THE POSITION OF A NURSE IN A COMPLEX NURSING PROCESS IN BALNEOTHERAPY

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ABSTRACT
The presented work is concerned with a disease which is important to be dealt with from the point of view of health care, social life and economy. The introduction and theory part focus on statistics, incidence and prevalence of diseases, the main causes, ethiopathogenesis, diagnose and therapy. An extensive part provides detailed explanations of balneotherapy and nursing. One of the goals of this work - the position of a nurse in balneotherapy and in complex nursing process while curing serious vertebral diseases - is explained here. The main part is based on research where the effect of spa treatment is statistically evaluated by using a method of McGill-Melzack questionnaire (Slovak version used); by using visual analogue scale (VAS) and objective tests based on measuring the mobility of spine before and after taking spa treatment. The results of the work positively proved the hypothesis of the positive effect of balneotherapy on the human body. It could be stated that mainly with chronic diseases spa treatment should become one of the possible methods of treatment and health care. The findings and results of this study could be compared with available literature.

Key words - health care – balneotherapy - vertebral diseases - McGill-Melzack questionnaire – civilization diseases - biopsychosocial factors

Introduction
Vertebral diseases represent important medical and economical problem. According to introduced statistics 70-80% of population in all developed countries suffer from these diseases. Taking into consideration all diseases, vertebral diseases take the second position in reasons for a visit at the doctors, the fifth position as a reason for hospitalisation and the third causing the operation. Incapability to work takes about 10-15 % of population. A year prevalence is about 25-45 %, from which 3-7 % is a chronic back pain. All expenses paid create up to 80% of all costs of treatment of vertebral diseases.

The top point of back pain prevalence is between the age of 35 to 55 years. In the period of previous years a marked increase of vertebral diseases has been noticed mainly in younger age groups. The cause may be searched in so called biopsychosocial factors (sex, weight, age, job) and in a complex of civilization factors most of all in physical exertion of motor apparatus (unsuitable habit stereotypes) and in the states of psychical stress, in the deficiency of adaptability of vegetative part of nervous system to demands of modern civilization.

The notion of „vertebral diseases” can be defined as functional and degenerative affections localized in spine and manifested in pains localized or radiant in some segment. The pain is an early signal of functional risk of locomotor apparatus which appears before the morphological changes can be noticed. By treatment with analgetics this natural defence mechanism is suppressed and consequently affected structures are constantly overloaded with the result of morphological changes. Vegetative changes appear as hyperalgetic changes (HAZ) and trigger points. This can be a starting point for treatment of painful vertebral syndrome whether acute or chronic. According to Janda (6) acute pain syndrom is only an immediate decompensation of status being prepared for years.

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It is the correct diagnosis and selection of the most effective curative procedure, that helps to manage and overcome this acute state so that it doesn’t become chronic. While treating functional disorders any local procedures that have local complex influence and thus improve function as a whole can be used. It means that it depends on the experience of therapist and his choice of procedure as well as on correct local and thorough diagnosis.

After taking case history and objective findings a doctor determines priorities in curative procedures in the process of rehabilitation. Proper connection of rehabilitation procedures in the plan of rehabilitation is up to the nurse. A complex nursing process comprises of recommended procedures, instructions for patient, his family and relatives about his disease, and the ability to influence the treatment of the patient with rehabilitation procedures. This creates inevitable motivation to active attitude of the patient to his own treatment with rehabilitation.

The basic point in balneotherapy is the complex influence of mechanical, physical, chemical and biological factors in natural curative sources. It is an affective and economical method. In the balneological department a nurse qualified in rehabilitation plays an important role. She creates her own "nursing diagnosis" by evaluating the functional capacity of motor apparatus and checking some data about stated problems. She keeps in contact with a doctor and informs him about the results of the treatment. The following check up helps to set up short and long termed aims in nursing care.

After complex balneotherapy the treatment is again evaluated according to its main goals. Here becomes apparent the role of a nurse in this process because it is her who can analyse the results of the whole therapy.

We’ve tried to support the main goal of our work which is to set up the position of a nurse in balneotherapy, with these partial findings:

- if the complex spa treatment has a positive influence on the course of the chronic vertebral illness,
- if the length of spa stay has an influence on the course of illness,
- if the spa treatment has a different influence on patients according to sex.

**Material and methods**

In clinic practise it is a big problem to evaluate pain problems especially the origin of vertebral pain. Very often it depends on a verbal information from sick people’s description of their bad feelings. The evaluation of the problem is being solved by many studies of visual analogy and verbal scales through various arrangements by the classical McGill-Melzack questionnaire, up to specifically selected questionnaire for the spine construction as Oswestry Low Back Pain Questionnaire - ODQ, Million Visual Analogue Scale - MVAS, Roland-Morris Disability Questionnaire - RMDQS, Low Back Pain Rating Scale - LBPRS, Quebeck Back Pain Disability Scale - QBPDS and many others.

To verify research aims we used several techniques. The axis of research was to evaluate the functional state of the patient, to evaluate spine mobility with the help of tests. In our studies for simplicity and an easy repetition of measurements we used the following tests: Schober, Stibor, Thomayer. We evaluated all the tests in centimeters according to standard procedures and agreements and all of them were registered into tables. We watched and registered the before and after results of the complex spa treatment. We evaluated the statistic results by Student’s pair t-test. Also we evaluated the clients length of spa stay, their age and sex.
For another evaluating function we used the Slovak version McGill-Melzack questionnaire of pain (1,5,28,29,68) and visual analogue scale, where the intensity of pain was evaluated as follows: 1. lower pain, 2. troublesome pain, 3. intensive pain, 4. cruel pain, 5. unbearable pain.

The obtained results were statistically worked out by computer technique according to Microsoft Excell (18,75) and evaluated student’s pair t-test. Quantification of pain according to McGill-Melzack pain questionnaire is more complicated than VAS (Visual Analogue Scale) when a patient for a 10 cm abscissa indicates pain intensity in millimeters or numerical. This visual analogy scale - graphically expressed pain intensity - was used for first time by Huskinson (30) for clinical experiments with analgetics and for evaluating functional capacity of sick patients with progressive polyarthritis. Here a similar experience was used by Tauchman (78). Today VAS is considered to be the most suitable and quick way for a subjective evaluation of pain intensity (79). The Slovak version of pain questionnaire (5) contains 60 descriptors, which are statistically of different importance to the pain intensity divided into 20 groups. Groups are assorted into four categories: sensory (1-10), affective (11-15), evaluating (16), mixed (17-20). The patient can choose - indicate words, which describe pain in the best way. He is allowed to choose one word from the most suitable group, referring mostly to the pain. He can leave out any group of words that are not suitable. Scoring of the questionnaire is detected with a certain help of 3 basic indexes, as NWC (Number of Words Choosen) that is the number of choosen words describing pain experience. PRI (Pain Rating Intensity) is the total scores of choosen descriptors and PPI (Present Pain Intensity) expressing the acute intensity of pain in scale extension 1-5 a responsibility of actual numbers VAS (5,78,80). The calculated and obtained indexes were then compared before and after attending spa treatment, then according to two selections Student’s t-test and equal dispenses for every group separately (18,75). Student’s t-test enables us in our practice to test hypothesis in given level of importance comparing the calculated criteria (called t-statistic) criticizing the evaluation of student’s division (t) a (v) which is dependent on the level of importance a and considering number of degrees v (tabulated evaluation). Here the level of importance gives an idea of error in the first rate, that is the risk - the possible connection with refusing valid zero hypothesis and not rejecting unvalid alternative hypothesis. That is why a - the level of importance- is chosen small enough - standard 0,05 or 0,01. Rejecting hypothesis H0 signals a confirmation of alternative hypothesis H1 and when the tested problem is formed as an alternative hypothesis then the risk of its mistaken rejection is low and there is the probability, that datas correspond with valid hypothesis H1 on level 95% or 99% (positive t-test). The precise interpretation of test results is, when the equality of middle level values or a certain difference is rejected on the level of importance a, there is probably a smaller coincidence possibility than small a, in concrete p (Te" t). Only rejecting H0 really has a small mistake a and thus a big supplement probability. That means when on a certain level of importance t-statistic is greater than t-critical (tabular) at the given loose degree, research appearance or research subject influences measured quality. In our case it concerns complex spa treatment. Evaluating t state”t crit on the level of importance a probability of coincidence is smaller than small a in concrete P(Td" t). Only rejecting H0 has a small mistake a and thus a big supplementary probability. That means, if on a certain level of importance t-stat is bigger than t-crit
(tabul) at a given loose degree, object of the research or research substance influences measured quality in a great deal (in our work the influence of complex spa treatment. Evaluating objective examples (Thomayer, Schober, Stibor) and their mutual comparision before and after spa treatment, at a certain level of importance, also evaluating McGill-Melzack pain questionnaire and VAS we were able to create a table of correlations and to evaluate partial relationship.

Sick people were cured by a complex spa treatment, which includes mirror pull, mud, hydrokinesitherapy, massotherapy, reflexology. The number of main procedures are usually twice a week. (Mirror pull 2x, Mud pack 2x, Hydrokinesitherapy 2x, Massotherapy 2x, Electrotherapy 3x). Patients take a half hour swimm every day. The patient’s diagnosis was chronic low back pain with clinic appearance with and without radiculitis and pseudoradliculitis.

Into the collection we took 147 accidentaly choosen patients, cured by balneotherapy in a period of the years 1999 till 2000. The group of patients was divided into two groups. One group was formed of 99 respondents, from that 44 men - 44,42% and 55 women (55,56%). Objective function tests of spine mobility were tests of Schober, Stibor, Thomayer.

The results were registred into tables from which we gattered basis for statistic evaluation before treatment and after treatment. In the same way we evaluated and compared the lenght of the stay, a two week stay and a three week stay. In the collection of a two week stay there were 28 respondents from this 13 women that is 13,13% and 15 men that is 15,53%. For a three week stay - 71 respondents, from these 42 women that is 42,42% and 29 men which creates 29,29% (Table 2). We divided the patients according to their age: 61 years old and above 61 years, the whole collection into groups of women and men. We did the same distinction by putting groups into the collection of two week and three week spa treatment (Table 4, 5).

**Results**

Structure of responders according to sex, presented in the Table 1, shows the patients who underwent the balneotherapy. The results show that from the total number of 99 respondents, there were 44 men (44,42%), 55 women (55,56%). In the Table 2 classification according to the length of balneotherapy is presented (number of days possible: 14 or 21 ). 28 patients took 14 days balnaeotherapy from that number there were 15 men (53,6%) and 13 women (46,43%). 71 patients, e.g. 29 men (40,85%) and 42 women (59,15%) took 21 days balneotherapy treatment

| Table 1. Structure of responders according to sex |
| sex | number (n) | % |
| Men | 44 | 44,42 |
| Women | 55 | 55,56 |
| Sum | 99 | 100 |

| Table 2. Structure of responders according to the length of spa stay |
|---|---|---|
| | men | Women | sum |
| | n | % | n | % | N | % |
| 2 weeks | 15 | 15,15 | 13 | 13,13 | 28 | 28,28 |
| 3 weeks | 29 | 29,9 | 42 | 29,9 | 71 | 71,72 |
| Sum | 44 | 45,05 | 55 | 43,03 | 99 | 100 |
Table 3 shows set of responders distinguished according to age and sex. Almost equal is the most numerous group of men and women in groups A5 and A6, that is from 50 to 69 years old. It can be stated that the biggest group create the working people in an active age. Graphic structure of the group of responders is shown in Figure 1.

Division of the set according to sex and age of group responder’s, evaluated functionally by McGill-Melzack questionnaire of pain and visual analogue scale is in the Table 4. From the total number of 48 responders there are 19 men, that is 39,58% and 29 women, that is 60,42%. The average age limit is from 40 to 59 years.

Division of the set according to sex is in Table 5 and an illustration in Figure 2.

**Discussion**

In our observations we used McGill-Melzack modified questionnaire of pain (5) and also a visual analogue scale (in our work verbal and numeral). In the observed set there were 48 respondents who were willing to undergo the test. The set consisted of 19 men which represented 39,58% and 29 women, which is 60,42%. The age of observed patients of both groups were between 34-95 years; the average age for men is 61,16 years and for women 51,14 years. This means that population is in a full active age. In the second set of 99 individuals, men form number 44 which is 44,42% and 55 women, which is 55,56%, an average represents 50 to 69 years, that means that the responders are still in an active age. We used objective criteria evaluating spine movement in the waist area according to Schober, Stibor and

<table>
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**Figure 1. Division of observed patients into groups according to age**
Thomayer. By comparing results of the complete set of 99 respondents, we compared objective measures of spine movements before and after the treatment. Observed parameter Schober before and after the treatment according to middle value had improved in 0,72 cm, that is in 14,8%. According to statistic calculation a significant parameter improvement on the level of importance, more than p<0,0001. The observed parameter Stibor improved after spa treatment in 0,97 cm, that is in 10,5% (p<0,0001). The observed parameter Thomayer after spa had improved in 7,0 cm that is in 29,5% (p<0,001).

By comparing results in men number 44, Schober after spa treatment had
improved in 0.68 cm that is in 13.9% (p<0.0001), Stibor in 0.88 cm, that is 10% (p<0.0001), Thomayer after spa treatment had improved in 6.45cm, that is 28.0% (p<0.0001). We can state, that the entire set after spa treatment came to a significant improvement on the level of importance (p<0.0001) for all the researched groups and in all the measured parameters. We didn’t find out statistically significant differences according to sex. Objective parameters after spa treatment had nearly identically changed as in women, also in men.

Comparing the results of the entire set of 28 responders - taking balneotherapy for **two** weeks - the observed parameters had improved, Schober according to middle value after treatment in 0.68 cm that is in 13.36% (p<0.0001), Stibor in 0.88 cm, that is 10% (p<0.0001), Thomayer after spa treatment had improved in 6.57cm, that is 28.44% (p<0.0001).

The basic parameters in men during a **two week** spa treatment: The number of responders 15. Schober after spa treatment had improved in 0.67 cm that is in 13.36% (p<0.0001), Stibor in 0.87 cm, that is 10% (p<0.0001), Thomayer after spa treatment had improved in 7.86 cm, that is 31.8% (p<0.0001).

The basic parameters in women during a **two week** treatment: The number of responders 13. Schober after spa treatment had improved in 0.62 cm that is in 13.0% (p<0.0001), Stibor in 0.88 cm, that is 9.3% (p<0.0017), Thomayer after spa treatment had improved in 5.08cm, that is 24.0% (p<0.002).

The basic tested parameters in 71 respondents taking balneotherapy for **three** weeks had improved in Schober after spa treatment in 0.74 cm that is in 15.4% (p<0.0001), Stibor in 0.95 cm, that is 11% (p<0.0001), Thomayer after spa treatment had improved in 7.63 cm, that is 31.0% (p<0.0001). With women a spa treatment lasting three weeks: Schober after spa treatment had improved in 0.69 cm that is in 14.2% (p<0.0001), Stibor in 0.89 cm, that is 10.1% (p<0.0001), Thomayer after spa treatment had improved in 6.87 cm, that is 29.2% (p<0.0001). Evaluating statistically these basic set of groups we only proved the essence of spa treatment on the level of importance lower than 0.0001, but we didn’t ascertain a significant statistic difference between individual groups. However by the strength of a t-test we may assume a more effective treatment lasting **three weeks** rather than **two**. Also from these statistic calculations we may judge Schober’s test as more sensitive than Thomayer’s.

While testing responders until 61 years, we also divided the set according the length of spa treatment to two and three weeks and according to sex to men and women. The basic evaluations of observed test’s in the complete set of 13 responders until 61 years and the length of a two week spa stay. Schober after spa treatment had improved in 0.73 cm that is in 14.5% (p<0.0001), Stibor in 1.07 cm, that is 11.69% (p<0.0002), Thomayer after spa treatment had improved in 6.23cm, that is 26.47% (p<0.0036). Men during a two weeks spa stay (N-6) Schober after spa treatment had improved in 0.58cm that is in 11.4% (p<0.029), Stibor in 0.75 cm, that is 8% (p<0.0086), Thomayer after spa treatment had improved in 8.33 cm, that is 29.4% (p<0.0153). Concerning a group of women until 61 years and the length of a two week stay, the results were comparable with men groups (N-7), Schober after spa treatment had
improved in 0.86 cm that is in 17.5% (p<0.0005), Stibor in 1.46 cm, that is 15% (p<0.0021), Thomayer after spa treatment had improved in 4.43 cm, that is 22.8% (p<0.0393).

The basic evaluation of observed tests of responders until 61 years and the length of a three week stay with the number of 36 responders, show that all were improved after the spa treatment, Schober after spa treatment had improved in 0.78 cm that is in 16.18% (p<0.0001), Stibor in 1.04 cm, that is 11.94% (p<0.0001), Thomayer after spa treatment had improved in 7.1 cm, that is 29.36% (p<0.0001).

The questionnaire of pain, where the correlation analysis was used, led us to conclusion, that the evaluations correlate and complement each other. After the spa treatment we didn’t find out accentuated changes in the affective pain in comparison with the sensory pain as described in most literature sources (79,78,16).

In our set of patients the sensory pain and the affective pain was influenced equally (improvement represents 62%). It could be probably caused by lower number in set of patients in comparison with other authors.

While comparing the influence of spa treatment on status of patient, taking into considerations his age, the level of significance was lowered, speaking about the patients 61 years old and 2 weeks treatment duration. This may be caused by not numerous group of patients observed. Introduced values and calculations were not influenced by substitution with other patients, because the aim was to show the structure of patient in our spa, chosen by chance in a concrete time period. The fact, that the results are comparable with other authors and that slight differences can be caused by polymorbidity of patients in our set, may be announced as well.

Conclusion
In the observed work we were concerned with the problem of vertebral disease in the part of lumbar spine and with the potential influence of complex spa treatment on this disease.

This disease takes the top position while talking about its prevalence and thus its negative influence on the economy of society.

Set of studies was compound from subacute and chronic states of vertebral syndrome. The following conclusion was achieved from the obtained results and their statistical evaluation:

1. Spa treatment has the positive influence on the course of the disease. This was proved in significant level of importance p<0.0001 in our set of 147 patients. According to the results significant improvement of objective measurements of mobility of spine was observed (Schober, Stibor, Thomayer) on the level of significant according to parameteric Student’s pair t-test (p<0.0001). McGill-Melzack test (Slovak version) showed a marked influence of pain, mainly in the zone of sensory pain and on the same level of significance in the zone of affective pain. Chronic states of the disease would correspond to the introduced results. According to our research spa treatment has a positive influence on the sensory pain that represents acute disease.

2. Evaluating, whether the length of spa treatment influences the course of disease and the result of treatment we didn’t get significant statistical difference, but according to intensity of statistical indicators (t-stat.) we can say that three weeks stay is more suitable than two weeks
Thus, according to the results of the test, we have to be moderate while evaluating the influence of the length of spa treatment stay on the course of vertebral disease. Empirical results in the past though stand for longer stay than two weeks.

3. Evaluating the differences in the influence of spa treatment according to sex we didn’t get significant difference in results of objective measurements in patients up to 61 years old undergoing the treatment of 2 weeks length. There was a lowering of the level of significance, but it was not marked as important. This fact was evaluated in the results as caused by low set of patients. No significant difference was found while talking about sex of patients on the whole as well as while talking about distinction among men and women up to 61 and above 61 years old.

4. The goals of our research were fulfilled. We have proved the effective place of complex spa treatment in complex nursing process in vertebral diseases. The results have proved that the importance of spa treatment in direct curative balneo-rehabilitation process can be claimed as well as in prevention. Our findings correspond to many sources in literature and to our present experience. We have also proved that rehabilitation nursing is by no means replacable and the constant education of health care staff in the field of rehabilitation nursing is important and necessary, as this represents a new field in science with a board and highly professional degree of activities interrelated with other scientific branches.

The main task of rehabilitation nursing is prevention of secondary changes, early mobilisation and psychical activation of patients. It is applied in all medical branches and in some of them takes even the most important part.

It is necessary to conclude that it is important for a doctor to analyse case history, objective findings, paraclinical examinations, to make diagnosis and to compound appropriate therapeutic procedure in a nursing-rehabilitation process. But the interaction of a doctor - a nurse and a nurse - a patient is also necessary. On the base of this interaction the decisions and demands of a doctor are realised in practice by a nurse.

References

38. Krahulec, P. a kol.: Minerálne vody Slovenska 1, Osveta Martin 1977, p.9-30
53. Mladjovský, V.: Klimatologie a balneologie, Náklad mladé generace lékařů, Praha 1923, p.56-66
54. Musilová, M. a kol.: Vybrané kapitoly z ošetrovate¾stva. Osveta, Martin 1993, p.8-141
65. Scherer, F.E.: Horúce pramene a kúpele Pieš•an, Balneologické múzeum, Tising Press s.r.o. Pieš•any 2000, p. 272
67. Si•aj, Š., Zbojanová, M., •itoanová, E.: Komplexná kúpeľná lieèba xoxartroz. Závereèná správa z výskumného úlohy, 1963
73. Š •astný, Z.: Matematické a statistické výpoøty v microsoft excelu, Computer Press Brno, 1999
76. Tauchmanová, H.: Pou•itie vizuálnej analogickej škály k ùáûi na funkñèní hodnotenie chorých s PAP. Fysia.st. vi st. 57, è. 3, 1979, p.141-146
77. Thurzová, E.: Úèinku k ùáûení hodnotení bolesti pri vertebrogénných syndromách. Fysiaтриký vi stní k 63, è. 4, 1985, p.190-195
87. Winter, ¼.: Spomienky na Pieš•any, Balneohistorica Slovaca, Tising Press s.r.o. Pieš•any 2001, p.117
89. Winter, ¼.: Spomienky na Pieš•any, Balneohistorica Slovaca, Tising Press s.r.o. Pieš•any 2001, p.117
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POLÓŽENIE MEDSČSTRY V SISTEME ORGANIZÁCIE RABOTY
BÁLNEOTERAPÉVTVÍCSKÝCH OTDELENÍ

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В представленной работе рассматривается положения медсестры в системе организации бальнеологической терапии и процессе лечения спинных больных. Результаты исследования основаны на данных полученных на основании анкетного опроса по методике McGill-Melzack (словацкая версия вопросника), а также проведения объективных тестов, основанных на измерении подвижности позвоночника до и после проведения курса бальнеотерапии. Полученные результаты этого исследования сравнины с данными других исследователей, опубликованных в доступной научной литературе.