Physiotherapy Students' Assessment of Psychosocial Yellow Flags in Low Back Pain

ABSTRACT: **Background:** *Low Back Pain (LBP) makes up a large proportion of referrals to physiotherapy worldwide. Thus training in its effective assessment and management is essential. With psychosocial yellow flags having been recognised as the strongest predictors of chronicity in LBP, guidelines on the management of LBP emphasise the importance of assessing and managing yellow flags.*

Aim: The aim of this research was to explore whether physiotherapy students were able to assess risk of chronicity based on the presence of yellow flags in descriptions of people with LBP.

Method: A postal semi-structured questionnaire based on clinical vignettes was sent to all the Level 3 physiotherapy students studying at Queen Margaret University College, Edinburgh.

Results: The survey was responded to by 15 of the students (35%). The respondents overestimated risk of chronic LBP from the vignettes. Evaluation of risk for chronicity was based on few yellow flags i.e. the strongest predictors of chronicity were not effectively interpreted resulting in incorrect determination of risk for chronic LBP. All respondents included at least one risk factor not supported by the evidence.

Conclusions: Physiotherapy students in this study did not appear to respond appropriately to the presence of yellow flags in the presented vignettes.

KEY WORDS: YELLOW FLAGS, PHYSIOTHERAPY STUDENTS, ASSESSMENT.

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INTRODUCTION

Low Back Pain (LBP) – that is pain occurring below the twelfth rib and above the inferior gluteal folds; afflicts between 4% and 33% of the worldwide population at any one time (Woolf and Pfleger, 2003). This high prevalence of LBP has financial implications for both the individual and the state. LBP costs the National Health Service (NHS) in the UK an estimated £140.6million in primary health care with 10% of physiotherapy time being spent on LBP (Foster et al., 1999). With LBP making up such a large proportion of referrals to physiotherapy it is essential that physiotherapists are trained in its effective management.

The impact of LBP and chronic LBP (LBP that has been present for more than 6 months) in particular, on society has resulted in research focusing on the risk factors for LBP – an attempt at identifying causes to limit impact (Burton et al., 1995). Despite a lack of clarity regarding the causes for the onset of LBP there is strong evidence suggesting psychosocial factors are of key importance (Hoogendoorn et al., 2000).

Psychosocial factors recognised to increase the risk of LBP becoming chronic have been dubbed "yellow flags" and this term is now commonly used by physiotherapists. These psychosocial factors are many and varied and include people's beliefs about what has happened to them, beliefs about their pain and their beliefs about how work will affect their pain (Linton and Hallden, 1998). Although yellow flags have only been recognised to be linked with LBP chronicity and have not been identified as being causative (Linton, 2000); their assessment and management has been found to improve outcome when included in physical treatment and rehabilitation in both acute and chronic LBP (Bendix et al., 1998).

Assessment is the first step in the treatment process and integral to the management and progression of effective treatments. Guidelines for the management of LBP recommend implementing a biopsychosocial model in both assessment and treatment (Hoogendoorn et al., 2000). In order to effectively assess LBP physiotherapists must develop skills in assessing not only biomedical aspects but also the psychosocial yellow flags that have been found to play such a major role. Thus physiotherapists must be educated and trained in all the dimensions of LBP in order to effectively apply the biopsychosocial model.

Several assessment tools have been developed to facilitate assessment of psychosocial factors including the Yellow Flags Questionnaire (Linton and Hallden, 1998). Despite the availability of these tools however physiotherapists still appear to struggle in the application

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of psychosocial assessment and integration of these factors into treatments (Harland and Lavallee, 2003).

Research into physiotherapists' and physiotherapy students' management of LBP has been limited. The focus of research has been on treatment with little investigation into the processes of assessment. This is perhaps surprising as assessment should be regarded as integral to the treatment process. The investigation of treatments in isolation from assessment processes providing limited insight. Only one paper was found on physical therapists' ability to recognise established risk factors for LBP (Overmeer et al., 2004). Previous research on physiotherapy students appears to have been focused on their knowledge of pain and attitudes towards pain (Latimer et al., 2004).

The identification of yellow flags is an essential component in assessing LBP as these are presently the only evidence-based factors predictive of chronicity. Physiotherapy students' ability to identify yellow flags in people with LBP does not appear to have been previously investigated. This element is of particular importance when considering the influence of psychosocial factors on the management of a person with LBP. In this study, a clinical vignette approach was used to explore physiotherapy students' recognition and interpretation of the yellow flags which place people with LBP at risk of chronicity.

The following research question was posed: "Can level 3 physiotherapy students respond appropriately to the presence of psychosocial yellow flags indicating risk of chronicity in descriptions of people with LBP?" This question was explored with two main aims, firstly to evaluate whether the students could correctly identify people at risk of chronic LBP from vignettes. The second aim was to evaluate what risk factors the students identified from the vignettes which may have influenced their evaluation of risk.

METHOD

A cross-sectional investigation of level three physiotherapy students at Queen Margaret University College (QMUC) was conducted using a questionnaire based on patient vignettes. Ethical approval was applied for and granted by QMUC.

Sample

A convenience sample of 43 physiotherapy students completing their third year of study at QMUC was investigated. This group of students had completed three years of a four year course leading to a BSc in Physiotherapy. The first two years of study focused on university based learning with studies in the sciences and applied sciences. The third year of study entailed 30 weeks of clinical education where the theoretical knowledge and concepts developed in the first two years were practically applied. Clinical education was interspersed with periods of university based study. The final year physiotherapy students were unavailable to participate in the study as they had recently graduated at the time the research was conducted.

Instrumentation

A questionnaire was developed using three patient vignettes (Appendix I – vignettes T, N and NN). Clinical vignettes are recognised as one of the most powerful methods of assessing clinician behaviour, allowing for the exploration of assessment and treatment processes (Rainville et al., 2000). Vignettes have been found to be a useful, valid and reliable method of researching clinician approaches (Hughes and Huby, 2002). While there is always the risk of questionnaire respondents answering a questionnaire with the "correct" answer rather than a description of their actual behaviour this is equally a risk with observed patient interactions.

The first page of the questionnaire was standardised to establish the demographic characteristics of the students. Thereafter the vignettes were presented in random order.

Factors such as gender (female), age group (30-40) and job type, which are known to influence clinician management of LBP were standardised in the vignettes (Rainville et al., 2000). Red flags – signs and symptoms indicative of serious spinal pathology, were also standardised. The goal was for the main differences between vignettes to be in yellow flags.

Each vignette contained a different number of yellow flags. The types of yellow flags occurring in each vignette are described in Table 1. For example in Vignette T the person described presents with catastrophizing issues relating to Attitudes and Beliefs about her pain with a description of feeling "that it won't be long before she'll be like her mother who had to stop working at 40 because of her back". Risk of chronicity increases with higher numbers of yellow flags thus one of the vignettes (vignette T) was loaded with several yellow flags (six) to clearly increase risk. Vignettes N and NN had only one and three yellow flags present respectively. These factors alone would not be sufficient to increase their risk of chronic LBP.

The same questions were applied to each vignette. They were:
1. Is this person at risk for developing chronic low back pain?
2. If yes, list the factors that indicate the person is at risk.

Procedure

A pilot study was conducted using six senior physiotherapists working in NHS outpatient departments who had been involved in student clinical education. Face validity was established with the clinicians responding that the vignettes were a valid way to establish understanding of yellow flags in the clinical context.

The students were pre-notified about the study in person prior to their departure from campus on their summer vacation. Following ethical approval information sheets/consent forms, questionnaires and stamped self-addressed envelopes were posted to the home addresses of the students. One month was allowed for return of the questionnaires. Consent forms and questionnaires were separated prior to analysis to maintain anonymity.

Analysis

Demographic data including students' age, gender and route of entry into the study of physiotherapy were gathered. A modified framework approach was used to develop a thematic framework

identifying key issues in each of the vignettes (Pope et al., 2000). Responses were evaluated and grouped under the headings identified in the frameworks as listed in Table 1. This analysis was conducted by a single researcher to maintain consistent analysis and grouping of results.

Once categorised the number of respondents per category was summed. Total numbers of responses for risk factors and yellow flags were established and as the results were non-parametric, median numbers were calculated. Statistical analyses of normality, measures of centrality and measures of dispersion were conducted using Microsoft Excel 2000 and SPSS (version 11.5).

RESULTS

A response rate of 35% was obtained with 15 of the 42 students returning questionnaires. All respondents were female with a median age of 21 years (range 20-30). Fourteen of the subjects had entered university direct from school, while one was a graduate of a previous degree. This respondent's results were analysed independently to the rest of the group and found not to differ in any way.

Identification of risk for chronic LBP

All 15 respondents answered this question for all three vignettes. While all respondents correctly identified vignette T as being at risk for chronic LBP, the results for vignette N were split. For vignette NN 14 respondents responded incorrectly. Table 2 presents an overview of the responses to this question.

Risk factors described

Table 3 summarises the median number of yellow flags identified for each vignette. For all three of the vignettes respondents identified a median of one risk factor not supported by evidence.

For all three vignettes at least one respondent identified each of the yellow flags present. Table 4 summarises the yellow flags present for each of the vignettes and the percentage of respondents describing that factor as a risk for chronicity for that vignette.

The only respondent correctly identifying Vignettes N and NN as not being

at risk for chronicity was also the respondent identifying the highest number of yellow flags for Vignette T (five of six).

DISCUSSION

Respondents

While the small sample size and restricted number of respondents limits the generalisability of the results several interesting factors were highlighted which may be of value for the future training of clinicians dealing with LBP.

The 15 respondents were all female with a median age of 21 years. Interestingly none of the males in the sample group responded. This may simply be a reflection of the previously reported tendency of males being less responsive to prenotification in mail surveys (Hornik, 1982).

Table 1: Thematic Framework of risk factors described in each vignette.

	Vignette T (at risk of chronicity)	Vignette N (not at risk of chronicity)	Vignette NN (not at risk of chronicity)
Yellow Flags	• Attitude and Beliefs about back pain • Behaviours relating to pain • Diagnosis and treatment issues • Emotions • Family • Work	• Work	• Attitude and Beliefs about back pain • Behaviours relating to pain • Work
Evidence-based risk factors	• Time since onset	• Time since onset	• Time since onset
Risk factors described by subjects with no supporting evidence	• Physical findings or observations • Physical issues • General Fitness Levels	• Physical findings or observations • Physical issues • General Fitness Levels • General Muscular Strength	• Physical findings or observations • Physical issues • Behaviours relating to coping

Table 2. Results for Question 1: "Do you think this person is at risk of chronic low back pain?" (* indicates preferred answer; n=15).

Vignette	YES (at risk)	NO (not at risk)
Vignette T	15* (100%)	0 (0%)
Vignette N	8 (53.3%)	7* (46.6%)
Vignette NN	14 (93.3%)	1* (6.6%)

Table 3. Number of yellow flags present and median numbers identified for each vignette.

Vignette	Number of yellow flags present	Median number of yellow flags identified (range)
Vignette T	6	3 (1-5)
Vignette N	1	1 (0-1)
Vignette NN	3	1 (0-2)

Table 4: Percentages of respondents identifying each yellow flag for each vignette.

6 Yellow Flags Present in Vignette T	Percentage of Subjects Identifying Flag	1 Yellow Flag Present in Vignette N	Percentage of Subjects Identifying Flag	3 Yellow Flags Present in Vignette NN	Percentage of Subjects Identifying Flag
Work	66.6%	Work	75%	Work	71.4%
Attitudes and Beliefs about back pain	73.3%	-	-	Attitudes and Beliefs about back pain	7.14%
Behaviours relating to pain	86.6%	-	-	Behaviours relating to pain	21.4%
Diagnosis and treatment issues	20%			-	-
Emotions	60%	-	-	-	-
Family	20%	-	-	-	-

Response to yellow flags

Although all 15 respondents correctly identified Vignette T as being at risk for chronic LBP; the high numbers of respondents incorrectly indicating that Vignettes N (53.3%) and NN (93.3%) were at risk suggests there is a problem with the interpretation of risk factors.

Vignette T contained six yellow flags indicating risk for chronicity; however a median of only three yellow flags were described by the subjects. Vignette NN contained three yellow flags yet a median of only one yellow flag was described. Vignette N contained only one yellow flag which was correctly identified by the subjects.

It is worth emphasising that it is not the presence of individual yellow flags which increases risk for chronicity but the presence of strong and cumulative numbers of yellow flags (Linton and Hallden, 1998). The respondents' evaluation of risk for chronicity in the present study appears to be based on relatively few yellow flags. The students overestimated risk for chronicity with the possible result of inappropriate patient management.

There are several possible reasons for the respondents' overestimation of risk for chronicity in the present study. In common with healthcare students in several other studies (Chiu et al., 2003), the respondents had received a limited amount of pain education, approximately six hours. This education on pain was separated into modules on assessment, pathology and treatment interventions.

Limited education on pain further separated into modules may compound the situation resulting in difficulty with the integration of assessments.

The inclusion of at least one risk factor not supported by the evidence may simply be a reflection of lack of training. However the students may have been influenced by their supervising clinical practitioners. Swedish researchers reported that physical therapists were selecting a median of 10 factors not supported by the evidence as indicative of risk for chronic LBP (Overmeer et al., 2004). If the respondents participating in the present study were supervised by clinicians with similar responses to those in Sweden, they may have been negatively influenced.

The attitudes and beliefs of the respondents in the present study may also have influenced their responses. Inexperienced clinicians and students have been reported to hold attitudes and beliefs about pain inconsistent with the evidence (Latimer et al., 2004). Beliefs influence an assessor's frame of reference and thus affect assessment and treatment of any painful condition.

Finally a lack of clinical experience in which to consolidate learning and reflect on practice could influence the respondents' skill in recognising and interpreting yellow flags. Skilled clinicians constantly reflect on their practice comparing their knowledge base to past experience and present findings. In order to develop these skills physiotherapists need to have a theoretical base,

spend time in clinical activities and reflect on these activities in light of the theory (Ladyshewsky, 2004). Considering the limited clinical experience of the respondents it may be unreasonable to expect them to be able to effectively interpret the yellow flags.

In light of the length of time it takes for clinicians to develop clinical reasoning skills which enable them to integrate theory into practice it may be advisable for students and physiotherapists assessing LBP to use recognised screening tools to assess yellow flags. Tools such as the Yellow Flag Questionnaire which was designed for use in New Zealand (Linton and Hallden, 1998) can be administered in relatively short time. This would allow the clinician to evaluate risk for chronicity without the subjective influence of their beliefs and clinical reasoning abilities. Although this tool was designed for use in a specific demographic group, it could be used as a learning tool with the aim of helping clinicians develop clinical reasoning skills (the Acute Low Back Pain Screening Questionnaire can be accessed free on the web through the New Zealand Guidelines Group website http://www.nzgg.org.nz/index.cfm) (N.Z.G.G., 2003).

The results raise a number of questions for future studies. The influence of education in pain on these results could be evaluated in a study using a similar vignette questionnaire applied before and after a teaching block on pain. Longitudinal studies following new

graduates would provide further insight into the effect of experience and skill development on the assessment of yellow flags in LBP. Insight into the effect of skill development on assessment of yellow flags could also be gained by the comparison of physiotherapy students' of different levels results to those of novice, experienced and expert physiotherapists.

CONCLUSION

The respondents of the present study were overestimating risk for chronic LBP from the vignettes. The evaluation of risk factors reported revealed that this overestimation appears to have occurred due to poor interpretation of yellow flags coupled with the identification of risk factors not supported by the evidence. Thus the strongest predictors of chronicity (yellow flags) were not effectively interpreted resulting in incorrect determination of risk for chronic LBP. In order to limit errors in the recognition and interpretation of yellow flags in LBP it would seem advisable for physiotherapy students and newly qualified clinicians with limited experience to use recognised screening questionnaires to evaluate these factors in patients.

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Appendix I: Clinical Vignettes used in Questionnaire.

Vignette T	Vignette N	Vignette NN
Joanne is a 37-year-old primary school teacher who presents with a 4-week history of low back pain. Joanne is not sure when her back pain started and can't remember an incident which brought it on. She says she has always had a weak back since being in a car accident as a teenager. At that time her GP advised her to rest in bed when it hurt. She feels that it won't be long before she'll be like her mother who had to stop working at 40 because of her back. Joanne says she used to enjoy her job but this term her workload has increased as one of her colleagues has gone off long term sick and she often has to double up classes. She says she's too tired to do anything outside of work and tends to collapse at the end of the day. Joanne tried going to the gym during the school holidays but after four days her pain came on and she thought she'd better stop. Joanne lives with her partner who is very understanding of her back problem and he does most of the housework to allow her to rest. Joanne has been getting more and more anxious about her back so her GP ordered an X-ray which was normal and then suggested she go to the physio to see if there was anything they could do. Joanne describes her pain as a constant deep ache that becomes excruciating – she's not sure why. Once again she is off sick because of her back. She's recently started to use an old back support of her mothers. Her forward flexion is limited and she can just reach below her knees. She says bending backwards is very difficult and makes her pain worse and is unwilling to do this movement. Lateral flexion to the right and left are equally limited to about half range with pain limiting her movements. Her rotation and straight leg raise were both normal. She has no symptoms into her buttocks or legs and no pain when she coughs or sneezes. A full assessment of passive intervertebral movements is not possible due to pain and withdrawal with wincing.	Jenny is a 32-year-old nurse who works in the outpatient department of the local hospital. Her job involves assisting in consultations and taking patient observations – she says she is always busy, on her feet a lot but she does get the chance to sit down and she loves working with different colleagues and different patients on a daily basis. Jenny first noticed her back ache about a month ago after a particularly long day. It was a bit stiff the next morning but soon eased off and she didn't worry about it. Since then she has had repeated bouts of pain, never long lasting or severe but they seem to be occurring more often. Jenny used to go to aerobics twice a week and yoga once a week. Now though she says she seems to have got out of the habit of it all. Jenny admits that her back pain is probably because she hasn't been exercising but wanted to make sure that there was nothing else going on. Jenny enjoys the outdoors and is planning a charity hike in Nepal later in the year. Jenny has worked in orthopaedics for many years and has been trying to read up on back pain but feels she's a bit out of her depth. She's fascinated by how physio works though and is looking forward to getting a grip on things. Jenny has central pain in her low back that extends left and right to her waist but not to her stomach. She says it feels like stiff muscle aching rather than pain. She has good posture and her movements are full in all directions. She does have some end range pain on bending forwards and backwards though. Her rotation and straight leg raise were both normal. She has no symptoms into her buttocks or legs and no pain when she coughs or sneezes. Passive intervertebral movements show that she is stiff at L2, L3 and L4 with some discomfort at the end of range. She has no muscle spasm or guarding. On assessing her deep muscles she is unable to initiate a contraction of transverses abdominus.	Jane is a 35-year-old nursery nurse who presents with a 6-week history of aching in her lower back. Jane has had bouts of back pain since her mid-twenties when she started working with toddlers and was bending over a lot. She has previously managed to cope and the pain would settle with the use of paracetomol and taking it easy for a few days. This time Jane has decided that she ought to do something about it as she feels that her back pain is now starting to occur with more frequency so she asked her GP to send her to physio. Jane goes to aerobics classes once or twice a week and enjoys going for a long walk on the weekend with her dog. She would like to start doing Pilates but thought she should get her back seen to before starting anything new. She knows that her work situation doesn't help things but she loves her job, she hates having to take any time off and admits she has to be at deaths door before she will stay home. She wouldn't change her job unless she was totally unable to do it. Jane's pain is in the middle of her lower back and extends equally left and right – she describes it as a deep ache that is eased by short rests but gets stiff after a full nights rest. Moving about in the morning eases it but by the end of the day the ache is worse again. Her forward flexion is limited and she can just reach her knees, bending backwards is very difficult and makes her pain worse. Lateral flexion to the right and left are equally limited to about half range but not as painful as bending backwards. Her rotation and straight leg raise were both normal. She has no symptoms into her buttocks or legs and no pain when she coughs or sneezes. Passive intervertebral movements found that she is stiff and tender at L3, L4 and L5 with some associated muscle spasm. Jane is a smoker who is constantly trying to give up.