

PAIN DISORDERS AMONG PROFESSIONAL DRIVERS IN THE ASPECT OF THE CONDUCTED RESEARCH AND REHABILITATION

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Abstract

Drivers are susceptible to pain syndromes. Pain is a subjective feeling, an unpleasant experience related to the damage of tissue essential for correct functioning of the body. A sharp pain serves as both a warning and protective sign. The lack of feeling pain can lead to the disappearance of defensive reflexes, abandonment of treatment, and later to death. Chronic pain is caused by damage or a long lasting illness without a particular location from which it stems from. After knowing its cause, one can attempt prevention of its emergence or the elimination of it. Drivers are a major occupation group, which, due to the activities carried out and working conditions, is particularly vulnerable to pain disorders affecting the locomotor system, caused by the "wear and tear" of the elements of the spine. These may lead to morphological damage and disorders within the musculature and nervous system. Research was conducted in Zielona Góra examining the locomotor system disorders among professional drivers in order to develop a medical and rehabilitation programme.

Keywords: *vehicle driver, safety, pain syndromes*

1. Introduction

To acquire information regarding drivers with a pain disorder of their locomotor system, its location, the medical advice and physical activity needed. All of these components are essential to the development of a medical and rehabilitation programme which should introduce efficient therapy and prophylaxis.

2. Data and methodology

The methodology focused on the analysis of publications, documents and legal sources and the examination of opinion with the use of an open and public interview. Quantitative analysis as a result of empirical studies was joined with statistical techniques. The synthesis resulted from generating conclusions from the analysis.

3. Results and conclusions

1. Professional drivers suffer from pain syndromes of particular body parts and their occurrence is related to the kind of the work performed.
2. One of the ways of fighting with pain is undergoing medical surgery or physiotherapy.
3. In order to diminish the pain syndromes, drivers should be spending their leisure time in an active manner.

Performing the occupation of a driver is accompanied by the danger of developing pain syndromes and lowering the job's safety. Pain is a subjective feeling. Our body is equipped with neurons, which are able to transform the perception of a painful stimulus into a sensation – pain, and a feeling – suffering [7]. The International Association for the Study of Pain has proposed the following definition: “Pain is an unpleasant sensual and emotional sensation related to currently occurring or potential tissue damage, alternatively described within the scope of such damage.” [1] The feeling of pain is a psychological interpretation of the appearing phenomena, modified by past experiences and psychosomatic circumstances [3]. Sharp pain is caused by a possible or present damage (or disease) to the skin, subcutaneous tissue or deeper placed somatic structures. It can also result from muscle tension and an illness/disorder of the functions of the visceral organs [4].

Being able to feel pain is essential to the correct functioning of the body [9]. The inability to do so does not decrease the level of suffering. An example may be the CIPA syndrome (*Congenital Insensitivity to Pain with Anhidrosis*), which results from a genetical mutation. It is described as an inborn inability to feel pain, temperature and sweating. The patients do not experience any kind of pain stimulus (somatic, visceral) and this leads to the disappearance of defensive reflexes and the abandonment of treatment. The consequence of this can be severe body damage or even death [9].

The function of pain is to serve as warning and protection. The stimuli, which do not damage tissue cause a physiological pain, which makes one resign from being exposed to high temperature, e.g. stop touching a hot object. The pain appearing with the infraction of deep somatic structures, present for example in the case of locomotor system injuries, results in the reduction of physical activity, and the co-existing oversensitivity contributes to the abandonment of movement, which minimises the potential risk of further damage. The pain of endogenous origin, for example in the case of internal organ diseases, serves as a warning resulting often in a doctor's appointment. The pain stimulus might precede the moment of the pain's occurrence, or appear too late or after the tissue has been damaged, e.g. after excessive sunbathing [2]. Feeling pain may lose its empirical feature – warning the body against overloading. This happens when pain experience lasts persistently long, e.g. in the final phase of some cancers. At the time, the pain does not fulfil its warning function, and causes only suffering [1].

Sharp pain, defined as: “pain of short duration, containing information about the threat of harmful stimulus”, occurring during the damage of soft or bone tissue, gives rise to a segmental and over segmental response of the central nervous system, thanks to which it is possible to maintain homeostasis during the development of the pathological process. The homeostasis focuses mainly on the changes in the respiratory system, causing the acceleration and deepening of breath. A visible reaction of the circulatory system is the acceleration of heartbeat and increased cardiac. What follows is also an increased blood flow in the brain and muscles and decreased blood flow in the viscera. Such a reaction of the body to a pain stimulus has a positive impact only in the initial phase of the development of the pathological process. If the sharp pain is sustained for a long period of time without efficient treatment, it leads to complications. Sharp pain is one of the major factors causing the body's response to a shock [2].

Sharp pain occurs in case of damage to the body or directly after falling ill, it is characterised by a specified location. It serves the body as an alarm signal, has a short duration, and physical activity hinders the comeback to health. Using painkillers against the sharp pain brings relief. The doctor is responsible for the treatment process. The patient experiences fear and anxiety during the

occurrence of a sharp pain stimulus [8].

The psychophysiological reactions appearing in the cases of sharp and chronic pain are different. Chronic pain is caused by a damage or disease lasting for a long time, has an extensive character, without the particular location of a spot from which it originates. It does not serve a warning purpose. The patient is often in a depressive mood. In the case of a chronic pain, painkillers are usually inefficient and their dosage should be limited. Physical activity is crucial, as it is a necessary condition for a recovery. The treatment of a chronic pain should be based on the cooperation of the doctor with the patient. It is to be considered a therapeutic priority [8].

The typical physiological reactions describing sharp pain are tachycardia, the increase in blood pressure, tachypnea, mydriasis, diaphoresis, increase in muscle tone, hyperactivity and tremor. The characteristic physiological reactions describing chronic pain include weakening of the parasympathetic response, appearance of chronic neurovegetative syndromes, eating disorders, constipation, psychomotor retardation reactions and lowering the threshold resistance to pain [8].

Anxiety and avoidant behaviour are among the typical psychosocial reactions accompanying sharp pain. Psychosocial reactions increase in the case of chronic pain and include irritability, sleeping disorders, asthenia, excessive tendency to embellish, changes of mood and personality. "Escape into disease" follows – withdrawal from social, family and professional life. Treating oneself as a disabled person increases the symptoms of latent depression. The pain accompanies the person from birth, it forces to cease effort and induces to undertake certain measures in order to diminish the unpleasant feeling. The lifestyle and type of work performed may cause an increase in pain stimuli, but after realising the cause, one may attempt the prevention of its occurrence or efficient elimination of it [8].

Drivers are a major occupational group, which in a particular way – due to the operations performed and work conditions – is vulnerable to pain syndromes affecting the locomotor system. During the performance of professional activities, overload factors cause functional disorders of the spine structures. Their occurrence is related not to a one-off overload, but to the "wear and tear" of spine elements over an extended period of time. In the environment shaped by the modern civilisation, this process has an accelerated and excessive character. This is caused by the lack of adaptability of the spine to the conditions, which the man has created and in which he currently lives, focusing on factors related to the lowering of fitness and the general state of motion organs and the whole body [6].

The overlapping and accumulation of the mentioned elements initiate certain changes to the locomotor system, initially functional, but later on degenerative. They give a full picture of a systemic overload disease, particularly visible and severe within the area of the spine. In the final period of the overload disease, morphological damage and disorders within the muscular and nervous systems appear (reflexes disruption, paresis, paralysis) [6].

In 2005, in Zielona Gora's Rehabilitation Centre WOMP [12] research was conducted considering the musculoskeletal disorders among the professional drivers of two entities: an international transport firm called ANNEBERG [10] and Urban Public Transport Services (MZK) [11].

During the studies, which concluded in the development of these results, qualitative and quantitative analysis were used as research methods, as well as opinion polls with the use of survey, interviews and synthesis.

The analysis of publications and documents was dominant within the scope of qualitative analysis. Quantitative analysis was the consequence of empirical studies undertaken with the technique of surveying. It was joined with statistical techniques.

Anonymous surveys (Appendix 1) were carried out among 127 professional drivers, who gave consent to them after a meeting run by the programme *Promocja zdrowia (Health promotion)*, which focuses on the prevention of locomotor system disorders. In the 1993 report by the World Health Organisation (WHO) [13], health promotion was defined as: "(...) social and political action on an individual and collective level, the aim of which is the increase in the society's health

awareness, promotion of healthy lifestyle and creation of conditions supporting health. It is a process of increased activity among local societies, politicians, professionals and amateurs, undertaken to achieve permanent changes of behaviour (...) and introducing changes which are supposed to diminish or eliminate social and environmental causes of health risk” [5].

The survey’s questionnaire was anonymous, and the questions appearing in it were multichotomous. The interview was a complementary technique and was executed with chosen people in a public and open way. The questionnaire of the interview included only open-ended questions. The synthesis involved generating crucial conclusions from the analysis.

The aim of the surveys was to acquire information necessary to develop a medical and rehabilitation programme, which should introduce appropriate treatment and ensure efficient prevention. In order to develop a better overview of the problem, objective exploration was undertaken. The general numbers of employed and surveyed drivers of ANNEBERG and MZK are presented in Tab. 1 below.

Tab. 1. Comparison of the number of the employed and surveyed drivers

#	DATA OF THE RESPONDENTS	ANNEBERG		MZK	
		Number	%	Number	%
1	Employed	130	100	180	100
2	Surveyed	54	41.54	73	40.56
3	Age (years)	24-59		24-58	

Source: own development on the basis of research

In the company ANNEBERG, 54 drivers aged between 24 and 59 responded to the survey, out of the 130 employed (41%). In the case of MZK, 73 drivers out of the 180 employed responded to the survey (40%).

The number of examined drivers from the firms ANNEBERG and MZK who experienced pain disorders is presented in Tab. 2 below.

Tab. 2. The examined drivers with pain afflictions

#	DATA OF THE RESPONDENTS	ANNEBERG		MZK	
		Number	%	Number	%
1	Surveyed	54	100	73	100
2	Pain afflictions	36	66,67	57	78,08

Source: own development on the basis of research

Among the 54 surveyed ANNEBERG drivers, pain afflictions were present in the case of 36, which accounts for 67%. In MZK, out of 73 surveyed drivers, 57 experienced pain, which is about 78%.

The areas where ANNEBERG and MZK drivers experienced pain are presented in Tab. 3 below.

In the examined group, the most frequent pain afflictions occurred in the lumbar region (nearly 64%), followed by the neck (47%) and knees (39%), then thoracic spine, wrists and forearms (19.5% each), ankles and feet (16.5%), shoulders and hips (14% each), with the last place occupied by elbows (8%). Among the drivers from ANNEBERG, the second most frequent affliction was pain in the neck region resulting from excessive isometric tensions of particular muscle groups while covering long distances. The forced position led to the strain of the very same

muscle groups and disturbed the balance of their tension. What increases the problem is the particular nature of reflex response of the postural muscles, which is causing chronic contraction under the influence of long exposure to stress.

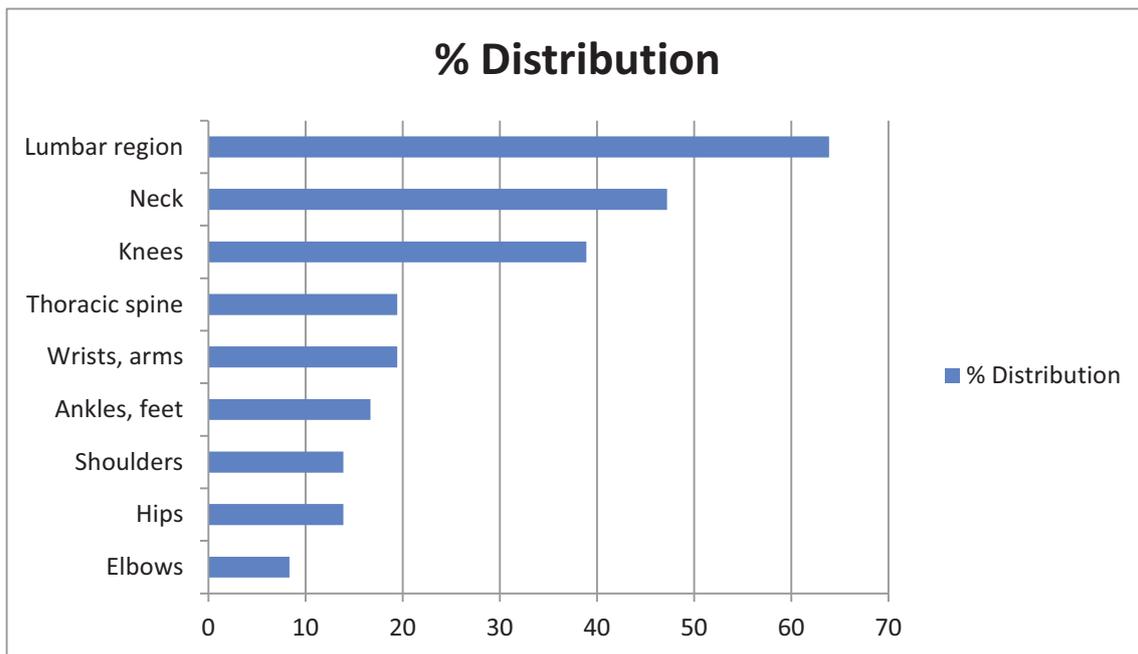
Tab. 3. Comparison of areas of pain among the drivers

#	AREAS OF PAIN AFFLICTIONS	ANNEBERG		MZK	
		Number	%	Number	%
1	Neck	17	47.22	24	42.11
2	Shoulders	5	13.89	26	45.61
3	Thoracic spine	7	19.44	13	22.81
4	Elbows	3	8.33	11	19.30
5	Wrists, forearms	7	19.44	13	22.81
6	Lumbar region	23	63.89	40	70.18
7	Hips	5	13.89	6	10.53
8	Knees	14	38.89	20	35.09
9	Ankles, feet	6	16.67	12	21.05

Source: own development on the basis of research

Table 4 shows the percentage distribution of pain afflictions among the surveyed drivers from ANNEBERG [6].

Tab. 4. The percentage distribution of pain afflictions among the surveyed drivers from the company ANNEBERG



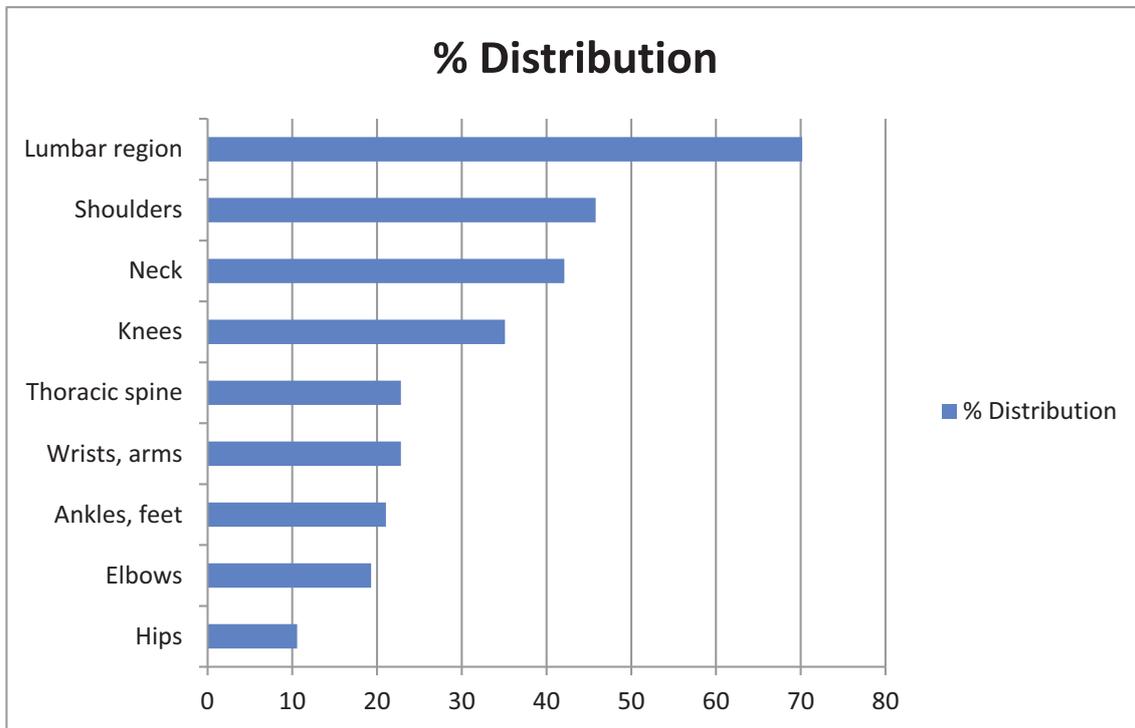
Source: development on the basis of research by WOMP

In the examined group, the most frequent pain afflictions occurred in the lumbar region (nearly 70%), followed by the shoulders (45.5%) and neck (42%), then knees (35%), thoracic spine, wrists and forearms (23% each), ankles and feet (21%), elbows (19%), with the last place occupied by hips (10.5%). Among the MZK drivers, the second most frequent affliction is the pain of shoulder joints and shoulders. These ailments stem from the nature of the work performed, during which considerable overloads of shoulder joints and shoulders are commonplace.

In the examined groups, the dominating affliction, irrespective of the differences in the nature of the work performed, was the pain of spine in the lumbar region.

Table 5 shows the percentage distribution of pain afflictions among the surveyed drivers from MZK [6].

Tab. 5. The percentage distribution of pain afflictions among the surveyed drivers from the company MZK



Source: development on the basis of research by WOMP

In Tab. 6 below, we present the number of people seeking medical advice due to the presence of pain.

Tab. 6. Presentation of the number of drivers seeking medical advice

#	TYPE OF DOCTOR	ANNEBERG		MZK	
		Number	%	Number	%
1	Orthopaedist	3	5.56	4	7.41
2	Rheumatologist	2	3.7	3	5.56
3	Neurologist	11	20.37	5	9.26
4	Occupational physician	3	5.56	5	9.26
5	Medical specialist (1-4 altogether)	19	39.19	26	48.15
6	GP	10	18.52	16	29.63

Source: own development on the basis of research

From the survey analysis, it is visible that ANNEBERG drivers sought medical advice chiefly from a neurologist (over 20%) and a GP (nearly 20%), not very often from an orthopaedist or occupational physician (less than 6% each), and rarely from a rheumatologist (below 4%). MZK drivers most often, in 30% of the cases, sought the help of a GP, and went to see a medical specialist rarely. If so, then they more often visited a neurologist or an occupational physician (over 9% each) than an orthopaedist (over 7%) or a rheumatologist (less than 6%).

Table 7 includes the comparison of preventive and therapeutic help forms offered to the respondents.

In the examined groups, the treatment of pain was more often focused on pharmacological painkillers than rehabilitation. ANNEBERG drivers used sick leave twice as often as MZK drivers and radiography was not treated as a priority.

Tab. 7. The comparison of preventive and therapeutic help forms offered to the respondents

#	HELP FORM	ANNEBERG		MZK	
		Number	%	Number	%
7	Sick leave	22	40.74	11	20.37
8	Rehabilitation	10	18.52	8	14.81
9	Painkillers	26	48.15	20	31.04
10	Radiography	11	20.37	11	20.37

Source: own development on the basis of research

Table 8 shows the forms of spending leisure time among the drivers of the surveyed firms.

Tab. 8. Forms of spending leisure time

#	FORM OF SPENDING LEISURE TIME	ANNEBERG		MZK	
		Number	%	Number	%
1	Watching TV	31	57.41	60	82.19
		2-3 hours/day		2-3 hours/day	
2	Reading	24	44.44	48	65.75
3	Doing sports	8	14.81	27	36.99
		Football, basketball, running		Tennis, swimming, running	
4	Gardening	11	20.37	33	45.31
		1 time per week		2-3 times per week	
5	Other	9	16.67	15	20.56
		Walks, fishing, DIY		Walks, fishing, DIY, cycling	

Source: own development on the basis of research

The most frequent form of spending leisure time among the surveyed was watching TV and reading. Active forms of spending leisure time were in a minority and their nature could increase the level of pain afflictions.

The Rehabilitation Centre WOMP was equipped with the apparatus to carry out treatment within the scope of physiotherapy and hydrotherapy. The meetings of WOMP employees with ANNEBERG and MZK drivers allowed to indicate the direction of change of their bad motion habits, advise an increase in physical activity and increase the awareness of the need of a targeted rehabilitation therapy. The drivers had the ability to seek advice from medical specialists and the preventive measures were aimed at decreasing the locomotor system afflictions related to the form of work performed.

Appendix 1

The survey on musculoskeletal system afflictions among professional drivers under the program of prevention of locomotor system disorders

The overloading of motion organs commonly occurs during the performance of professional work as well as while taking care of house duties. However, some activities and working conditions in a particular way predispose to the occurrence of disorders affecting the bone and joint system. According to the recent studies carried out by the Institute of Occupational Medicine (Instytut Medycyny Pracy) in Lodz, 66% of examined drives suffer from spine pain localised in the lumbar and cervical regions. These afflictions are most often observed among truck drivers, bus drivers and the operators of heavy building equipment. The below survey aims to estimate the scale and nature of the phenomenon in your working environment, so as to undertake right solution steps in the future and offer efficient medical help to those who need it.

1. Please provide the following data:

- Age:
- Height (cm):
- Weight (kg):

2. What is the length of your career:

- generally:
- as a professional driver:

3. Please fill in the supplementary data regarding working conditions:

- Do you work shifts? YES / NO
- How many hours per day do you spend driving, on average?
- Do you work nightshifts? YES / NO
- Do you consider your job stressful? YES / NO
- Does your job meet your expectations in terms of comfort / ergonomics? YES / NO

If not, what is the main feature that needs improvement?

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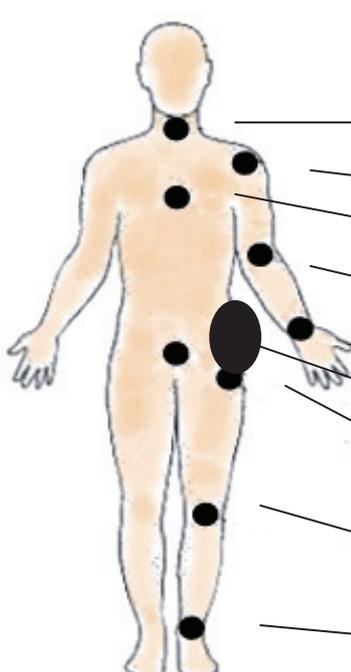
4. How do you spend your leisure time

- watching TV (how many hours a day? – on average
- reading (how many hours a day? – on average
- doing sports (examples and how many times a week.....)
- gardening (how many times a week?
- other forms (examples?

5. Do you experience pain afflictions of your muscoskeletal system? YES / NO

If NOT, then thank you very much for filling out this short survey honestly (further points do not apply to you).

If YES, we would like to ask you to point them on the following scheme (if possible, stating for how many years the afflictions have been present) and filling in the rest of the points:



	At present	At work (for how many years?)	After work (for how many years?)
Neck			
Shoulders			
Thoracic spine			
Elbows			
Wrists, arms			
Lumbar region			
Hips			
Knees			
Ankles, feet			

6. Have you, due to the above afflictions, used:

- the advice of a doctor? YES / NO
- If YES, then of which medical specialty?
- Orthopaedist

- Rheumatologist
- Neurologist
- Occupational physician
- GP
- sick leave? YES / NO
If YES, then for how many days in the last year?
- rehabilitation? YES / NO
- painkillers? YES – sometimes / YES – regularly / NO
- radiography treatment? YES / NO

Acknowledgement

Thank you very much for: Provincial Centre of Work Medicine, Rehabilitation Centre, Dąbrówki Street 15c, 65-096 Zielona Góra, tel.: 68 328 48 00, fax: 68 328 48 04, <http://www.womp.zgora.pl>.

References

- [1] Dobrogowski, J., Kuś, M., Sedlak, K., Wordliczek, J., *Ból i jego leczenie*, Warsaw 1996.
- [2] Dobrogowski, J., Wordliczek J. (red.), *Medycyna bólu*, Warsaw 2004.
- [3] Dobrogowski, J., Zajączkowska, R., Dutka, J., Wordliczek, J., *Patofizjologia i klasyfikacja bólu*, Polski Przegląd Neurologiczny, 7, 1, Wrocław 2011.
- [4] Filipczak-Bryniarska, I., Bryniarski, K., Woron, J., Wordliczek, J., *Mechanizmy przewodzenia bólu, Rola układu odpornościowego w regulacji odczuwania bólu*, Anestezjologia i Ratownictwo, 4, Gdansk 2010.
- [5] Jethon, Z., Grzybowski, A. (red.), *Medycyna zapobiegawcza i środowiskowa*, Warsaw 2000.
- [6] Pietruczynik, M., *Analiza ankiet dotyczących dolegliwości ze strony układu ruchu u kierowców zawodowych firmy ANNEBERG i MZK w ramach programu zapobiegania schorzeniom układu ruchu*, Zielona Góra 2005.
- [7] Scherpereel, P., *Cierpienie w ujęciu filozoficznym*, Anestezjologia i Ratownictwo, 3, Gdansk 2009.
- [8] Suchocka, L., *Psychologia bólu*, Warsaw 2008.
- [9] Trzecienciecka-Green, A. (red.), *Psychologia, Podręcznik dla studentów kierunków medycznych*, Cracow 2006.
- [10] <http://www.anneberg.com.pl/> [entry date: 22.10.2013].
- [11] <http://www.mzk.zgora.pl/> [entry date: 22.10.2013].
- [12] <http://www.womp.zgora.pl/> [entry date: 22.10.2013].
- [13] <http://www.who.int/> [entry date: 22.10.2013].

Abbreviation set

- WOMP – Wojewódzki Ośrodek Medycyny Pracy (Provincial Centre of Work Medicine)
- ANNEBERG – Anneberg Transpol Int. Spółka z o.o. (Anneberg Transpol Int. Limited Liability Company)
- MZK – Miejskie Zakłady Komunikacji (Urban Public Transport Services)