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WORKING PAPER

The Long-Term Evolution of Quality of Life for Breast Cancer Treated Patients

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August 2004
2004/255

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D/2004/7012/41

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Abstract

Life is not just a matter of length but of depth and quality as well. The effect of treatment on quality of life (QoL) is important at all stages of the patient's treatment. However, relatively little is known about the long-term evolution of QoL for breast cancer treated patients. To systematically analyse long-term (LT) QoL we made a distinction between short-, medium- and long-term survivals.

Through a questionnaire, we gathered information on treatment, general health, activity problems, disease symptoms, pain, emotions, work, social activities, self care, housekeeping, sexuality, family and meaning of life. This broad questionnaire allowed us to analyse the evolution in QoL for different dimensions over three survival groups.

We found that the longer the survival time, the more the QoL of breast cancer treated patients ameliorated. Rather surprisingly, patients treated more than five years ago assessed their actual health status as slightly better – however not statistically significant – than before diagnosis. Differences were found depending on the QoL related dimension and survival time. The scores on the emotional and meaning of life variables restored to initial levels in the long-term, while the lower scores on sexuality items remained more persistent. The longer the survival time, other factors such as ageing related problems influenced results.

Keywords: Breast cancer, Long-term evolution, Quality of life, Questionnaire

Abbreviations

AT	After breast cancer treatment
BD	Before breast cancer diagnosis
DT	During breast cancer treatment
LT	Long-term
MT	Medium-term
n	Number
QoL	Quality of Life
SD	Standard deviation
ST	Short-term

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Introduction

Breast cancer patients have high rates of cure for localized disease and long-term overall survival [1]. Mortality rates from breast cancer are declining for North American and European women [2-3]. Many women survive the disease and experience physical and psychological sequelae that affect their everyday lives [4-5].

Since breast cancer patients live longer, attention is drawn to the aftereffects of treatment. It is not only a matter of surviving the disease but also of knowing under which conditions this will happen [6]. To quote Feifel [7]: "life is not just a matter of length but of depth and quality as well".

Most quality of life (QoL) studies pay attention to side-effects during treatment or the first year of the follow-up period. Although the effect of treatment on QoL is important at all stages of the patient's later life [8], relatively little is known about the long-term adaptation of breast cancer patients beyond the first year after diagnosis [4-5]. The survival time is very important since there may not be a close relationship between short-term clinical effects and long-term outcomes [9]. Therefore, we made in our analysis a distinction between a short-, medium- and long-term survival group. This allowed us to analyse the evolution of several QoL domains. Since the QoL evolution could also be the result of other health problems, it was interesting to consider to what extent people thought the changes in their QoL were due to breast cancer.

Methods

QoL questionnaire

Many questionnaires are available to measure and value health status in clinical research, public health surveys and economic evaluations: “Assessment of Quality of Life”, “Behavioural risk factor surveillance system questionnaire”, “Core MOS measures of quality of life”, “Easy Test Creator”, “EORTC QLQ-C30 and QLQ-BR23 questionnaire”, “EQ-5D”, “Health and Labour Questionnaire”, “Health-Related Quality-of-life measure”, “Health Utility Index”, “Patient Generated Index of Quality of Life”, “Short-Form 36 Health Survey Questionnaire”, “Wisconsin Quality of Life Index”, etc. We adhere to the recommendation by Cramer et al. [10] not to reinvent the wheel and to use existing instruments that are both reliable and valid. However, most questionnaires are restricted to one or two specific QoL-categories. We therefore constructed a broader questionnaire to analyse a wider range of QoL dimensions.

Cramer et al. [10] present the four major QoL domains generally referred to in most studies: physical status and functional abilities, psychological status and well-being, social interactions and finally economic and/or vocational status and factors. Studying only one or two of these domains is seen as a limitation. Gunnars et al. [11] describe more specifically the most common aspects taken into account in clinical trials to assess QoL: physical symptoms, hair loss, functional ability, sexuality, emotional symptoms, social function, work life, family situation, future planning, spiritual aspects and total QoL assessment or general life satisfaction. With the exception of spiritual aspects we enclosed all these categories in our questionnaire.

Population

There is a poor correlation between QoL reported by physicians and patients [12] or by patients and their families [10]. Because of this discrepancy, it is preferable that the patients themselves judge QoL aspects during and after treatment. For contacting breast cancer patients anonymously, we obtained assistance of "Leven Zoals Voorheen", a non-profit organisation which supports and informs breast cancer diagnosed women.

'Leven Zoals Voorheen' had the disposal of 300 questionnaires. 47 of them were not distributed. 187 questionnaires returned of which 174 could be used, which gave a participation rate of about 69 per cent. Besides general and treatment related questions, 67 QoL related items were questioned to reflect the evolution of QoL. It took about 40 minutes to complete the questionnaire. In spite of this, we had a very high rate of response. The help of 'Leven Zoals Voorheen' volunteers to distribute and collect our questionnaire during their information sessions was very crucial.

We divided our population into three groups depending on the survival time. The first group contained the short-term (ST) survivals, i.e. women which were less than one year survival free. The second and third group respectively contained women which were one to five years and more than five years disease free. As in the study of Ganz et al. [4] our zero point was one month after breast cancer surgery. The disease free period for the three groups was respectively 4.44 (number (n) = 39; standard deviation (SD) = 3.89), 32.31 (n = 70; SD = 12.96) and 133.28 (n = 65; SD = 63.20) months.

In our questionnaire, respondents had to answer to what extent a certain statement was applicable for them. We used a five-digit answer scale, i.e. always, most of the times, sometimes, rarely or never applicable. For negative statements, such as 'having pain in the chest', a value of one was assigned to 'always' and five to 'never'. We recoded the answers for positive statements, such as 'feeling feminine', i.e. 'always', 'most of the time',

'sometimes', 'rarely' and 'never' respectively received a score of five to one. As a result, for all statements, the lowest score reflects the worst situation.

The evolution in QoL was reproduced for each person by asking people to give an answer on each question for three moments, i.e. before breast cancer diagnosis, during treatment and on the moment the questionnaire was filled in. Asking how people validated QoL before breast cancer diagnosis was important to have a baseline against which comparisons could be made [10]. The answers for the two other periods allowed us to see how the scores evolved over time for each survival group.

Results

We presented the results of our study part by part in accordance with the structure of our questionnaire. In this overview, we will concentrate on the evolution in QoL. Correlations will be discussed extensively elsewhere.

Within each survival group, the scores before, during and after treatment were analysed through pairwise comparisons for nominal, categorical variables. In case of quantitative variables, the paired-samples t-test procedure was used to compare means within one of the survival groups at two different times.

Furthermore, we analysed differences over the three survival groups. A Somers' d test was used to analyse the strength and direction of the relationship between the row and column variables of a crosstabulation. These ordinal, categorical variables were on the one hand the survival time and on the other hand the answers on a certain statement of our questionnaire. For nominal, categorical variables in 2x2 tables, the Phi test was appropriate. For quantitative variables, the independent-samples t-test was used to compare means over the survival groups.

Treatment

Patients were asked which treatment(s) they had. 93.5% received surgery. About 74.7% and 54.1% of patients received respectively radio- and chemotherapy and about one patient in three (35.3%) had hormonal treatment. A significant increase in radio- (Phi: test value 0.26 (significance 0.00)) and chemotherapy (Phi: 0.22 (0.01)) was found when comparing the long-term (LT) to the medium-term (MT) survival group. In the ST and MT survival group, more treatment options were combined when comparing to the LT (Somers' d: respectively 0.20 (0.03) and 0.29 (0.00)).

A recent positive trend was detected towards giving sufficient information about the disease and its treatment. In the LT survival group, one on three patients did not get enough information about the disease when it was diagnosed whereas this was only one patient on eight in the ST group (Somers' d: -0.21 (0.00)). Concerning information about treatment(s), this evolution was less explicit. One patient on four did not get enough information in the LT whereas this was less than one on five in the ST (Somers' d: -0.12 (0.10)).

With respect to surgery, we made a distinction between mastectomy and lumpectomy. The proportion of mastectomy declined steadily over the three periods with a significant decline when comparing the ST and LT survival groups (Phi: 0.23 (0.05)). This was probably due to the more positive attitude towards breast-conserving treatment.

General health situation

People were asked to answer on a ten-points-scale how they felt about their health situation at three moments in time. For all survival groups we found a significant deterioration when comparing the periods before breast cancer diagnosis and during treatment. After treatment this health situation significantly improved and was comparable with the initial level of health (figure 1 and table 1; pairwise comparisons).

Insert figure 1 and table 1 around here

When comparing the ST and LT survival groups we found a difference of 0.15 at the 10% (0.07) significance level in the health situation after treatment (table 1; Somers' d). The improvement in the health situation after treatment was significant during the first year and improved slightly further in the LT. It was remarkable that in the LT survival group, the score after treatment was, however not significantly, higher than before treatment. It is assumed that when people have been able to cope with difficult health situations such as breast cancer, they appreciate health more afterwards.

In general, it was notable that the improvement was much stronger for general health than for the variables discussed in the following parts. This could be due to the possibility that people kept other factors in mind, such as ageing, when valuing their general health situation. People could state that their health status was almost identical to the level they wanted it to be before treatment and after treatment even if their health status had slightly deteriorated because of ageing. Since they knew that ageing was inevitable they probably adapted their expectations. In this way we could refer to a relative definition of QoL which emphasises the difference between 'what is and what could have been' [13-14]. For the other variables people had to answer on a five-digit scale to what extent a statement was applicable to them. For each QoL domain we asked explicitly to what extent the evolution was directly or indirectly the result of breast cancer.

Activities

Comparing the situation before diagnosis and during treatment, the scores for all activity variables significantly worsened (table 2, pairwise comparisons). The lowest scores and

largest decreases were noted for intense activities such as running, lifting heavy objects, cycling hard, carrying two bags of vegetables and walking a long distance. It was notable that the activity problems with the largest decline can be associated with arm movements.

Insert table 2 around here

In all survival groups a significant increase was noticed after treatment for all activity scores with the exception of one. The ST survival group did not have a significant improvement for lifting or carrying some bags, which indicated it took some time for arm problems to ameliorate. Comparing the situation before diagnosis and after treatment, the differences mostly remained significant. After treatment, intense and arm activities still remained the biggest problems. Only for intense activities, a significant difference was noticed after treatment when comparing the LT survival group with the other two groups, which indicated it took some time for greater improvements (table 2, Somers' d).

In the ST two persons on three said the evolution in activity problems was completely or largely due to breast cancer. In the LT this was only one on three. This confirmed the idea that in the LT survival group, more and more other health problems had an influence on activity problems (Somers'd: -0.24 (0.00)).

Disease symptoms

The item 'being tired' was considered as most problematic during treatment. We found the same results for feeling weak, the need for short sleeping periods and problems with falling asleep. The decrease in the scores for the disease symptoms was relatively larger when comparing with the other variables. Generally, the greatest decrease during treatment was

found for feeling weak and being nauseated (table 3, pairwise comparisons). Other variables such as needing short sleeping periods during the day and being tired also worsened a lot.

Insert table 3 around here

After treatment, almost all scores significantly increased. The biggest problem remained being tired. However, in the LT survival group, the score after treatment was not significantly different from the score before diagnosis (table 3, pairwise comparisons) and when comparing the ST and LT survival groups a significant difference after treatment was found (table 3, Somers' d), which indicated that this problem took some time to resolve. Having not slept enough also remained a problem in the short-term. No significant increase was found for the ST survival group, whereas in the LT survival group it even reached the level of before breast cancer diagnosis. In general, in the LT, the biggest problems resolved for breast cancer survivors and much more variables reached a significantly equal level after treatment when comparing with before diagnosis. For the most variables no significant differences were noticed when comparing the survival groups after treatment.

A Somers'd test (-0.33 (0.00)) indicated that the longer the survival time, the more other health problems were responsible for the evolution in disease symptoms. In the ST survival group, 60.6 per cent answered that the evolution was completely or largely due to breast cancer. In the LT survival group, this was only 26.1 per cent.

Pain

In general, the scores for the pain variables were not as low as for the other variables. Physicians were probably able to control pain or the symptom only occurred for short periods of time.

Having pain in the arm and experiencing difficulties moving the arm had the lowest scores. Furthermore, these variables had the highest starting level. The relatively large significant decrease emphasized these problems (table 4, pairwise comparisons). Having pain in the breast and an oversensitivity of the breast also occurred much more. After treatment, the situation never reached the level of before diagnosis. In the ST only the problems of moving the arm and having pain in the arm improved after treatment at the 5% significance level. In the MT, the situation improved for most variables. However, the problems of having a thick arm worsened significantly and probably refer to the arm movement problems. The situation after treatment in the LT survival group was comparable to that of the ST survival group. As for the disease variables, not much significant differences were noticed when comparing the survival groups after treatment. When comparing the ST and LT survival groups, only one variable was significantly different at the 5% level and deteriorated (table 4, Somers' d). These joints ache problems were most probably age related.

Insert table 4 around here

A Somers'd test (-0.30 (0.00) confirmed a strong relation between the survival time and the influence of breast cancer on the pain evolution. In the ST survival group 85.7 per cent of women answered that the pain was completely or largely due to breast cancer. In the MT and LT survival groups this was respectively 58.9 and 36.6 per cent. The improvements of the first years faded away mainly due to other health problems.

Emotional

The lowest scores were obtained for feeling themselves as good as other people do, being without energy, being anxious, having the feeling everything they do is too hard, being

cheerful, having a restless sleep and feeling sad. Together with having problems concentrating, being hopeful about the future and being weepy the scores of these variables decreased the most (table 5, pairwise comparisons). There were less problems with emotional variables which could be linked to social contact, i.e. people are unfriendly, having the feeling that people have an aversion to them and being not talkative.

Insert table 5 around here

Concerning the period after treatment, there was a striking contrast between the three survival groups. In the ST and MT survival groups, only respectively five and four of the twenty emotional variables reached the same level after treatment when comparing with before breast cancer diagnosis. In the LT survival group this was the case for fifteen variables. Even after a long period of time, people still seemed to be more irritated by things that normally do not bother them, have problems to concentrate, feel depressed, have the feeling that everything they do is too hard and are more anxious than before treatment. For ten of the twenty emotional variables, the level that was reached after treatment was significantly higher in the LT survival group when comparing with the ST survival group (table 5, Somers' d). In general, the emotional situation was much better in the long-term and reaching similar levels as before treatment.

The Somers'd test also confirmed (-0.34 (0.00)) that more other events, such as the possible loss of a family member or a dear friend, had an influence on the emotional variables. In the ST survival group 73.5 per cent answered that the evolution in emotional variables was completely or largely due to breast cancer. In the MT and LT survival group this was respectively 64.4 and 35.3 per cent.

Work

The number of people working after treatment slightly rose from 50 to 54.7 per cent over the ST and MT survival groups to decrease to 46.2 per cent in the LT survival group. No correlation was found with survival time (Somers'd: -0.04 (0.62)) because two factors worked in the opposite direction. On the one hand, the longer the survival time, the less people answered the evolution in work related variables was due to breast cancer (Somers'd: -0.40 (0.00)). Not working was caused by breast cancer in respectively 75, 23.3 and 3.7 per cent of the cases. On the other hand, retirement and early retirement were involved in respectively 18.8, 43.3 and 85.2 per cent.

The number of working hours (figure 2) and days diminished drastically during treatment and improved significantly afterwards without ever reaching the same level of before breast cancer diagnosis (table 6, pairwise comparisons).

Insert figure 2 around here

In the ST, MT and LT survival groups, respectively 0, 7.89 and 9.09 per cent worked less than eight hours a week before treatment. During treatment, this was respectively 88.89, 90 and 92.86 per cent. After treatment respectively half of the persons and one out of three worked less than eight hours a week in the ST and MT survival groups. In the LT survival group it was again more than 40 per cent. The positive trend in paid working hours after treatment was countered in the LT by the increasing amount of retirements.

Insert table 6 around here

During breast cancer treatment, the situation concerning practising their profession and absenteeism worsened due to physical or emotional problems (table 6, pairwise comparisons). After treatment, only absenteeism remained a problem in the ST survival group. Concerning the net monthly family income, a small but significant reduction was found during treatment. After treatment the situation did not change significantly, probably again due to the opposite influence of breast cancer and retirement. When looking at the differences over the several survivals groups we noticed significant differences during treatment concerning absenteeism. However, these differences could be attributed to different starting levels before breast cancer diagnosis (table 6, Somers' d).

Social activities

The health situation had a significant negative influence on social activities with family or friends (figure 3 and table 7, pairwise comparisons). After treatment, the situation improved. In the LT survival group it was even significantly better after treatment when comparing with the other survival groups (table 7, Somers' d) and only remained significantly different from the level of before treatment on a 10% level.

Insert figure 3 and table 7 around here

When comparing their own social activities with those of other people of the same age significantly more people were physically or emotionally hampered by their health situation during treatment (table 7, pairwise comparisons). After treatment, the situation improved more and more without ever reaching the same level as before treatment. When comparing the situation after treatment in the LT with the other survival groups, significant differences were

noted. These differences, however, were already found before or during treatment (table 7, Somers' d).

As with the other variables, the longer the survival time, the less people stated the evolution was due directly or indirectly to breast cancer (Somers'd: -0.36 (0.00)).

Self care and housekeeping

While before breast cancer diagnosis there were almost never problems with self care, this significantly worsened during treatment (table 8, pairwise comparisons). Afterwards, the situation improved significantly but never reached the same level as before. If there were problems, washing themselves (45.8%) and dressing (50.8%) were the greatest concerns. In the MT and LT survival groups about 15 per cent more people asked external help for these problems during treatment. This help was only temporary and became more or less redundant after treatment. When comparing the several survival groups, no significant differences were noted during or after treatment (table 8, Somers' d). The longer the survival time, the less the changes were due to breast cancer (Somers'd: -0.32 (0.00)).

Insert table 8 around here

More people asked help for household jobs. About half of all persons asked domestic help during treatment where this was on average one person in five before treatment. After treatment, significant less help was needed (table 8, pairwise comparisons). The LT survival group even needed significantly less help when comparing with the ST and MT survival groups (table 8, Somers' d) and was significantly comparable with the situation before treatment. As with asking help for self care, the Somers 'd test (-0.36 (0.00)) pointed out that the influence of other factors increased in the LT.

Sexuality

The average score on feeling feminine was between 'most of the times' or 'always' before breast cancer diagnosis. During treatment this score significantly decreased to 'sometimes' (figure 4 and table 9, pairwise comparisons). Afterwards, the situation improved and was better for LT survivals when comparing with the ST survivals (table 9, Somers' d), however without ever reaching again the level of before treatment.

Insert figure 4 and table 9 around here

The persons of our sample were 'sometimes' to 'most of the times' interested in sex before treatment. During treatment this significantly decreased to 'not much'. After treatment, a significant increase was found which did not vary over the three survival groups.

There was a significant but fairly weak relationship between the survival time and the influence of breast cancer on sexuality (Somers' d -0.14 (0.05)). Over the three survival groups respectively 63.7, 55.4 and 47.9 per cent answered the changes were completely or largely due to breast cancer. In comparison with the other variable groups the influence of breast cancer on sexuality variables seemed to be more persistent.

Family

A persons' health situation could also have an influence on the partner's work situation, children's school performances and their characters.

In the MT and LT survival groups respectively 10.3 and 19.6 per cent answered the partner's work situation was influenced because of breast cancer. In the ST survival group, this was 51.6 per cent and significantly different from the two other groups (table 10). Most of the

times (86.7%) the partner worked less for various reasons such as being more at home or taking care of the children. A minor part worked more to keep the family income high enough. The group where the health situation had a lot of influence on school performances was restricted to 7.7 per cent. Also the influence on the partner's and children's characters remained restricted. Respectively 12.0 and 4.1 per cent answered that the latter were affected a lot.

Insert table 10 around here

Meaning of life

The diagnosis of breast cancer and its treatment may have changed the perception of life. People felt they had significantly less control over their lives during treatment in comparison with before breast cancer diagnosis (table 11, pairwise comparisons). After treatment the situation improved for all three survival groups and was comparable with the situation before treatment in the MT and LT.

To what extent every day had something to offer and was worthwhile also decreased significantly for all three survival groups (figure 5). In contrast with the previous variable, it already reached a comparable level with before breast cancer diagnosis in the ST. The scores after treatment even exceeded, however not significantly, the scores of before breast cancer diagnosis in the MT and LT survival groups. As for the general health situation, people assume that if one has been able to cope with a difficult situation, they learn to appreciate life more and more.

Insert figure 5 and table 11 around here

When asking about whether people succeeded in realising some goals during their life, significant improvements were noticed after treatment for all three survival groups. A comparable level as before treatment was reached in the MT and LT survival groups. As with the previous variable, the score after treatment was higher, however not significantly, in comparison with before treatment in the LT survival group. The Somers' d test confirms the better results in the LT when comparing with the ST survival group for the meaning of life variables (table 11, Somers' d).

In general, the perception about meaning of life based on our three statements seemed to improve more and more. The influence of breast cancer on these changes also diminished in the LT (Somers' d -0.30 (0.00)).

Conclusion

The purpose of our study was to determine the evolution of QoL after treatment since most studies only look at the ST effects. During breast cancer treatment, the patients' QoL deteriorated significantly. The evolution of QoL after treatment differed according to the survival time and to which aspect of QoL has been studied.

Activity problems which could be associated with arm problems did not improve significantly in the ST. These problems ameliorated after some time without ever restoring to initial levels. For being interested in sex, the situation improved significantly after treatment but did not improve further in the long-term. Concerning feeling feminine, the situation improved more and more in the LT. However, both previous variables never restored to initial levels.

Disease related symptoms on the other hand were equal when comparing the LT survival group and the situation before treatment, whereas this was not the case in the ST. Concerning emotional problems five variables on twenty reached a comparable level when comparing

with before treatment in the ST. In the LT, this was three times as much and the emotional situation was in general about the same as before treatment. The social activities similarly improved more and more after treatment and restored to initial levels in the LT.

The meaning of life variables also reached their original level in the LT. Furthermore, two out of three meaning of life variables even reached, however not significantly, a higher level in the LT than before breast cancer diagnosis. The same was found for the general health situation. The situation already restored to initial levels in the ST and improved further in the LT to reach a non-significant higher level than before treatment. If people have been able to cope with a difficult health situation such as breast cancer, they seem to appreciate health and life more and more. Comparing with the individual QoL variables, improvement in general health status was stronger. People probably took the difference between what the situation was and what it could have been whereas the other questions referred to how a certain situation was.

LT results could be influenced by other factors such as ageing problems. The work-related variables improved in the ST and MT survival groups. In the LT, retirement adversely influenced this evolution. The influence of breast cancer was most persistent for the sexual QoL domain. In general, the influence of breast cancer on the several QoL domains diminished significantly over time.

It is important for patients to know what they may expect not only during treatment but especially after. When answering this question, a distinction has to be made not only between several QoL domains but also concerning the survival time since for some QoL domains relatively more patience is needed to observe improvements.

Acknowledgements

The process of gathering quality-of-life data required input from numerous persons. The authors wish to acknowledge the people of 'Leven Zoals Voorheen' for their co-operation. A special expression of gratitude for Mrs L. Marsé, founder and chairperson of this non-profit organisation. We are very grateful to all persons for their valuable participation.

References

1. Boring CC, Squires TS, Tong T, Montgomery S. Cancer Statistics, 1994. CA Cancer J Clin 1994; 44 (1): 7-26.
2. Beral V, Hermon C, Reeves G, Peto R. Sudden fall in breast cancer death rates in England and Wales. Lancet 1995; 345 (8965): 1642-1643.
3. Cole P, Rodu B. Declining cancer mortality in the United States. Cancer 1996; 78 (10): 2045-2048.
4. Ganz PA, Coscarelli A, Fred C, Kahn B, Polinsky ML, Petersen L. Breast cancer survivors: psychosocial concerns and quality of life. Breast Cancer Res Treat 1996; 38 (2): 183-199.
5. Ganz PA, Rowland JH, Desmond K, Meyerowitz BE, Wyatt GE: Life after breast cancer: understanding women's health-related quality of life and sexual functioning. J Clin Oncol 1998; 16 (2): 501-514.
6. Belgische Federatie tegen kanker: kankerinfo. 4de trimester 2001, nr. 56.
7. Feifel H. Psychology and death. Meaningful rediscovery. Am Psychol 1990; 45 (4): 537-543.

8. Steer CB, Marx GM, Galani E, Harper PG and Khayat D. Quality of life: it's never too late. J Clin Oncol 2002; 20 (13): 2920-2929.
9. Pritchard C, Towse A. Methodologies used to evaluate and measure the economic outcomes of drug treatment. In: Salek S: Pharmacoeconomics and Outcome Assessment - A Global Issue. Haslemere: Euromed Communications, 1999: 33-52.
10. Cramer JA, Spilker B. Quality of Life and Pharmacoeconomics: An Introduction. Philadelphia, New York: Lippincott – Raven Publishers, 1997: 1-48.
11. Gunnars B, Nygren P, Glimelius B, SBU-group. Swedish Council of Technology Assessment in Health Care. Assessment of quality of life during chemotherapy. Acta Oncol 2001; 40 (2-3): 175-184.
12. Slevin ML, Plant H, Lynch D, Drinkwater J, Gregory WM. Who should measure quality of life, the doctor or the patient? Br J Cancer 1988; 57 (1): 109-112.
13. Calman KC. Quality of life in cancer patients – an hypothesis. J Med Ethics 1984; 10 (3): 124-127.
14. Bergner M. Quality of life, health status, and clinical research. Med Care 1989; 27 (3): 148-156.

Figures

Figure 1: general health situation

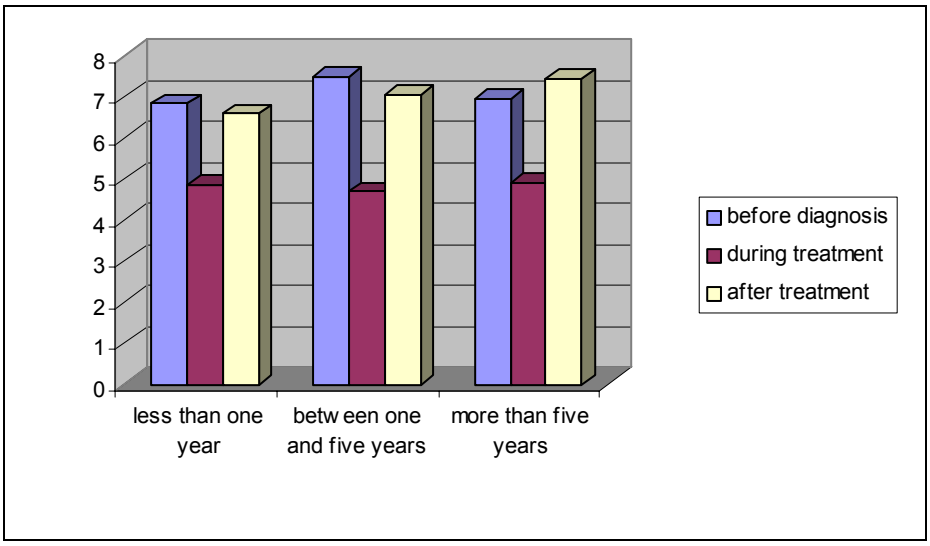


Figure 2: paid working hours per week

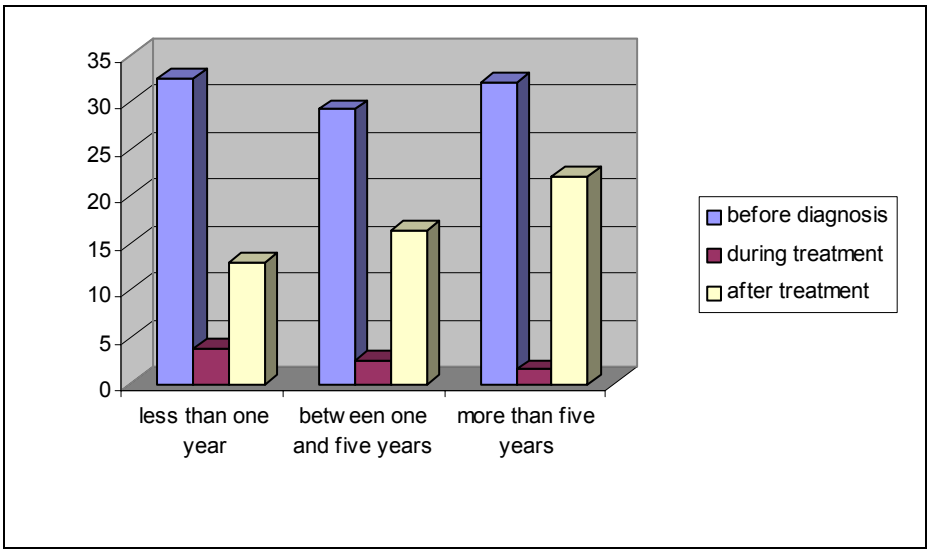


Figure 3: social activities with family or friends

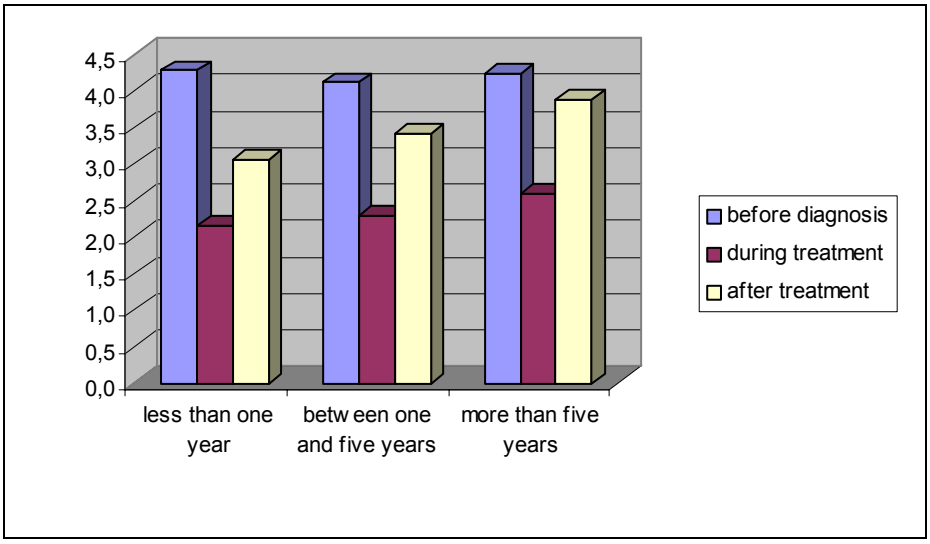


Figure 4: feeling feminine

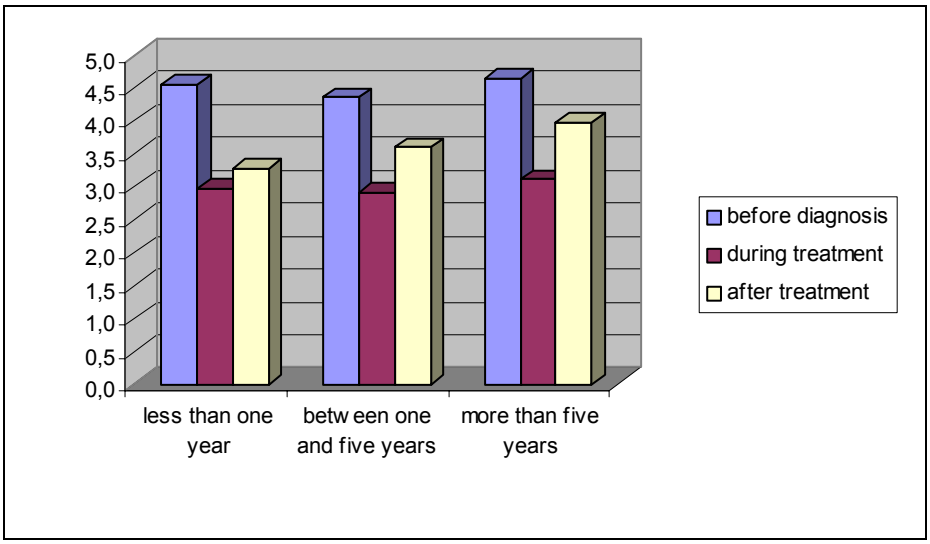
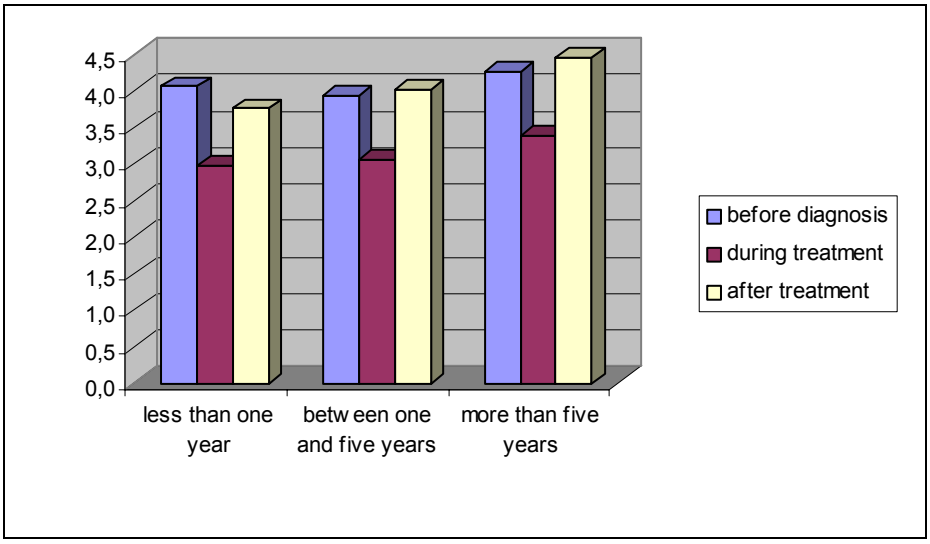


Figure 5: every day has something to offer and is worthwhile



Tables

Table 1: general health situation

	pairwise comparisons				Somers' d		
	ST	MT	LT		BD	DT	AT
General: What do you think about your health situation							
BD – DT	1,97 (0.00)*	2,78 (0.00)*	2,06 (0.00)*	MT – LT	-0.06 (0.46)	0.08 (0.32)	0.07 (0.35)
BD – AT	0,24[a] (0.65)[b]	0,42 (0.26)	-0,48 (0.31)	ST – MT	0.04 (0.61)	-0.04 (0.60)	0.08 (0.32)
AT – DT	1,73 (0.00)*	2,36 (0.00)*	2,54 (0.00)*	ST – LT	-0.01 (0.93)	0.07 (0.48)	0.15 (0.07)°

ST: short-term survival group, less than one year
MT: medium-term survival group, between one and five years
LT: long-term survival group, more than five years
BD: before breast cancer diagnosis
DT: during breast cancer treatment
AT: after breast cancer treatment
[a]: test value
[b]: significance (*: 5% significance level, °: 10% significance level)

Table 2: activity variables

	pairwise comparisons				Somers' d		
	ST	MT	LT		BD	DT	AT
Act 1: My health impeded me doing intense activities, e.g. running, lifting heavy objects and cycling hard							
BD – DT	2,00 (0.00)*	1,32 (0.00)*	1,62 (0.00)*	MT – LT	0.13 (0.11)	0.07 (0.43)	0.19 (0.01)*
BD – AT	1,45 (0.00)*	0,90 (0.00)*	0,62 (0.01)*	ST – MT	-0.10 (0.24)	0.08 (0.37)	0.03 (0.76)
AT – DT	0,55 (0.05)*	0,42 (0.01)*	1,00 (0.00)*	ST – LT	0.06 (0.55)	0.15 (0.12)	0.22 (0.01)*
Act 2: My health impeded me doing less intense activities, e.g. moving a table, vacuuming and pushing a trolley							
BD – DT	1,44 (0.00)*	1,26 (0.00)*	1,06 (0.00)*	MT – LT	-0.11 (0.22)	-0.02 (0.79)	-0.03 (0.74)
BD – AT	0,97 (0.00)*	0,63 (0.00)*	0,37 (0.04)*	ST – MT	-0.11 (0.25)	-0.01 (0.88)	0.05 (0.59)
AT – DT	0,47 (0.03)*	0,63 (0.00)*	0,69 (0.00)*	ST – LT	-0.20 (0.04)*	-0.02 (0.81)	0.02 (0.84)
Act 3: My health impeded me in lifting or carrying two bags of vegetables							
BD – DT	1,67 (0.00)*	1,45 (0.00)*	1,41 (0.00)*	MT – LT	-0.00 (0.99)	0.00 (1.00)	0.01 (0.89)
BD – AT	1,47 (0.00)*	1,00 (0.00)*	0,83 (0.00)*	ST – MT	-0.15 (0.11)	-0.05 (0.54)	0.01 (0.92)
AT – DT	0,20 (0.41)	0,45 (0.00)*	0,59 (0.00)*	ST – LT	-0.15 (0.12)	-0.04 (0.65)	0.02 (0.85)
Act 4: My health impeded me to take 75 stairs							
BD – DT	1,47 (0.00)*	1,24 (0.00)*	1,04 (0.00)*	MT – LT	-0.02 (0.86)	0.03 (0.70)	-0.02 (0.79)
BD – AT	0,91 (0.00)*	0,51 (0.00)*	0,37 (0.07)°	ST – MT	-0.06 (0.53)	0.04 (0.68)	0.06 (0.48)
AT – DT	0,56 (0.03)*	0,73 (0.00)*	0,67 (0.00)*	ST – LT	-0.07 (0.49)	0.07 (0.46)	0.03 (0.72)
Act 5: My health impeded me to take 25 stairs							
BD – DT	0,97 (0.01)*	0,92 (0.00)*	0,65 (0.00)*	MT – LT	-0.11 (0.20)	0.01 (0.95)	-0.03 (0.75)
BD – AT	0,50 (0.02)*	0,35 (0.00)*	0,09 (0.61)	ST – MT	-0.09 (0.36)	0.04 (0.66)	-0.00 (0.97)
AT – DT	0,47 (0.06)°	0,57 (0.00)*	0,57 (0.00)*	ST – LT	-0.18 (0.06)	0.04 (0.68)	-0.03 (0.74)
Act 6: My health impeded me to make a two-kilometre walk							
BD – DT	1,23 (0.00)*	1,35 (0.00)*	1,00 (0.00)*	MT – LT	-0.04 (0.67)	0.10 (0.24)	-0.03 (0.76)
BD – AT	0,13 (0.56)	0,32 (0.01)*	0,15 (0.47)	ST – MT	-0.02 (0.87)	0.03 (0.70)	0.00 (0.98)
AT – DT	1,10 (0.00)*	1,03 (0.00)*	0,85 (0.00)*	ST – LT	-0.05 (0.63)	0.13 (0.16)	-0.02 (0.82)
Act 7: My health impeded me to make a ten-kilometres walk							
BD – DT	1,42 (0.00)*	1,40 (0.00)*	1,40 (0.00)*	MT – LT	0.08 (0.37)	0.08 (0.32)	0.11 (0.18)
BD – AT	0,71 (0.02)*	0,59 (0.00)*	0,50 (0.04)*	ST – MT	0.01 (0.88)	0.01 (0.91)	0.066 (0.54)
AT – DT	0,71 (0.04)*	0,81 (0.00)*	0,90 (0.00)*	ST – LT	0.09 (0.39)	0.10 (0.33)	0.15 (0.12)

Table 3: disease symptoms

	pairwise comparisons				Somers' d		
	ST	MT	LT		BD	DT	AT
Dis 1: Being tired							
BD – DT	1,38 (0.00)*	1,77 (0.00)*	1,51 (0.00)*	MT – LT	-0.06 (0.43)	-0.01 (0.92)	0.15 (0.08)°
BD – AT	0,71 (0.01)*	0,80 (0.00)*	0,27 (0.27)	ST – MT	0.18 (0.03)*	0.09 (0.34)	0.15 (0.10)°
AT – DT	0,68 (0.00)*	0,97 (0.00)*	1,24 (0.00)*	ST – LT	0.12 (0.20)	0.08 (0.43)	0.25 (0.01)*
Dis 2: Feeling weak							
BD – DT	1,59 (0.00)*	2,05 (0.00)*	1,56 (0.00)*	MT – LT	-0.09 (0.30)	0.10 (0.21)	0.15 (0.06)°
BD – AT	0,59 (0.04)*	0,87 (0.00)*	0,19 (0.41)	ST – MT	0.08 (0.42)	-0.02 (0.86)	-0.04 (0.67)
AT – DT	1,00 (0.00)*	1,17 (0.00)*	1,38 (0.00)*	ST – LT	-0.01 (0.95)	0.09 (0.34)	0.10 (0.31)
Dis 3: Having not slept enough							
BD – DT	0,69 (0.02)*	0,77 (0.00)*	0,77 (0.00)*	MT – LT	-0.07 (0.42)	-0.08 (0.33)	-0.06 (0.43)
BD – AT	0,53 (0.01)*	0,42 (0.02)*	0,21 (0.22)	ST – MT	0.10 (0.23)	0.06 (0.49)	0.09 (0.32)
AT – DT	0,16 (0.42)	0,34 (0.04)*	0,56 (0.00)*	ST – LT	0.05 (0.62)	-0.03 (0.80)	0.04 (0.67)
Dis 4: Having troubles staying awake by day							
BD – DT	1,50 (0.00)*	1,19 (0.00)*	1,00 (0.00)*	MT – LT	0.11 (0.22)	0.14 (0.09)°	0.05 (0.59)
BD – AT	0,44 (0.05)*	0,30 (0.03)*	0,31 (0.01)*	ST – MT	0.15 (0.11)	0.18 (0.04)*	0.11 (0.20)
AT – DT	1,06 (0.00)*	0,89 (0.00)*	0,69 (0.00)*	ST – LT	0.27 (0.00)*	0.32 (0.00)*	0.16 (0.09)°
Dis 5: Having troubles falling asleep							
BD – DT	0,44 (0.05)*	0,89 (0.00)*	0,71 (0.00)*	MT – LT	-0.18 (0.02)*	-0.11 (0.15)	-0.10 (0.22)
BD – AT	0,18 (0.40)	0,54 (0.00)*	0,20 (0.33)	ST – MT	0.11 (0.21)	-0.05 (0.58)	-0.03 (0.73)
AT – DT	0,26 (0.14)	0,35 (0.02)*	0,51 (0.00)*	ST – LT	-0.09 (0.29)	-0.18 (0.05)*	-0.13 (0.15)
Dis 6: Needing short sleeping periods during the day to feel well							
BD – DT	1,79 (0.00)*	1,61 (0.00)*	1,22 (0.00)*	MT – LT	0.02 (0.79)	0.10 (0.20)	-0.01 (0.90)
BD – AT	1,03 (0.00)*	0,64 (0.00)*	0,48 (0.01)*	ST – MT	0.06 (0.55)	0.05 (0.53)	0.15 (0.08)°
AT – DT	0,76 (0.00)*	0,97 (0.00)*	0,74 (0.00)*	ST – LT	0.08 (0.42)	0.17 (0.07)°	0.14 (0.13)
Dis 7: Being nauseated							
BD – DT	1,70 (0.00)*	1,82 (0.00)*	1,39 (0.00)*	MT – LT	0.05 (0.60)	0.15 (0.07)°	0.12 (0.16)
BD – AT	0,30 (0.02)*	0,34 (0.00)*	0,22 (0.05)*	ST – MT	-0.11 (0.23)	-0.04 (0.69)	-0.18 (0.06)°
AT – DT	1,39 (0.00)*	1,48 (0.00)*	1,16 (0.00)*	ST – LT	-0.06 (0.53)	0.09 (0.38)	-0.06 (0.53)
Dis 8: Having trouble with vomiting							
BD – DT	1,09 (0.00)*	1,26 (0.00)*	0,98 (0.00)*	MT – LT	0.06 (0.52)	0.08 (0.35)	0.18 (0.04)*
BD – AT	0,06 (0.49)	0,15 (0.01)*	-0,02 (0.66)	ST – MT	-0.03 (0.79)	-0.04 (0.66)	-0.08 (0.41)
AT – DT	1,03 (0.00)*	1,11 (0.00)*	1,00 (0.00)*	ST – LT	0.03 (0.79)	0.03 (0.78)	0.09 (0.43)
Dis 9: Having trouble with constipation							
BD – DT	0,70 (0.00)*	0,60 (0.00)*	0,45 (0.00)*	MT – LT	-0.02 (0.78)	0.06 (0.49)	0.01 (0.95)
BD – AT	0,18 (0.08)°	0,06 (0.48)	0,04 (0.60)	ST – MT	-0.05 (0.56)	-0.02 (0.84)	-0.05 (0.60)
AT – DT	0,52 (0.02)*	0,53 (0.00)*	0,40 (0.01)*	ST – LT	-0.08 (0.38)	0.04 (0.70)	-0.04 (0.65)
Dis 10: Having trouble with diarrhoea							
BD – DT	0,55 (0.01)*	0,38 (0.00)*	0,09 (0.16)	MT – LT	0.00 (1.00)	0.15 (0.08)°	0.05 (0.59)
BD – AT	0,15 (0.20)	0,10 (0.11)	-0,02 (0.78)	ST – MT	0.01 (0.91)	0.00 (0.99)	-0.01 (0.96)
AT – DT	0,39 (0.02)*	0,28 (0.00)*	0,11 (0.23)	ST – LT	0.01 (0.90)	0.13 (0.21)	0.04 (0.68)
Dis 11: Being short of breath							
BD – DT	0,88 (0.00)*	0,93 (0.00)*	0,57 (0.00)*	MT – LT	0.05 (0.57)	0.20 (0.02)*	0.08 (0.38)
BD – AT	0,30 (0.02)*	0,41 (0.00)*	0,34 (0.00)*	ST – MT	0.08 (0.39)	0.03 (0.75)	-0.01 (0.95)
AT – DT	0,58 (0.00)*	0,52 (0.00)*	0,23 (0.04)*	ST – LT	0.13 (0.18)	0.20 (0.04)*	0.07 (0.49)
Dis 12: Having heart palpitations							
BD – DT	0,56 (0.00)*	0,69 (0.00)*	0,49 (0.00)*	MT – LT	0.01 (0.88)	0.10 (0.26)	0.03 (0.69)
BD – AT	0,38 (0.00)*	0,34 (0.01)*	0,31 (0.02)*	ST – MT	0.01 (0.89)	-0.05 (0.55)	-0.02 (0.87)
AT – DT	0,19 (0.11)	0,34 (0.00)*	0,18 (0.08)°	ST – LT	0.02 (0.82)	0.06 (0.53)	0.02 (0.84)

Table 4: pain variables

	pairwise comparisons				Somers' d		
	ST	MT	LT		BD	DT	AT
Pain 1: Having pain in the chest							
BD – DT	0,75 (0.00)*	0,67 (0.00)*	0,59 (0.00)*	MT – LT	0.04 (0.63)	0.07 (0.45)	-0.03 (0.75)
BD – AT	0,69 (0.00)*	0,35 (0.03)*	0,43 (0.00)*	ST – MT	-0.11 (0.23)	-0.03 (0.74)	0.10 (0.30)
AT – DT	0,06 (0.64)	0,32 (0.01)*	0,15 (0.27)	ST – LT	-0.07 (0.50)	0.03 (0.78)	0.07 (0.48)
Pain 2: Having pain in the arm							
BD – DT	2,00 (0.00)*	2,03 (0.00)*	1,63 (0.00)*	MT – LT	-0.14 (0.14)	0.09 (0.29)	0.13 (0.10)°
BD – AT	1,61 (0.00)*	1,74 (0.00)*	1,20 (0.00)*	ST – MT	-0.03 (0.74)	-0.05 (0.57)	-0.08 (0.35)
AT – DT	0,39 (0.05)*	0,30 (0.07)°	0,43 (0.03)*	ST – LT	-0.17 (0.09)°	0.04 (0.69)	0.04 (0.69)
Pain 3: Having a thick arm							
BD – DT	0,61 (0.01)*	0,54 (0.00)*	0,58 (0.00)*	MT – LT	0.05 (0.41)	0.07 (0.44)	0.23 (0.01)*
BD – AT	0,76 (0.00)*	1,22 (0.00)*	0,76 (0.00)*	ST – MT	-0.03 (0.62)	-0.01 (0.92)	-0.18 (0.03)*
AT – DT	-0,15 (0.44)	-0,68 (0.00)*	-0,18 (0.12)	ST – LT	0.02 (0.81)	0.06 (0.57)	0.06 (0.57)
Pain 4: Having difficulties moving the arm							
BD – DT	1,76 (0.00)*	1,95 (0.00)*	1,68 (0.00)*	MT – LT	-0.06 (0.47)	0.05 (0.54)	0.04 (0.65)
BD – AT	1,03 (0.00)*	1,03 (0.00)*	0,81 (0.00)*	ST – MT	-0.08 (0.27)	-0.08 (0.39)	0.01 (0.94)
AT – DT	0,73 (0.00)*	0,92 (0.00)*	0,87 (0.00)*	ST – LT	-0.14 (0.10)°	-0.02 (0.82)	0.05 (0.64)
Pain 5: Having joints ache							
BD – DT	0,59 (0.00)*	0,84 (0.00)*	0,54 (0.00)*	MT – LT	-0.06 (0.54)	0.03 (0.72)	-0.05 (0.56)
BD – AT	0,69 (0.00)*	0,90 (0.00)*	0,73 (0.00)*	ST – MT	-0.10 (0.30)	-0.12 (0.19)	-0.14 (0.12)
AT – DT	-0,09 (0.45)	-0,07 (0.67)	-0,19 (0.19)	ST – LT	-0.14 (0.14)	-0.09 (0.36)	-0.18 (0.05)*
Pain 6: Having pain in the breast							
BD – DT	1,03 (0.00)*	0,90 (0.00)*	0,84 (0.00)*	MT – LT	0.11 (0.24)	0.12 (0.18)	0.03 (0.71)
BD – AT	0,83 (0.01)*	0,41 (0.03)*	0,59 (0.00)*	ST – MT	-0.11 (0.27)	0.01 (0.91)	0.14 (0.13)
AT – DT	0,20 (0.14)	0,49 (0.00)*	0,25 (0.20)	ST – LT	-0.01 (0.95)	0.13 (0.18)	0.16 (0.09)°
Pain 7: Having an oversensitive breast							
BD – DT	1,03 (0.00)*	0,93 (0.00)*	0,84 (0.00)*	MT – LT	0.09 (0.33)	0.08 (0.40)	0.01 (0.88)
BD – AT	0,73 (0.03)*	0,45 (0.02)*	0,59 (0.01)*	ST – MT	-0.03 (0.73)	0.03 (0.78)	0.06 (0.51)
AT – DT	0,30 (0.10)°	0,48 (0.00)*	0,24 (0.10)°	ST – LT	0.05 (0.67)	0.11 (0.31)	0.07 (0.50)
Pain 8: Having trouble with infections							
BD – DT	0,61 (0.00)*	0,85 (0.00)*	0,43 (0.00)*	MT – LT	0.03 (0.75)	0.17 (0.05)*	0.09 (0.28)
BD – AT	0,48 (0.00)*	0,42 (0.00)*	0,24 (0.02)*	ST – MT	-0.09 (0.33)	-0.12 (0.19)	-0.06 (0.55)
AT – DT	0,12 (0.32)	0,43 (0.00)*	0,19 (0.07)°	ST – LT	-0.07 (0.51)	0.04 (0.72)	0.02 (0.84)

Table 5: emotional variables

	pairwise comparisons				Somers' d		
	ST	MT	LT		BD	DT	AT
Emo 1: Being irritated by things that normally do not bother me							
BD – DT	0,76 (0.00)*	0,97 (0.00)*	0,82 (0.00)*	MT – LT	-0.00 (0.98)	0.03 (0.73)	0.04 (0.65)
BD – AT	0,58 (0.02)*	0,56 (0.00)*	0,45 (0.00)*	ST – MT	0.04 (0.67)	-0.02 (0.80)	0.01 (0.89)
AT – DT	0,18 (0.28)	0,41 (0.00)*	0,37 (0.00)*	ST – LT	0.03 (0.74)	0.00 (0.99)	0.04 (0.72)
Emo 2: Having no appetite							
BD – DT	0,61 (0.02)*	1,53 (0.00)*	1,11 (0.00)*	MT – LT	-0.10 (0.28)	0.12 (0.16)	0.07 (0.43)
BD – AT	0,06 (0.70)	0,18 (0.05)*	-0,16 (0.23)	ST – MT	0.08 (0.40)	-0.21 (0.02)*	0.03 (0.78)
AT – DT	0,55 (0.01)*	1,35 (0.00)*	1,27 (0.00)*	ST – LT	-0.01 (0.92)	-0.11 (0.28)	0.10 (0.35)
Emo 3: Nobody can cheer me up, even not my family or friends							
BD – DT	0,73 (0.00)*	0,92 (0.00)*	0,48 (0.01)*	MT – LT	-0.05 (0.56)	0.13 (0.13)	0.20 (0.02)*
BD – AT	0,45 (0.00)*	0,45 (0.00)*	-0,11 (0.42)	ST – MT	0.08 (0.39)	-0.03 (0.77)	0.05 (0.61)
AT – DT	0,27 (0.12)	0,47 (0.00)*	0,59 (0.00)*	ST – LT	0.04 (0.74)	0.10 (0.34)	0.26 (0.01)*
Emo 4: Feeling as good as other people do							
BD – DT	1,21 (0.00)*	0,90 (0.00)*	0,90 (0.00)*	MT – LT	-0.02 (0.84)	0.00 (0.96)	0.07 (0.39)
BD – AT	0,61 (0.02)*	0,29 (0.08)°	0,02 (0.89)	ST – MT	0.12 (0.16)	0.15 (0.09)°	0.19 (0.02)*
AT – DT	0,61 (0.00)*	0,61 (0.00)*	0,88 (0.00)*	ST – LT	0.11 (0.22)	0.17 (0.07)°	0.28 (0.00)*
Emo 5: Having problems to concentrate							
BD – DT	1,24 (0.00)*	1,24 (0.00)*	1,09 (0.00)*	MT – LT	-0.12 (0.18)	-0.03 (0.75)	0.11 (0.19)
BD – AT	0,70 (0.00)*	0,74 (0.00)*	0,26 (0.08)°	ST – MT	0.10 (0.28)	0.08 (0.38)	0.07 (0.45)
AT – DT	0,55 (0.01)*	0,50 (0.00)*	0,83 (0.00)*	ST – LT	-0.02 (0.87)	0.06 (0.55)	0.17 (0.07)°
Emo 6: Feeling depressed							
BD – DT	1,06 (0.00)*	0,90 (0.00)*	1,22 (0.00)*	MT – LT	0.13 (0.14)	0.01 (0.95)	0.14 (0.10)°
BD – AT	0,61 (0.00)*	0,44 (0.00)*	0,36 (0.01)*	ST – MT	-0.00 (0.98)	0.06 (0.47)	0.03 (0.76)
AT – DT	0,45 (0.01)*	0,46 (0.00)*	0,87 (0.00)*	ST – LT	0.13 (0.21)	0.07 (0.49)	0.16 (0.10)°
Emo 7: Having the feeling everything I do is too hard							
BD – DT	1,68 (0.00)*	1,62 (0.00)*	1,56 (0.00)*	MT – LT	0.04 (0.63)	0.06 (0.45)	0.17 (0.04)*
BD – AT	1,03 (0.00)*	0,78 (0.00)*	0,42 (0.02)*	ST – MT	0.03 (0.71)	0.05 (0.54)	0.13 (0.14)
AT – DT	0,65 (0.00)*	0,84 (0.00)*	1,13 (0.00)*	ST – LT	0.09 (0.40)	0.12 (0.22)	0.31 (0.00)*
Emo 8: Being hopeful about the future							
BD – DT	1,25 (0.00)*	0,76 (0.00)*	0,73 (0.01)*	MT – LT	0.08 (0.36)	0.09 (0.30)	0.27 (0.00)*
BD – AT	0,66 (0.00)*	0,38 (0.00)*	-0,14 (0.36)	ST – MT	-0.11 (0.18)	0.00 (1.00)	-0.07 (0.44)
AT – DT	0,59 (0.00)*	0,38 (0.00)*	0,86 (0.00)*	ST – LT	-0.04 (0.72)	0.10 (0.34)	0.22 (0.02)*
Emo 9: Having the feeling my life has been a failure							
BD – DT	0,55 (0.00)*	0,58 (0.00)*	0,45 (0.00)*	MT – LT	0.00 (0.98)	0.01 (0.90)	0.08 (0.36)
BD – AT	0,33 (0.01)*	0,29 (0.02)*	-0,02 (0.84)	ST – MT	0.04 (0.66)	0.07 (0.45)	0.06 (0.53)
AT – DT	0,21 (0.09)°	0,29 (0.01)*	0,47 (0.00)*	ST – LT	0.05 (0.67)	0.09 (0.35)	0.14 (0.16)
Emo 10: Being anxious							
BD – DT	1,67 (0.00)*	1,39 (0.00)*	1,27 (0.00)*	MT – LT	-0.05 (0.58)	0.01 (0.89)	0.06 (0.51)
BD – AT	1,09 (0.00)*	0,69 (0.00)*	0,40 (0.07)°	ST – MT	0.07 (0.44)	0.09 (0.33)	0.15 (0.10)°
AT – DT	0,58 (0.00)*	0,69 (0.00)*	0,87 (0.00)*	ST – LT	0.02 (0.83)	0.11 (0.27)	0.20 (0.04)*
Emo 11: Having a restless sleep							
BD – DT	0,79 (0.00)*	1,25 (0.00)*	0,74 (0.00)*	MT – LT	-0.25 (0.00)*	-0.08 (0.33)	-0.08 (0.34)
BD – AT	0,52 (0.01)*	0,67 (0.00)*	0,11 (0.56)	ST – MT	0.21 (0.02)*	0.02 (0.83)	0.15 (0.08)°
AT – DT	0,27 (0.13)	0,57 (0.00)*	0,63 (0.00)*	ST – LT	-0.06 (0.49)	-0.07 (0.49)	0.06 (0.52)
Emo 12: Being cheerful							
BD – DT	1,09 (0.00)*	0,98 (0.00)*	1,24 (0.00)*	MT – LT	0.16 (0.06)°	0.04 (0.64)	0.18 (0.03)*
BD – AT	0,55 (0.03)*	0,29 (0.01)*	0,20 (0.16)	ST – MT	-0.07 (0.44)	0.00 (0.98)	0.05 (0.57)
AT – DT	0,55 (0.00)*	0,70 (0.00)*	1,04 (0.00)*	ST – LT	0.11 (0.27)	0.04 (0.70)	0.23 (0.02)*
Emo 13: Being not talkative							
BD – DT	0,28 (0.11)	0,58 (0.00)*	0,73 (0.00)*	MT – LT	0.11 (0.18)	0.06 (0.51)	0.05 (0.60)
BD – AT	0,31 (0.12)	0,06 (0.59)	0,13 (0.28)	ST – MT	-0.05 (0.59)	-0.13 (0.11)	0.04 (0.65)
AT – DT	-0,03 (0.84)	0,52 (0.00)*	0,60 (0.00)*	ST – LT	0.06 (0.58)	-0.08 (0.42)	0.09 (0.37)

Emo 14: Feeling lonely							
BD – DT	0,45 (0.02)*	0,48 (0.00)*	0,51 (0.00)*	MT – LT	0.02 (0.79)	0.02 (0.85)	0.04 (0.62)
BD – AT	0,21 (0.27)	0,14 (0.30)	0,02 (0.83)	ST – MT	0.06 (0.53)	0.08 (0.40)	0.07 (0.43)
AT – DT	0,24 (0.17)	0,33 (0.00)*	0,49 (0.00)*	ST – LT	0.09 (0.40)	0.09 (0.36)	0.12 (0.23)
Emo 15: People are unfriendly							
BD – DT	-0,15 (0.06)°	0,13 (0.23)	0,13 (0.31)	MT – LT	0.03 (0.77)	0.03 (0.72)	0.04 (0.69)
BD – AT	-0,12 (0.10)°	0,13 (0.16)	0,02 (0.81)	ST – MT	-0.03 (0.75)	-0.12 (0.18)	-0.17 (0.06)°
AT – DT	-0,03 (0.32)	0,00 (1.00)	0,11 (0.32)	ST – LT	0.01 (0.95)	-0.07 (0.48)	-0.11 (0.23)
Emo 16: Enjoying life							
BD – DT	0,94 (0.00)*	0,92 (0.00)*	0,89 (0.00)*	MT – LT	0.02 (0.84)	0.02 (0.79)	-0.03 (0.73)
BD – AT	0,28 (0.22)	0,06 (0.62)	0,07 (0.55)	ST – MT	0.01 (0.94)	-0.02 (0.82)	0.05 (0.58)
AT – DT	0,66 (0.00)*	0,85 (0.00)*	0,83 (0.00)*	ST – LT	0.03 (0.77)	0.00 (0.98)	0.02 (0.84)
Emo 17: Being weepy							
BD – DT	1,26 (0.00)*	1,22 (0.00)*	1,00 (0.00)*	MT – LT	-0.06 (0.47)	-0.00 (0.97)	0.11 (0.19)
BD – AT	0,62 (0.00)*	0,46 (0.00)*	0,00 (1.00)	ST – MT	0.09 (0.32)	0.10 (0.25)	0.11 (0.26)
AT – DT	0,65 (0.00)*	0,76 (0.00)*	1,00 (0.00)*	ST – LT	0.02 (0.81)	0.09 (0.37)	0.19 (0.04)*
Emo 18: Feeling sad							
BD – DT	1,18 (0.00)*	1,16 (0.00)*	1,02 (0.00)*	MT – LT	-0.09 (0.28)	-0.02 (0.80)	0.04 (0.66)
BD – AT	0,55 (0.00)*	0,39 (0.01)*	-0,07 (0.67)	ST – MT	0.04 (0.69)	0.02 (0.80)	0.07 (0.45)
AT – DT	0,64 (0.00)*	0,77 (0.00)*	1,09 (0.00)*	ST – LT	-0.07 (0.50)	0.00 (0.98)	0.11 (0.26)
Emo 19: Having the feeling people have an aversion to me							
BD – DT	0,06 (0.54)	0,38 (0.00)*	0,20 (0.08)°	MT – LT	0.12 (0.20)	0.15 (0.08)°	0.12 (0.16)
BD – AT	-0,03 (0.81)	0,16 (0.05)*	0,04 (0.64)	ST – MT	-0.00 (0.97)	-0.12 (0.19)	-0.13 (0.17)
AT – DT	0,10 (0.18)	0,22 (0.00)*	0,16 (0.01)*	ST – LT	0.12 (0.26)	0.05 (0.65)	0.00 (0.97)
Emo 20: Being without energy							
BD – DT	1,50 (0.00)*	1,59 (0.00)*	1,18 (0.00)*	MT – LT	-0.06 (0.52)	0.10 (0.24)	0.13 (0.11)
BD – AT	0,66 (0.01) *	0,71 (0.00)*	0,24 (0.13)	ST – MT	0.11 (0.20)	0.11 (0.24)	0.07 (0.40)
AT – DT	0,84 (0.00)*	0,87 (0.00)*	0,93 (0.00)*	ST – LT	0.06 (0.55)	0.19 (0.05)*	0.20 (0.03)*

Table 6: work-related variables

	pairwise comparisons				Somers' d		
	ST	MT	LT		BD	DT	AT
Work 1: Working hours a week							
BD – DT	7.30 [a] (0.00)*	11.36 (0.00)*	9.33 (0.00)*	MT – LT	0.78 [b] (0.44)	0.43 (0.67)	1.09 (0.29)
BD – AT	3.44 (0.00)*	4.34 (0.00)*	3.00 (0.01)*	ST – MT	0.85 (0.40)	0.51 (0.61)	0.80 (0.43)
AT – DT	2.84 (0.01)*	4.51 (0.00)*	3.16 (0.01)*	ST – LT	0.09 (0.93)	0.89 (0.38)	1.51 (0.14)
Work 2: Working days a week							
BD – DT	6.78 [a] (0.00)*	12.06 (0.00)*	7.71 (0.00)*	MT – LT	1.97 [b] (0.05)*	0.60 (0.55)	0.57 (0.58)
BD – AT	3.13 (0.01)*	3.89 (0.00)*	3.00 (0.01)*	ST – MT	1.22 (0.23)	1.07 (0.29)	0.52 (0.61)
AT – DT	2.44 (0.03)*	4.75 (0.00)*	2.66 (0.02)*	ST – LT	0.55 (0.59)	0.30 (0.77)	0.86 (0.40)
Work 3: Physical or emotional problems impeded my in doing my job							
BD – DT	1,77 (0.00)*	1,97 (0.00)*	1,81 (0.00)*	MT – LT	0.08 (0.42)	0.17 (0.12)	0.10 (0.29)
BD – AT	1,09 (0.00)*	1,03 (0.00)*	0,94 (0.00)*	ST – MT	-0.11 (0.31)	-0.09 (0.47)	-0.08 (0.45)
AT – DT	0,68 (0.02)*	0,95 (0.00)*	0,87 (0.00)*	ST – LT	-0.03 (0.77)	0.05 (0.66)	0.01 (0.96)
Work 4: Physical or emotional problems resulted in absenteeism							
BD – DT	2,30 (0.00)*	2,56 (0.00)*	2,33 (0.00)*	MT – LT	0.18 (0.09)°	0.22 (0.07)°	0.15 (0.17)
BD – AT	1,70 (0.00)*	1,35 (0.00)*	1,10 (0.01)*	ST – MT	-0.27 (0.01)*	-0.27 (0.05)*	-0.10 (0.41)
AT – DT	0,60 (0.07)°	1,21 (0.00)*	1,24 (0.00)*	ST – LT	-0.13 (0.34)	-0.08 (0.57)	0.03 (0.83)
Work 5: How much is your monthly family income							
BD – DT	0,30 (0.01)*	0,20 (0.00)*	0,17 (0.02)*	MT – LT	-0.09 (0.34)	-0.06 (0.59)	-0.15 (0.11)
BD – AT	0,26 (0.02)*	0,30 (0.00)*	0,31 (0.05)*	ST – MT	0.06 (0.55)	0.06 (0.56)	0.01 (0.93)
AT – DT	0,04 (0.57)	-0,10 (0.17)	-0,14 (0.38)	ST – LT	-0.03 (0.80)	-0.01 (0.97)	-0.13 (0.22)

[a] paired samples t-test
[b] independent samples t-test

Table 7: social variables

	pairwise comparisons				Somers' d		
	ST	MT	LT		BD	DT	AT
Soc 1: Health situation had an influence on normal activities with family, friends, neighbours or other people							
BD – DT	2,12 (0.00)*	1,82 (0.00)*	1,64 (0.00)*	MT – LT	-0.00 (0.97)	0.13 (0.13)	0.14 (0.10)°
BD – AT	1,21 (0.00)*	0,70 (0.00)*	0,36 (0.09)°	ST – MT	-0.02 (0.81)	0.01 (0.92)	0.10 (0.27)
AT – DT	0,91 (0.00)*	1,11 (0.00)*	1,29 (0.00)*	ST – LT	-0.03 (0.78)	0.15 (0.13)	0.24 (0.01)*
Soc 2: If I compare my social activities with those of other people of the same age, I have the feeling I am physically or emotionally impeded by my health situation							
BD – DT	1,88 (0.00)*	2,00 (0.00)*	1,75 (0.00)*	MT – LT	0.13 (0.16)	0.16 (0.05)*	0.22 (0.01)*
BD – AT	1,22 (0.00)*	0,88 (0.00)*	0,52 (0.00)*	ST – MT	0.10 (0.31)	-0.02 (0.80)	0.12 (0.19)
AT – DT	0,66 (0.00)*	1,12 (0.00)*	1,23 (0.00)*	ST – LT	0.25 (0.02)*	0.14 (0.16)	0.31 (0.00)*

Table 8: self care and housekeeping variables

	pairwise comparisons				Somers' d		
	ST	MT	LT		BD	DT	AT
Self 1: Having trouble with self care							
BD – DT	1,00 (0.00)*	1,38 (0.00)*	1,23 (0.00)*	MT – LT	-0.09 (0.31)	0.02 (0.84)	-0.03 (0.71)
BD – AT	0,48 (0.00)*	0,48 (0.00)*	0,36 (0.02)*	ST – MT	-0.01 (0.95)	-0.12 (0.18)	-0.01 (0.92)
AT – DT	0,52 (0.01)*	0,90 (0.00)*	0,87 (0.00)*	ST – LT	-0.10 (0.31)	-0.09 (0.33)	-0.04 (0.69)
Self 2: Asking external assistance for self care							
BD – DT	-0,03 (0.33)	-0,16 (0.00)*	-0,14 (0.02)*	MT – LT	0.18 [a] (0.09)°	0.04 (0.72)	0.03 (0.80)
BD – AT	-0,03 (0.33)	-0,02 (0.32)	0,03 (0.57)	ST – MT	/ [b] (/)	0.15 (0.18)	-0.05 (0.68)
AT – DT	0,00 (/)	-0,14 (0.01)*	-0,17 (0.01)*	ST – LT	0.16 (0.18)	0.19 (0.12)	-0.02 (0.88)
House 1: Asking external assistance for housekeeping							
BD – DT	-0,42 (0.00)*	-0,36 (0.00)*	-0,24 (0.00)*	MT – LT	0.17 [a] (0.09)°	-0.02 (0.82)	-0.19 (0.05)*
BD – AT	-0,26 (0.00)*	-0,19 (0.01)*	0,12 (0.13)	ST – MT	-0.10 (0.34)	-0.08 (0.47)	-0.13 (0.23)
AT – DT	-0,16 (0.02)*	-0,17 (0.00)*	-0,37 (0.00)*	ST – LT	0.06 (0.57)	-0.10 (0.38)	-0.32 (0.00)*

[a] Phi-test

[b] No statistics were computed since all persons answered no and therefore this variable was seen as a constant.

Table 9: sexuality variables

	pairwise comparisons				Somers' d		
	ST	MT	LT		BD	DT	AT
Sex 1: Feeling feminine							
BD – DT	1,59 (0.00)*	1,43 (0.00)*	1,52 (0.00)*	MT – LT	0.10 (0.27)	0.06 (0.48)	0.11 (0.19)
BD – AT	1,28 (0.00)*	0,75 (0.00)*	0,66 (0.00)*	ST – MT	-0.03 (0.78)	-0.00 (0.98)	0.10 (0.22)
AT – DT	0,31 (0.00)*	0,68 (0.00)*	0,86 (0.00)*	ST – LT	0.08 (0.46)	0.06 (0.52)	0.22 (0.01)*
Sex 2: Being interested in sex							
BD – DT	1,71 (0.00)*	1,51 (0.00)*	1,72 (0.00)*	MT – LT	0.07 (0.47)	-0.04 (0.66)	-0.02 (0.86)
BD – AT	0,90 (0.00)*	0,78 (0.00)*	0,93 (0.00)*	ST – MT	0.05 (0.60)	0.09 (0.36)	0.05 (0.57)
AT – DT	0,81 (0.00)*	0,73 (0.00)*	0,79 (0.00)*	ST – LT	0.11 (0.26)	0.05 (0.62)	0.03 (0.79)

Table 10: family-related variables

	Somers' d
Fam 1: If you have a partner, did his work situation changed because of your changed health situation	
MT – LT	0.13 [a] (0.17)
ST – MT	-0.46 (0.00)*
ST – LT	-0.33 (0.00)*
Fam 2: If you have a partner, did your changed health situation had an effect on his character	
MT – LT	-0.03 (0.76)
ST – MT	-0.02 (0.82)
ST – LT	-0.05 (0.66)
Fam 3: If you have children, did your changed health situation had an effect on school performances	
MT – LT	-0.04 (0.75)
ST – MT	-0.21 (0.16)
ST – LT	-0.21 (0.11)
Fam 4: If you have children, did your changed health situation had an effect on their character	
MT – LT	-0.10 (0.33)
ST – MT	-0.02 (0.89)
ST – LT	-0.11 (0.37)

[a] Phi-test

Table 11: meaning of life variables

	pairwise comparisons				Somers' d		
	ST	MT	LT		BD	DT	AT
Mean 1: I have the feeling I have control of my life							
BD – DT	1,34 (0.00)*	1,18 (0.00)*	0,98 (0.00)*	MT – LT	0.05 (0.54)	0.11 (0.19)	0.13 (0.11)
BD – AT	0,81 (0.01)*	0,26 (0.09)°	0,09 (0.64)	ST – MT	-0.06 (0.47)	0.01 (0.93)	0.09 (0.34)
AT – DT	0,53 (0.00)*	0,92 (0.00)*	0,89 (0.00)*	ST – LT	-0.01 (0.90)	0.12 (0.22)	0.19 (0.05)*
Mean 2: Every day has something to offer and is worthwhile							
BD – DT	1,09 (0.00)*	0,87 (0.00)*	0,87 (0.00)*	MT – LT	0.12 (0.15)	0.11 (0.18)	0.13 (0.12)
BD – AT	0,30 (0.15)	-0,08 (0.57)	-0,19 (0.17)	ST – MT	-0.05 (0.57)	0.03 (0.78)	0.07 (0.48)
AT – DT	0,79 (0.00)*	0,95 (0.00)*	1,06 (0.00)*	ST – LT	0.08 (0.41)	0.13 (0.17)	0.18 (0.08)°
Mean 3: I succeed to realise some goals during my life							
BD – DT	1,09 (0.00)*	1,10 (0.00)*	0,78 (0.00)*	MT – LT	0.06 (0.47)	0.19 (0.03)*	0.19 (0.03)*
BD – AT	0,56 (0.00)*	0,24 (0.12)	-0,09 (0.44)	ST – MT	0.03 (0.71)	0.01 (0.88)	0.13 (0.18)
AT – DT	0,53 (0.00)*	0,86 (0.00)*	0,87 (0.00)*	ST – LT	0.10 (0.30)	0.19 (0.06)°	0.28 (0.00)*

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