 to10 (0 = no symptom; 10 = severe symptoms). Symptoms were morning-sickness, leg cramps, oedema, heavy legs, urgency, stress-incontinence, urge-incontinence, constipation, diarrhoea, incontinence of flatus, faecal incontinence (fluid), faecal incontinence (solid), skin rashes, mood disorders, fear during pregnancy, backache, pelvic girdle pain, painful breasts postpartum, painful contractions postpartum, postnatal depression and “other symptoms”.

Statistical Analyses

To establish the reliability of scoring the questionnaire by the students, kappa, weighted kappa and ICC for respectively nominal, ordinal and ratio/interval variables were used. Weighted kappa and ICC values higher than 0.80 were termed very high and values between 0.80 and 0.50 were termed moderate (17-18). Descriptive statistics were used to document obstetric characteristics and symptoms. All statistical procedures were performed with the SAS system.

Ethics

The procedures of the study received ethical approval from the Commission Medical Ethics of the University Hospitals KULeuven responsible for human/animal experimentation.
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Results

The mean age of the 489 participants was 30.5 ± 3.8 years.

Reliability of the Perinatal Data

Most of the obstetrical data and symptoms showed reliability values between 0.80 and 1.0. Smoking habits, place of birth, type of birth, foetal position, posture at second stage of labour, use of episiotomy and breast-feeding showed perfect reliability (kappa = 1.0). The same reliability rate was seen for the age at the first birth and parity (ICC = 1.0). Pregnancy preparation, posture and use of tools during the first stage of labour and the use of instruments at delivery had kappa values higher than 0.80. The same reliability was seen for duration of breast-feeding (ICC > 0.80). However, some symptoms like pelvic instability at 1st trimester, urge and morning-sickness at second

trimester, leg cramps and constipation at third trimester, urge and mood disorders at first month postpartum, urinary incontinence and pelvic instability at two to three months postpartum, backache at four to six month postpartum showed ICC values lower than 0.80 but higher than 0.50. Faecal incontinence (solid) at first trimester, faecal incontinence (fluid) at second trimester, painful contractions and postnatal depression at two to three months postpartum and constipation at four to six months postpartum had low ICC but high percentage agreement.

Prevalence of Common Perinatal Data

The prevalence rates of common perinatal data in this study were compared with prevalence rates reported by the Study Centre for Perinatal Epidemiology in Flanders 2006(SPE) (Table1).

Table 1: Comparison between findings of current study and SPE

Variable	Present Study	SPE
No. of Primiparas	52%	48%
Epidiral analgesia	61%	67%
The age at first birth	27.7 years	28 years
Type of birth:		
Spontaneous	71%	70%
Caesarian section	15%	19%
Vacuum delivery	11%	9%
Forceps	3%	1%
Foetal Positions:		
Head Position	95%	95%
Breech positioning	5%	5%
Episiotomy	55%	59%

Prevalence of more specific non-medical perinatal data

Table 2 gives specific antenatal, obstetrical and neonatal characteristics. Two hundred and fifty-five women (52.1%) consulted a physiotherapist to guide them during their pregnancy. Only 35 women (7.2%) chose to get information from a midwife and 43 (8.8%) chose both options. Eighty-seven women (17.8%) smoked before their pregnancy of whom 53 (60.9%) quit smoking once they were pregnant. Four hundred and thirty-three women (88.5%) had a normal hospital stay (five to seven days) and 38 women (7.8%) had chosen a short stay in hospital (24 hours). Two hundred women (40.9%) did not use any tool during the first stage of labour. The prevalence of women using a ball or bath was 16.2% and 8.8% respectively. Supine position was the most used maternal position during the first stage of labour (49.1%) as well as during the second stage of labour (84.4%). Three hundred and ninety-four women (80.6%) breast-fed for an average duration of 122.9 ± 74.9 days.

Prevalence and severity of symptoms during pregnancy and postpartum

The percentages and the severity of symptoms during the prenatal and postpartum period are shown in table 3 and 4. In the first trimester, morning sickness was the most frequent symptom (61.3%), followed by mood disorders (49.9) and urgency (36.4). Urgency (53%), mood disorders (46.2) and backache (44.2) became the most

frequent symptoms in the second trimester. In the third trimester urgency, backache and edema had a prevalence rate of respectively 76.1%, 69.1 and 55%. In addition to the specific symptoms mentioned in the questionnaire, 10.4 % of the women reported “other symptoms” in the first trimester, 15.7% in the second and 19.6% in the third trimester. These problems included: tiredness, reflux and painful breasts.

On a scale from 0 to 10, morning sickness was the most inconvenient symptom in the first trimester with a score of 5.6. Although not frequent, pelvic girdle pain was the most serious symptom in the second and third trimester (5.4 and 6.0). Urgency was a frequent and serious complaint during pregnancy with a score of 5.8 just before birth. In addition to the specific symptoms mentioned in the questionnaire, the highest score on the visual analogue scale was given for tiredness in each trimester in the category “other symptoms”.

Whereas painful breasts were most frequent in the first month postpartum (59.9%), with a relatively high prevalence rate until four to six months postpartum (14.9%). Backache was the most frequent symptom at four to six months postpartum, with a percentage of 21.9%. Urinary incontinence was always classified in the top five most frequent symptoms postpartum. On a scale from 0 to 10, pelvic girdle pain remained high during the postpartum period as compared to the prenatal period. Postnatal depression was the most serious complaint 4 to 6 months postpartum with a score of 5.0. Nine percent reported “other symptoms” in the first month postpartum, 7.8% in the second to third month and 6.3% in the fourth to sixth month postpartum. These problems included: tiredness, discomfort from the episiotomy and hair loss.

Evolution of symptoms before and after pregnancy

The evolution of symptoms before and after birth is shown in Figure 1. Only symptoms, mentioned in the questionnaire before and after birth, were considered. The percentages can be compared over time to understand symptom changes. The majority of symptoms increased during pregnancy and reached their highest prevalence rate at the third trimester. The highest occurrence of prevalence during pregnancy was seen with urgency. Its prevalence was almost doubled in the third trimester compared to the first trimester.
Moreover most of the symptoms showed a decline in the postpartum previed. Diarrhoea and faecal incontinence did not show a change over the time-period. Despite an improvement, backache, mood disorders and urinary incontinence still showed a high prevalence rate at 4 to 6 months postpartum.

Discussion

All of the perinatal data and most of the symptoms showed high reliable values. No differences were found between the characteristics of the women of the present study and the young mothers in Flanders.

Prevalence of specific non-medical perinatal data

Two hundred and fifty-five (52%) women consulted a physiotherapist when preparing for their pregnancy in this study while only 7% contacted a midwife, although 9% contacted both. This was a high percentage for those having physiotherapy although no comparison could be made with the literature.

Only 17.8% of all women in this study smoked before pregnancy. Of these 60.9% quit smoking during pregnancy. Colman et al reported a higher

percentage of smokers (23%) and a lower percentage of 43% women who quit smoking during pregnancy (3). Odlind et al presented descriptive data from the Swedish Medical Birth Register as they developed between 1973 and 2000 and reported that smoking habits decreased from 30% to 12% (4). In Norway, daily smoking prevalence of pregnant women was reduced from 17% in 1999-2001 to 13% in 2002-2004 (5). A number of studies have presented the disadvantages of smoking during pregnancy. Regarding the place of birth, the present study found a home birth rate of 3.5%. This is low and differs from Wiegers et al who reported a home birth rate of approximately 30% in the Netherlands (6). In recent times, most Belgian women prefer to deliver their babies in the hospital where there is better health care.

The improved medical service has resulted in a shorter duration spent in the hospital leading to a decrease in home delivery. Although in the present study, five to seven days was longer than in Sweden where women stayed in hospital an average of two days (4). A lot of aids are available to help to decrease the pain and discomfort that women experience during the first stage of labour (7).

A gym ball and bath have become popular tools over the years. Immersion in warm water may help with relaxation, pain relief and increasing elasticity of the birth canal (7). In the present study, 41% did not use any of these tools, or other rather simple tools, like massage or breathing exercises which were used more frequently. In the literature the prevalence rates of tools used during the first stage of labour were not found.

An important finding in this study was the high percentage of women using the supine position during the first and second stage of labour. Similar to this finding, Gupta et al concluded that most of the women in Western society deliver in a supine, semi-recumbent or lithotomy position and have difficulties in retaining the squat position for prolonged periods of time (8). They compared different positions during the second stage of labour and the supine position was not recommended in most cases (9).

The percentage of women breast-feeding percentage in the postpartum period was found to be 80.6%, which is high with a mean duration of approximately four months. The need to return to work, doubt about the sufficiency of breast-milk, mothers' perception of hunger and crying with colic were the main reasons for cessation of breast-feeding. Information regarding non-medical obstetrical data from the current study is of clinical importance for practitioners, physiotherapists and midwives providing counselling and care. It is also helpful for future parents.

Prevalence and severity of symptoms during pregnancy and postpartum

The results of this study found that morning sickness and urgency were the most frequent symptoms during the first and second trimester. The prevalence rate of morning sickness in the first trimester was 61.3%, and urgency had a prevalence of 53% in the second trimester. This finding is in agreement with prevalence rates found in previous studies (12-13). Both morning sickness and urgency were in the top five of most serious problems in the first and second trimester. Women from the current sample considered them to be a major discomfort.

Despite its relative lower frequency in the present study, pelvic girdle pain has been found a serious

problem in the second and third trimester as well as in the postpartum period. Indeed, such a disability interfered with running the household, nurturing the baby, performing a job and participating in sports. Prevalence rates of pelvic girdle pain vary widely. Robinson et al found a prevalence of 46% in pregnancy (19). Van De Pol et al found a lower prevalence (7%) but their percentages increased after birth with almost half the women suffering from pelvic girdle pain 3 months after delivery (20).
In general, painful breasts, urinary incontinence, backache and mood disorders were the most frequent symptoms in the postpartum. The high percentage of painful breasts, found in this study, can be associated with the high percentage of those breast-feeding.

Of the current sample, 40% reported urinary incontinence in the last trimester of pregnancy. In contrast, Chiarelli et al found a prevalence rate of 64% (21). Although, they also found that urinary incontinence was most common during the third trimester which was similar with the current study. Urinary incontinence was a common problem after pregnancy, affecting just over 18% of the women sampled at three months postpartum. In a review, Morkved has reported prevalence rates of urinary incontinence between 6% and 67% during pregnancy and between 3 and 38% postpartum. The variation may be explained by the different populations investigated, the different definitions of incontinence and the registration of incontinence at different stages of pregnancy or postpartum. (22).

An important finding in this study was that backache started early in pregnancy (22.5% in the first trimester), became more frequent as pregnancy progressed and was still a relative frequent symptom (26.4%) in the third month postpartum. The same trend during pregnancy was reported by Kristiansson et al but they found a lower prevalence rate (9.4%) at three months after delivery (23). Östgaard et al reported a prevalence of 25% throughout pregnancy (24). However, low back pain exists in the non-pregnant population. Psychological symptoms like mood disorders seemed to be frequently present in the pre- and postnatal period (25). Wu et al and Josefsson et al reported a prevalence rate of about 16% of psychological symptoms in the third trimester of pregnancy (26-27). This was much lower compared to the present study (54%) because the previous studies considered mood disorders to be depressive symptoms. Postnatal depression was experienced in 13% the first month postpartum, 10% the second and third month and 8% four to six months after birth in the present study. Josefsson et al reported a prevalence rate of 13% from six weeks to six months after birth. It may have a deleterious effect on woman's social and personal adjustments, the marital relationship and the mother-infant interaction.
Symptoms like leg cramps, edema and heavy legs increased from the first to the third trimester. In the present study, half of the pregnant women had these complaints in the last trimester. In the study of Davison, a higher percentages of women had leg edema (80%) in pregnancy (28).

Evolution of symptoms before and after birth

This is the first study to collect a wide range of symptoms on three occasions before and three occasions after pregnancy. The study enabled an identification of the symptoms which increased or improved over time. It was found that most of the symptoms occurred with greatest frequency in the third trimester with the exception of backache. Zib et al also found that the highest prevalence for most

symptoms was mentioned in the third trimester (12). The frequency of symptoms decreased markedly after delivery. Overall, in the current study the decline in specific symptoms postpartum was similar to those reported by Thompson et al (14). Although backache, urinary incontinence and mood disorders declined significantly over the first postpartum months, their prevalence still remained high at four to six months postpartum. In addition, realistic expectations can be given to women about the expected time taken to recover from childbirth, and the physical as well as emotional demands of early motherhood.

This study has some limitations. After analyses, it seemed that not all symptoms were reported in the questionnaire. Tiredness or fatigue was not included in the list of symptoms although less than 10% of women volunteered such information under the category of “other symptoms”. In the other studies, tiredness was always in the top five pre- and postnatal symptoms (12-14). Also, other common medical conditions like headache, varicose veins, dyspnoea and heartburn were not included. A second limitation in this study was that there was no control group even though it would be better to compare the prevalence of symptoms with an age matched non-pregnant group.

Conclusion

In conclusion, the present study draws attention to more widespread but under-recognised non-medical perinatal data like pregnancy preparation, smoking habits, place of birth, time spent on the maternity ward, posture and tools used during labour and breast-feeding. Urgency, mood disorders and backache were the most frequent symptoms during pregnancy. Painful breasts, mood disorders and backache were the most frequent symptoms after pregnancy.

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Table 1: Numbers and percentages of specific perinatal variable

Obstetric variables Total sample N=489	Number N	Percentage %
PRENATAL PERIOD		
Pregnancy preparation		
Physiotherapist	255	52.1
Midwife	35	7.2
Both	43	8.8
None	156	31.9
Smoking before pregnancy		
Yes	87	17.8
No	402	82.2
Quit smoking during pregnancy		
Yes	53	60.9
No	34	39.1
BIRTH		
Place of birth		
Home	17	3.5
Short hospital stay (24 h)	38	7.8
Normal hospital stay (5-7 d)	433	88.5
Other: car	1	0.2
Tools during first stage of labour		
Gym ball	79	16.2
Bath	43	8.8
Other: breathing exercises, massage	144	29.4
None	200	40.9
Combinations	23	4.7
Posture during first stage of labour		
Supine	240	49.1
Sitting	93	19.0
Standing	36	7.4
Other: bath, squat, walking	67	13.7
Combinations	53	10.8
Posture during second stage of labour		
Supine	408	84.4
Sitting	49	10.0
Standing	3	0.6
Other: bath, squat	21	4.3
Combinations	8	1.7
Breast-feeding		
Yes	394	80.6
No	95	19.4

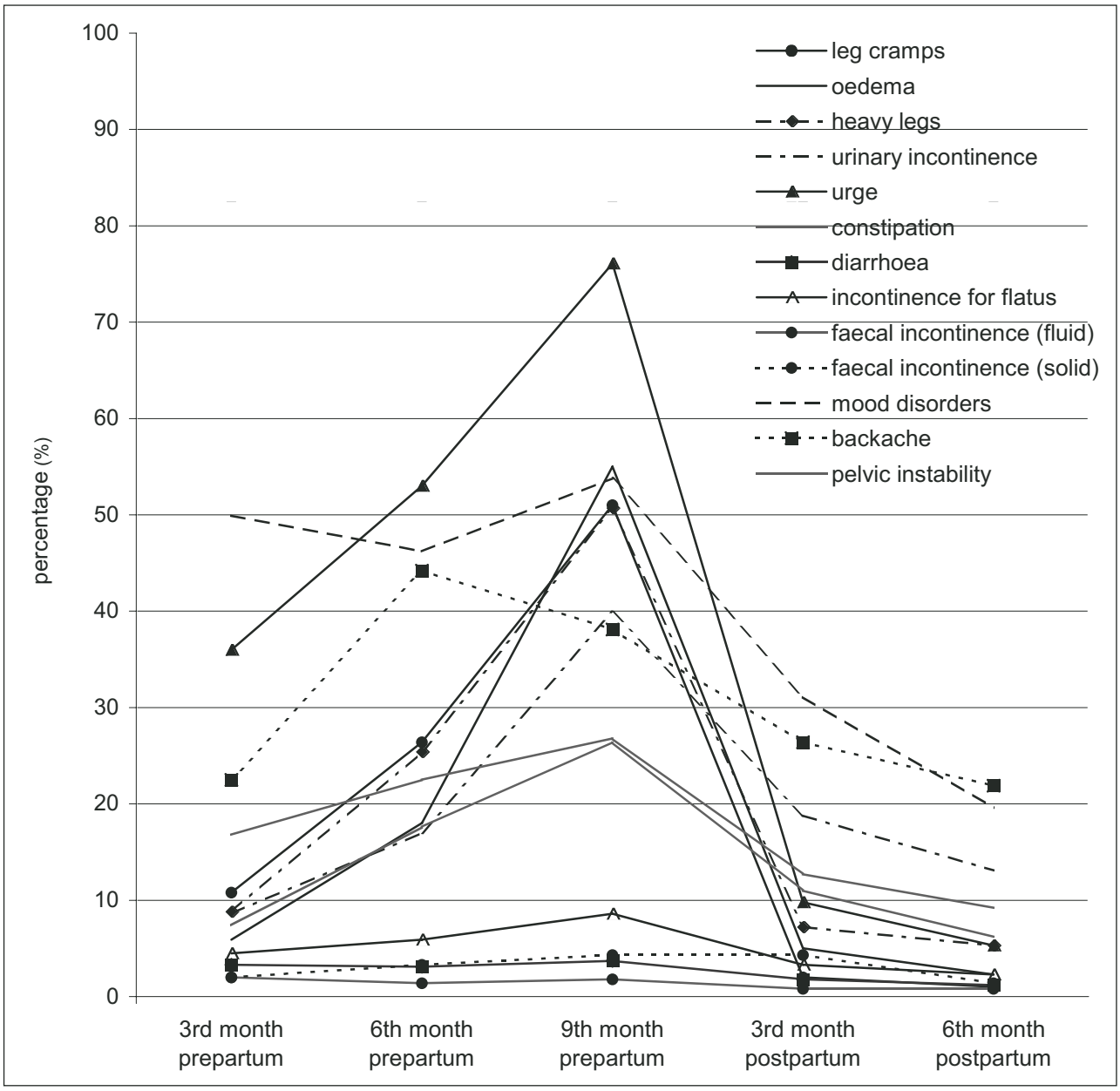
Table 2: Percentages and severity of symptoms during pregnancy

Total sample N=489	First trimester		Second trimester		Third trimester	
Prenatal Symptoms	N *(%)*	Severity (0-10)	N *(%)* (0-10)	Severity (0-10)	N *(%)*	Severity
Morning- sickness	300 (61.3)	5.6	134 (27.4)	4.6	78 (16.0)	4.7
Leg cramps	53 (10.8)	4.1	129 (26.4)	4.4	249 (50.9)	4.7
Oedema	29 (5.9)	3.6	89 (18.2)	3.9	269 (55.0)	5.4
Heavy legs	43 (8.8)	4.3	124 (25.4)	4.1	248 (50.7)	5.4
Stress-incontinence	23 (4.7)	3.1	46 (9.4)	3.4	109 (22.3)	3.9
Urge-incontinence	19 (3.9)	3.2	37 (7.6)	4.1	87 (17.8)	4.1
Urgency	178 (36.4)	5.2	259 (53.0)	4.8	372 (76.1)	5.8
Bowel problems						
-constipation	82 (16.8)	4.9	110 (22.5)	4.7	131 (26.8)	5.0
-diarrhoea	16 (3.3)	4.8	15 (3.1)	4.6	18 (3.7)	4.9
-incontinence	22 (4.5)	2.9	29 (5.9)	3.4	42 (8.6)	3.4
for flatus						
-faecal incontinence						
(fluid)	10 (2.0)	3.6	7 (1.4)	4.1	9 (1.8)	3.9
-faecal incontinence						
(solid)	10 (2.0)	4	16 (3.3)	4.9	21 (4.3)	4.7
Skin rashes						
-stomach	24 (4.9)	3.8	74 (15.1)	4.1	185 (37.8)	5.2
-bottom	11 (2.2)	2.5	49 (10.0)	4.0	119 (24.3)	4.7
-breasts	22 (4.5)	3.4	48 (9.8)	3.7	109 (22.3)	4.4
Mood disorders	244 (49.9)	4.8	226 (46.2)	4.4	263 (53.8)	4.8
Fear	131 (26.8)	4.9	131 (26.8)	4.5	186 (38.0)	5.0
Backache	110 (22.5)	4.3	216 (44.2)	4.7	338 (69.1)	5.5
Pelvic girdle pain	36 (7.4)	5.5	86 (17.6)	5.4	129 (26.4)	6.0
“Other symptoms”	51 (10.4)	6.0	77 (15.7)	5.9	96 (19.6)	6.7

Table 3: Percentages and severity of symptoms during postpartum

Total sample N=489 postpartum	First month postpartum		Second-third month postpartum		Fourth-sixth month	
Postnatal symptoms	N (%)	Severity (0-10)	N (%)	Severity (0-10)	N (%)	Severity (0-10)
Painful contractions	183 (37.4)	4.8	11 (2.3)	3.7	4 (0.8)	4.5
Leg cramps	29 (5.9)	3.7	10 (2.0)	3.7	5(1.0)	2.4
Oedema	85 (17.4)	4.5	24 (4.9)	3.8	11 (2.3)	3.6
Heavy legs	68 (13.9)	4.3	35 (7.2)	4.2	26 (5.3)	4.2
Urinary						
Incontinence	140 (28.6)	4.5	92 (18.8)	4.0	64 (13.1)	3.2
Urgency	84 (17.2)	4.0	48 (9.8)	4.3	26 (5.3)	3.7
Bowel problems						
-constipation	116 (23.7)	5.1	61 (12.4)	4.8	45 (9.2)	4.4
-diarrhoea	13 (2.7)	4.1	9 (1.8)	3.7	6 (1.2)	3.0
-incontinence						
for flatus	29 (5.9)	3.7	16 (3.3)	3.8	11 (2.3)	3.1
-faecal						
incontinence						
(fluid)	7 (1.4)	4.3	4 (0.8)	4.5	4 (0.8)	3.2
-faecal						
incontinence						
(solid)	18 (3.7)	3.9	21 (4.3)	3.8	7 (1.4)	3.6
Painful breasts	293 (59.9)	5.4	150 (30.7)	4.5	73 (14.9)	3.1
Mood						
disorders	241 (49.3)	5.4	152 (31.1)	4.6	96 (19.6)	4.3
Postnatal depression	66 (13.5)	5.1	52 (10.6)	4.7	39 (8.0)	5.0
Backache	166 (33.9)	4.9	129 (26.4)	4.5	107 (21.9)	4.5
Pelvic girdle pain	79 (16.2)	5.4	54 (11.0)	5.2	43 (8.8)	4.6
“Other						
symptoms”	44 (9.0)	6.7	38 (7.8)	4.5	31 (6.3)	4.9

Figure 1: Evolution of symptoms from the third month prepartum till the sixth month postpartum



A SYSTEMATIC REVIEW ON THE EFFECT OF STRETCHING IN SPORTS INJURY PREVENTION

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ABSTRACT

Introduction:

Although stretching increases soft tissue flexibility and joint range of motion, numerous studies demonstrated contradictory findings as to its effect in injury prevention. Aim: The purpose of this systematic review is to assess the effectiveness of stretching on the prevention of injuries.

Methodology:

An electronic search using MEDLINE, SCIENCE DIRECT, COCHRANE, EBSCOHOST, SPORTDiscus and CINAHL databases, checking the references. Randomised control trials (RCTs) and cohort studies investigating stretching as an injury prevention measure published in the last decade were selected in this review. Methodological quality was assessed using the Critical Appraisal Skills Programme (CASP) tool.

Results:

Two RCTs and two prospective cohort studies all of high quality were included in this analysis. One cohort study found that stretching reduced the incidence of exercise related injuries. Two RCTs and one cohort study found that stretching did not produce practical reduction on the occurrence of injuries.

Conclusion:

Stretching exercises does not give a practical useful reduction in the risk of injuries. Not enough recent research has been done to draw definitive conclusion on the effect of stretching in injury prevention. Well designed studies are needed to shed light as to the effect of stretching in exercise-related injury risk reduction.

Keywords:

Effect, stretching, sports, injury prevention

Introduction

Many people are extensively engaging in physical activities and sports for several reasons ranging from profession (Hägglund, Waldén, & Ekstrand, 2004) to the fight against chronic diseases of lifestyle (Lee & Laffrey, 2006) and better quality of life (Mulvihill, Rivers & Aggleton, 2000). There has been an increase in the number of people at risk for injuries with the resultant upsurge in participation in sporting activities (Leininger, Knox, & Comstock, 2007), thus the call for injury prevention. It is believed that stretching is one of the fundamental procedures that prevent injuries (Cabbie, Brunell, Finch, Wajswelner, & Orchard, 2006) and it is extensively encouraged among athletes in different literature (Arnheim & Prentice, 1993; Brukner & Khan, 1993). Many studies have been done determining the effect of stretching either before or after exercises and have demonstrated contradictory findings (Yeung & Yeung, 2001). Likewise, numerous studies documented the effect of stretching on the increase of soft tissue flexibility and joint range of motion (Magnusson, Simonsen, Aagaard, Sorensen, & Kjer, 1996; Harvey, Herbert, & Crosbie, 2002) nevertheless there is inconclusive evidence as to its effect on the reduction of the risk or the occurrence of injuries. However, the debate continues whether stretching does influence injury prevention. Therefore, the purpose of this systematic review is to assess the effectiveness of stretching on the prevention of injuries.

METHODS

This review is based on information obtained from peer reviewed published articles for the period of January 1998 to April 2008. In accordance with the aim of this review, the inclusion criteria for the review was all studies that used stretching as an intervention, included a comparison group, and had some form of injury risk as an outcome. This review included randomised or quasi-randomised full text accessible studies investigating the effect of any stretching exercise on any sport or any exercise-related activity injury. This review excluded studies investigating the effect of stretching on performance as well as studies with abstracts only. Articles published before January 1998 was also excluded from this study.

Search strategy

A computer search of the literature was conducted to retrieve relevant articles using MEDLINE, SCIENCE DIRECT, COCHRANE, EBSCOHOST, SPORTS Discus and CINAHL databases. In addition, all pertinent citations from the references of these papers were also reviewed. Experts in the field were also contacted to locate extra studies. Furthermore, a manual search was conducted for any relevant studies not recovered by other methods. The following key terms were used: Stretch*OR flexib*; Sprain OR strain OR injur*; Muscle OR tendon OR ligament; Sport OR athlet* OR activ* OR exercis*; Prevent* OR avoid*. They were combined with the optimum search terms as described by Dickersin, Scherer and Lefebvre (1994).

Search results

The search generated a total number of 333 articles in which 42 were found relevant to this topic. The articles were then further assessed and 33 were excluded because they did not fulfil the inclusion criteria. An article which was duplicated from one source to another was counted for the first source that it was retrieved from. Thus, a total number of 9 articles were retained. Table 1 gives details of findings from each search strategy.

Table 1: Search results

Database	Hits	Included	Excluded	Retained	Duplicated	Total
Academic search premier	86	9	6	3	0	3
Medline	25	7	5	3	2	1
ERIC	2	1	1	0	0	0
CINAHL	30	6	4	2	2	0
SPORT Discuss	129	8	6	2	2	0
Pubmed	32	1	0	1	1	0
PEDro	9	4	0	4	2	2
Science direct	12	1	0	1	1	0
Cochrane library	3	1	0	1	1	0
Manual search	5	4	1	3	0	3

Assessment of study quality

Of the 9 articles, 2 RCT's and 2 prospective cohort studies were retained whereas 4 systematic reviews and 1 retrospective cross-sectional series were excluded. After selection of studies of acceptable designs, the in-depth assessment of their methodological quality was done. The included studies were scored using the Critical Appraisal Skills Programme (CASP) tool (CASP, 2006). The CASP was developed by the Public Health Resource Unit of the National Health Service (NHS) in the United Kingdom with the aim of enabling individuals to develop the skills to find and make sense of research evidence, helping them to put knowledge into practice (CASP, 2006). According to Clyde (2006), it has some values in raising awareness of the need for critical assessment of research as a basis for evidence-based practice. The Randomised Controlled Trials (RCTs) were scored out of 13 whereas cohort studies were scored out of 10 according to the presence of criteria such as random allocation and concealment, blinded subjects or therapists or assessors, precise results, appropriate statistical analysis, enough number of participants, number and follow up of dropouts. The quality of each study was classified as high (7-10/10 or 9-13/13), moderate (4-6/10 or 5-8/10) and poor (1-3/10, 1-4/13).

Table 2: Type of study designs

Study designs	No. of studies	Authors
RCT'S	2	Pope, R.P., Herber, R., & Kirwan, J. (1998)
		Pope, R,P., Herber, R., Kirwan, J., & Graham, B.J (2000)
Prospective cohort study	2	Arnason, A., Andersen, T.E., Holme, I.,
		Engegretsen., & Bahr, R. (2008)
		Harting, D.E., & Hederson, J.M. (1999)

Subgroup analysis was done according to the study design. All articles were further screened using the CASP appraisal tools and each citation was evaluated for quality. The table 3 details each study score.

Table3: Quality scores of studies

Type of study	Authors	score
RCT	Pope, R.P., Herber, R., & Kirwan, J. (1998)	10/13
	Pope, R,P., Herber, R., Kirwan, J., & Graham, B.J (2000)	11/13
Prospective cohort study	Arnason, A., Andersen, T.E., Holme, I., Engegretsen., & Bahr, R. (2008)	8/10
	Harting, D.E., & Hederson, J.M. (1999)	7/13

Results

From the nine studies that met the inclusion criteria, two controlled studies have been published that specifically addressed the effect of stretching in the prevention of injury. For the purpose of this review the two RCTs will be reviewed and since there are few of them, it was opted to include the two prospective cohort studies. Table 4 shows description of each study included in the review.One of the two cohort studies found out that lower extremity overuse injuries was significantly lower in the intervention group (29%) compared with the control group (17%) (P=0.02) (RR=0.63, 95% CI 0.41-0.99) following introduction of hamstring stretching added to the normal basic training programme (Harting, & Henderson, 1999). This study further found a statistically significant difference (P<0.001) between the changes in the flexibility of the hamstring muscles between the intervention and the control group. The results of this study are different from the other cohort study conducted among soccer teams which found no significant difference in the incidence of hamstring strains between the intervention and the control teams (RR: 1.53, 95% CI 0.76-3.08) following hamstring flexibility training (Arnason et al., 2008). This study further found no difference in the incidence of hamstring strains between the intervention teams and all the teams the previous year (RR: 1.03, 95% CI 0.59-1.79) or between the two seasons for the intervention group only (RR: 0.89, 95% CI 0.42-1.85).

One RCT evaluated the effect of stretching before exercising on the risk of injury (Pope et al., 1998). The results of this study show no significant effect of pre-exercise stretching on the risk of incurring one of the five selected injuries (tendon Achilles lesions, lateral ankle sprains, stress fractures of the foot or tibia periostitis of the tibia and anterior tibial compartment syndrome) (HR=0.92, 95% CI 0.52-1.61). According to the authors, small but clinically worthwhile effects may have gone undetected due to low statistical power therefore these results could be treated with caution. In addition, ranges of motion of the ankle dorsiflexion were measured and it was found that flexibility was a strong predictor of injury risk (Likelihood Ratio LR=4.97; df=1; p=0.03). The findings of the second RCT conducted by the same authors (Pope et al., 2000) show that there was no significant effect of pre-exercise stretching on all injury risk (Hazard Ratio HR= 0.95; 95% CI 0.77-1.18). Moreover, there was no effect of stretching observed when examining soft tissues injuries (HR=0.83, 95% CI 0.63-1.09) or bone injuries separately (HR=1.23, 95% CI 0.86-1.76).

Table 4: Description of studies included in systematic review

Reference	Design	Country	Subjects	Intervention	Outcome
Harting & Henderson 1999	Prospective cohort study	USA	298 army recruits in two companies with average age 20 years	1) 148 recruits: static hamstring stretch, 3 times daily 2) 148 recruits controls: no stretching programme	Incidence of lower extremity overuse injuries
Arnason et al., 2008	Prospective cohort study	Norway	14 soccer teams of 18-24 players/team in 1 soccer seasons (2001)	1) 7 teams: warm up stretching and flexibility straining programme 2) 7 teams: no use of the intervention programme	Incidence of hamstring strains
Pope et al., 1998	Cluster randomized	Australia	1093 Army recruits (26 platoons) in 12-week basic training aged 17-35 years	1) 549 recruits: two 20-s stretches of calf muscles before physical exercises 2) 544 recruits: two 20-s stretches of wrist and triceps before physical exercises	Incidence of soft tissue injuries
Pope et al., 2000	Cluster randomized	Australia	1538 army recruits (39 platoons) in 12-week basic training aged 17-35 years	1) 735 recruits: 20-s stretches of 6 major leg muscle groups before physical exercise 2) 803 recruits: no stretching programme	Incidence of lower limb injury by body area and type

DISCUSSION

This review looked at available literature where the relationship between stretching and injury prevention was examined. The reviewed studies show conflicting results which could be explained by a number of differences like the intervention, the outcomes used and the methodological quality of studies.

Intervention used (type of stretching)

The intervention protocol varied across studies both in duration of stretch and the number of sessions. The two RCTs and one cohort study by Harting and Henderson, (1999) used sustained stretch while Arnason et al. (2008) used hold relax technique. According to Shrier and Gossal (2000) sustained stretching or static stretching is a slow, sustained muscle lengthening that is held for 15–60 seconds whereas hold relax is a stretching technique that often utilizes a partner who briefly resists contraction of stretched muscle groups, after which the muscles are relaxed while the partner passively stretches the muscle group. Hold relax is one of the techniques of proprioceptive neuromuscular facilitation (PNF) (Osternig, Robertson, Troxel, & Hansen, 1990). The two RCTs showed no significant reduction in injury risk which is in disagreement from the results of the cohort study that used the same technique. One of the major differences is that Harting and Henderson (1999) utilized four stretching sessions per day (three sessions added to the routine morning stretching session) (Table 4) whereas the two RCTs used only one session. This would be explained by the

conclusions made by DePino, Webright and Arnold (2000) and Moller, Ekstrand, Oberg and Gillquist, (1985) that the duration of increased flexibility after stretching is from 6 to 90 minutes although an extensive programme of several weeks duration has been documented to produce increased flexibility that persist for several weeks (Zebas, & Rivera, 1985). It is difficult to draw conclusions by comparing the findings of the RCTs and the cohort study. Therefore, there is a need of extensive studies investigating the effect of stretching in injury prevention based on the number of repetitions in the stretching sessions.

The results of the cohort study conducted by Arnason et al. (2008) which used the hold relax method concur with the two RCTs. It has been found in the literature that the PNF techniques increased flexibility better than the sustained stretching techniques though some results have not been statistically significant (Etnyre & Abraham, 1986; Lucas, & Koslow, 1984). However, there are no studies which have been found investigating the effect of different stretching techniques on the reduction of injuries. This shows how it is difficult to compare these studies because they differ in their designs and the stretching techniques used. Similarly, it is difficult to compare and draw conclusions from the two cohort studies due to unsuitable study design.

Even though the two RCTs used the same stretching protocol (static stretching during warm up before training), they differ from the repetition of the stretch to a muscle group during one session (Table 4). It has been documented that a 15-s or 30-s passive stretch is more effective than shorter duration stretches (Walter, Figoni, Andres, & Brown, 1996; Roberts & Wilson, 1999) and as effective as stretches of longer duration (Bandy & Irion, 1994). Nevertheless this difference in repetition did not have any impact on the incidence of injuries. We could not be able to draw conclusions as to whether stretching does not have any effect in injury prevention because these studies had some limitations. In addition these are the only studies which were found during the search of published studies in the last decade.

Outcome used

The comparison of the two cohort studies was difficult, although both used stretching of hamstring muscles as intervention, because they used different outcomes: overuse injuries (Harting, & Hederson, 1999) versus hamstring muscle strain (Arnason et al., 2008). If the first study would have identified the occurrence of hamstring strain separately, we would be able to compare the incidence of hamstring injuries in both studies. Similarly, outcomes used in the two RCTs were different. The primary concern of researchers in the first study was selected six lower leg injuries (Pope et al., 1998) while soft tissue injuries were of concern in the second study (Pope et al., 2000). Lack of harmony in these studies in terms of outcome show the need for many studies aiming at reducing selected types of injuries.

Methodological quality

The results of Arnason et al. (2008) study might have been influenced by the extended exposure time during training and matches, the physical demands of the game as well as lack of close follow up on how stretching exercises were performed because the study had an extended period of time. The occurrence of injuries and the exposure time was reported by the physical therapist of each team which rendered impossible to blind the assessor. Methodologically, the results of the two cohort studies are difficult to compare since the military side was followed up over a period of 12 weeks and the elite athletes over a period of 28 weeks (one soccer season). Another reason is that soccer may

be classified as a high intensity and contact game compared to the exercises performed by military recruits.

One of the cohort studies which found that stretching might prevent injury is small and of lower methodological quality than the other cohort study which concluded negatively as to the effect of stretching in injury reduction. The two contradicting cohort studies are also of lower methodological quality compared to the two RCTs which did not provide evidence of the protective effect of stretching. Furthermore, the two RCTs were found to have some limitations such as lack of the use of statistical power (Pope et al., 1998), loss of follow up (Pope et al., 1998; Pope et al., 2000), and withdrawal not mentioned (Pope et al., 1998). One of them concluded that on average about 100 people would stretch for 12 weeks to prevent one injury and the average subject would need to stretch for 23 years to prevent one injury (Pope et al., 2000). From this, it is obvious that some studies could not find a worthwhile effect of stretching on the reduction of injuries when conducted for a short period of time. Therefore, there is a need of many months or years longitudinal studies to determine the significant effect of stretching in the reduction of injuries.

Conclusion

This systematic review find strong suggestion that muscle stretching before exercise does not reduce the risk of injuries. These conclusions are consistent with other reviews on the effect of stretching in injury prevention. Due to the selection criteria of relevant studies, this review found few studies. Comparison was difficult because of the variation in the definition of injury, designs, study population and outcome measures used. In addition, not enough research has been done to draw a definite conclusion on the effect of stretching in injury prevention among either military population or other people engaging in physical activities and sport.

There is a need for carefully designed control trials in this field to shed light on the possible interventions for the prevention of injuries in sports with specific emphasis on stretching. Challenges that may be faced include the difficulty to randomize a greater numbers of athletes with a close follow up, controlled compliance as well as concealment, blindness and better statistical analysis. This would be important as there is an increase in number of athletes and growing recognition that all people need to increase their physical activity levels to improve their fitness for a better health and subsequent better quality of life.

Footnotes

Ethical approval

This is a systematic review therefore ethical issues were not applicable.

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Conflict of interest

The authors declare that no conflict of interest exists.

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A Holistic Approach to Research

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Abstract

There are a number and variety of research models from which to choose when examining phenomena relevant to nursing and health. Each model reflects the underlying ontological and epistemological foundations. A purely qualitative or quantitative model does not adequately reflect a holistic view. Research models examining holistic phenomena should be congruent with holistic nursing theory. Epistemological triangulation helps ensure research grounded in a holistic epistemology. A hermeneutical approach to research design and interpretation provides a holistic framework for study. The resulting overall design should be both methodologically rigorous and congruent with holistic philosophy.

Key Words: Holistic Research, Methodology, Mixed methods, Epistemology

Introduction

There exists a complex variety of competing research models and paradigms. It is not always clear which method, paradigm, or guiding philosophy is appropriate to a field of inquiry or a phenomenon under consideration. This is especially true for a holistic approach from a health care perspective. The most empirically rigorous methods are quantitative, but lack many elements sufficient to illustrate human experience. Qualitative methodologies tend to be the most popular for holistic research because they are more suitable for studying lived experience. This paper will argue for a method of choosing a research model appropriate for holistic nursing inquiry.

Methodologies and Paradigms

The philosophical foundations underlying each of the methodologies represent different perceived realities and offer different, complementary views of the same phenomena (Sale, Lohfeld, & Brazil, 2002). All views are relevant. Each methodological paradigm has its associated philosophical foundations. Part of this philosophical underpinning is ontological, dealing with the fundamental nature of reality. The other primary philosophical aspect is epistemological, concerning the nature and justifications of truth and knowledge (Tashakkori & Teddlie, 1998).

Quantitative Paradigm

Quantitative models are based on a positivist empirical philosophy (Newman & Benz, 1998). Positivism requires facts be verified by empirical observations, and only allows statements conforming to this requirement (Ayer, 1952). This principle of verifiability is an implicit rejection of any subjective source for knowledge.

The underlying ontology of the quantitative paradigm consists of a single, objective reality independent of any observer within it (Tashakkori & Teddlie, 1998). Rudolph Carnap describes a positivist ontology in which reality is reduced to units called elementary experiences (Gross, 1970). This single objective ontology is the theoretical foundation allowing for a reductionist, atomist approach, where every meaningful constituent of being is theoretically reducible to a single perspective.

Positivist epistemology is based on the principle where all statements must be empirically verifiable (Ayer, 1952). Phenomena must be reduced to the smallest constituent parts which provide empirical indicators (Sale, Lohfeld, & Brazil, 2002). This reductionism, reducing phenomena to explain things from a single perspective began in medicine and nursing with René Descartes (17th century). Descartes, the father of modern philosophy, was looking to construct a secure system of knowledge supported by certainty. He postulated that true knowledge must come from true reason alone, as the senses could not be trusted. His strictly rational and systematic model of thought proposes to never accept anything except clear and distinct ideas. This can be limiting when explaining human experience such as trauma and pain. Descartes was influenced by Aristotle's strictly logical approach to scientific investigation of natural phenomena. Natural science extracts quantitative data to reveal pure cause and effect relationships, and is adopted by physical sciences such as chemistry, biology, physics, and medicine. The standard model of hypothesis testing, derived from Karl Popper's notion of falsifiability, is a positivist model logically reversed (Hamlyn, 1970). A proposition, to be falsifiable, must be constructed in such a way where it can, at least in theory, be empirically disproved. Statements not logically contradicted by hypothetical empirical data cannot be tested. In the more radical forms of positivism such as Ayer's (1952), all propositions which cannot be positively, empirically tested are considered meaningless.

Quantitative methodologies reflect these underlying principles. Quantitative surveys and experiments evince rigidly controlled variables, standard instrumentation, and statistical analysis of falsifiable hypotheses (Creswell, 2003). The positivist framework is robust to questions of reliability due to the rigid requirements for verification and analysis, but the narrowness of focus limits its validity in describing the human condition. No amount of quantitative data collection and analysis can provide a meaningful description or explanation of the lived experience (Creswell, 1998).

Qualitative Paradigm

Qualitative inquiry is based on constructivist philosophical assumptions grounded in the subjective point of view (Creswell, 1998; Sale, Lohfeld, & Brazil, 2002; Tashakkori & Teddlie, 1998). Every individual, including the researcher and the participant, is a co-creator of their own reality. Describing these perceived realities should be the aim of this research. Constructivism is interpretive, subjective, and recognizes many truths in contrast to the positivist belief in one objective truth

There is no separation or reduction of the observer and the observed in a qualitative epistemology (Tashakkori & Teddlie, 1998). A significant intersubjective element is therefore inherent in qualitative research. No single objective ground exists for interpretation of facts derived from subjective experience. Observer and observed are each subjects in themselves, which is reflected in the amount of interpersonal involvement in approaches such as grounded theory and ethnography (Creswell, 1998; Maggs-Rapport, 2001).

Qualitative methodologies reflect the need to report subjective and intersubjective aspects of phenomena (Maggs-Rapport, 2001). Creswell (1998) categorizes qualitative methods into biographical, phenomenological, grounded theory, ethnographic, and case study traditions. Phenomenological methods generally follow either Husserlian descriptive phenomenology or Heideggerian hermeneutic (interpretive) phenomenology. Husserl (1973) viewed phenomenology as a reduction to pure conscious experience; therefore, the Husserlian version of phenomenology is restricted to a description of phenomena as they are given to consciousness. Heidegger, in contrast, viewed phenomena as irreducible, gestalt, beyond the subject plus the world (Heidegger, 1962). Heideggerian phenomenology therefore requires an interpretive element, reducing credibility for quantitative methodologists.

Mixed Methodology

Pragmatism

Most mixed-method approaches, if they can be said to adhere to any single philosophy, reflect the pragmatism of American philosopher John Dewey. Dewey's ontology defines reality not as a collection of substances, but a series of ordered events (Field, 2001). This places the fundamental ground for being in the subjective, lived element of experience. Dewey's naturalist epistemology rejects reductionist approaches. This pragmatic theory of truth rejects the traditional correspondence theory (i.e. truth is what corresponds to objective reality), and instead bases the truth standard on utility for problem solving (Field, 2001). Concepts useful for solving real world human problems qualify as truths. The truth is whatever works best.

Standard pragmatic research models utilize quantitative, qualitative, or mixed methods to search for a pragmatic truth based on what works best (Sale, Lohfeld, & Brazil, 2002). Mixed-method approaches are particularly suited for exploratory research where a variety of viewpoints are most valuable (Borkan, 2004). Issues of ultimate philosophical grounding are not necessarily addressed. Paradigms are considered ontologically and epistemologically independent and are chosen according to the needs of the moment (Caracelli & Greene, 1997).

Paradigm Wars

The distinction between truth definitions of the quantitative and qualitative paradigms is a prime reason many consider them incompatible (Sale, lohfeld & Brazil, 2002). This attitude is rooted in the polarization of research communities. It is typically reflected in the manner in which research methods are taught (Tashakkori & Teddlie, 2003). Combined methods generally manifest a hierarchy of methodology dominated by quantitative methods and analysis.

Borkan (2004) notes several possible barriers to the integration of paradigms. Any new idea threatens the entrenched thought patterns and leads to turf wars as change is resisted. This extends to the audiences of the research as well; those who read

quantitative research do not typically read qualitative research. Theoretical barriers may exist for primary theories that do not acknowledge the truth value of other theories (Borkan, 2004).

This dichotomy reflects a reductionist approach requiring one paradigm to be fundamental for ideological purposes. This assumption is known as the incompatibility thesis (Tashakkori & Teddlie, 2003). A holistic approach to the problem is in fundamental disagreement with the incompatibility thesis. The incompatibility view hinders comprehensive holistic understanding by ignoring valid viewpoints (Goding & Edwards, 2002).

Holism

The central philosophic assumption of holism is the whole is greater than the sum of its parts. There are interrelationships and other aspects of reality not apparent in the qualities of the individual parts. The parts of a system can only be understood in terms of the entire system. Holistic theory guiding the nursing profession extends this basic non-reductionist philosophy into the health care system. An example of holistic nursing theory is Rosemarie Rizzo Parse's Theory of Human Becoming.

Holistic Ontology

The primary ontological assumption of Parse's theory is human beings co-exist with the world as a unitary phenomenon (Parse, 1998). Two other aspects of the theory are particularly important to the philosophical grounding. The intersubjective practitioner-patient relationship, which Parse calls *true presence*, is central to the theory and logically extends to the researcher-participant dialectic (Parse, 1998). Health is defined strictly from the patient's perspective, placing the epistemological ground squarely in the subjective element of experience (Parse, 1998). Parse's definition of health is representative of general holistic perspectives on health care (McDowell, Spasoff, & Kiristjansson, 2004).

A holistic approach is appropriate for the complex interactions involved in health care (Goding & Edwards, 2002). Parse follows the Heideggerian model of ontology whereby the individual and the world are interdependent and not reducible to purely objective elements (1995). This follows the general holistic view of reality not as separate realms of the physical, mental, and spiritual, but a unified whole of interdependent parts (Shealey, 2003). Heidegger explains the fundamental mode of our being as irreducible from the world, which makes it impossible to adopt a perspective that attains a purely objective understanding of the world or ourselves apart from it (Johnson, 2000). Heidegger (1962) adopted phenomenology as the method of inquiry for his analysis of being. Phenomenology is also the default approach to holistic inquiry (Paley, 1998).

Phenomenology

The epistemological basis for phenomenology is purely subjective, reduced to the phenomena as they present themselves to consciousness (Honderich, 1995). The fundamental grounding for knowledge is in the conscious lived experience of the individual (Merleau-Ponty, 1958). Reduction to pure experience is achieved by *bracketing*, consciously disregarding all constituents of experience other than the immediate phenomena present in consciousness (Husserl, 1973).

Heidegger disagreed with Husserl regarding one important aspect of phenomenological reduction. Heidegger (1962) did not think it possible to truly bracket out the subjective elements of experience, but instead argued the subject exists in an in-the-world mode that is fundamentally irreducible. Paley

(1998) shares the view where phenomenology is just as reductionist as positivism if it reduces phenomena to only the subjective. Paley further argues the self-reporting nature of phenomenological approach is inherently weak, since it rests on the assumption of a faithful, accurate reflection and recounting.

Dahlberg and Halling (2001) argue for an *open* approach to phenomenological research in order to preserve objectivity. This openness includes familiarity with oneself and the research, as well as open-mindedness and open relationships with colleagues. Openness should result in a more good faith rendering of the research.

A Holistic Epistemology

Thought in this field is evolving. Positivist epistemology categorically denies the legitimacy of subjective and intersubjective forms of knowledge (Russell, 1959). Quine (1961) suggests a less stringent form of empiricism, allowing broader conceptual schemes than radical reductionism. Quine considers the existence of abstract concepts and matters of experiential fact to differ only in degree, not in kind. This scheme allows for broader arena of questioning, but is still restricted to a positivist justification of knowledge.

There is an ideological reason suggesting subjective and intersubjective elements are not reducible to the objective in the holistic view. A cornerstone of holistic ethics is to never treat the other as an object. The metaphysical root of this mode of relations is Buber's dialogical concept of the *I-Thou* relationship. Buber (1970) argues for a fundamental relationship to others and the world as more of an *I-Thou* encounter than a mere *I-It* objective experience. Objectifying the other in a research model would violate this ethical principle. Subjective and intersubjective elements must therefore be acknowledged.

Davidson (2001) outlines a holistic epistemology based on interdependent subjective, intersubjective, and objective elements. None of the three varieties of empirical knowledge are reducible to any combination of the others. The argument begins by asserting belief is a necessary condition for knowledge. Knowledge only has meaning against a background of truth and falsehood. Belief about the world requires a working concept of objective truth. The source of the concept of objective truth is communication. Davidson is further in agreement with Wittgenstein (1958); there are no private languages. Intersubjective relationships are required for any communication.

Davidson's chain of reasoning shows multiple interdependencies between the three varieties of knowledge (objective, subjective, and intersubjective). If all objective knowledge requires intersubjective communication, then the intersubjective cannot be reduced to the objective. If knowledge of the self beyond the sensory level requires communication, then the intersubjective cannot be reduced to the subjective. The intersubjective element is primary to both the objective and subjective aspects of human knowledge. A concept of objective truth is primary to subjective and intersubjective knowledge. The apparent paradox of multiple primary grounds illustrates the impossibility of reducing the epistemological model beyond the three varieties, objective, subjective, and intersubjective. All are relevant.

For example, I need no recourse to the objective world or to other subjects to know the contents of my own mind. This appears to be a subjective grounding. However, as a purely internal matter, I am limited to sensory information, which is not knowledge. Any truth is filtered through my

perceptions. To conceptualize these feelings into a form of knowledge, I must use language. Language requires intersubjective activity. I can not get to the intersubjective without first having subjects with whom to interact. The existence of another subject 'outside' of my mind requires there to be an objective world. Instead of considering this example as an impossible paradox, it is more useful to view the complexity as coevolved and interdependent. Davidson's interdependent approach to knowledge is congruent with the holistic ontological concept of a unitary, non-reducible reality. A truly holistic research design must address the interdependent concerns of the objective, the subjective, and the intersubjective, all inherent in the holistic philosophy.

A Holistic-Pragmatic Approach

A strictly quantitative or qualitative approach is not congruent with holistic philosophy simply because a reduction to one or the other is incomplete (Morse & Chung, 2003). For example, in nursing, the lived experience of the cardiac patient is relevant to approaches to treatment, but the quantitative measurements of blood parameters such as oxygen levels and cardiac enzymes are still relevant, never ignored. One approach does not provide the entire picture; all data is relevant. A mixed-method approach is required to integrate and understand phenomena in a holistic manner (Colley & Diment, 2001). This does not imply monomethods are not valid, just that they are not the final word on a particular subject. A framework for holistic research should ensure the proper categories of questions are asked, whether or not a particular model seeks to answer them all. A body of knowledge is not complete until all of the epistemological bases are covered.

Questions for the Holistic Paradigm in Research

The holistic paradigm must address the subjective, intersubjective, and objective elements for a complete view of a subject, as does the practice of nursing. Phenomenological research based exclusively on lived experience, for example, does not say anything general about the objective correlates of experience. Research focused exclusively on objective measures does not address the subjective experiential elements. The central importance of interpersonal relationships to holistic theory means the intersubjective element also must be considered.

The particular research method chosen should provide the best fit for the epistemological necessities. This comprehensive epistemological requirement can be approached with a form of conceptual triangulation as described by Denzin (Morse & Chung, 2003; Tashakkori & Teddlie, 1998). Triangulation combines multiple perspectives to generate a more complete picture of the phenomenon under study than is possible with any single perspective. Denzin's three forms of triangulation are theory triangulation, where multiple theoretical perspectives are used; investigator triangulation, which uses multiple researchers; and data triangulation, which uses multiple sources (Tashakkori & Teddlie, 1998). Multiple perspectives are inherently valuable and often lead to new insights (Borkan, 2004). This is not necessarily an organic or interdependent view of the different perspectives, but rather a complementary view (Sale, Lohfeld, & Brazil, 2002).

Interpretation and Discussion

The ontological and epistemological foundations of holism allow for multiple interpretations (Colley & Diment, 2001; Hein & Austin, 2001). A hermeneutic or interpretive phenomenological approach is therefore indicated to control for the subjective

nature of qualitative reporting (Maggs-Rapport, 2001).

Philosophical hermeneutics is a method of interpretation seeking to provide a comprehensive understanding of human experience which accounts for personal, interpersonal, and societal aspects (Gadamer, 1976). Gadamer's hermeneutics is based on the phenomenology of Heidegger, with an added emphasis on awareness of one's own preconceptions and potential biases (Mak & Elwyn, 2003). Hermeneutics initially referred only to interpretation of texts, but was extended into the interpretation of human actions (Wiklund, Lindholm, & Lindström, 2002).

Hermeneutical methods typically are variations on Gadamer's hermeneutical reflection, called the hermeneutical circle (Reedy, 1998). Hermeneutical reflection begins with the researcher's preconceptions and foreknowledge toward the phenomena under study. Once the phenomena have been analyzed, the researcher integrates the phenomena, modifying the original understanding. A return to the phenomena based on a new understanding may yield further refined results (Gadamer, 1976). A properly applied hermeneutical approach has the effect of mitigating researcher bias (Reedy, 1998). Hermeneutics should provide a meta-method for holistic research, to be applied in both the design and interpretation of the study.

A Holistic Model for Nursing Research

A holistic, mixed method strategy should be chosen based on its applicability to the study. Tashakkori and Teddlie (1998) outline three dimensions for analyzing study needs. The first dimension is the investigation type. Is the goal of the study to explore new ideas or to confirm existing research? The second dimension is the data type. Are the data quantitative or qualitative in nature? The third dimension is data analysis. Is the analysis to be qualitative or statistical in nature? Creswell's criteria for complex studies include the sequence of data collection, the priority of mixed data, the integration of mixed data, and the overall theoretical perspective (1998). For example, research on the lived experience of a treatment protocol will place a priority on qualitative data, with quantitative data in a supporting role.

A triangulation approach should be used to define the specific research criteria before selecting a model (Tashakkori & Teddlie, 1998). This step will provide for a stronger justification of the resulting research design as a rationale emerges from the analysis (Creswell, Fetters, & Ivankova, 2004). Analysis of the triangulation should also answer questions of paradigmatic priority – whether it is primarily a qualitative or quantitative question to be answered (Sale, Lohfeld, & Brazil, 2002; Creswell, Fetters, & Ivankova, 2004). A hermeneutical approach to triangulation in the design phase will be an iterative process. As a model design emerges from the analysis, each part of the model should be re-assessed in light of the new whole.

An epistemological analysis should be used to guide holistic research. Consider, for example, a study to explore the lived experience of cancer treatment within a holistic nursing framework. The phenomenological, subjective viewpoint is the primary perspective by definition. Epistemological triangulation of the question suggests objective and intersubjective correlates should be added to the subjective element to complete the epistemological picture. Objective correlates to the treatment experience could include physiological measurements coinciding with pre- and post-treatment conditions. Accounting for the

intersubjective element of practitioner-patient interactions finishes the triangulation.

Triangulation of central research question dictates elements of the model design. Data collection sequences for the example are determined by the required timing of pre- and post-treatment measurements. Integration of the data will follow a hermeneutical cycle, with re-assessment of individual data followed by re-integration as required. The overall model is holistic in both design and process.

A review of extant research models has shown a variety of tools available for the holistic researcher. An analysis of the requirements of holistic inquiry has shown a method for choosing a research model, based on a holistic framework. Triangulation of the data collected is necessary to ensure each epistemological aspect of the question is covered. Continual reflection and integration of research activities will ensure each phase of the research is understood in proper relation to the whole. A nursing research model based on the systematic application of holistic principles will provide a high standard of rigor and thoroughness.

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INFORMATION AND COMMUNICATION TECHNOLOGY IN HEALTH: A REVIEW OF THE LITERATURE

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Abstract

Information and communication technology has been shown to be increasingly important in the education and professional practice of healthcare workers. The World Health Organisation (WHO) discusses the benefits of using ICT in the Primary Healthcare setting in terms of better access to information, improved communication between colleagues, facilitating continuing professional development and providing learning tools for healthcare professionals, patients and the community as a whole. This review of the literature describes the role of information and communication technology (ICT) in the education and professional practice of healthcare workers and goes on to outline the challenges facing the widespread adoption of ICT. The conclusion is that ICT does indeed have a positive role to play in both the education and professional practice of healthcare workers, including physiotherapists, as long as it is implemented as an adjunct to established and proven practice, and not a replacement.

Key Words: information and communication technology, education, healthcare, professional practice.

Introduction

It is widely recognised that the role of information and communication technology (ICT) in the future of healthcare will be significant and that healthcare professionals will need to be computer literate in order to function effectively in an increasingly digital environment (National Health Service, 1998). One estimate is that by 2010, 30% of a medical practitioners time will be spent using ICT (Skinner, Biscope, & Poland, 2003). It also seems clear that today's students are well suited to make use of technology, as they were the first to grow up in a period of unprecedented access to information and computer use (Coomes, 2004). There is general agreement that they are more comfortable with technology and that they use it almost constantly (Prensky, 2001; Foehr, 2006). They also have distinctive ways of thinking, communicating and learning (Barnes, Marateo & Ferris, 2007), which may have an impact not only in their social lives, but also in the ways in which they learn and how they will practice their profession. Thus, determining how ICT can be used to educate healthcare

professionals and support their professional development and evidence-based practice, is important. The World Health Organisation (WHO) has discussed the benefits of ICT within the healthcare sector and states that it has the potential to improve the exchange of data leading to better access to information and to improve the cost-effectiveness of institutions. It can also facilitate the continuing professional development (CPD) of healthcare professionals by allowing the transfer of training materials to rural areas, as well as enhancing communication between teachers and students or professional colleagues. Other benefits of ICT in healthcare include providing learning tools for healthcare professionals, students, patients and the community as a whole and providing the opportunity for primary healthcare centres to have access to clinical specialists, through tele-conferencing (WHO, n.d.).

The use of ICT within the field of healthcare is becoming an increasingly important aspect of clinicians professional practice, improving the delivery of health services and communication between healthcare workers, as well as enhancing the decision making process through the efficient flow of information. The purpose of this article is to highlight some of the ways in which ICT is currently being used globally in the education and practice of healthcare professionals, with an emphasis on it's use in the field of physiotherapy in South Africa. Sources were drawn from academic papers and books published in the fields of healthcare, education and technology, through online searches using keywords relevant to the topic.

ICT in the training of health professionals

The South African government has recognised the importance of ICT in education, stating in it's "*Draft White Paper on e-Education*" that "...ICT has the potential to improve the quality of education and training" and specifically names the healthcare sector as a focus area in which development needs to take place (Department of Education, 2004). The use of ICT in education is generally known as e-learning, where content can be distributed in several formats (for example digital video, audio, images and text) through several channels (for example telephone, radio, TV, compact discs and the Internet). E-learning can be described as any teaching or learning scenario in which the teacher and student are separated in time and space and the gap between the two is bridged by some form of online technology (Wikipedia[2], n.d.). Web-based teaching and learning brings several benefits to the educational process, including allowing students to engage more actively with the content, rather than learning being a passive process. This encourages "deep learning"[3] through activities such as problem-solving and information-gathering. Finally, coursework is accessible to students anywhere, at any time (Johns, 2003).

A study of the use of e-learning at two South African universities indicated that it has a positive role to play as an alternative mode of instruction in higher education (Rohleder, Bozalek, Carolissen, Leibowitz & Swartz, 2007). The main advantage reported by students taking part in this study was an improvement in communication between students and facilitators through the use of online

2. The use of Wikipedia as a resource for academic work has been the subject of much debate. However, in a 2005 study by the British scientific journal, *Nature*, Wikipedia was found to be "...about as accurate as the Encyclopedia Britannica...", particularly with regards scientific and technological entries (British Broadcasting Corporation [BBC], 2005).
3. Deep learning describes an enhancement of the learning process whereby knowledge acquires meaning, is analysed and conceptualised. It contrasts with surface learning, which is the reproduction of knowledge by rote learning (Prosser & Trigwell, 1999).

forum discussions and email. Other advantages included a cost saving of working in a paperless environment, as well as easier submission of assignments. However, the authors found that some students experienced difficulty with e-learning as there was a strong preference for face-to-face interaction that would be problematic for this method of teaching. This preference for face-to-face contact was also found by Sweeney, O'Donaghue and Whitehead (2004), and in a study among South African physiotherapy students (Rowe, 2008).

Eksteen (2005) investigated the use of e-learning among physiotherapy students as a means of enhancing their clinical reasoning and lifelong learning skills, as well as their interaction with each other and lecturers. She concluded that while e-learning provides a well-structured way of working through problem solving and clinical reasoning situations, it does not provide the important interaction that is possible with direct face-to-face contact. In other words, e-learning may have an influential role to play in education but should be seen as a means of enhancing this process, rather than as an end in itself. It was also found that the response to e-learning is related to each students individual style and approach to learning, suggesting that there is no "one size fits all" approach. Peacock and Hooper (2007) suggest that institutions using e-learning must prepare students to engage effectively with these systems, as they are unlikely to be familiar to the student. Rowe (2008) also found that the majority of physiotherapy students had not had regular access to ICT prior to beginning tertiary education. Induction programmes as part of the curriculum could be used to provide a framework upon which physiotherapy students can use online learning resources to assist their development as independent learners (Hamshire, 2008).

The use of video to enhance the learning process was demonstrated by Maeno, Fujita, and Iwatsuki (2004), who used videoconferencing to teach basic therapeutic techniques to first year physiotherapy students over a distance. Davies, Ramsay, Lindfield and Couperthwaite (2005) showed that traditional classroom teaching techniques could be combined with digital video to develop physiotherapy students' neurological and analytical skills. It was found that the use of video footage of real patients, combined with students' theoretical knowledge of neurological conditions gave them a better appreciation of what to expect on their clinical placements. Again, the studies suggest that digital multimedia resources should be used as a way to add value to already established teaching techniques, rather than trying to substitute one for the other.

In the United Kingdom (UK), Devitt and Murphy (2004) surveyed doctors' use of computers for clinical tasks at an acute hospital in the National Health Service (NHS). The study found that doctors mainly used computers to conduct literature searches, write clinical reports and prepare presentations. However, while clinicians and researchers often use online databases to support their practice, they sometimes lack the skills to do this well (Haynes, McKibbon, Wilczynski, Walter and Werre, 2005). This may be a result of not addressing the problem during undergraduate training, as was suggested by Giustini and Barsky (2007), who found that students are not taught how to search the literature effectively or to evaluate the credibility of search results. Mostert (2005) had previously highlighted the importance of teaching students the skills to manage the vast amount of information that is available online, although whether or not this practice has found it's way into the curriculi of health-related education is uncertain.

While the situation in Europe appears positive, medical students in Africa seem to be losing out on the benefits that ICT has to offer. Samuel, Coombes, Miranda, Melvin, Young and Azarmina (2004) looked at the use of ICT by medical students at a Tanzanian university, as well as a pilot ICT mentoring programme by elective UK medical students at the same university. They found that Tanzanian medical students had a low level of ICT literacy but that mentoring by the UK students had the potential to improve this situation, with only about five hours of input required to double ICT competency scores. The authors suggest that programmes to increase ICT skills are required, as well as improving access to computers for medical students. These results were similar to those of Ajuwon (2003), who found that first year medical and nursing students in Nigeria had not made full use of ICT as a means of enhancing their medical education. This was partly because of the high cost of accessing ICT services and low ICT penetration. The recommendations made were similar to those of Samuel et al. (2004), that is, to improve access to ICT by including computer education in medical and nursing training and the establishment of more computer laboratories for use by students.

The use of ICT in education has been shown to have several benefits and while there are some inherent problems with the e-learning paradigm, such as diminished opportunities for face-to-face contact, educators must recognise that ICT is the lens through which this generation views the world and should seek to incorporate it into their teaching practice. Clinical reasoning and problem solving skills, essential to the clinician, were found to be improved among physiotherapy students using an e-learning approach, which may have an impact on professional competence.

ICT in professional practice

ICT not only has the ability to enhance the education and training of healthcare professionals, but has also been shown to be a potential means of addressing several important problems in their professional practice (WHO, "*eHealth for Healthcare Delivery*", n.d.). These problems relate mainly to evidence-based practice (EBP), continuing professional development (CPD) and geographical and professional isolation.

Evidence based practice

EBP is fast becoming the standard by which assessment and treatment interventions in healthcare are measured. It is "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients" (Sackett, Rosenberg, Gray, Haynes & Richardson, 1996). According to the Health Professions Council (HPC) in the UK, physiotherapists must "be able to use research, reasoning and problem solving skills to determine appropriate actions" (Chartered Society of Physiotherapists [CSP] website, 2008). In addition to the skills just mentioned, regular access to information is essential in EBP, and clinicians are increasingly turning to the Internet to find content that supports their clinical practice (Martin, 2004). In addition to this, a study by Kulier et al. (2008) found that an e-learning programme focusing on the teaching and learning of evidence-based medicine across five European countries improved the knowledge, attitudes and skills among postgraduate medical students. This demonstrates that ICT is not only an effective means of facilitating EBP, but has also been useful in teaching it.

In a study of the attitudes and barriers of evidence based practice (EBP) among physiotherapists in Tanzania, Maigeh (2003) showed that the majority

of participants (91.3%) considered EBP to be useful in their practice, and that although most physiotherapists surveyed had a good knowledge of EBP, lack of access to literature limited them from incorporating this into practice. This common barrier has been highlighted in several other studies (Guyatt, Meade, Jaeschke, Cook, & Haynes, 2000; Grimmer-Somers, Lekkas, Nyland, Young, & Kumar (2007). It has been suggested that electronic knowledge bases or increasingly, Health Information Systems[4] (HIS) could be used to conduct research (Guyatt et al., 2000). However, in a survey of South African physiotherapists working in community service placements, some reported having "no" or "minimal" access to the Internet, universities or libraries and no opportunities for even basic research (Steyn, 2005). This lack of access to information limits the potential to engage in EBP, a cause for concern among newly graduated therapists. Peacock and Hooper (2007) have suggested that employers have a vital role in encouraging EBP by supporting ICT-based initiatives to promote the "...sharing of expertise and practice that is evidence based".

It seems clear that EBP is being recognised as a requirement for good practice among healthcare professionals and that the role of the Internet in providing access to research upon which to base their practice is becoming increasingly important. However, there are obstacles when it comes to incorporating EBP into professional practice, including a lack of access to relevant content. It has been suggested by some authors that increased use of ICT may provide greater access to resources with which to conduct research.

Continuing professional development

ICT not only has the ability to enhance the education and training of healthcare professionals, but can also provide a channel by which CPD can be effected, through the use of telemedicine and teleconsultation (WHO, "*eHealth for Healthcare Delivery*", n.d.).

In her survey of 52 physiotherapists working in community service in KwaZulu-Natal Province in South Africa, Steyn (2005) found that there were no CPD courses offered specifically to accommodate rural physiotherapists, and sometimes not even textbooks were available for reference. The physiotherapists also reported that the few courses available to them were too expensive, too far away and unrelated to community work.

These results were similar to those of Hill and Alexander (1996), who found that health professionals in rural parts of Australia were disadvantaged when it came to accessing CPD, mainly because of their geographical isolation. They implemented a solution whereby rural nurses and community members used the telephone network to access a CPD module on diabetes care, which allowed students and experts to interact and share information. Mitchell, Robinson, McEvoy, and Gates (2001) used a combination of videoconferencing, telephone, video-tapes, the Internet and printed material to show how telemedicine[5] was able to play a role in the professional development of health, education and welfare professionals in two small mining towns. These studies demonstrate that the use of ICT (in it's various forms) is able to facilitate the CPD

4. Health Information Systems are used to efficiently manage information such as patient records, billing and appointment scheduling within healthcare. They are also increasingly used for research, as well as seeking to guide and inform the decision making process (Wikipedia, 2008).

process through the transfer of information and experience to remote areas.

Geographical and professional isolation

The problem of geographical isolation was found to be an influential factor affecting the recruitment and retention of healthcare workers to remote areas of Australia (Struber, 2004), which are often associated with lower numbers of healthcare workers than cities (Australian Institute of Health and Welfare, 2001). Struber (2004) also identified several disincentives to rural work, including a lack of professional supervision, support and/or mentoring, difficulties accessing professional development opportunities, a lack of support for ongoing/postgraduate education, professional isolation and a lack of resources.

Together with the points related to professional practice mentioned above, social and cultural isolation and a lack of access to entertainment have also been identified as other factors related to geographical isolation in both Australia and South Africa (Mitchell, 1996; Mitchell, Robinson, McEvoy & Gates, 2001; Struber, 2004; Steyn, 2005). It was suggested by Taylor and Lee (2005) that the use of ICT may influence the recruitment and retention of occupational therapists who work under difficult conditions. Together with this, the transfer of information to rural areas through the use of telemedicine may be an effective means of improving the medical care provided to patients (Fraser, 2002).

WHO, in their document *"eHealth for Healthcare delivery"* (n.d.), have suggested that the use of ICT in healthcare may have a role to play in minimising the problems associated with geographical isolation, including the effects of professional isolation. The challenges to recruiting and retaining healthcare workers in rural areas can be overcome through the implementation of online support networks, such as interactiveCSP (CSP, 2008), but physiotherapists need to be provided with the skills, time and resources to participate in these services (Peacock & Hooper, 2007).

The importance of access to the Internet at work was highlighted by Louw and Hanmer (2002), who suggested that South African provincial government departments allow unrestricted use of the Internet for healthcare professionals to access relevant health information. While it seems self-evident that access to the vast resources on the Internet, as well as the ability to enhance communication between healthcare professionals can only enhance patient care and professional development, it is a concern that this resource is often not available to South African healthcare professionals.

Challenges of implementing ICT solutions in healthcare

Not everyone is singing the praises of ICT in health education and practice. Coyne (1995) argued that the implementation of ICT can lead to a widening of the gap between rich and poor, as well as of the "digital divide", described by WHO as being "more dramatic than any other inequity in health or income" (Edejer, 2000). The tragedy is that those who need the vast resources of the Internet the most, are often the ones with the least access

5. Telemedicine is defined by the American Telemedicine Association (ATA) as "...the use of medical information exchanged from one site to another via electronic communications to improve patients' health status" (ATA, n.d.). It includes videoconferencing between healthcare workers, the transfer of digital images, access to educational resources to facilitate CPD, monitoring of vital signs over a distance and nursing call centres (Fraser, 2002).

(Samuel et al., 2004). Coyne (1995) also argued that the vast amounts of often contradictory information available on the Internet, often published by dubious authors, can actually lead to more difficulty in the ability to make decisions. Edejer (2000) agreed and suggests that the "...quality of health information available on the web is inconsistent" and highlighted the fact that the results of research from developing countries can be difficult to find. This would suggest that the technology, while increasingly pervasive, is still unevenly distributed and in itself, is not a solution to the problems found in either education or healthcare.

While e-learning has often been portrayed as the answer to many problems, it has also been associated with loneliness, time management issues, poor physical examination skills and difficulty following the study material. Students have also struggled to take responsibility for their own independent learning, as well as finding that access to technology was limited and their technological literacy, low (Mostert, 2006). Unfortunately, among those students who are ICT literate, academic dishonesty has become alarmingly widespread over the past three decades (Stephens, 2004). Milliron and Sandhoe (2008) discussed these challenges to educators and found that a combination of technological solutions and behavioural changes through education based on respect, honesty, trust and responsibility can have a positive effect. The impact of this is that educators must themselves be aware of the potential avenues for cheating in the digital age.

Another potential barrier to the widespread penetration of ICT into healthcare is the high cost of equipment ("Tygerberg children's hospital," 2003). While this is certainly the case, Fraser (2002) points optimistically to the falling cost of hardware and bandwidth, better imaging devices and compression technology, the increasing use of the Internet and the use of appropriate technology in developing countries, as important factors in the adoption of ICT. Even though the telephone network is still inadequate for the wholesale adoption of all Internet technologies, in particular the transmission of digital video, South Africa's communications infrastructure is the "best developed and most modern in Africa" (World Factbook, 2008), which is a positive indication of the potential to improve. While Nel ("Tygerberg children's hospital," 2003) mentioned the difficulty of accessing networks from areas with poor Internet connectivity because of a lack of infrastructure, wireless and satellite networks could be considered as alternatives (Louw and Hanmer, 2002).

Conclusion

The use of ICT in education has been shown to have several benefits, including the potential to enhance communication, improve access to information and facilitate deep learning. While there are some inherent problems with the e-learning paradigm, for example diminished opportunities for face-to-face contact and increased opportunities for academic dishonesty, if it is used as an adjunct (rather than a replacement) to proven methods of education, ICT in education can be a powerful tool. Educators need to recognise that ICT is the lens through which this generation of students views the world and should seek to incorporate it into their established teaching practice.

The use of ICT within the field of healthcare is becoming an increasingly important aspect of a clinicians professional practice, improving the delivery of health services and communication

between healthcare workers, as well as enhancing the decision making process through the efficient flow of information. Other important benefits include facilitating EBP through access to information for research, allowing CPD in rural areas and diminishing the disadvantages of geographical and professional isolation. While there are barriers to widespread adoption of ICT in healthcare, such as the high cost of equipment, and concerns about the credibility of information, these obstacles are not prohibitive.

It is evident that the role of ICT in both the professional education and practice of healthcare professionals is becoming increasingly important. However, evidence is lacking in terms of specific technological innovations or tools to enhance healthcare education and consequently, professional practice, through deeper understanding of the content, was not found to be evident from the literature. It is recommended that further investigation into the use of ICT and it's specific implementations in education and professional practice are carried out in order to better inform clinicians and educators with regards the beneficial potential of technology in healthcare.

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List all the authors the first time. Use "et al." thereafter.

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One study found ". . ." (Smith et al., 2001, p. 2).

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2 or more authors –

Brown, D. A., Cole, F. R., & Smith, R. T. (2000). *Writing essays.* Toronto: New Press.

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Note that "2" refers to the first page of the article and "15" refers to the next (and last) page.

When no author is given –

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