*Journal of Physical Education and Sport* ® (JPES), Vol. 23 (issue 8), Art 230, pp. 1997 - 2003, August 2023
online ISSN: 2247 - 806X; p-ISSN: 2247 – 8051; ISSN - L = 2247 - 8051 © JPES

**Original Article**

# Quality of life in men with varying levels of regular physical activity after prostate adenoma resection

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Published online: August 31, 2023
(Accepted for publication August 15, 2023)
**DOI:10.7752/jpes.2023.08230**

**Abstract**:
Research into various means and methods, including physical activity, is necessary for scientists to comprehensively study the serious disturbances in men's comfort caused by disorders in the genitourinary system, with the aim of improving the quality of life indicators. The aim of this research is to investigate the correlation between the level of regular physical activity of men and their quality of life after a transurethral removal of prostate adenoma. ***Materials and methods***. The research was conducted in medical institutions located in four cities of the Republic of Kazakhstan. The research evaluated 205 men, between the ages of 40 and 90 who had undergone transurethral resection of prostate adenoma. To compare the quality of life, a survey was performed using the SF-36 questionnaire. This questionnaire consists of 8 scales assessing the physical and mental condition of a person. The researchers categorized all participants into two different observation groups, depending on the volume and intensity of their regular physical activity. Group "O" (n = 68 men) was classified as those who had achieved the WHO-recommended optimal level of non-weekly physical activity, which was a minimum of 2.5hrs./week of moderate physical activity. A group of 136 men (Group "H") with a low level of physical activity, less than 2.5hrs./week, was included in the study. The weekly physical activity of the participants was measured by the International Physical Activity Questionnaire-Short Form (IPAQ-SF). ***Research results.*** The study findings are as follows: Men in group "O" exhibited a cumulative value of 234 mins/week for moderate physical activity, indicating an 86.1% increase compared to men in group "H", who had recorded only 125.7 mins/week ($p < 0.05$). Men in group "O" engaged in non-weekly moderate physical activity with a mean of 149. This index was 1 minute per week and was 84.5% higher in men of group "O" compared to group "H", where it was 80.8 minutes per week ($p < 0.05$). Patients in group "O" had a 27.5% higher frequency of walking per week compared to men in group "H". The group of patients with optimal regular activity had a mean of 85.6 minutes of walking time per week, which was 90.6% higher than the mean among men in group "H" (44.9 minutes per week) ($p < 0.05$). ***Conclusions.*** In men who engage in regular physical activity at an optimal level, the values of indicators in all scales of quality of life were notably higher than those of men with low physical activity ($p < 0.05$). In conclusion, to alleviate discomfort caused by prostate adenoma in middle-aged, elderly and senile men, promoting regular physical activity should be actively promoted in addition to medical measures.
**Key Words**: - Leave **one blank line after the Abstract and write your Key-Words (4 - 6 words)**



## Introduction

Hyperplastic prostate tissue (prostate adenoma) is the most common cause of urinary symptoms in middle-aged and older men. It affects more than 210 million men worldwide. While the prevalence of symptomatic prostate adenoma is 2.7% in men aged 45-49 years, this rises to 24% by the age of 80 years (Gandaglia et al, 2021). For a man aged 46 with no symptoms, the risk of developing a symptomatic prostate adenoma in the next 30 years is 45% (Rawla, 2019).

In addition to medical treatment, prostate adenoma is often treated surgically. Transurethral resection of the prostate is the most common procedure (Chen-Pang Hou et al, 2013). However, many transient symptoms of bladder dysfunction, such as end-tidal leakage and urinary incontinence, rapid urination, often occur after surgery in older men (Lins, Carvalho, 2016). These symptoms lead to insomnia, irritability, deterioration of the psycho-emotional state, the appearance of depression, the formation of a sense of unease and, in general, cause patients discomfort and reduce their quality of life. This term is understood by various authors as human


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satisfaction with the somatic, physical, mental and spiritual-moral components of health (Santini et al., 2020; Park et al., 2020). To measure quality of life, Ware et al. (1994) proposed the SF-36 (Short Form Health Survey) questionnaire. This method of assessing life satisfaction began to be used in research studies and remains an effective method of observation to this day (Pablo Hernández Lucas et al., 2023; Fernanda Albuquerque da Silva et al., 2023; Swift et al., 2023). This confirms the authors' conclusions about the sufficiently high reliability of the results obtained by monitoring quality of life using this questionnaire, the validity of the methodology and the possibility of comparative analysis of the data obtained in different countries and social groups.

The use of the SF-36 questionnaire makes it possible to assess the influence of various factors on the quality of life of a man, including those suffering from postoperative symptoms of prostate adenoma, in order to adjust the treatment and rehabilitation plan of patients, which will improve their quality of life. Exercise is one such factor that influences the comfort of patients.

In the scientific literature there is a fairly complete description of the methodology of using localised physical exercises to strengthen the pelvic floor muscles in men with prostate adenoma (Chen-Pang Hou et al, 2013). The authors of the study achieved a higher rate of patient comfort after transurethral resection of the prostate gland after performing targeted physical exercises to strengthen the pelvic floor muscles. In recent years, a mobile application for smartphones has been developed and tested with a programme of exercises to improve pelvic floor muscle strength (Widdison et al, 2022). The authors found the app to be quite effective and convenient to use at home.

It is known from scientific sources that physical activity can be used as an effective non-medical method for prevention and recovery from somatic diseases of various origins (Chen et al., 2020; Dominski, Brandt, 2020). Physical exercise improves the pi-ho-emotional state and cognitive function (Grajek, & Sobczyk, 2021). The positive effects of physical activity on the human body are based on the improvement of physical health indicators with normalisation of body weight, basic functional indicators and metabolic processes (Mozolev et al., 2020). An essential role in strengthening the human body is played by the improvement of its immune status (Aksay, 2021).

The scientific literature provides many examples of the health-promoting effects of regular physical activity in many diseases (Rahmati-Ahmadabad & Hosseini, 2020; De la Cαmara et al., 2021), including cancer. Prostate disorders in men can cause benign tumours to become malignant. According to Gandaglia et al. (2021); Rawla (2019), it has been established that a man's physical activity reduces the risk of this pathology and the progression of prostate cancer.

To normalise the necessary amount and intensity of physical activity, the recommendations developed by the World Health Organization (WHO. Global recommendations on physical activity for health, 2010) are used. According to these recommendations, to maintain and stabilise existing levels of health, an adult aged 18-64 years and over should engage in at least 150 minutes of moderate-intensity physical activity or 75 minutes of vigorous-intensity physical activity per week on a regular basis. To achieve a more pronounced health improvement, a person's physical activity should be increased by a factor of 2.

An analysis of the scientific literature shows that there is a great deal of material on the preventive role of regular physical activity in the development of various human diseases. At the same time, there is no information on the preventive role of regular physical activity on quality of life indicators in men after transurethral resection of prostate adenoma. We believe that studying this issue will make it possible to make adjustments in planning the course of treatment and surgical intervention in patients with prostate adenoma.

**Research aim**. To determine the dependency of the influence of the level of regular physical activity of men on their quality of life after transurethral removal of prostate adenoma.

**Material & methods**

The research was conducted from April to December 2019 on the basis of medical institutions of Semey, Ust-Kamenogorsk, Pavlodar, Astana (Republic of Kazakhstan). 205 men aged 40-90 years who underwent transurethral resection of prostate adenoma were included in the study. Exclusion criteria for participation in the study were: residence in another region of Kazakhstan; other prostate diseases; dementia or any other disability preventing verbal communication. Approval of the Ethical Committee of the NAO "Semey Medical University" (Protocol No. 2, 25 October 2018) was obtained prior to the start of the study. The research did not violate the tenets of the 2008 Helsinki Declaration on the conduct of biomedical research.

The study employed the SF-36 (Short Form Health Survey) questionnaire, a 36-question survey that takes 5-10 minutes to complete. Dr. John Ware Jr developed the survey in 1990 as a versatile short medical questionnaire. The SF-36 measures eight dimensions of physical and mental well-being. The survey has eight scales that measure: 1. Physical functioning (PF) - 10 questions.

2. Role limitation due to physical problems (RP) - four questions.
3. Bodily pain (BP) - two questions.
4. General health (GH) - five questions.
5. Vitality (VT) - four questions.

6. Social functioning (SF) - two questions.
7. Impairment of various human activities related to emotions (RE) - three questions.
8. Five questions regarding mental health (MH).

Respondents also use an additional self-report form to report their health status. The scores ranged from 0 to 100, where higher scores indicated a better quality of life. To examine the connection between the quality of life and weekly physical activity in the male participants of this study, a survey was carried out to determine the number of minutes of moderate or vigorous physical activity reported by the respondents on a daily basis during the week before prostate adenoma resection. For this purpose, the IPAQ-SF (International Physical Activity Questionnaire) by Craig et al. (2003) was utilized.

All men were divided into 2 groups according to their level of regular weekly physical activity before surgery: "O" group (n = 68 patients) - with optimal moderate-intensity physical activity, which was at least 2.5hrs. per week, and "H" group (n = 136 patients) - with low weekly moderate-intensity physical activity, which was less than 2.5hrs. per week. As there was no indication of vigorous physical activity in the patients' responses, they were excluded from the analysis of results. The patients' walking was included in the moderate physical activity.

The data obtained were subjected to statistical analysis using SPSS version 20.0 (IBM Ireland Product Distribution Limited, Ireland). The arithmetic mean, standard deviation and arithmetic mean error were calculated, and the median, 25th and 75th quartiles were determined. Student's t-test was used to determine the significance of differences.

**Results**

Of the 205 patients who underwent surgery for prostate adenoma, they came from four cities of the Republic of Kazakhstan: Semey - 132 (64.9%), Ust-Kamenogorsk - 48 (23.4%), Pavlodar - 7 (3.4%), Astana - 17 (8.3%). The age distribution of patients is shown in Figure 1.

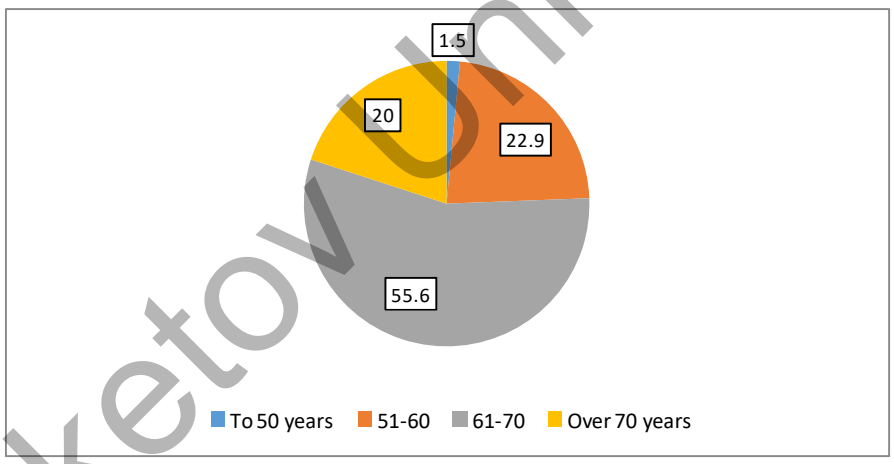


**Fig. 1: Number of patients by age, %.**

By nationality, 111 (54.1%) were Kazakh and 94 (45.9%) were of other nationalities. Patients with higher education were 33.2%, with specialised secondary education - 38.5%, with secondary education - 28.3%. Regarding marital status, 80.0% were married, 2.4% were single, 3.9% were divorced and 13.7% were widowed. At the same time, 26.3% were smokers and 73.7% were non-smokers. 39.0% did not drink alcohol, 45.9% drank alcohol on holidays, 7.3% drank alcohol once a week, 6.3% drank alcohol two or three times a week and 1.5% drank alcohol every day. The values of the quality of life indicators for men after transurethral resection of prostate adenoma are shown in Table 1.

**Table 1. Data on physical and mental status parameters of all patients observed**

| SF-36 scales | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Mean, points | 63.67 | 37.32 | 51.98 | 51.87 | 53.12 | 61.71 | 39.84 | 56.66 |
| 25th Percentile | 50.00 | 0.00 | 35.00 | 40.00 | 40.00 | 50.00 | 0.00 | 44.00 |
| 50th Percentile | 70.00 | 25.00 | 45.00 | 50.00 | 50.00 | 62.50 | 33.33 | 56.00 |
| 75th Percentile | 90.00 | 75.00 | 67.50 | 60.00 | 65.00 | 75.00 | 100.00 | 68.00 |
| Standard deviation | 27.85 | 41.54 | 25.76 | 17.46 | 20.69 | 23.68 | 42.79 | 19.37 |
| %, Ceiling | 5.90 | 23.90 | 10.70 | 0.50 | 0.50 | 11.70 | 28.80 | 1.00 |
| %, Floor | 2.40 | 48.30 | 2.00 | 1.00 | 0.50 | 1.50 | 45.40 | 0.50 |

Men scored highest on the Physical Functioning (PF) scale with 63.67 (±27.85) points, which corresponds to an above-average quality of life based on the 50th Percentile. The lowest scores were found in the Role-Physical Functioning (RP) scale, with 37.32 (±41.54) points representing a below-average level of comfort. The mean score on the Social Functioning (SF) scale was 61.71 (±23.68) points, which indicates an above-average quality of life. On the Mental Health (MH) scale, men scored an average of 56.66 (±19.37) points, indicating an average level of comfort. The Vitality (VT) and Bodily pain (BP) scale scores were 53.12 (±20.69) and 51.98 (±25.76) points respectively, indicating an average quality of life score. Additionally, the General Health (GH) scale established a mean quality of life score of 51.87 (±17.46). A decreased index of comfortable existence was observed in the patients, which was indicated by a mean value of 39.84 (±42.79) in Role Emotional (RE) scale due to their emotional state. Table 2 shows the quality of life scores of patients who underwent resection of prostate adenoma while having varying levels of regular weekly physical activity.

**Table 2. Quality of life of patients after prostate adenoma resection and having different levels of regular weekly physical activity (M± m)**

| Quality of life scales | Physical activity of patients, min/week | |
|---|---|---|
| | Group "O", more than 2.5hrs./week, points | Group "N", less than 150 min/week, points |
| 1 | 68.15±1.7 | 54.16±0.7* |
| 2 | 39.43±1.2 | 23.14±0.4* |
| 3 | 59.17 ±1.6 | 45.77±0.6* |
| 4 | 63.67±1.8 | 47.20±1.3* |
| 5 | 55.42±1.2 | 46.05±0.7* |
| 6 | 60.56±1.7 | 36.40±0.4* |
| 7 | 43.34±1.1 | 29.52±0.3* |
| 8 | 66.87±1.8 | 48.18±0.7* |

*Note. * - reliability of the difference, $p < 0.05$*

Men in the optimal physical activity group ("O") who engaged in 150 or more minutes of physical activity per week had significantly higher quality of life scale indicators than those in the low physical activity group ("H") with $p < 0.05$. The above evidence suggests that male patients who engage in optimal physical activity (> 2.5hrs./week) have better quality of life scale indicators than those with insufficient physical activity (< 2.5hrs./week).

Figure 2 shows the difference in life satisfaction scores between patients in group: "O" and "H" (%).

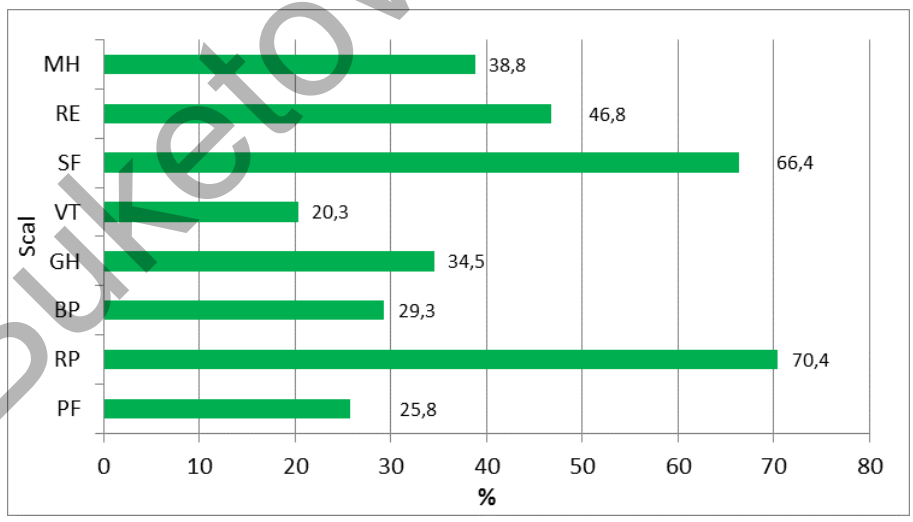


**Fig. 2: Difference in life satisfaction indicators for patients in group "O" compared to patients in group "H**

It was found that in men of group "O" the values of quality of life indicators exceeded 60% in the SF (66.4%) and RP (70.4%) scales. The smallest difference was observed in the VT scale - 20.3%.

Due to the peculiarities of regular physical activity between patients of different observation groups, it is important to study the characteristics of the type and amount of physical activity performed (Table 3).

**Table 3: Characteristics of weekly physical activity of patients, (M±m)**

| Weekly physical activity | Characteristics of weekly physical activity | | | |
|---|---|---|---|---|
| | Number of days per week of moderate physical activity | Duration of moderate Physical activity per day (min) | Number of days of walking per week | Duration of walking per day (min) |
| Group "O" (>150 min/week) | 4.2±0.14 | 35.5±1.75 | 4.0±0.12 | 21.4±1.23 |
| Group "H" (<150 min/week) | 3.3±0.11* | 24.5±1.34* | 2.9±0.10* | 15.5±0.67* |

*Note: * - reliability of differences in responses between patients of groups "O" and "H", p<0.05*

It was found that of all the men studied, patients in group "O" had the greatest number of days per week and the greatest duration per day of moderate physical activity compared to these indicators in group "H". The weekly moderate physical activity of the men in group "O" was 149.1 min/week, which was 84.5% more than that of the men in group "H", where this index was 80.8 min/week, $p < 0.05$. A reliable difference in the value of walking per week was found between men in groups "O" and "H". In the "O" group, the number of walking days per week was 27.5% higher than in the "H" group. In the group of patients with optimal regular activity, the amount of walking time per week was 85.6 minutes, which was 90.6% more than in the men of group "H", where this indicator was 44.9 min/week, $p < 0.05$. The cumulative score for moderate physical activity was 234 min/week for men in group "O" and was 86.1% higher than for men in group "H", where the score was 125.7 min/week, $p < 0.05$.

The results of asking patients about their weekly physical activity showed that patients in group "O" had the highest rates of moderate physical activity compared to patients in group "H" who did not meet the optimal weekly exercise regime, $p < 0.05$. In our opinion, the higher rates of all quality of life scales in group "O" patients are associated with adherence to a regular exercise regime of more than 150 min/week.

**Dicussion**

The significant frequency of prostate adenoma among elderly men (Gandaglia et al., 2021) leads to a decline in quality of life and the risk of the development of a malignant neoplasm. Therefore, it is essential for the scientific community to explore a wide range of means and techniques to address urinary system dysfunction and enhance the quality of life (Lins, Carvalho, 2016).

The scientific literature provides comprehensive information on the utilisation of targeted exercise to train pelvic floor muscles, which helps alleviate patient discomfort. Nonetheless, there is an inadequate amount of information in the scientific literature regarding the correlation between routine physical exercise and improved life contentment in patients who have undergone prostate adenoma resection. An understanding of these concerns will facilitate modifications in treatment, prevention, and recovery policies for patients post-transurethral resection of prostate adenoma. This is particularly crucial regarding the elderly populace (Wettstein, 2020).

Regular physical activity effectively prevents and aids in the recovery from various somatic diseases (Rahmati-Ahmadabad & Hosseini, 2020; Chen et al., 2020; Dominski & Brandt, 2020; De la Cɑmara et al., 2021). The health-promoting effects of physical activity originate from the prevention of physical health deterioration, which involves a significant boost in the energy potential of the human body. The enhancement of physical health through regular physical activity increases the reserve capabilities of the human body's functional systems (Mozolev et al., 2020). The activity of the immune system during regular physical activity plays a significant role in aiding the organism's recovery from diseases (Aksay, 2021). The WHO "Global Recommendations on Physical Activity for the Population, 2010" enabled the differential analysis of physical activity in patients that underwent prostate surgery.

The observational data we obtained allowed us to establish the dependence of life satisfaction scores on the SF-36 questionnaire on the amount of regular weekly physical activity. Men who did at least 150 min/week of preventive physical activity had significantly higher scores on all eight quality of life scales compared with patients who did less than 150 min/week of physical activity. Moderate physical activity was 86.1% higher in group "O" than in the group of patients with low physical activity (group "H").

The improvement in the physical condition of the organism of the observed patients, as indicated by the Physical Functioning and Role-Physical Functioning scales of the SF-36 questionnaire in men of all age groups with an optimal level of regular physical activity, increases the possibilities of self-care, walking and climbing stairs, performing physical work at work and at home, daily chores, etc. These data support the findings of many researchers. These findings support the conclusions of many researchers on the positive role of physical activity in improving human physical parameters (Rahmati-Ahmadabad & Hosseini, 2020; Chen et al., 2020; Dominski, Brandt, 2020; De la Cɑmara et al., 2021).

The General Health (GH), Vitality (VT) and Mental Health (MH) scales had significantly higher scores in patients with optimal physical activity, compared to those with low physical activity. Our study found that scores on these scales corresponded to the average level of quality of life in patients with low levels of physical activity. Men with optimal physical activity had notably high scores on these scales, indicating a superior quality of life. The WHO's recommended level of weekly physical activity has shown a positive effect on mental health. The improvement in mental health is associated with higher levels of emotional well-being and social functioning in patients with greater physical activity levels. Higher scores on the mentioned scales lead to increased social activity, contacts, and dialogue with other people compared to patients with low physical activity levels. This data is in accordance with the findings of previously conducted research (Jamali et al., 2013). Our study stresses the significance of thoroughly researching the effects of regular physical activity on men with prostate disease pathology.

**Conclusions**

As a result of this study, it was found that regular optimal physical activity in older men can be considered as a means of increasing the level of comfortable life activity in patients who have undergone resection of prostate adenoma.

Patients with regular weekly physical activity of 150 min/week or more, as recommended by the WHO, had significantly higher life satisfaction scores on the SF-36 questionnaire than men with weekly physical activity of less than 150 min/week, $p < 0.05$. The total value of moderate physical activity was 234 min/week in men with optimal weekly physical activity and was 86.1% higher than in patients with insufficient physical activity, where it was 125.7 min/week, $p < 0.05$.

In patients with optimal levels of weekly physical activity in all eight scales of the SF-36 questionnaire, the values of the indicators corresponded to average and high levels of comfortable existence, compared with men with insufficient levels of physical activity, in whom the majority of the scores corresponded to low levels of quality of life. To improve the quality of life of mature and elderly men, it is necessary to actively promote a healthy lifestyle and regular physical activity, in addition to medical measures.

**Conflicts of interest.** The authors declare no conflict of interest.

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