Low back pain risk factors in a large rural Australian Aboriginal community. An opportunity for managing co-morbidities?

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Abstract

Background

Low back pain (LBP) is the most prevalent musculo-skeletal condition in rural and remote Aboriginal communities. Smoking, physical inactivity and obesity are also prevalent amongst Indigenous people contributing to lifestyle diseases and concurrently to the high burden of low back pain.

Objectives This paper aims to examine the association between LBP and modifiable risk factors in a large rural Indigenous community as a basis for informing a musculo-skeletal health promotion program.

Methods

A community Advisory Group (CAG) comprising Elders, Aboriginal Health Workers, academics, nurses, a general practitioner and chiropractors assisted in the development of measures to assess self-reported musculo-skeletal conditions including LBP risk factors. The Kempsey survey included a community-based survey administered by Aboriginal Health Workers followed by a clinical assessment conducted by chiropractors.

Results

Age and gender characteristics of this Indigenous sample were comparable to those reported in previous Australian Bureau of Statistics (ABS) studies of the broader Indigenous population. A history of traumatic events was highly prevalent in the community, as were occupational risk factors. Thirty-four percent of participants reported a previous history of LBP. Sporting injuries were associated with multiple musculo-skeletal conditions, including LBP. Those reporting high levels of pain were often overweight or obese and obesity was associated with self-reported low back strain. Common barriers to medical management of LBP included an attitude of being able to cope with pain, poor health, a lack of awareness of treatment options and inadequate finances.

Conclusion

Addressing the modifiable risk factors associated with LBP such as smoking, physical inactivity and obesity may also present a wider opportunity to prevent and manage the high burden of illness imposed by co-morbidities such as heart disease and type-2 diabetes.

Keywords

Low back pain; risk factors; chiropractic; general health; Australian; Aboriginal.

Background

Low back pain (LBP) is the most prevalent musculo-skeletal condition in rural and remote communities [1,2,3]. Indigenous people in these communities are over-represented in low-skilled, manual jobs and the community-service sector [4]. As such they are more likely to be exposed to greater manual handling of loads, repetitive strains and risk of musculo-skeletal conditions. Formal reporting of such conditions in the Australian Indigenous community is infrequent [1]. These occupational factors and resulting LBP may be compounded by lifestyle risk factors including smoking, physical inactivity, and obesity [5].

There is an abundance of literature reporting on the risk factors associated with LBP in the general population [6]. Known modifiable risk factors for low back pain are lack of fitness, poor health, obesity, smoking, drug dependence, and occupational factors including heavy lifting, twisting, bending, stooping, awkward posture at work and prolonged sitting. Those that are non-modifiable are increasing age, number of children, a previous episode of LBP and major scoliosis [6]. Within the public health context it is important to prevent injuries and painful conditions by addressing modifiable risk factors [7,8].

Risk factors for morbidity in Indigenous people are frequently reported in isolation [9]. However, it is important to study multiple risk factors at one time because the level of risk associated with musculo-skeletal conditions, diabetes or cardiovascular disease increases when several risk factors are present concurrently [9]. It has been argued that by adopting a holistic approach and addressing modifiable risk factors associated with LBP, such as smoking, physical inactivity and obesity, the clinical management of co-morbidities such as heart disease and diabetes may also be collectively addressed [10]. Once their presenting condition has been effectively managed, patients are more likely to comply with other measures to promote their health [10].

Modifiable risk factors for LBP mentioned above have been further classified as lifestyle (physical inactivity, poor muscle strength, obesity, smoking), and occupational (heavy lifting, twisting, bending, stooping, prolonged sitting, awkward

posture at work, previous history of injury to the area) [6]. These are summarised in Table 1.

As part of a study investigating the prevalence of LBP in this community [3], the risk factors known to be associated with LBP and other serious causes of morbidity and mortality were measured. This paper aims to describe the most commonly reported risk factors for LBP in a large rural Indigenous community; and examine their association with reported LBP as a basis for informing the development of a broad health promotion intervention in this community.

Methods and Materials

Design

A cross-sectional self-report survey (Kempsey survey) was conducted to determine the extent of the risk factors (Table 1) and their association with LBP in the study community.

Community consultation, collaboration and ownership of the program

The Durri Community of Kempsey, NSW, Australia, comprises one of Australia's largest rural Aboriginal communities. The Durri Aboriginal Corporation Medical Service (ACMS) is at the forefront of providing culturally appropriate care, largely via its Aboriginal Health Workers (AHWs). Durri ACMS aims to:

> 'make primary health care and education accessible to all members of the community in a culturally appropriate and spiritually sensitive manner, endeavouring to improve not only the health status but also the well-being of the Durri Aboriginal community' [11].

Discussions with a cross section of community members led to the formation of a Community Advisory Group (CAG) (which included representatives from the Durri ACMS, Booroongen Djugun Aboriginal Health Worker College, Hands On Health Australia and the University of Newcastle). The CAG aimed to advise on the development and implementation of the musculo-skeletal prevalence study [12]. Aboriginal Health Workers were chosen as the study agents because they are recognised as essential in providing culturally appropriate and effective health-care for their communities [13,14,15,16,17,18,19,20].

Community consultation occurred throughout the study. This process involved regular discussions with key-informants from the community including AHWs, elders and health professionals. The community was informed of developments via information sheets and the publication of a summary report during the process and at the completion of the study.

Sample

Our goal was to select a representative cross-sectional sample of the local Aboriginal community of sufficient size to generalise our major findings to the whole local community (population 550). A random sampling procedure stratifying for age and sex was used to derive a representative sample of the local community. The sample size was generated using Epi-Info 6 [21]. With a population size of 550, the expected frequency of the main variable of interest (low back pain) was estimated at 50%. The value chosen as the farthest from the real population was 44%. Using these values and a 95% confidence interval, the ideal random sample size calculated was 180. However, we expected that logistically this was unlikely to be achieved, as many of the sample selected were likely to be uncontactable given the transient nature of community residents [22]. Accordingly, where randomly selected community members were unable to participate, they were replaced using a convenience sampling approach to achieve the required sample size. Although this strategy was not ideal, all attempts were made to attain a representative sample as the ultimate goal. Participants within the community were selected from persons aged 15-years or older who had been previously identified as Aboriginal (according to the definition of Aboriginal adopted by the Department of Aboriginal Affairs Constitutional Section) [23]. These participants were recruited by distributing letters inviting them to contact the assisting AHWs at the ACMS. If no response was received within a week, an attempt to contact the person via telephone was made by the assisting AHW [21].

Procedure

The Kempsey survey included a screening survey administered by Aboriginal Health Workers followed by a clinical assessment conducted by chiropractors.

Screening survey

Participants completed a previously validated screening questionnaire [20]. The purpose of the screening questionnaire was to identify those who had experienced a musculo-skeletal condition including ache, pain or discomfort. The questionnaire also assessed self-reported limitations to Activities of Daily Living (ADL) imposed by pain.

Assessment

Participants subsequently attended a clinical assessment to confirm the presence of musculo-skeletal conditions [20]. Chiropractors and 5th year chiropractic students performed a follow-up clinical assessment (based on clinical assessment parameters used in 1999 at the School of Chiropractic, RMIT University, Victoria, Australia) [24] to validate the findings reported in the screening questionnaire. At the screening, other musculo-skeletal risk factors and findings requiring follow-up management or referral were identified.

Health workers using a laptop computer entered data on-site into a specifically designed, Microsoft Access database.

Screening and assessment agreement

The questionnaire results were compared to the data from the clinical examination and published in a previous study (Table 2). Eighty-three percent of all participants with LBP were also positive for LBP via the clinical assessment. Sensitivity of the screening survey for LBP was 0.826, specificity 0.632 and Kappa 0.4648. Thus the screening survey achieved an adequate level of agreement [25]

Measures

The main variables of interest from the survey were:

- Demographic and other sample characteristics-age, sex, number of children, occupation, weight, and Body Mass Index (BMI).
- Prevalence of LBP (within the last seven days, according to self report).
- Pain levels were recorded using a Likert scale where a score of 0 corresponded to no pain and 10 to severe pain.
- Duration of LBP was categorised as less than/equal to or more than seven weeks.
- Disability levels were recorded using a Likert scale where a score of 0 corresponded to no disability and 10 to severe disability. Disability was defined as "how much the condition (ache, pain or discomfort) had affected the participants ability to carry out daily activities (e.g., housework, washing, dressing, lifting, walking, driving, climbing stairs, getting in and out of bed or a chair, sleeping, working, social activities and sport)".
- Self-reported modifiable risk factors as described in Table 1 (according to a standardised clinical history).
- Other musculo-skeletal conditions.

Analyses

Frequencies and confidence intervals were reported for characteristics of the sample, prevalence of LBP and reported risk factors for low back pain. Chi-square analyses were performed to test for factors associated with low back pain.

Results

Sample

This study was conducted between January 2001 and July 2002. The sample comprised 189 Indigenous people: 80 were selected randomly and the remainder were convenience sampled as described above.

Sample characteristics

Age and sex

The mean age of participants was 44 years ($\pm$14.8) and the median age 43 years.. The sample comprised 87 males (46%) and 102 females (53%) ranging in age from 15 to 80 years. There were no significant differences in the distribution of males and

females in the various age categories (p=0.35). Gender was comparable with previous ABS census data for Indigenous people in Australia [26]. Age categories were also similar in breakdown to those described in census data for the entire Indigenous community (Table 3) [26].

Despite a high consent rate (85% of the randomly recruited sample), the response rate was low (40%) because many members of this highly mobile community were unable to be contacted.

Overall age and gender characteristics of this Indigenous sample were comparable to those reported in previous Australian Bureau of Statistics (ABS) studies of the broader Indigenous population.

Number of children

Approximately one third (31%) of participants had between two or three children. Thirty percent of participants had no dependent childrenand 17% had 4-5 children. Of note, 15% had six or more children. These findings are comparable to those of other Indigenous studies [5]. An Australian Bureau of Statistics (ABS) study reported that Indigenous families tend to be larger than Australian families overall. According to the 1996 Census, approximately 13% of Indigenous families had four or more children compared with less than 5% of other Australian families [5].

Occupation

Occupational demographics of the participants in the study are summarised in Table 4. Approximately one third of the community surveyed were students or unemployed. A significant number of people surveyed were associate professionals, retired workers, involved in home duties or labourers. These data were generally comparable with those reported by the ABS (2000). However, for males in the Kempsey survey, there were significantly less professionals, managers, tradespersons and transport workers, and more intermediate clerical, sales and service persons, compared to the ABS population. For females there were significantly more professional, and associates professionals, and less tradespersons or transport workers as well as many less intermediate clerical, sales and service persons, compared to the ABS population [5].

Weight and BMI

Table 5 shows that 46% of participants weighed 80kg or more and Table 6 shows that 32% of participants were overweight and 39% were obese.

Using Body Mass Index (BMI) estimates, 26% (95% CI: 20%-32%) of participants were overweight (BMI = 25.0-29.9) and 45% (95% CI: 38%-52%) were obese (BMI ≥30.00). The high prevalence of obesity in this study agrees with national figures demonstrating that Indigenous people generally experience more obesity than do other Australians [5].

Self-Report of LBP within the last seven days

The LBP prevalence within the last seven days was 72% (95% CI: 63%-80%) and LBP lasting seven weeks or longer was 34 % (95% CI: 27%-40%).

Previous history of LBP

Previous history of LBP was present in 34% (95% CI: 27%-40%) of respondents. A previous history of LBP is known to predispose individuals to recurrent episodes of back pain [27].

Other modifiable risk factors for LBP

Smoking

Smoking was highly prevalent 46%(95% CI: 38%-53%) in the community, with equal numbers of males and females smoking. Thirty eight per cent (95% CI: 31%-45%) of people smoked between 10-20 cigarettes daily and 8% (95% CI: .04%-11%) smoked more than 20 cigarettes per day. This is consistent with the 2001 National Health Survey (NHS), which found that 51% of Indigenous people aged 18 years or older were current smokers, compared with 24% of non-Indigenous people [28].

Physical inactivity

Sixteen percent (95%CI: 10%-21%) of participants spent no time actively exercising and 35.9% (95% CI: 26%-45%) exercised less than 30 minutes per week. There are no other detailed data available on the levels of physical activity among Indigenous people. However, the 2001 NHS reported that 43% of Indigenous people aged 18 years or older living in non-remote areas were sedentary, compared with 30% of non-Indigenous people [28].

Psychosocial stress

Of those reporting LBP, 72% (CI: 65%-78%) perceived themselves as being frequently exposed to "stressful situations" in their occupation. Stress at home was not measured on the advice of the CAG.

Physical trauma

For those reporting LBP (66.1% CI: 54%-68%), the most commonly reported traumatic events included sporting injuries 26.5% (95% CI: 20%-38%), motor vehicle accidents 18% (95% CI: 12%-23%) and work-related trauma 17.5% (95% CI: 12 %-22%).

Occupational risk factors

Figure 1 details reported occupational risk factors for LBP. Common risk factors were adopting awkward postures at work 32% (95% CI: 25%-39%), frequent bending and twisting 29% (95%: CI: 22%-35%) and heavy lifting 26% (95% CI: 20% - 32%).

Factors associated with reported LBP

Even though a trend was evident, no statistical association between LBP and the lifestyle factors detailed above. However, more participants reporting high levels of LBP pain were overweight or obese and obesity was statistically associated with self-reported strain causing reported LBP (χ^2 = 9.02, df =2 10, p = 0.01). While sporting injuries were not statistically associated with report of LBP in particular, participants reporting sporting injuries experienced between two and four musculo-skeletal conditions (χ^2 = 7.90, df = 2, p = 0.0193).

Discussion

The 72% seven day prevalence of LBP found in the Kempsey survey is significantly greater than similar prevalence levels reported in other rural Indigenous Communities [2,1,29,30].

In their study, Honeyman and Jacobs [2] found that the majority of community members, 68% (95% CI: 61%-74%), had experienced their presenting LBP for seven weeks or more. Thus according to accepted definitions of chronicity [31], the majority of Indigenous people in this community were suffering from chronic pain and were

therefore, likely to be at greater risk of enduring prolonged disability [27]. Thirty-four percent of participants also reported a previous history of LBP, which was likely to predispose them to recurrent, future episodes [27]. Furthermore, trauma particularly that incurred in sporting injuries was associated with multiple musculo-skeletal conditions. Past studies have reported that Indigenous people are more likely to die from transport accidents, intentional self-harm and assault than other Australians with rates approximating three times those of the rest of the Australian population [32].

The findings in this study of higher levels of smoking, physical inactivity and obesity are consistent with those reported by other studies of Indigenous Australians [9]. Though many of the modifiable risk factors known to be associated with LBP were highly prevalent in this study, none of these were statistically associated with LBP. One explanation for this finding is that the size of the sample, though sufficiently large to demonstrate comparability with ABS findings for demographic categories, may not have been sufficiently large to achieve the statistical power to detect the association between LBP and associated study factors.

Obesity and physical inactivity are the two most important modifiable factors contributing to the development of type 2 diabetes mellitus. These factors were highly prevalent in the community with 26% of subjects overweight, 45% obese and 16% spending no time actively exercising plus a further 35.9% exercising less than 30 minutes per day. Obesity in this study was associated with self-reported low back strain The prevalence of obesity in this community is of concern, first because obesity is an independent predictor of back pain [33], but more importantly as obesity has a global health impact.

Health providers including chiropractors and osteopaths commonly counsel LBP sufferers to lose weight to unload their spines. Weight loss also offers other musculo-skeletal benefits. Females with a BMI of over 25 kg/m2, can by losing 5kg
(2 BMI units) reduce future onset of knee osteoarthritis by 50% and males by 25% [34]. Obesity has also been associated with a higher prevalence of work limitations, hypertension, dyslipidemia, type 2 diabetes and the metabolic syndrome in adults of working age [35]. Furthermore, Australia-wide some 50% of cases of type 2 diabetes are asymptomatic, undiagnosed and persons subclinically undergo progressive macro and micro-vascular changes [36]. The current findings suggest that screening

this population group for evidence of glucose intolerance when reviewing musculo-skeletal conditions such as LBP may be valuable.

Of those reporting LBP, 72% of participants (CI: 65%-78%) were frequently exposed to “stressful situations” in their occupation. However, psychosocial stress outside of the work place was not measured given the cultural sensitivity of this factor according to the CAG. Psychosocial stress in general is a strong predictor of LBP [37,38]. If conducted in a culturally appropriate manner, future studies assessing LBP in Indigenous Communities should ideally attempt to also measure psychosocial stress as a potential contributing study factor.

Another concurrent health hazard is the high prevalence of cigarette smoking. In addition to the well documented risks of smoking it has been found that compared with matched groups of non-smokers, chronic cigarette smokers are more likely to be insulin resistant, hyperinsulinemic, and dyslipidemic [36].

Exercise is the most common method of treating LBP in Australia [40]. In addition it may be the single most important lifestyle factor for both preventing and reversing insulin resistance, particularly among obese individuals [41,42]. This suggests a good case for concentrating on general exercise health promotion for Indigenous communities.

Lifestyle interventions incorporated into a culturally sensitive health promotion program could potentially benefit the health and modify the morbidity and mortality of this population group. These results suggest an opportunity to review and address risk factors associated with LBP along with more serious diseases affecting Indigenous people. Addressing modifiable risk factors associated with LBP, such as smoking, physical inactivity, and obesity could significantly contribute to the management of co-morbidities including diabetes and heart disease which so commonly affect Indigenous Australians.

An understanding of the modifiable risk factors for LBP identified in this paper also formed the basis for a culturally acceptable musculo-skeletal intervention designed to address the high prevalence of LBP. This involved using a pilot training program for Aboriginal Health Workers (AHWs). The intervention was designed to promote the

musculo-skeletal and general health of Indigenous people living in this rural community [12]. We propose that any future musculo-skeletal study or intervention in an Indigenous community be accompanied by a review of the modifiable risk factors associated with LBP and counselling about those factors. This may have a beneficial effect on the overall well being of indigenous communities. Further research should test such a program for efficacy and effectiveness.

Conclusion

The disturbingly high prevalence of LBP experienced in this community necessitates a serious response. Managing LBP through health services and addressing the modifiable risk factors through culturally sensitive, health promotion programs will be an important step in addressing the high burden of illness imposed by LBP and other more serious conditions suffered in this community.

Acknowledgements

The authors would like to acknowledge the assistance of the Durri ACMS, NSW, as well as the Booroongen Djugun College, NSW, The Murray School of Health Education, NSW, and volunteers from the RMIT University, Victoria, Australia. The authors also thank Hands on Health Australia for funding the program. Also, Dr Janice Perkins for introducing the authors to the community and assisting in the design of the original program from which this study was drawn, Mrs Karen Woulfe for kindly proof-reading the text and offering helpful suggestions and Julie Bateman for formatting the paper.

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Tables

Table 1 Individual modifiable risk factors associated with low back pain

Lifestyle factors	**Occupational factors**
Lack of fitness/Physical inactivity	Awkward posture at work
Smoking	Frequent bending and twisting
Obesity	Gripping
Psychosocial stress	Heavy lifting
Physical trauma	Jarring/vibration
	Prolonged sitting
	Prolonged standing
.	Repetitive actions

Source: Adapted from Kirkaldy Willis, 1992

Table 2 **Sensitivity, specificity and Kappa for LBP screening survey compared to clinical assessment (n= 189)**

Survey results	Clinical Assessment			Sensitivity	Specificity	Kappa coefficient
	Negative	Positive	Total			
Negative	43	21	64	**0.826**	**0.632**	**0.4648**
Positive	25	100	125			
Total	**68**	**121**	**189**			

Table 3 Age and sex of study participants

Age category (years)	Male	Female	Total	% Male	% Female	% Total
15 - 25	20	20	40	23.0	19.6	21.2
26 - 35	14	16	30	16.1	15.7	15.9
36 - 45	25	29	54	28.7	28.4	28.6
46 - 55	13	10	23	14.9	9.8	12.2
56 +	12	24	36	13.8	23.5	19.0
Unknown	3	3	6	3.4	2.9	3.2
Total	**87**	**102**	**189**	**100**	**100**	**100**

Table 4 Occupation of study participants according to sex

Occupation	Male	Female	Total	% Male	% Female	% Total
Managers and Administrators	5	3	8	5.7	2.9	4.2
Professionals	7	9	16	8.0	8.8	8.5
Associate professionals	5	16	21	5.7	15.7	11.1
Tradespersons and related workers	1	2	3	1.1	2.0	1.6
Advanced clerical and service workers	3	2	5	3.4	2.0	2.6
Intermediate clerical, Sales and service workers	3	2	5	3.4	2.0	2.6
Elementary Clerical, Sales and Service workers	2	6	8	2.3	5.9	4.2
Labourers and Related workers	13	3	16	14.9	2.9	8.5
Unemployed/Student	38	28	66	43.7	27.5	34.9
Home duties	1	16	17	1.1	15.7	9.0
Retired	4	15	19	4.6	14.7	10.1
Unknown		5	0	5	0.0	2.6
Total	**87**	**102**	**189**	**100**	**100**	**100**

Table 5 Weight of study participants, according to sex

Weight category (kg)	Male	Female	Total	% Male	% Female	% Total
< 60	4	18	22	4.6	17.6	11.6
60 - 69	9	16	25	10.3	15.7	13.2
70 - 79	18	14	32	20.7	13.7	16.9
80 - 89	11	13	24	12.6	12.7	12.7
90 - 99	13	20	33	14.9	19.6	17.5
100 - 109	15	10	25	17.2	9.8	13.2
110 & >	10	6	16	11.5	5.9	8.5
Unknown	7	5	12	8.0	4.9	6.3
Total	**87**	**102**	**189**	**100**	**100**	**100**

Table 6 Body Mass Index (BMI) of participants, according to age and sex (n = 189)

		BMI classification									
Age (yrs)	**Sex**	**Normal**	**(%)**	**Overweight**	**(%)**	**Obese**	**(%)**	**Unknown**	**(%)**	**Total**	**(%)**
15 - 25	Male	10	23%	7	14%	2	.02%	0	0%	19	10%
	Female	7	16%	5	10%	9	12%	0	0%	21	12%
	Total	17	39.5%	12	24%	11	14%	0	0%	40	22%
26 - 45	Male	5	12%	13	26%	18	23%	4	33%	40	22%
	Female	14	33%	9	18%	18	23%	5	42%	46%	25%
	Total	19	44%	22	44%	36	47%	9	75%	86	47%
> 45	Male	4	9%	6	12%	13	17%	1	8%	24	13%
	Female	3	7%	10	20%	17	22%	2	17%	32	18%
	Total	7	16%	16	32%	30	39%	3	25%	56	31%
	TOTAL	**43**	**100%**	**50**	**100%**	**77**	**100%**	**12**	**100%**	**182**	**100%**

Note: BMI = Weight (kg) divided by square of height (m)

Figures

Figure 1 Modifiable occupational risk factors for musculo-skeletal conditions

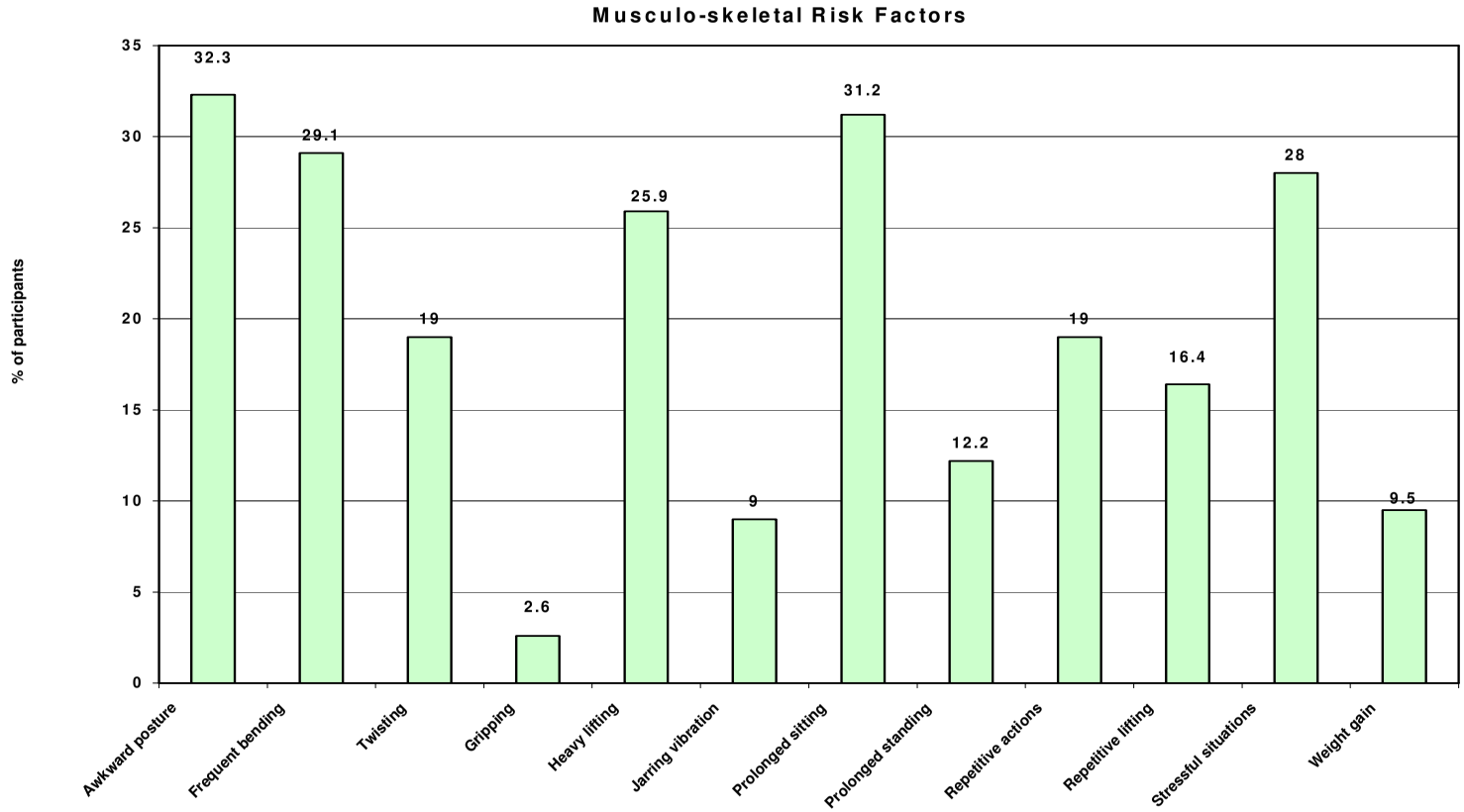
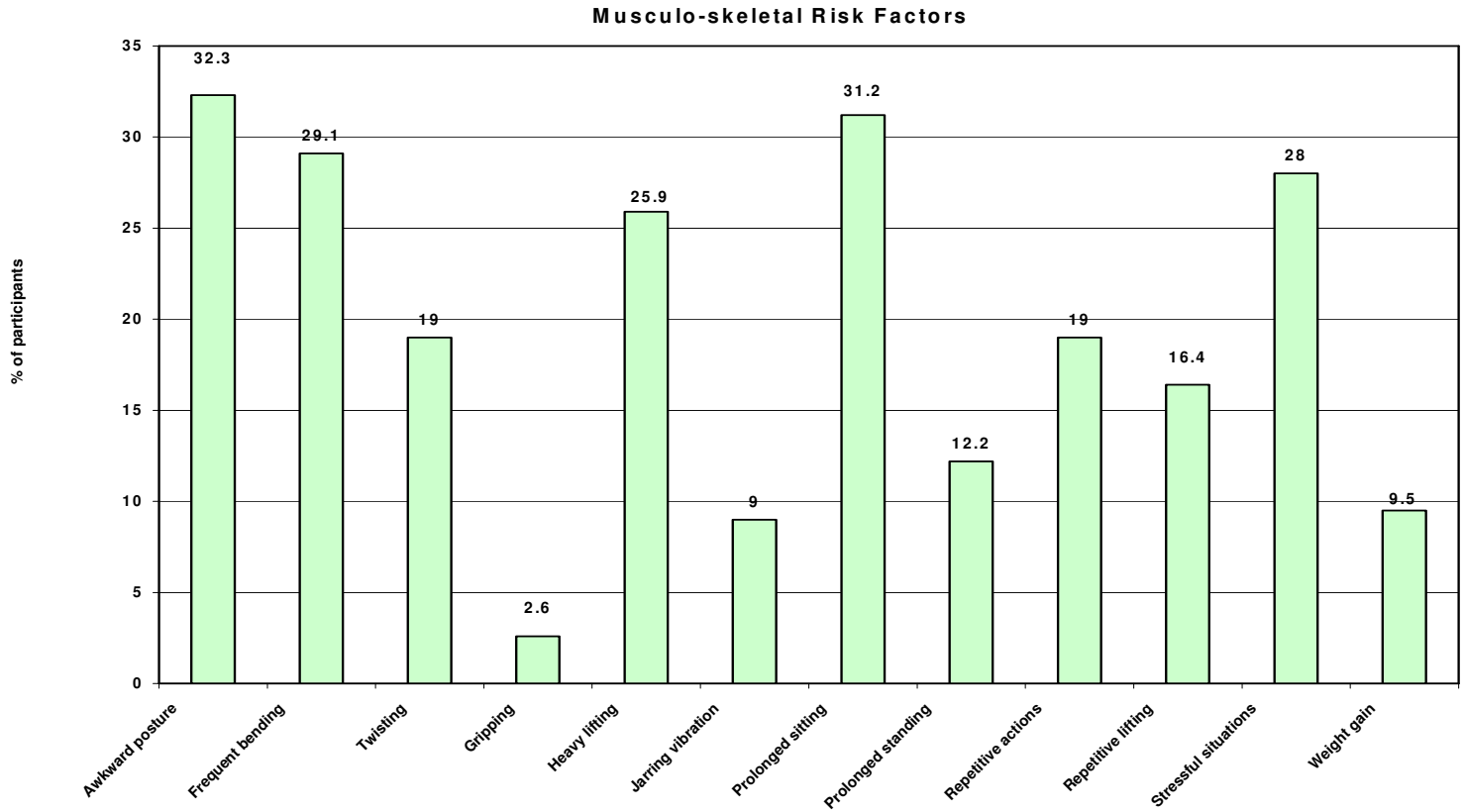


Figure 1

Figure 1 Modifiable occupational risk factors for musculo-skeletal conditions



Additional files provided with this submission:

Additional file 6 : Table6_19_05_05.doc : 54Kb
http://www.chiroandosteo.com/imedia/4010938706996446/sup6.DOC
Additional file 5 : Table5_19_05_05.doc : 25Kb
http://www.chiroandosteo.com/imedia/1862458743699644/sup5.DOC
Additional file 4 : Table4_19_05_05.doc : 29Kb
http://www.chiroandosteo.com/imedia/9890892056996446/sup4.DOC
Additional file 3 : Table3_19_05_05.doc : 25Kb
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Additional file 2 : Table2_19_05_05.doc : 22Kb
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Additional file 1 : Table_1_19_05_05.doc : 19Kb
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