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# Ocena jakości życia pacjentek pomenopauzalnych ze zmianami zwyrodnieniowymi stawów biodrowych i kolanowych oczekujących na protezoplastyki

**Streszczenie**

**Wstęp.** Protezoplastyki stawów biodrowych i kolanowych z zaawansowanymi zmianami zwyrodnieniowo-zniekształcającymi są powszechnie stosowaną skuteczna metodą leczenia tych istotnych i częstych dysfunkcji narządu ruchu. Zgodnie z wprowadzonym obowiązkowym systemem kolejkowym okres oczekiwania na protezoplastykę biodra lub kolana obecnie wynosi w Polsce około dwu lat.

**Cel.** Celem badań była charakterystyka i ocena jakości życia pacjentek pomenopauzalnych ze zmianami zwyrodnieniowymi stawów biodrowych (koksartroza) i kolanowych (gonartroza) oczekujących na protezoplastyki.

**Materiał i metody.** Materiał badawczy stanowiły dwie grupy kobiet w wieku pomenopauzalnym z zaawansowanymi zmianami zniekształcającymi stawów biodrowych (n=59) i kolanowych (n=51) w wieku od 50-62 lat. Badano jakości życia bezpośrednio przed planowanym zabiegiem przy użyciu ankiety własnej konstrukcji z wykorzystaniem dwóch pytań zaczerpniętych z ankiety HRQ – Johansona i wsp. (1992). W analizie statystycznej przy istotności $p<0,05$ wykorzystano weryfikacje hipotez statystycznych opartą o testy nieparametryczne U Manna-Whitneya i $Chi^2$ Pearsona oraz test dokładny p Fishera.

**Wyniki.** Zaawansowane zmiany zniekształcające stawów kolanowych częściej niż biodrowych skojarzone były z nadwagą lub otyłością ($p=0,02$). W przeciwieństwie do gonartrozy ograniczenie funkcji stawu biodrowego często uniemożliwiało samoobsługę stopy ($p=0,0002$). Samopoczucie i własna ocena zdrowia pacjentek z koksartrozą w porównaniu do okresu przed rokiem była istotnie niższa niż tych z gonartrozą ($p=0,05$). Z uwagi na czas trwania objawów osoby z dysfunkcją biodra szybciej decydowały się na operację ($p<0,0001$). W mieście częściej niż na wsi występowała gonartroza, zaś osoby ze środowiska wiejskiego bardziej niż w mieście były narażone na chorobę biodra ($p=0,04$). Koksartroza częściej niż gonartroza występowała przed operacją u badanych kobiet z wykształceniem podstawowym i zawodowym, niż pomaturalnym i wyższym ($p=0,05$).

**Wnioski.** Wyniki przeprowadzonych badań wskazują na większą potrzebą przeprowadzania w krótszym czasie protezoplastyk stawów biodrowych niż kolanowych. Wykazana nadwaga i otyłość w grupie kobiet z gonartrozą wskazuje na możliwość nieoperacyjnej interwencji – redukcji masy ciała poprawiającej jakość życia tych osób.

**Słowa kluczowe:** artroza, biodro, kolano, menopauza, jakość życia.

# The quality of life of postmenopausal women with hip and knee advanced dysfunction due to osteoarthritis prior to joint replacement

**Abstract**

**Introduction.** Surgical replacement of hip and knee joints with advanced degenerative and deformative changes is a method commonly used for treatment of such important and frequent ailments of the locomotor organ. In accordance with an obligatory system of scheduling in Poland the waiting time for a hip or knee endoprothesoplasty takes up to two years.

**Aim.** The aim of the research was to characterize and assess the quality of life of postmenopausal patients with the degenerative changes of hip joints (coxsarthrosis) and knee joints (gonarthrosis) waiting for joint arthroplasty.

**Material and methods.** The research was based on two groups of postmenopausal women aged 50-62 with advanced osteoarthritis of the hip (n=59) and knee (n=51). The quality of life just prior to the planned surgery was measured by means of an individually prepared survey where two questions from the HRQ Johansson and co. survey (1992) were used. In the statistical analysis with the significance of $p<0.05$ statistical hypotheses were verified with the use of U Mann-Whitney non-parametric test and $Chi^2$ Pearson's test as well as Fisher's exact test.

**Results.** Advanced degenerative osteoarthritis of the knee more frequently than of the hip was related to overweight or obesity ($p=0.02$). In contrast to gonarthrosis, degenerative hip disease more often made foot care difficult ($p=0.0002$). The state of mind and individual health-esteem of patients with coxarthrosis compared with the same period a year before was significantly lower than of the patients with gonarthrosis ($p=0.05$). Due to lengthy time of symptoms the patients with hip dysfunction decided on operation faster ($p<0.0001$). Gonarthrosis occurred more frequently in a city, while patients from rural environment were more susceptible to hip diseases ($p=0.04$). Advanced coxarthrosis more often than gonarthrosis was related in investigated groups of postmenopausal females to elementary and vocational education rather than higher and post-vocational ($p=0.05$).

**Conclusions.** Coxarthrosis demands more rapid surgery than gonarthosis in comparable postmenopausal women. Coexistence of overweight and obesity related to gonarthrosis indicates a possibility, need and full medical justification for a body mass reduction in these very patients.

**Keywords:** osteoarthritis, hip, knee, menopause, quality of life.

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## INTRODUCTION

Pathologies, particularly in large joints of lower limbs, constitute a serious medical and socio-economic problem as in the course of time the dysfunctions get advanced, persistent and irreversible, thus considerably limiting locomotion. Degenerative osteoarthritis at an advanced stage constricts one's independent existence and the ability to fulfill social functions. The morbidity with joint dysfunction diseases (arthrosis) in the world places itself high, on the second position, following cardiovascular diseases [1].

Arthrosis more frequently regards and occurs in women than in men and increases with ageing of the population [2]. Implantation of artificial hip and knee joints (joint replacement, arthroplasty) in advanced degenerative and dysfunctional changes is a commonly used, efficient surgical method of treatment of such crucial locomotor organs dysfunctions. In England and Wales there are approximately 160,000 total hip and knee replacement procedures performed each year [3] and in the USA this number reaches 300,000, respectively [4].

It is estimated that nowadays around one million hip joint replacements and knee surgeries alike are performed annually around the world , while in Poland there are about 40,000 hip joint surgeries and slightly below that number knee joints per year, which , seems to be strongly insufficient comparing to UK and USA data. A scheduling system, implemented in Poland following the UK example, is not efficient enough as the waiting time for a knee or hip joint arthroplasty at the moment takes up to about two years on average, in spite of the efforts of National Heath Fund.

Progress in anesthesiology and orthopaedics offers a high level of safety, even in the case of extensive surgeries including replacements of large joints which restore their painless and extensive range-of-motion movements. A high efficiency of such a treatment raises wide interest among patients and a demand for such procedures, while they generate certain, considerable costs which encumber the health care budget. Transfers within resources allocated to joint arhroplasties of different joints will either shorten or prolong the period of waiting for a surgery within a certain category i.e. a hip or a knee (so called "finance juggling").

The National Health Fund strictly follows the scheduling system rules which regulate the performance of hip and knee joint prosthetic plasty surgery. Then the question arises whether these two groups of patients, from an ethical, health and social point of view should be treated similarly in the context of availability of joint replacement surgery. Another question arises if effective medical alternative measures concerning these patients can be taken, which will not result in costs and still positively affect the level of health care in these two groups of patients characterized mainly by limitations in walk competence.

The ability to move around is one of the most important and crucial functions of a human. Understanding of walk mechanism and its characteristics makes it possible to localize movement disorders due to particular joint dysfunctions (hip, knee, foot). Efficient gait depends immediately on the functions of the central and peripheral nervous system and reflects competency of bones, joints and muscles that have a supportive, locomotive, amortization and protective function [5].

Owing to the skeletal and muscular system a human is able to perform free-form and, so called, dynamic stereotype driven locomotion by changing positions of particular parts of the body against each other, at the same time maintaining an upright position in order to move mostly horizontally against the surface. A human's locomotion is characterized as bipedal, symmetric (asymmetry in gait means limping) and forward. Thus gait can be defined as a rhythmic losing and regaining balance in interchangeable swing and stance phase [5,6].

There are six markers of a normal gait. Three of them regard changes of the hip bone and hip joints position, while two others focus on knee movement, and the last one refers to the ankle joint. They are kinematic characteristics regarding gait on a smooth, horizontal surface [6].

The manner of walking characterizes particular persons and it changes with age. It is different for men and women, and locomotion differences result from subtle dissimilarities predominantly in the skeleton build and the amount of muscular tissue. Emotional condition such as stress or depression may also alter gait parameters. Limited capability of locomotion indicates disability and much worsens the quality of life [6]. The loss of ability to move naturally which results from degenerative osteoarthritis of lower limbs large joints, i.e. hip and knee, decreases dramatically the quality of life.

Epidemiologic research shows that the degenerative disease of joints more often regards women [1]. The account for such an occurrence is not quite explained. It is known that the developmental dysplasia of the hip occurs threefold more often in female than in male newborns. Such an outcome partly explains more frequent appearance of coxarthrosis in women [7].

The deficiency of follicular hormones and malfunction of joint hyaline cartilages in the postmenopausal period may cause degenerative changes, inter alia, in the knee joint, and, in particular, obesity following menstruation arrest, which clearly correlates with progression and pain symptoms of gonarthrosis [8,9].

The postmenopausal women's susceptibility to hip and knee degenerative changes causes certain social consequences. This group of female patients is quite big in highly developed modern societies and expects appropriately high quality of life. Limitations in fulfilling social and family functions, which result from hip and knee dysfunctions, have a negative influence by developing low self-esteem, and they may become an objective reason for losing the ability to play the role of and active spouse [10].

In the treatment of advanced osteoarthrotic changes of hips and knees, introduction of a surgical treatment replacing them with artificial joints really revolutionized this branch of operative orthopaedics. The effectiveness of joint replacement is manifested in pain relief and regaining the ability to walk. What is more, good results of treatment achieved thanks to the use of new generation implants usually do not get worse even in spite of years passing by. The number of arthroplasties of large joints is continuously growing due to the fact that the population is ageing [2,11].

Thus the situation forces the health care budget to control such procedures, more particularly as they aim at improving the quality of life, not at saving it.

## AIM

The aim of the research was to characterize and assess the quality of life of postmenopausal females with advanced degenerative changes of hip joints and knee joints waiting for replacement surgery.

## MATERIAL AND METHODS

The investigation was based on two groups of postmenopausal women with advanced deformative changes of hip joints (n=59) and knee joints (n=51) aged 50-62. There were 34 patients with elementary education, 20 with vocational education, 39 with secondary vocational education, 3 with post-secondary education, and 14 with higher education.

The research straight before the planned surgery was conducted by means of an individually prepared survey where two questions from the HRQ Johansson and co. survey (1992) were used [12]. In the statistical analysis tests U Mann-Whitney's and Chi$^2$ Pearson's, as well as Fisher's exact test, bilateral were used at $p<0.05$ [13,14] (STATISTICA 9.0).

## RESULTS

A significant correlation was found between the kind of joint disease (a hip, knee) and the value of body mass index BMI (p=0.02, Table 1).

**TABLE 1. Joint disease vs. body mass index (BMI) ***

| BMI | | Joint | | Total |
|---|---|---|---|---|
| | | Hip | Knee | |
| Obesity | number | 19 | 28 | 47 |
| | % | 32.20% | 54.90% | 42.73% |
| Overweight | number | 24 | 18 | 42 |
| | % | 40.68% | 35.29% | 38.18% |
| Norm | number | 16 | 5 | 21 |
| | % | 27.12% | 9.80% | 19.09% |
| Total | total | 59 | 51 | 110 |
| Chi$^2$ Pearson: 7.80190, df=2, p=0.020226 | | | | |

* World Health Organisation (2006) Obesity and overweight. Available from: http://www.who.int/mediacentre/factsheets/fs311/en/index.html. Accessed September 2009

Joint diseases most frequently occurred in obese (42.73% investigated patients) and overweight women (38.18%). Knee disorder was most characteristic of obese females (54.90% investigated patients), while hip disease occurred quite often also in overweight patients (40.68%) and in those with BMI within the norm.

The patients with the knee dysfunction maintained the capability of unassisted care of the foot, which was getting more and more difficult due to the advancement of the hip disease (p=0.0002, Table 2).

**TABLE 2. Capability of unassisted care of the foot.**

| Unassisted care of one's foot | | Joint | | Total |
|---|---|---|---|---|
| | | Hip | Knee | |
| I cannot do this | number | 7 | 0 | 7 |
| | % | 11.86% | 0.00% | 6.36% |
| I need somebody's help | number | 28 | 12 | 40 |
| | % | 47.46% | 23.53% | 36.36% |
| I need a big shoehorn | number | 19 | 18 | 37 |
| | % | 32.20% | 35.29% | 33.64% |
| It is a bit difficult but I do not require | number | 5 | 21 | 26 |
| | % | 8.47% | 40.17% | 23.64% |
| Total | number | 59 | 51 | 110 |
| Chi$^2$ Pearson: 14.32, df=1, p=0.0002 | | | | |

A significant correlation was found between the kind of disease (a hip, knee) and duration of a disease ($p<0.0001$, Table 3).

**TABLE 3. Duration of symptoms vs. kind of joint.**

| Duration of symptoms (years) | | Joint | | Total |
|---|---|---|---|---|
| | | Hip | Knee | |
| 1-5 | number | 31 | 10 | 41 |
| | % | 52.54% | 19.61% | 37.27% |
| 6-10 | number | 24 | 41 | 65 |
| | % | 40.68% | 80.39% | 59.09% |
| 11 and more | number | 4 | 0 | 4 |
| | % | 6.78% | 0.00% | 3.4% |
| Total | total | 59 | 51 | 110 |
| Chi$^2$ Pearson: 17.85, df=1, p<0.0001 | | | | |

Due to a low number of investigated patients in some subgroups with a regard to the duration of a disease, for Chi$^2$ Pearson calculations 1-5 and 6 and more periods were taken into account. Painful symptoms of a hip disease occurred quite often as early as 1-5 years of duration of symptomatic disease (52.54%), while in the case of a knee they occurred much later i.e. 6-10 years of duration (80.39% investigated patients).

Crucial differences were observed in health and state of mind in comparison to the same period previous year in patients with hip and knee diseases (p=0.05, Table 4).

**TABLE 4. Health condition and state of mind caused by a joint disease compared to the year ago period.**

| Your general health and state of mind compared to the same period a year ago | | Joint | | Total |
|---|---|---|---|---|
| | | Hip | Knee | |
| Now much better than a year ago | number | 1 | 0 | 1 |
| | % | 3.03% | 0.00% | 1.41% |
| Now a bit better than a year ago | number | 0 | 7 | 7 |
| | % | 0.00% | 13.73% | 6.36% |
| Almost the same like a year ago | number | 2 | 3 | 5 |
| | % | 3.39% | 5.88% | 4.55% |
| Now a bit worse than a year ago | number | 11 | 12 | 23 |
| | % | 18.64% | 23.53% | 20.91% |
| Now much worse than a year ago | number | 45 | 29 | 74 |
| | % | 76.27% | 56.86% | 67.27% |
| Total | number | 59 | 51 | 110 |
| Test U Mann-Whitney: Z=1.98102, p=0.047590 | | | | |

The hip disease advanced much faster within a year preceding the planned replacement.

A significant relation was found between a kind of a joint disease (i.e. hip, knee) and a place of residence (p= 0.04, Table 5).

**TABLE 5. Relation of joint involvement to a place of residence.**

| Place of residence | | Joint | | Total |
|---|---|---|---|---|
| | | Hip | Knee | |
| Urban area | number | 35 | 39 | 74 |
| | % | 59.32% | 76.47% | 67.27% |
| Rural area | number | 24 | 12 | 36 |
| | % | 40.68% | 23.53% | 32.73% |
| Total | number | 59 | 51 | 110 |
| | % | 53.64% | 46.36% | 100% |
| Exact test p Fisher, p=0.0432 | | | | |

Knee disease was more frequent in a city than in a rural area, while hip disease was more characteristic of a countryside population (they occurred twofold more often than knee).

Due to a low number of patients with post-secondary education, for the purpose of $Chi^2$ Pearson calculations post-secondary and higher education were taken into account jointly. A significant correlation was observed between a kind of a joint disease (a hip, knee) and the level of patient education (p=0.05, Table 6)

**TABLE 6. Relation of joint involvement to the level of education.**

| Education | | Joint | | Total |
|---|---|---|---|---|
| | | Hip | Knee | |
| Elementary | number | 19 | 15 | 34 |
| | % | 32.20% | 29.41% | 30.91% |
| Vocational | number | 13 | 7 | 20 |
| | % | 22.03% | 13.73% | 18.18% |
| Secondary | number | 23 | 16 | 39 |
| | % | 38.98% | 31.37% | 35.45% |
| Post-secondary | number | 0 | 3 | 3 |
| | % | 0.00% | 5.88% | 2.73% |
| Higher | number | 4 | 10 | 14 |
| | % | 6.78% | 19.61% | 12.73% |
| Total | number | 59 | 51 | 110 |
| | % | 46.48% | 53.52% | 100.00% |
| $Chi^2$ Pearson: 7.75088, df=3, p=0.05 | | | | |

Lower education i.e. elementary and vocational more often was associated with a hip disease, while post-secondary and higher with a knee disorder.

## DISCUSSION

In spite of the prevalence of chondrosis with advancing age, the course of degenerative joint disease is not quite predictable [15]. Prospective observations of the course of the degenerative joint diseases show the subjects which decompensate fast or other who remain stationary for many years [1].

In the investigated own material it was concluded on the basis of medical history that intensification of incompetence caused by degenerative joint disease of the hip occurred much faster than in knee joints. The duration of joint dysfunction and intensity of pain until a patient's decision to undergo operational treatment was much shorter in the case of a hip than knee (p=0.0001). Moreover, the quality of life of patients with coxarthrosis worsened more than of those with gonarthrosis (p=0.05) over the past year.

Due to anatomical role of the hip and knee in the biomechanical chain the decrease of locomotor capability, which results from deformative changes has a different functional and clinical meaning. Flexion contracture, which limits locomotor function of the hip joint, precludes patients from unassisted care of the foot, putting on socks, tights or shoes while knee joint arthrosis seldom impedes these activities (p=0.0002).

Negligence on the side of social environment, which is undoubtedly associated with the awareness of an individual and family members' health may have a negative influence on prophylactic pro-health behaviours. From an orthopedic point of view, the most striking and negative example of such negligence is ignorance of hip joint dysplasia as a developmental disease causing premature joint wear and

deformative changes of involved joint [7]. Perhaps higher frequency of coxarthrosis over gonarthrosis (p=0.04) in the rural environment has just such a background.

Numerous epidemiological and clinical research works raise the issue of relation between civilizational predispositions and epidemiology of modern society diseases. Undoubtedly, one of the threats related to a general availability of food is permanent and excessive food consumption by both children and adults [16,17]. Harmfulness of obesity should be considered in at least two aspects, namely a mechanical one causing overloading of lower limbs joints in the first place, as well as a metabolic aspect. The latter is associated, inter alia, with accompanying obesity. Metabolic syndrome advances the development of hypertrophic changes deforming joints [18].

The outcomes of other authors‘ works and own research show a relation of the body mass index with a type of investigated deformative changes. At the level of significance (p=0.002) in the own research knee joint degenerative changes were associated more often than these of the hip with overweight and obesity. Similar observations were conducted by Japanese researchers as well [19,20].

In the context of civilization changes followed by a continuous increase of an average life –span of women in particular, the quality of life of this group is becoming more and more important. That value is difficult to define; however, it refers to clearly measurable features related also to generally understood health of an individual. The definition of health assumes not only the absence of the disease but the condition of full competence with positive state of mind [21].

The degenerative joint disease commonly occurs in the elderly and it much decreases their quality of life [15]. This is particularly perceptible and bothersome when it is caused by dysfunction of large bearing joints of a lower limb i.e. a hip joint and/or knee joint as the hallmarks of these diseases are limitations of range of movement (contractures) and pain. The latter is initially caused by extortion but it does not subside after rest. Permanent night pains of coxarthrosis disturb rest and make patients take harmful pain-killers.

A proven method of treatment of hip and knee joints degenerative changes is joint replacement surgery. This intervention popularized around the world in the mid-1970s which consists in resection of degenerated joint ends and replacing natural, however deformed by the disease, “working ends” with appropriately formed metal, ceramics or/and polythene implants fixed by means of bone cement or in a non-cemented, press-fit way. Arthroplasty results in painlessness and restores a wide range of locomotor activities.

Hip and joint replacements guaranteed by availability and financed by the National Health Fund generate certain, quite high financial costs. With a continuously growing social demand the possibilities of refunding such surgeries by the state become limited. Implementation of a scheduling system is an attempt to ensure a fair access to such treatments of diseased hip and knee joints. Hence a question arises whether a control of access to enhancing one’s quality of life by means of surgical treatment can be considered in terms of social justice.

Clinical experience supplies enough evidence that the worsened health related quality of life (HRQL) is related to the hip or knee joint arthrosis and stems from numerous factors [9,12]. Investigations conducted by many authors as well as original own research found out that degenerative changes in the knee joint are related to obesity [19,20]. It could be assumed that the reduction of body mass of these patients improves their quality of life also owing to reduced pain in deformed knee joints. Thus therapeutic weight loss could be a factor efficiently reducing negative patterns resulting from long-lasting scheduled waiting for a surgery. Moreover, improvement of the body mass index (BMI) is beneficial to general health and decreases the perioperative risk and survival rate of implanted artificial joints [22].

The occurrence of orthopedic benefits resulting from a body mass reduction to a smaller extent regards people with coxarthrosis [22]. Thus there emerge reasonable needs of flexible shifting patients within the scheduled waiting-lists within these two groups of patients awaiting costly surgery. Moreover, benefits of body weight reduction in both groups of postmenopausal women awaiting hip and knee replacement are self-evident and do not generate appreciable costs.

## CONCLUSIONS

1. The outcome of the research conducted on postmenopausal women prior to the surgery of prosthetic plasty due to advanced deformative changes proves a higher urgency of operative treatment of hip joints rather than knee joints
2. Coexistence of overweight and obesity related to gonartrosis emphasizes a possibility, need and full medical justification for a body mass reduction in the patients belonging to this group

### REFERENCES


1. Bijlsma JWJ, Berenbaum F, Lafeber FPJG. Osteoarthritis: an update with relevance for clinical practice. Lancet. 2011;377:2115-26.
2. Felson DT, Naimark A, Anderson J, Kazis L, Castelli W, Meenan RF. The prevalence of knee osteoarthritis in the elderly. The Framingham osteoarthritis study. Arthritis Rheum. 1987;30:914-8.
3. http://www.njrcentre.org.uk/njrcentre/Patients/Jointreplacementstatistics/tabid/99/Default.aspx
4. http://www.surgery.com/procedure/hip-replacement-surgery/demographics
5. Jóźwiak M. Filogenetyczne i ontogenetyczne uwarunkowania chodu. In: W. Marciniak, A. Szulc (ed). Wiktora Degi Ortopedia i rehabilitacja. Warszawa: PZWL;2003. s. 27-38.
6. Dega W. Chód i jego mechanizm. Ortopedia i Rehabilitacja. Warszawa: PZWL; 1964. p.46-53.
7. Czubak J, Kruczyński J. Rozwojowa dysplazja i zwichnięcie stawu biodrowego. In: W. Marciniak, A. Szulc (red). Ortopedia i rehabilitacja. Warszawa: PZWL; 2003. s. 159-93.
8. Bourne R, Mukhi S, Zhu N, et al. Role of obesity on the risk for total hip or knee arthroplasty. Clin Orthop Relat Res. 2007;465:185-8.
9. Cooper C, Snow S, McAlindon TE, Kellingray S, Stuart B, Coggon D, Dieppe PA. Risk factors for the incidence and progression of radiographic knee osteoarthritis. Arthritis Rheum. 2000;43:995-1000.
10. Salaffi F, Carotii M, Stancati A, Grassi W. Health-related quality of life in older adults with matched healthy controls. Aging Clin Exp Res. 2005;17:255-63.
11. [http://www.amd3.org/ROblog/2008/01/total-joint-replacement-educat-2.html
12. Johanson NA, Charlson ME, Szatkowski TP, Ranawat CS. A Self-Administered Hip-Rating Questionnaire for the assesment of outcome after total hip replacement. J Bone Joint Surg. 1992;74-A(4):587-96.
13. Armitage P. Metody statystyczne w badaniach medycznych. Warszawa: PZWL; 1978.

14. Sawicki F. Elementy statystyki dla lekarzy. Warszawa: PZWL; 1982.
15. Felson DT, Zhang Y, Hannan MT, Naimark A, Weissman BN, Aliabadi P, Levy D. The incidence and natural history of knee osteoarthritis in the elderly. The Framingham osteoarthritis study. Arthritis Rheum. 1995;38:1500-5.
16. Pawłowska H, Dmitruk A, Czeczuk A. Częstość występowania nadwagi i otyłości u dziewcząt i chłopców wiejskich w zależności od wykształcenia rodziców. Zdr Publ.2007;117:54-8.
17. Sygit K. Nieprawidłowości żywieniowe zagrożeniem zdrowia populacji dzieci i młodzieży. Zdr Publ. 2010;120:132-5.
18. Puenpatom RA, Victor TW. Increased prevalence of metabolic syndrome In individuals with osteoarthritis: an analysis of NHANES III data. Postgrad Med. 2009;121:9-20.
19. Nishimura A, Hasegawa M, Kato K, Hamada T, Uchida A, Sudo A. Risk factors for the incidence and progression of radiographic osteoarthritis of the knee among Japanese. Int Orthop. 2011;53:839-43.
20. Sudo A, Miyamoto N, Horikawa K, Urawa M, Yamakawa T, Hamada T, Uchida A. Prevalence and pisk factors for knee osteoarthritis in erderly Japanese men and women. J Ortop Sci. 2008;13:413-8.
21. Górajek-Jóźwik J. Filozofia i teorie pielęgniarstwa. Lublin: Czelej; 2007. p. 46-8.
22. Wang Y, Simpson JA, Wluka AE, Teichtah DR, Englisch DR, Giles GG, Graves S, Cicuttini FM. Relationship between body adipositiy measures and risk of primary knee and hip replacement for osteoarthritis: a prospective cohort study. Arthitis Res Ther. 2009;11:R31.

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