

Backache in Dumper Operators of a Private Iron Ore Mine in Eastern India: A Cross-Sectional Study

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Abstract

Introduction: Occupational back pain is most common symptoms among seated workers, standing workers, truck drivers and so on. Driving frequently involves many risk factors such as prolonged sitting and motor vehicle driving, vibration, tight running schedules, reduced rest breaks, the sedentary nature of job etc. Backache in working individuals is a commonly present complaint.

Determining whether a patient's low backache is a consequence of occupational activity can be challenging. Various studies across the world show prevalence of backache as 45-60%. Very few studies were carried out in India amongst heavy vehicle operators regarding backache and the occupational factors associated with it.

Objectives: To find the spectrum, epidemiological profile, prevalence of backache and occupational factors associated with it in 50 dumper operators of a private Iron Ore Mine of Eastern India (Jharkhand).

Methodology: A cross-sectional study on 50 dumper operators of a private Iron Ore Mine of Eastern India.

Results: As per this study prevalence of backache among the dumper operators is 42% and more common in persons above 40 years of age (81%) and working experience more than 15 years (72%).

BMI had been established as an important indicator for backache when the study reveals that 72% of the workers have BMI ≥ 25 (overweight, obese).

Average RMDQ (Ronald-Morris Disability Questionnaire) in comparison to workers with and without backache was 5.3 and 3.1 respectively which is almost similar (5.1 and 3.9 respectively) to the study in India by BorleAmod and others in Truck drivers of Nagpur, India.

Conclusions: In the present study it was established that backache is a very common problem in dumper operators. It is cumulative trauma disorder. Injury develops gradually over a period of weeks, months, or even years as a result of stress. Other non-occupational activities may also lead to backache like sports and house hold heavy work.

Keywords: Backache, Dumper operators, BMI, RMDQ

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Introduction

“Occupational Health” is the promotion and maintenance of highest degree of physical, mental and social well-being of workers in all occupations¹. When the physical well-being is not maintained properly it may cause much health hazards. Occupational back pain is one of them. Back pain is a common ailment in populations of working age and it is one of the most important causes for short-and long-term disability in all occupational groups.²

Over five million working days are lost each year due to back pain caused or made worse by work. Back pain can be caused by many working and non-working activities.³ Occupational low back pain is most common symptom among seated workers, standing workers, truck drivers and so on. Driving frequently involves many risk factors such as prolonged sitting and motor vehicle driving, tight running schedules, reduced rest breaks, traffic congestion, and the sedentary nature of job...etc.⁴

Determining whether a patient's low back pain is a consequence of his or her occupational activity, and how best to treat symptoms to maximize functionality and potential for a return to full employment capacity, can be challenging. Various studies were carried out to assess the prevalence of back pain.

Various studies carried out across the world show prevalence of back pain as 45-60%.⁵⁻⁸

Studies also suggest that around 60% to 90% of the people will suffer from back disorders at some point in their life and that at any one time 15% to 42% of people suffer.

So far, very few studies were carried out in India amongst heavy vehicle operators regarding back pain and the occupational factors associated with it. So this study was conducted with the objective to find out the prevalence of occupational back pain among dumper operators and to study occupational factors associated with it. This project is also required in partial fulfilment of the requirement of the AFIH Course.

A dumper⁹ is a vehicle designed for carrying bulk material, often on building sites. Dumpers are distinguished from dump trucks by configuration: a dumper is usually an open 6-wheeled vehicle with the load skip in front of the driver, while a dump truck has its cab in front of the load. The skip can tip to dump the load; this is where the name "dumper" comes from. They are normally diesel powered. A towing eye is fitted for secondary use as a site tractor. Dumpers with rubber tracks are used in special circumstances and are popular in some countries.



Figure 1. Dumper

Objectives

1. To find the spectrum of backache in dumper operators working in a private Iron Ore Mine of Eastern India (Jharkhand).
2. To study the epidemiological profile and prevalence of backache in dumper operators and to study occupational factors associated with back pain.

3. To provide the recommendations for prevention of backache in dumper operators, to recommend the rehabilitations of the workers if needed and to refer the case for appropriate management.

Methodology

A cross-sectional study was conducted among Dumper Operators of a private Iron Ore Mine of

Eastern India (Jharkhand). As a part for fulfilment of requirement for the Associate Fellow of Industrial Health (2012-2013) course, data was collected in the month of January, 2013. Due to time constraints and as assigned by the guide (of AFIH course) 50 dumper operators were randomly selected for the study and as there were not a single female operator was involved, so all the fifty cases were male by sex.

All the Dumper Operators were given general proforma and a questionnaire (Roland-Morris disability Questionnaire-RMDQ) and the answers were noted. The pro forma was used to collect information on socio-demographic profile, personal habit like smoking, tobacco, alcohol consumption etc. The RMDQ¹⁰ focuses on a limited range of physical

functions that were chosen as functions which would be relevant to all patients with back pain.

A thorough clinical examination was done for evaluation of backache. The conditions of the cases were assessed clinically and evaluated by radiological investigation (X-Ray L-S Spine) and referred them to the orthopaedic specialist for opinion and further specific or proper management, detailed investigations like MRI, L-S Spine etc.

Prevalence of backache (occupational) was analysed based on age, duration of exposure, pre-existing spine condition, educational qualification, socio-economic status, present working experience, onset of symptoms, previous history of back ache etc.

Table 1. Socio demographic profile of study subjects

Characteristics of the participants	Frequency	Percentage
Age		
21-30	03	06%
31-40	07	14%
41-50	12	24%
51-60	28	56%
Working experience in current job (years)		
5 <	09	18%
6-15	04	08%
16-25	23	46%
≥ 25	14	28%
Educational qualification		
Graduate	07	14%
Matriculation	39	78%
Class VIII pass	04	08%
Marital status		
Married	48	96%
Unmarried	02	04%
Per capita income (Rs.)		
≤ 5,000	03	06%
5,001-10,000	30	60%
10,001-15,000	16	32%
> 15,000	01	02%
Personal habit (Smoking)		
Smoker	25	50%
Non-Smoker	25	50%
Habit of miscellaneous addiction (Smokeless tobacco)		
Smokeless tobacco	21*	42%
No tobacco	29	58%
Habit of addiction (Smokeless tobacco)* (N=21)		
Gutkha	05	24%
Khaini	16	76%
Personal habit (Alcohol consumption)		
Alcoholic	32	64%
Non-alcoholic	18	36%

Results

Socio Demographic Profile (Table 1)

As per the study, maximum of the workers were from the age 51-60 years (56%) followed by 41-50, 31-40 and 21-30 years-24%, 14% and 6% respectively. Maximum of the workers were with working experience in present job of 16-25 years and more than 25 years (46% & 28% respectively). Most of them passed Matriculation (78%) whereas 96% were married. Per capita income was maximum (60%) among the income group with Rs. 5,001-10,000 followed by income group with Rs. 10,001-15,000 (32%), ≤ Rs. 5,000 (6%) and >Rs. 15,000 (2%).

There were equal number (50%) of smokers and non-smokers whereas 64% were alcoholic and 36% non-alcoholic. There were more workers (58%) with habit

of smokeless tobacco-‘Khaini’ and ‘Gutkha’ in comparison to the workers who had no habit of tobacco (42%). Among them, more workers were addicted to ‘Khaini’ (76%) followed by ‘Gutkha’ (24%).

Backache with Risk Profile (Table 2)

Study revealed that 42% (n=21) were suffering from backache whereas 58% (n=29) had no backache.

Among this 21 workers, maximum of the workers were of the age 51-60 years (62%), followed by age 41-50 years, 62% and 19% respectively. Which also proves that prevalence of backache was increased with age. Maximum of the workers were with working experience in present job of 16-25 years and more than 25 years (43% and 29% respectively). So, in a nutshell, workers with more than 15 years of experience in present job were 72%.

Table 2. Subjects suffering from backache & risk profile

Subjects with backache (N=21)	Frequency	Percentage
Symptom (Backache)		
Backache present	21	42%
No backache	29	58%
Age		
21-30	01	05%
31-40	03	14%
41-50	04	19%
51-60	13	62%
Working experience in current job (years)		
5 ≤	03	14%
6-15	03	14%
16-25	09	43%
> 25	06	29%
BMI		
18.5-24.9 (Normal)	02	10%
25.0-29.9 (Overweight)	15	71%
≥ 30 (Obese)	04	19%
Radiological investigations (X-Ray L-S Spine)		
X-ray not done	03	14%
X-Ray done within last 2months	06	28%
X-Ray with positive findings	02	10%
X-Ray-WNL	10	48%
Imaging study (MRI of L-S Spine)		
MRI already done	02	09%
MRI suggested by Specialist	05	24%
MRI not suggested by Specialist	14	67%
Status of treatment		
Already with treatment	09	43%
Without treatment	12	57%

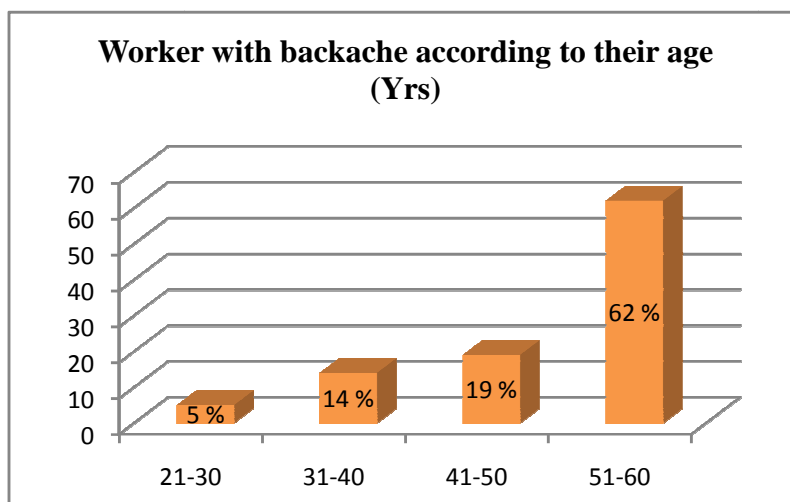


Figure 2. Distribution of worker with backache according to their age (years)

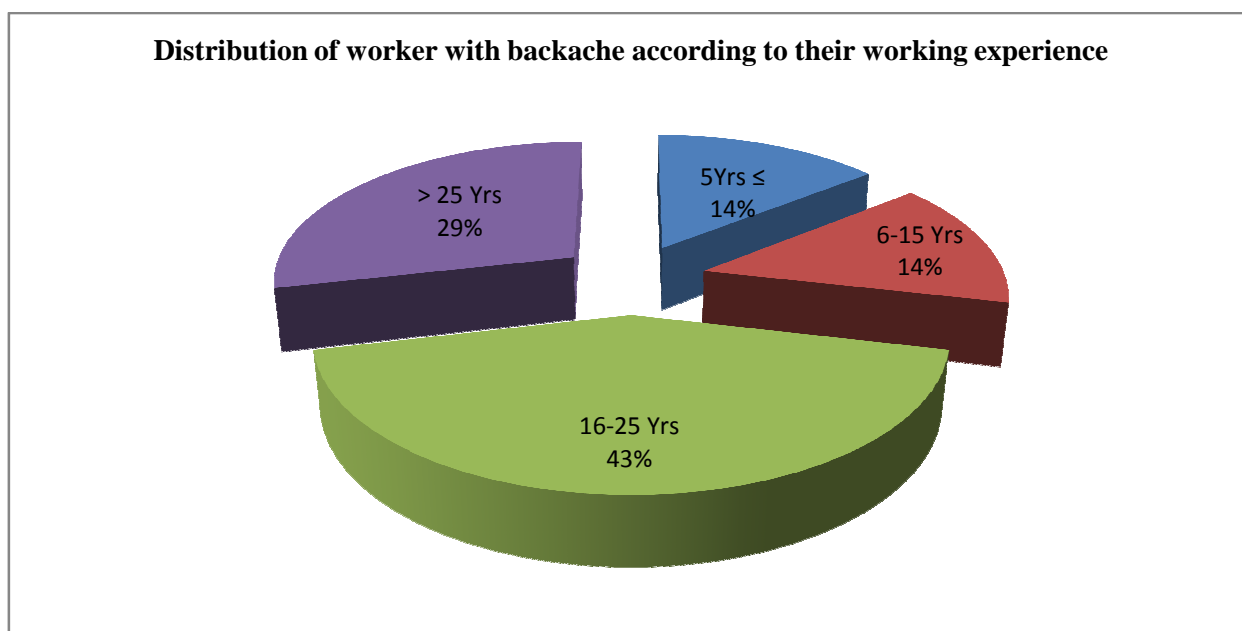


Figure 3. Distribution of worker with backache according to their working experience (years)

BMI had been established as an important indicator for backache (see Table 3 & Figure 4).

Only basic investigation used-X-Ray L-Spine. MRI (of L-S Spine) was used as special investigation. Study

revealed that only 43% were diagnosed cases whereas 57% were not under the treatment in Orthopaedic department, diagnosed as new case. This was the importance of the study.

Table 3. Distribution of worker according to their BMI & backache

BMI	No. of workers (Total, n=50)			
	Backache	Percentage (%)	No backache	Percentage (%)
18.5-24.9 (Normal)	02	10	12	41
25.0-29.9 (Overweight)	15	71	12	41
≥ 30 (Obese)	04	19	05	18
Total	21	100	29	100

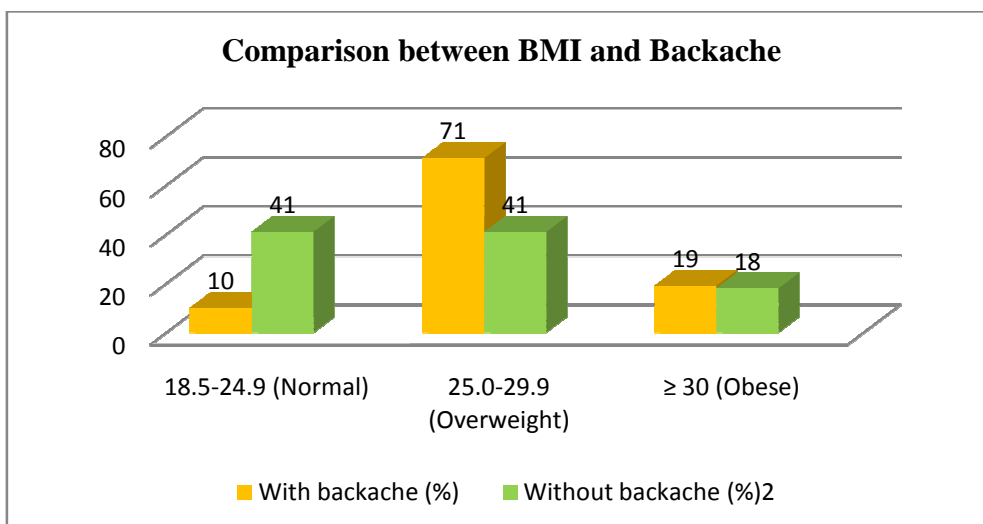


Figure 4. Comparison between BMI and Backache

BMI had been established as an important indicator for backache when the study revealed that overall 72% of the workers had BMI ≥ 25 (54% overweight and 18% obese-from Table No.-15) whereas among the

workers suffering from backache, 71% were overweight (BMI ≥ 25) and 19% were obese (BMI ≥ 30). So, 90% of the workers suffering from backache had BMI ≥ 25 . This was an important finding.

RMDQ Score

Table 4. Distribution of worker according to their RMDQ Score

RMDQ Score	No. of workers	Percentage (%)
0	01	02
2	07	14
3	12	24
4	12	24
5	11	22
6	02	04
7	03	06
8	01	02
9	01	02
Total	50	100

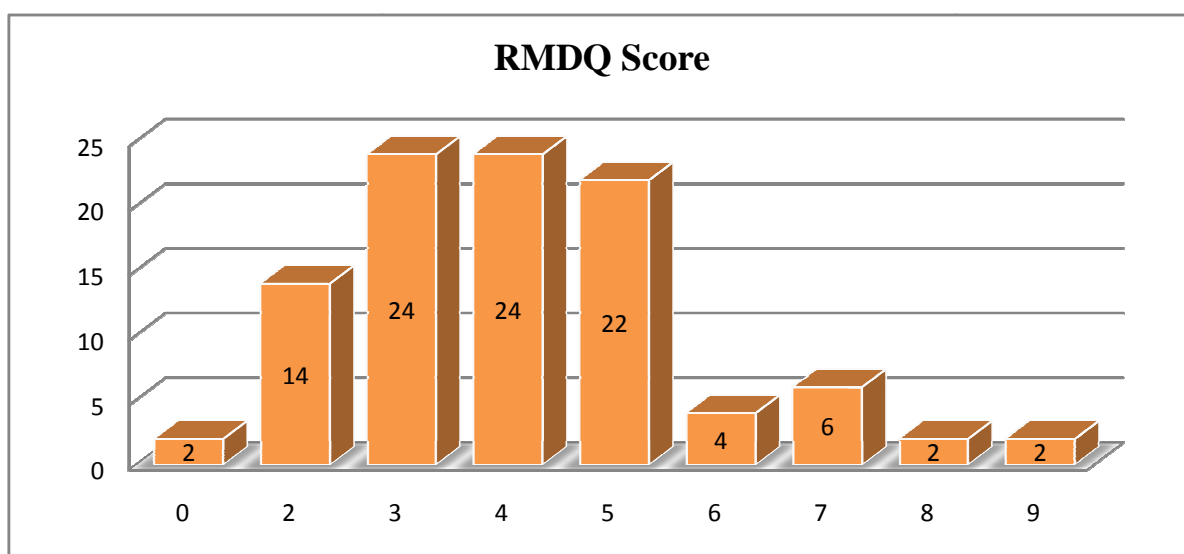


Figure 5. RMDQ Score

In the study Roland-Morris Disability Questionnaire (RMDQ) was used minimum was '0' (in a scale of 0-24). maximum score was found '9' and

Table 5. Average RMDQ Scores amongst study subjects with and without backache

Category	RMDQ Scores	No. of workers	Average RMDQ Score
With backache	112	21	5.3
Without backache	91	29	3.1

Table 6. Comparison of the response rate by RMDQ among respondents with & without backache

Question	"Yes" response given by % of workers with backache	"Yes" response given by % of workers without backache
	(n=21)	(n=29)
I avoid heavy jobs around the house because of my back.	95	72
I change position frequently to try and get my back comfortable.	90	69
Because of my back, I try not to bend or kneel down.	81	55
I find it difficult to turn over in bed because of my back.	48	34
I find it difficult to get out of a chair because of my back.	48	10
I have trouble putting on my socks (or stockings) because of the pain in my back.	43	38
Because of my back, I have to hold on to something to get out of an easy chair.	29	24
I sleep less well because of my back.	29	3
I only stand for short periods of time because of my back.	24	0
I stay at home most of the time because of my back.	14	0
My back is painful almost all the time.	14	0
Because of my back I am not doing any of the jobs that I usually do around the house.	10	0
Because of my back, I lie down to rest more often.	10	3
. Because of my back, I use a handrail to get upstairs.	0	3
I walk more slowly than usual because of my back	0	0
Because of my back, I try to get other people to do things for me.	0	0
I get dressed more slowly than usual because of my back.	0	0
My appetite is not very good because of my back pain.	0	0
I only walk short distances because of my back.	0	0
Because of my back pain, I get dressed with help from someone else.	0	0
I sit down for most of the day because of my back.	0	0
Because of my back pain, I am more irritable and bad tempered with people than usual.	0	0
Because of my back, I go upstairs more slowly than usual.	0	0
I stay in bed most of the time because of my back.	0	0

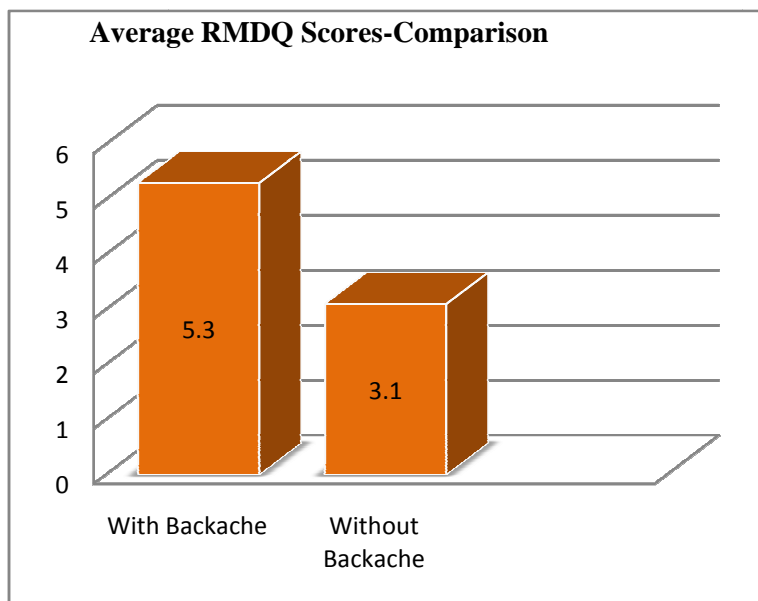


Figure 6. Average RMDQ Score comparison

Average RMDQ (Ronald-Morris Disability Questionnaire) in comparison to workers with and without backache was 5.3 and 3.1 respectively which

is almost similar (5.1 and 3.9 respectively) to the study in India by BorleAmod and others in Truck drivers of Nagpur, India.¹¹

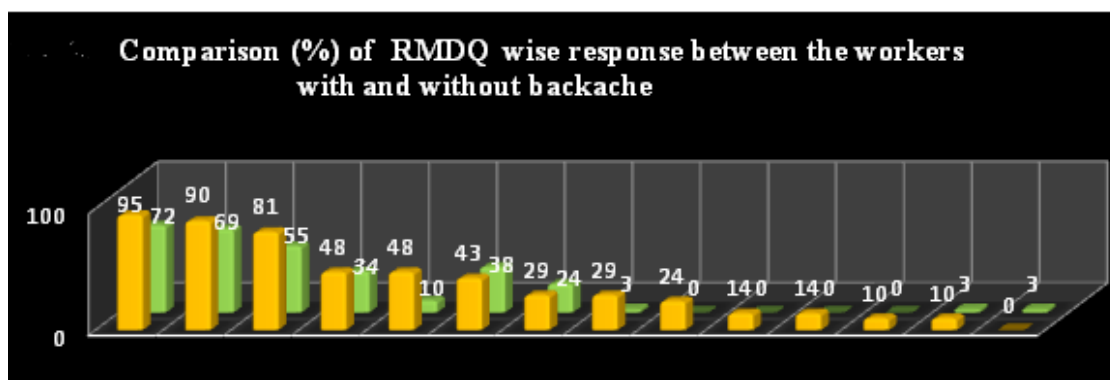


Figure 7. Comparison (%) of RMDQ wise response between the workers with and without backache

Conclusions

From the data analysed it is clear that backache or low back disorders are an important issue in today’s working environment.

Backache cannot be eliminated but with careful management it can be prevented. Ergonomics remains the primary preventive approach, it has an important role.

Good quality of seats for the heavy vehicles like dumper, shovel, loader, dozer etc to be used following proper ergonomics so that the prevalence of backache will be decreased in future.

Detailed studies should be conducted in future on the same topic, in a large sample with long duration by

the govt./ large private organizations / in joint venture for more analytical data and specific result. More research works to be needed.

Recommendations

General Recommendations

1. Workers must be aware of hazards present in work place.
2. Maintenance and regular checking of dumpers/ heavy vehicles.
3. Comfortable sitting of operators following proper ergonomics-proper guidance by the Ortho-Surgeon and Physiotherapist.
4. More emphasis on pre-employment & periodical medical examination of dumper and other heavy

vehicle operators to detect the occupational diseases in early stages.

5. Motivate them to do physical exercise, Yoga regularly to keep them fit & for stress management.

Specific Recommendations

1. **Weight management plan** by regular follow-up of the particular workers who are overweight or obese by the physician and prepare "Diet Chart" & give it to them, follow-up.
2. **De-addiction program** by regular basis training and education about personal habits and oral hygiene, and advice to give up their personal habits like smoking, alcoholism etc.
3. **Awareness** sessions/ shop floor classes/ training program on ergonomics.

Conflict of Interest: None

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Appendix

The Roland-Morris Disability Questionnaire

As you read the list, think of yourself *today*. When you read a sentence that describes you today, **put a tick only** against it. If the sentence does not describe you, then leave the space blank and go on to the next one.

- | | |
|---|--------------------------|
| 1. I stay at home most of the time because of my back. | <input type="checkbox"/> |
| 2. I change position frequently to try and get my back comfortable. | <input type="checkbox"/> |
| 3. I walk more slowly than usual because of my back. | <input type="checkbox"/> |
| 4. Because of my back I am not doing any of the jobs that I usually do around the house. | <input type="checkbox"/> |
| 5. Because of my back, I use a handrail to get upstairs. | <input type="checkbox"/> |
| 6. Because of my back, I lie down to rest more often. | <input type="checkbox"/> |
| 7. Because of my back, I have to hold on to something to get out of an easy chair. | <input type="checkbox"/> |
| 8. Because of my back, I try to get other people to do things for me. | <input type="checkbox"/> |
| 9. I get dressed more slowly than usual because of my back. | <input type="checkbox"/> |
| 10. I only stand for short periods of time because of my back. | <input type="checkbox"/> |
| 11. Because of my back, I try not to bend or kneel down. | <input type="checkbox"/> |
| 12. I find it difficult to get out of a chair because of my back. | <input type="checkbox"/> |
| 13. My back is painful almost all the time. | <input type="checkbox"/> |
| 14. I find it difficult to turn over in bed because of my back. | <input type="checkbox"/> |
| 15. My appetite is not very good because of my back pain. | <input type="checkbox"/> |
| 16. I have trouble putting on my socks (or stockings) because of the pain in my back. | <input type="checkbox"/> |
| 17. I only walk short distances because of my back. | <input type="checkbox"/> |
| 18. I sleep less well because of my back. | <input type="checkbox"/> |
| 19. Because of my back pain, I get dressed with help from someone else. | <input type="checkbox"/> |
| 20. I sit down for most of the day because of my back. | <input type="checkbox"/> |
| 21. I avoid heavy jobs around the house because of my back. | <input type="checkbox"/> |
| 22. Because of my back pain, I am more irritable and bad tempered with people than usual. | <input type="checkbox"/> |
| 23. Because of my back, I go upstairs more slowly than usual. | <input type="checkbox"/> |
| 24. I stay in bed most of the time because of my back. | <input type="checkbox"/> |
| The score of the RMDQ-min of "0" to a max of "24". | <input type="checkbox"/> |

Signature/ Thumb impression of the person (examined)

Signature of Medical Officer