KYAMC Journal   Vol. 8, No.-2, January 2018

Original Article

A study on knee osteoarthritis in physical medicine and rehabilitation department, Rangpur Medical College

Moniruzzaman M[1], Mandal MA[2], Islam MA[3], Haque MA[4], Ullah MA[5],
Ahmed SM[6], Rahman MH[7], Hossain MZ[8], Rahman MM[9]

Abstract

Background: Physical Medicine & Rehabilitation (PMR) Department has also been trying to provide services with specialized outdoor (referred patient only) set up for twenty million people of Rangpur division. Objectives: Study is to know the demographic study, clinical grading, examination findings and radiological changes of Knee osteoarthritis. Materials & Methods: It was an observational study. This study was done on referred patients of Knee osteoarthritis in PMR specialized outdoor of RpMCH from 20th September, 2012 to 20th October; 2012. The objective of this study is to know the demographic study, clinical grading, examination findings and radiological changes of knee osteoarthritis (OA). Consecutive sampling technique was adopted and total 34 samples were taken. Results: Among 30 study population, 4 (13.3%) were male, 26 (86.7%) were female and male: female ratio was 0.15 (Table I). The mean age was 52.20±9.572 (standard deviation) and P value was 0.000. Regarding Occupation, 18 (60%) were housewife, 10 (33.3%) were sedentary worker and 2 (6.7%) were businessmen (P value 0.002) (Table IV). Among the study population, 18 (60.0%) had both knee joint OA, 8 (26.7%) had right knee joint OA and 4 (13.3%) had left knee OA. The mean duration of knee joint pain was 25.33 ± 37.570 (standard deviation) month (P value 0.001) (Table VII). Among the study population, 4 (13.3%) had diabetes mellitus, 6 (20.0%) had hypertension, 2 (6.7%) had hypertension with ischemic heart disease and 2 (6.7%) had diabetes mellitus with hypertension with bronchial asthma and 16 (53.3%) were normotensive and nondiabetic (Figure 1). According to clinical grading of knee OA, 2 (6.7%) were in grade-1a, 6 (20%) were in grade-1b, 2 (6.7%) were in grade-2a, 4 (13.3%) were in grade-2b, 8 (26.7%) were in grade-3b, 8 (26.7%) were in grade-4 (P value 0.180) (Figure 2). Conclusion: This study reveals that clinically more advanced OA patients actually carrying early radiological changes.

Key words: Clinical grading and Radiological changes, Demographic, OA knee.

Date of received: 25.05.2017
Date of acceptance: 05.12.2017

Introduction

In Bangladesh, Rangpur Medical College Hospital (RpMCH) is situated in north-west side of the country in which all departments have running with a full speed with several limitations. Physical Medicine & Rehabilitation (PMR) Department has also been trying to provide services with specialized outdoor (referred patient only) set up for twenty million people of Rangpur division. Osteoarthritis is the commonest form of arthritis and one of the most important causes of long

1. Dr. Mohammad Moniruzzaman, Assistant Professor, Department of Physical Medicine & Rehabilitation, Dhaka Medical College Hospital, Dhaka, Bangladesh.
2. Dr. Muhammad Alamgir Mandal, Assistant Professor & Head, Department of Physical Medicine & Rehabilitation, KYAMCH, Sirajgonj, Bangladesh.
3. Dr. Md. Ariful Islam, Registrar, Department of Physical Medicine & Rehabilitation, Rangpur Medical College Hospital, Rangpur, Bangladesh.
4. Dr. Md. Ashraful Haque, Assistant Professor, Department of Medicine, Rangpur Medical College Hospital, Rangpur, Bangladesh.
5. Dr. Md. Ahsan Ullah, Associate Professor, Department of Physical Medicine & Rehabilitation, Bangabandhu Sheikh Mujib Medical University.
6. Dr. Syed Mozaffar Ahmed, Professor, Department of Physical Medicine & Rehabilitation, Bangabandhu Sheikh Mujib Medical University.
7. Dr. Md. Habibur Rahman, Professor & Head, Department of Physical Medicine & Rehabiliation, National Institute of Traumatology and Rehabilitation (NITOR), Dhaka, Bangladesh.
8. Professor Dr. Md. Zakir Hossain, Principal & Head, Department of Medicine, Bogra Medical College Hospital, Bogra, Bangladesh.
9. Dr. Md. Masudur Rahman, Assistant Professor, Department of Surgery, KYAMCH, Sirajgonj.

Correspondence: Dr. Muhammad Alamgir Mandal, Assistant Professor & Head, Department of Physical Medicine & Rehabilitation, KhwajaYunus Ali Medical College Hospital, Sirajgonj, Bangladesh. e-mail: dralam00@yahoo.com

term disability in adults[1,2]. OA has a worldwide distribution though there is a variation in the prevalence among different groups and genders. However, OA mainly affects the elderly population. The prevalence of OA in population older than 60 years of age is more than 50%[1]. The common sites of joints to develop OA include the knee, hand, hip, spine and foot. Of these, OA of the knee is most commonly found. In addition to increasing age, OA of the knee is associated obesity, trauma, history of inflammatory arthritis, and certain metabolic diseases such as acromegaly and calcium pyrophosphate dehydrate (CPPD) arthropathy[3]. Osteoarthritis is characterized clinically by pain, swelling of joints and limitation of motion of the affected joints. Pathological OA presented by focal erosive lesions, cartilage destruction, subchondral sclerosis, cyst formation and large osteophyte at the margin of the joints[4]. Diagnosis of osteoarthritis is based on X-ray evidence of joint space narrowing, subchondral sclerosis or osteophyte formation, and symptoms of pain in the affected knee on motion or rest plus at least one of the following; tenderness with pressure; mild swelling; crepitious on motion; or stiffness, either in morning or after prolonged inactivity[5]. Different modalities in physiotherapy have been shown to help improve clinical symptoms and functions of knee OA, with fewer adverse effects than medical treatment. Knee OA frequently involves the medial compartment. Varus angulation deformity may occur in medial compartment knee OA and contribute to the progression of OA by causing increased load to the medial knee compartment, with subsequent damage to the articular cartilage and subchondral bone in the area[6].

Methods

It was an observational study. This study was done on referred patients of Knee osteoarthritis in PMR specialized outdoor of RpMCH from 20th September, 2012 to 20th October; 2012. The objective of this study is to know the demographic study, clinical grading, examination findings and radiological changes of knee osteoarthritis (OA). Consecutive sampling technique was adopted and total 34 sampleswere taken. Data was collected by trained personal from a preformed questionnaire. Data was processed, edited and analyzed by SPSS windows version 17. P value < 0.05 was considered statistically significant at 95% confidence Interval. The inclusion criteria were a) Knee pain more than 4 weeks. b) Knee OA diagnosed according to classification of American College of Rheumatology (ACR) criteria that is pain in the knee joint with any one

of three like i) over the 50 years of age, ii) less than 30 minutes of morning stiffness iii) crepitus on active motion, iv) bony tenderness, v) bony enlargement, vi) no palpable warmth of synovium. Clinical grading of knee OA is grade-0 is normal, grade-1a is pain only while getting up from squatting posture (toilet/prayer), grade-1b is pain during getting up and down to squatting position, grade-2a is gr-1b with pain while staring up or down (2nd floor or above), grade-2b is gr-2a with pain during prolong walking (1 km or more), grade-3a is gr-2b with pain while walking and no pain during lying or sitting, grade-3b is gr-3a with pain during lying or sitting (mild to moderate) and grade-4 is 24 hours severe pain. The criteria of radiological grading of knee OA is grade 0=none, grade 1 is questionable osteophyte with possible joint space narrowing with or without osteophyte, grade-3 is definite moderate joint space narrowing (at least 50%), cyst or sclerosis, may be present and osteophytes are usually present and grade-4 is severe joint space narrowing.

Results

Among 30 study population, 4 (13.3%) were male, 26 (86.7%) were female and male: female ratio was 0.15 (Table I). The mean age was 52.20 ± 9.572 (standard deviation) and P value was 0.000. 28 (93.3%) were Muslim and 2 (6.7%) were Hindu (Table II). 28 (93.3%) were Married and 2 (6.7%) were widow (Table III). All (100%) were nonsmoker. Regarding Occupation, 18 (60%) were housewife, 10 (33.3%) were sedentary worker and 2 (6.7%) were businessmen (P value 0.002) (Table IV). Among study population, 20 (66.7%) were in middle class family and 10 (13.3%) were in lower class family (P value 0.068) (Table V). Among them, 8 (26.7%) were using high commode and 22 (73.3%) were using low commode (P value 0.011) (Table VI). Among the study population, 18 (60.0%) had both knee joint OA, 8 (26.7%) had right knee joint OA and 4 (13.3%) had left knee OA. The mean duration of knee joint pain was 25.33 ± 37.570 (standard deviation) month (P value 0.001) (Table VII). Among the study population, 4 (13.3%) had diabetes mellitus, 6 (20.0%) had hypertension, 2 (6.7%) had hypertension with ischemic heart disease and 2 (6.7%) had diabetes mellitus with hypertension with bronchial asthma and 16 (53.3%) were normotensive and nondiabetic (Figure 1). According to clinical grading of knee OA, 2 (6.7%) were in grade-1a, 6 (20%) were in grade-1b, 2 (6.7%) were in grade-2a, 4 (13.3%) were in grade-2b, 8 (26.7%) were in grade-3b, 8 (26.7%) were in grade-4 (P value 0.180) (Figure 2).

Regarding physical examination, 4 (13.3%) had varus deformity of knee joint, the mean body mass index (BMI) was 24.14 ± 3.400 (standard deviation) (P value 0.000). Among the study population, the mean visual analogue scale (VAS) for right knee joint was 4.40 ± 2.647 (standard deviation) (P value 0.000) and for left knee joint was 3.27 ± 2.815 (standard deviation) (P value 0.000). The mean swelling index for right knee joint was 0.80 ± 0.997 (standard deviation) (P value 0.000) and for left knee joint was 0.73 ± 1.015 (standard deviation) (P value 0.000). The tenderness index for right knee joint was 1.73 ± 1.363 (standard deviation) (P value 0.000) and for left knee joint 1.67 ± 1.516 (standard deviation) (P value 0.000). Among the study population, The mean range of motion (ROM) for right knee joint was 130.664 ± 5.252 (standard deviation) degree (P value 0.000) and for left knee joint was 131.333 ± .5.195 (standard deviation) degree (P value 0.000). The mean heel-buttock distance for right knee joint was 6.2667 ± 7.570 (standard deviation) cm (P value 0.000) and for left knee joint was 4.333 ± 6.121 (standard deviation) cm (P value 0.000). Among the study population, the mean 50 (fifty) feet walking time 2.47 ± 1.525 (standard deviation) min (P value 0.000) (Table VIII). Regarding investigations, the mean erythrocyte sedimentation rate (ESR) was 28.20 ± 16.808 (standard deviation) mm in 1st hour (westergreen method) (P value 0.000). The mean hemoglobin was 11.0067 ± 1.18057 (standard deviation) gm/dl (P value 0.000), the mean serum creatinine was 0.80 ± 0.212 (standard deviation) mg/dl (P value 0.000), the mean serum uric acid level was 4.92 ± 0.797 (standard deviation) mg/dl (P value 0.000). According to radiological grading of knee OA, 12 (40%) were in grade-1, 10 (33.3%) were in grade-2, 6 (20%) were in grade-3, 2 (6.7%) were in grade-4 (P value 0.049) (Table IX). Clinical grading of OA Knee compare with radiological grading of OA Knee (Figure 3).

Table I: Sex Distribution

Sex	No. of patient / (%)	Ratio
Male	4 (13.3)	
Female	26 (86.7)	0.0 15
	30 (100)	

Table II: Marital status

Marital status	No. of patient / (%)	P - value
Married	28 (93.3)	
Widow	2 (6.7)	
	30 (100)	

Table III: Religious Status

Religion	No. of patient / (%)
Muslim	28 (93.3)
Hindu	2 (6.7)
Total	30 (100)

Table IV: Occupation

Occupation	No. of patient / (%)	P - value
House wife	18 (60)	.002
Sedentary worker	10 (33.3)	
Businessman	2 (6.7)	
	30 (100)	

Table V: Socioeconomical condition

Socioeconomical condition	No. of patient / (%)	P - value
Middle class	20 (66.7)	
Lower class	10 (13.3)	.068
Total	30 (100)	

Table VI: Type of Commode

Type of Commode	No. of patient / (%)	P - value
High	8 (26.7)	
Low	22 (73.3)	0.011
	30 (100)	

Table VII: Site of Pain

Site of Pain	No. of patient/ (%)	Standard Deviation	P-value
Both knee	18 (60)		
Rt. Knee	8 (26.7)	25.33+37.57	0.001
Lt. Knee	4 (13.3)		
	30 (100)		

Table VIII: Physical Examination

Physical Examination	Standard Deviation	P-value
Varus Deformity of Knee	24.14 ±3.400	
VAS		
Right Knee	4.40 ±2.647	
Swelling		
Right Knee	3.27 ±2.815	
Left Knee	0.73 ±1.015	
Tender		
Right Knee	1.73 ±1.363	
Left Knee	1.67 ±1.516	0.000
ROM		
Right Knee	130.664 ±5.252	
Left Knee	131.333 ±5.195	
Heel Buttock Distance		
Right Knee	6.2667 ±7.570 cm	
Left Knee	4.333 ±6.121 cm	
50 Feet Waling Time	2.47 ±1.525	

Table IX: Investigation

Investigation	Standard Deviation	P -value
ESR	28.20 ±16.808	
Hb	11.0067 ±1.18057	0.000
S. Uric Acid	4.92 ±0.797	
Radiological grading of OA Knee	No. of patient/ (%)	P -value
Grade -1	12(40)	
Grade -2	10(33.3)	0.049
Grade -3	6(20)	
Grade -4	2(6.7)	
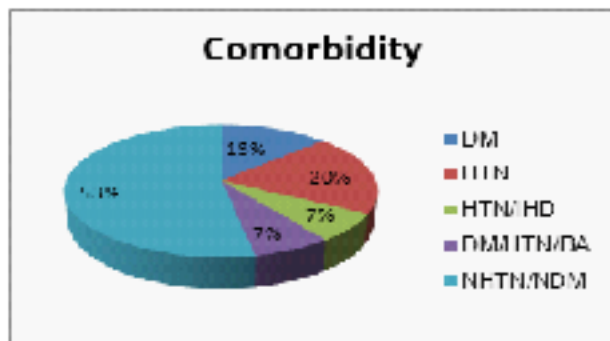
Figure 1 Comorbidity
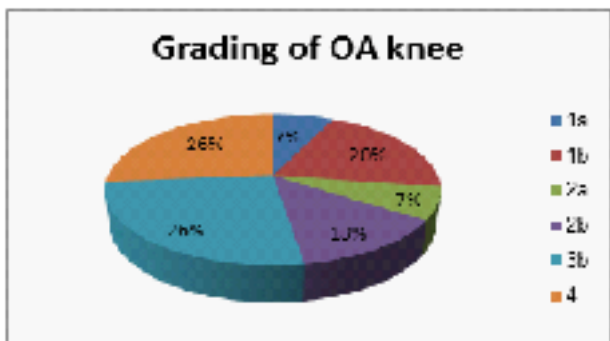
Figure 2: Grading of OA Knee
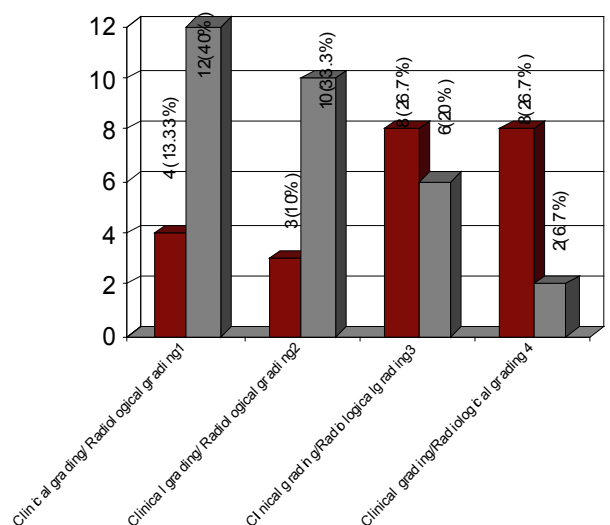
Figure 3: Clinical grading of OA Knee compare with radiological grading of OA Knee

Discussion

Among 30 study population, 4 (13.3%) were male, 26 (86.7%) were female and male: female ratio was 0.15. The reason behind this is most of the female in Bangladesh are housewife and they have to do work in kitchen room with a lot of squatting and standing. The mean age was 52.20 ± 9.572 (standard deviation) and P value was 0.000 which was statistically significant. 28 (93.3%) were Muslim and 2 (6.7%) were Hindu. 28 (93.3%) were Married and 2 (6.7%) were widow. All (100%) were nonsmoker. Regarding occupation, 18 (60%) were housewife, 10 (33.3%) were sedentary worker and 2 (6.7%) were businessmen (P value 0.002). Among study population, 20 (66.7%) were in middle class family and 10 (13.3%) were in lower class family (P value 0.068). Middle class may be more than lower class probably for visiting to specializedoutdoor. Among them, 8 (26.7%) were using high commode and 22 (73.3%) were using low commode (P value 0.011).

This is also rational in the context of low resource country. Among the study population, 18 (60.0%) had both knee joint OA, 8 (26.7%) had right knee joint OA and 4 (13.3%) had left knee OA. The mean duration of knee joint pain was 25.33 ± 37.570 (standard deviation) month (P value 0.001). It also indicates that patients were carrying pain without satisfactory relief with conventional treatment. Among the study population, 4 (13.3%) had diabetes mellitus, 6 (20.0%) had hypertension, 2 (6.7%) had hypertension with ischemic heart disease and 2 (6.7%) had diabetes mellitus with hypertension with bronchial asthma and 16 (53.3%) were normotensive and nondiabetic. According to clinical grading of knee OA[7], 2 (6.7%) were in grade-1a, 6 (20%) were in grade-1b, 2 (6.7%) were in grade-2a, 4 (13.3%) were in grade-2b, 8 (26.7%) were in grade-3b, 8 (26.7%) were in grade-4 (P value 0.180). Most of study population had enjoyed grade 3b criteria that means pain while walking, lying or sitting. Regarding physical examination, 4 (13.3%) had various deformity of knee joint, the mean body mass index (BMI) was 24.14 ± 3.400 (standard deviation) (P value 0.000). According WHO criteria[8], BMI more than 23 should be level as overweight for asia-occeania people and most of study population was in overweight. Among the study population, the mean visual analogue scale (VAS)[9-13] for right knee joint was 4.40 ± 2.647 (standard deviation) (P value 0.000) and for left knee joint was 3.27 ± 2.815 (standard deviation) (P value 0.000). It also indicates that right knee OA was more common and pain was mild to moderate in most cases.

The mean swelling index for right knee joint was 0.80 ± 0.997 (standard deviation) (P value 0.000) and for left knee joint was 0.73 ± 1.015 (standard deviation) (P value 0.000) that means most of study population had no swelling The tenderness index for right knee joint was 1.73 ± 1.363 (standard deviation) (P value 0.000) and for left knee joint 1.67 ± 1.516 (standard deviation) (P value 0.000). It also showed that tenderness was more on right than left and the grading showed that most had mild tender. Among the study population, The mean range of motion (ROM) for right knee joint was 130.664 ± 5.252 (standard deviation) degree (P value 0.000) and for left knee joint was 131.333 ± .5.195 (standard deviation) degree (P value 0.000). It showed that the difference between right and left was not much more and right side was more affected than left. The mean heel-buttock distance for right knee joint was 6.2667 ± 7.570 (standard deviation) cm (P value 0.000) and for left knee joint was 4.333 ± 6.121 (standard deviation) cm (P value 0.000). Among the study population, the mean 50 (fifty) feet walking time 2.47 ± 1.525 (standard deviation) min (P value 0.000). Regarding investigations, the mean erythrocyte sedimentation rate (ESR) was 28.20 ± 16.808 (standard deviation) mm in 1st hour (westergreen method) (P value 0.000). The mean hemoglobin was 11.0067 ± 1.18057 (standard deviation) gm/dl (P value 0.000), the mean serum creatinine was 0.80 ± 0.212 (standard deviation) mg/dl (P value 0.000), the mean serum uric acid level was 4.92 ± 0.797 (standard deviation) mg/dl (P value 0.000). The study showed that all investigations were within normal limit except ESR. One patient had ESR 70 for respiratory tract infection and for this the mean ESR had raised beyond normal limit.

According to radiological grading of knee OA[14-24] 12 (40%) were in grade-1, 10 (33.3%) were in grade-2, 6 (20%) were in grade-3, 2 (6.7%) were in grade-4 (P value 0.049). This also showed that most population had grade-1 radiological changes and after comparison with clinical grading , it was clear that early (grade-1 & 2) radiological changes of patient had enjoyed clinically more advanced (grade 3b & 4 criteria) (Figure 3). This was may be due to patient come to doctor for sudden increase of pain with carrying lower clinical grading previously.

Acknowledgement

Conclusion

This study reveals that clinically more advanced OA patients actually carrying early radiological changes. This study also helps to understand the importance of OA knee treatment in rural level & sanitation in the form of high commode. This study will encourage the other physiatrist and researcher to do further study in a broad spectrum.

Reference

1. Dieppe P. Management of osteoarthritis hip and knee joints. Current Opin Rheumatol; 1993:5;487-493.

2. Doherty M. Lonyon P,:Ralston S H,:Musculoskletal disorder: In: Davidson"s Principles & Practice of medicine Boon NA, College NR, WalkerBR: 20th edition, Edinburgh, Churchill livingstone,2006, pp1065-1144.

3. Chard J, Dieppe P, : The case for Non pharmacologic Therapy of osteoarthritis :Current Rheumatology Report edited by Bruce N. Cronstein,2001:3:251-257.

4. Lozada CJ & Altman RD : Management of limp joint osteoarthritis; In: Practical Rheumatology: Hochberg MC, Silman AJ, Smoen JS, Weinblett ME, Weisman MH, 3rd edition London, Mosby publication, 2004, pp511-17.

5. Rahman MS,: Manual of Physical Medicine and Rehabilitation. Approach to patients with knee pain, First edition, 2008,pp59-64.

6. Cerejo R, Dunlop DD, Cahue S, Channin D, Song J, Sharma L.The influence of alignment on risk of knee osteoarthritis progression according to baseline stage of disease, Arthritis Rheum. 2002;46(10):2632-36.

7. Altman RD. Criteria for classification of clinical osteoarthritis. J Rheumatology. 1991;18 (suppl 27) :10-12.

8. Resolution WHA51.18. Noncommunicable disease prevention and control. In: Fifty- first World Health Assembly, Geneva, 11 -16 May 1998. Volume 1. Resolutions and decisions, annexes. Geneva, World Health Organization, 1998 (WHA51/1998/REC/1).

9. Huskisson EC. Measurement of pain. J Rheumatol. 1982 Sep-Oct;9 (5):768-769.

10. Spear FG. Pain in psychiatric patients. J Psychosom Res. 1967 Aug;11 (2):187-193.

11. Aitken RC. Measurement of feelings using visual analogue scales. Proc R Soc Med. 1969 Oct;62 (10):989-993.

12. Beecher HK. Pain in Men Wounded in Battle. Ann Surg. 1946 Jan;123 (1):96-105.

13. Radiology Petersson IF, Boegård T, Saxne T et-al. Radiographic osteoarthritis of the knee classified by the Ahlbäck and Kellgren & Lawrence systems for the tibiofemoral joint in people aged 35-54 years with chronic knee pain. Ann. Rheum. Dis. 1997;56 (8): 493-6.

14. KELLGREN JH, LAWRENCE JS. Radiological assessment of osteo-arthrosis. Ann. Rheum. Dis. 2000;16 (4): 494-502.

15. Leach RE, Gregg T, Siber FJ. Weight-bearing radiography in osteoarthritis of the knee. Radiology.1970;97:265-268.

16. Altman RD, Fries JF, Bloch DA, Carstens J, Cooke TD, Genant H, Gofton P, Groth H, McShane DJ, Murphy WA, et al. Radiographic assessment of progression in osteoarthritis. Arthritis Rheum.1987;30:1214-1225.

17. Kellgren JH, Lawrence JS. Radiological assessment of osteoarthrosis. Ann Rheum Dis. 1957;16:494-502.

18. Doherty M, Watt I, Diepple P. Influence of primary generalized osteoarthritis on development of secondary osteoarthritis. Lancet. 1983;ii:8-11. doi: 10.1016/S0140- 6736(83)90003-X.

19. Naitou K, Kushida K, Takahashi M, Ohishi T, Inoue T. Bone mineral density and bone turnover in patients with knee osteoarthritis compared with generalized osteoarthritis. Calcif Tissue Int.2000;66:325-329. doi: 10.1007/s002230010068.

20. Rossi A, Marino G, Barbieri L, et al. Backache from exertion in health personnel of the Istituti Ortopedici Rizzoli in Bologna. A case-control study of the injury phenomenon in the 10-year period of 1987-1996. Epidemiol Prev 1999;23:98-104.

21. Firth H, Herbison P, McBride D, Feyer AM. Health of farmers in southland: an overview. NZ Med J 2001;114:426-8.

22. Stevenson JM, Weber CL, Smith JT, Dumas GA, Albert WJ. A longitudinal study of the development of low back pain in an industrial population. Spine 2001;26:1370-7.

23. Latza U, Karmaus W, Sturmer T, Steiner M, Neth A, Rehder U. Cohort study of occupational risk factors of low back pain in construction workers. Occup Environ Med 2000;57:28-34.

24. Friedrich M, Cermak T, Heiller I. Spinal troubles in sewage workers: epidemiological data and work disability due to low back pain. Int Arch Occup Environ Health 2000;73:245-54.