

Social and Personal Consequences of Disability in Adults with Hip and Knee Arthroplasty. A French National Community Based Survey

ISABELLE BOUTRON, SERGE POIRAUDEAU, PHILIPPE RAVAUD, GABRIEL BARON, MICHEL RÉVEL, REMY NIZARD, MAXIME DOUGADOS, and JEAN-FRANÇOIS RAVAUD

ABSTRACT. Objective. To describe and compare participation restrictions and environmental factors of persons with and without hip or knee arthroplasty in a national community based survey: the Handicap, Disability, Dependence Survey.

Methods. During the 1999 French Census, a screening questionnaire was proposed to 417,500 persons, for which the response rate was 86%. A stratified random sample with an overrepresentation of disabled persons was performed to constitute the selected population. A computer assisted interview was proposed to 21,760 persons, with a 78% response rate. Chronic conditions, impairment, disability, participation restrictions, and the description of environmental factors were ascertained from the subjects' reports.

Results. The hip and knee arthroplasty group was estimated at 691,000 persons in the French population. Although reporting a higher level of disability, this population did not report more participation restrictions than the general population in terms of their economic situation, housing, social relationships, and holidays. Moreover, when comparing environmental factors, this population reported better housing accessibility, more assistive devices (OR 5.2, 95% CI 3.7–7.2), specific fittings (OR 2.9, 95% CI 2.0–4.2), and helpers (OR 1.8, 95% CI 1.3–2.5). These environmental factors may have compensated for the higher level of disability. Nevertheless, individuals with hip and knee arthroplasty reported more disadvantages when moving within their environment (OR 2.1, 95% CI 1.5–2.9).

Conclusion. This study provides a detailed description based on a national random sample of participation restrictions and environmental factors of adults with hip and knee arthroplasty. (J Rheumatol 2004;31:759–66)

Key Indexing Terms:
EPIDEMIOLOGY
ARTHROPLASTY

DISABILITY
HIP

PARTICIPATION RESTRICTION
KNEE

From the National Institute of Statistics and Economic Studies (INSEE), Paris; Réseau Fédératif de Recherche sur le Handicap, Vincennes; and Centre d'Enseignement et de Recherche en Mécanique des Sols (CERMES), INSERM U502, Villejuif, France.

Supported by the Ministry of Employment and Solidarity, National Social Security, by mutual insurance organizations, insurance companies, and disability associations.

I. Boutron, MD; S. Poiraudau, MD, PhD, Département de Médecine Physique et de Réadaptation, Hôpital Cochin (AP-HP), Paris, Réseau Fédératif de Recherche sur le Handicap, Paris; P. Ravaud, MD, PhD; G. Baron, BSc, Département d'Epidémiologie, Biostatistique et de Recherche Clinique, Groupe hospitalier Bichat-Claude Bernard (AP-HP), Université X. Bichat, Paris; M. Revel, MD, Département de Médecine Physique et de Réadaptation, Hôpital Cochin, Réseau Fédératif de Recherche sur le Handicap; R. Nizard, MD, PhD, Service d'Orthopédie, Hôpital Lariboisière (AP-HP), Université D. Diderot, Paris; M. Dougados, MD, Service de Rhumatologie, Hôpital Cochin, Université R. Descartes, Paris; J-F. Ravaud MD, PhD, CERMES, INSERM U502, Villejuif, Réseau Fédératif de Recherche sur le Handicap.

Address reprint requests to Dr. S. Poiraudau, Service de rééducation et de réadaptation de l'appareil locomoteur et des pathologies du rachis, Hôpital Cochin, 27 rue du Faubourg St. Jacques, 75679, Paris cedex 14, France. E-mail: serge.poiraudau@cch.ap-hop-paris.fr

Submitted October 23, 2002; revision accepted August 19, 2003.

Public health policies previously evaluated the status of a population using mortality and morbidity rates. Disability and handicap measures add an important perspective to the health status of a population and are becoming an important component in population-based studies for defining public health strategies. The development of studies on disablement is a relatively recent phenomenon. It was not until 1980 that the World Health Organization (WHO) officially adopted the "International Classification of Impairments, Disabilities, and Handicaps" (ICIDH) model, based on Wood's theoretical framework¹. This ICIDH model considers a pathway from disease to impairment, from impairment to disability, and from disability to handicap. Impairment refers to any loss or abnormality of psychological or anatomical structure or function and can be seen as disturbances at the level of the organ or other body structure. Disability is defined by any restriction or lack of ability to perform an activity in the manner or within the range considered normal for a human being. Disability operates at

the individual level and can be described through personal description of simple activities of daily living. Handicap refers to disadvantage for a given individual, resulting from impairment or a disability that limits or prevents the fulfillment of a social role that is normal for that individual. Handicap operates at the level of the individual in a social context. For example, osteoarthritis (OA) can lead to deformity and restricted joint movement (impairment) that can induce difficulty or inability in activities of daily living such as walking or dressing (disability). Individuals with OA may therefore be unable to work or to participate in social activities (handicap). The ICIDH has recently been changed to ICF (International Classification of Functioning, Disability and Health)². In the ICF, the dimensions Impairment, Disability, and Handicaps have become Body Structure and Function, Activity Limitation, and Participation Restriction. Participation restriction records the discordance between the observed and expected social participation of an individual with a specific health condition. The expected social participation cannot be determined a priori, but represents the population norm. Assessing participation restrictions supposes that the individuals with a specific health condition are compared to a representative population of people without the specific health condition. This model also gives a central role to contextual factors such as environmental factors that describe the context in which individuals live and personal factors that are the particular background of the individual, such as sex, age, and lifestyle. Environmental factors interact with the other dimensions as facilitators or barriers. For example, an environment with barriers such as stairs will restrict the individual participation if this individual cannot climb stairs. Facilitators such as an access rail could reduce this restriction of participation.

Total joint replacement is a widely performed treatment³. Because of an aging population, high prevalence of arthritis among the elderly, and prosthetic advancements, the demand for lower limb arthroplasty has been increasing³. The projections for 2030, based on future changes in the age profile of the population and assuming that no new treatment is introduced, will result in an increase of roughly 85% in total knee replacements and 80% in total hip replacements³. Extensive clinical evidence supports a high surgical success of lower limb arthroplasty regarding postoperative complications, mortality, revision rates, pain relief, and health-related quality of life⁴⁻²⁴. Several studies comparing the level of disability before and after surgery have shown clearly that arthroplasty does result in an improvement of disability¹⁷⁻²⁰. The results of a French national survey, entitled Handicap, Disability, Dependence, involving a representative sample showed that after adjustments for confounding factors, activity limitations were greater among individuals with arthroplasty for activities involving hip and knee functions: climbing stairs, walking distance, bending forward, cutting toenails, and housekeeping activi-

ties (carrying and shopping)²⁵. Nevertheless, to our knowledge, no study performed to date on a large national representative sample has described the social participation restrictions of individuals with hip or knee arthroplasty.

We aimed to describe social participation and environmental factors of individuals with hip and knee arthroplasty based on a large national representative sample, and to compare them with the general population (without arthroplasty). For this purpose we analyzed the data of the Handicap, Disability, Dependence Survey.

MATERIALS AND METHODS

Study design. The data for this report were collected from the Handicap, Disability, Dependence (HID) Survey, conducted by the French National Institute of Statistics and Economic Studies (INSEE) between November 1999 and January 2000. The survey methodology is described in detail elsewhere²⁶. Briefly, the survey aimed to describe disability and social participation restrictions in France. The target population included residents in all French households (n = 57.4 million). A 2-stage method was used according to UN recommendations²⁷. For the first stage, a representative sample of census districts (roughly 600 inhabitants per district) was selected. Along with the standard forms of the 1999 French population census, enumerators in these districts gave households an additional questionnaire concerning daily life and health. This screening questionnaire classified persons into 6 groups of increasing disability. This first phase concerned about 417,500 persons and had an 86% response rate.

For the second stage, a stratified randomization with a high sampling rate for the most severely disabled group and a minimum sampling rate for persons without daily living restrictions was performed to constitute the selected population. Each of the resulting groups is allocated a specific sampling coefficient, which increases with the probability or severity of the presumed handicap. This design allows weighting the data to estimate representative results at a national level. Computer assisted personal interviews were conducted by 442 trained interviewers at the subjects' homes. Successful interviews were obtained for 16,945 persons out of the 21,760 potential respondents (77.9%). The sample on which the analysis is based is the final sample of 16,945 subjects representative of the French population living at home.

Questionnaire

Chronic conditions. The presence of chronic conditions and impairments was ascertained in 2 different stages from the subjects' reports. At the beginning of the interview, the respondents were asked: "In your daily life do you have any physical, sensorial, intellectual or mental difficulties (resulting from an accident, a chronic disease, a problem at birth, a disability, aging)?" If the response was "yes," 2 additional questions were asked: "What kind of difficulties, impairments or other health problems?" and "Can you specify the origin of every problem you have just mentioned?" During the second stage, individuals were interviewed about their difficulty in performing certain tasks. When a difficulty was reported for a specific task, the subject was asked to indicate the cause and the origin of the difficulty. If the cause was not previously mentioned in the health disorders, a new line was added. The questionnaire did not contain a limited list of chronic conditions, but the chronic conditions were reported as the participants mentioned them and were equally weighted.

Disability status. Disability was assessed based on subjects' reports. Disability instruments developed in gerontology research and used in community surveys focusing on disability and aging served to develop this questionnaire according to UN recommendations²⁸⁻³⁰. Participants were asked whether they could perform different activities of daily living with "no difficulty," with "some difficulty," or with "a lot of difficulty," or whether they needed help in 5 defined areas: activities of personal care

(washing, dressing, cutting toenails, ability to hold an object, cutting food, filling a glass, eating, using the toilet, control of bladder and bowel movements); mobility (going outside, getting out of bed or a chair, climbing stairs, bending forward, and walking distance); housekeeping (shopping, carrying, housework, meal preparation); cognitive ability (to remember something, orientation, to complete a form, ability to take medication); and sensorial ability (vision, hearing, and talking). For each activity, subjects were defined as disabled if they reported "some difficulty" in performing an activity. Disability status has been analyzed in a previous study²⁵.

Participation restrictions. The social and personal consequences of disability were assessed on the basis of subjects' reports. Respondents were asked about getting around inside and outside the house, satisfaction with housing conditions, trips and means of transportation, employment, family and social relationships, and leisure and holidays.

Contextual factors — personal and environmental. Respondents were asked about their demographic, financial, administrative, and legal situation, and about their education and degrees.

Information was also obtained on social and family environment, in the different persons helping them perform activities of daily living, and on technical aids, home accessibility, housing adjustments and public transportation accessibility.

Satisfaction. The questionnaire also assessed respondents' satisfaction with their living conditions, and the technical and human help they received. Respondents also reported whether they wanted to go out more often.

The complete questionnaire (80 pages, French and English versions) can be obtained from the website of the Réseau Fédératif de Recherche sur le Handicap at the following URL: http://rfr-handicap.inserm.fr/hidden-quete/FTP/que99_a.pdf.

Definition of the Study Group

The hip or knee arthroplasty group was identified using the following procedure. First, all subjects reporting "prosthesis" as a cause of difficulty were selected. For these subjects the interview data were reexamined by one of us (IB) to exclude: individuals having a prosthesis unrelated to the study (e.g., upper limb prosthesis, ankle prosthesis, amputation, eye prosthesis, ear prosthesis); individuals with severe neurological conditions that interfere with mobility (e.g., hemiplegia, Parkinson's disease, paraplegia, tetraplegia, multiple sclerosis); and individuals for whom the investigator could not ascertain whether they had knee or hip arthroplasty (undetermined group). During this first stage, individuals with difficulty due to lower limb arthroplasty were identified; second, individuals not reporting prosthesis as a cause of difficulty in daily living but responding "yes" to both questions: "Do you have a prosthesis replacing a part of your body? Is it a lower limb prosthesis?" were selected. For these subjects the interview data were also reexamined to exclude: individuals having unrelated prosthesis (e.g., ankle prosthesis, amputation); individuals with severe neurological conditions interfering with mobility (e.g., hemiplegia, Parkinson's disease, paraplegia, tetraplegia, multiple sclerosis); and individuals for whom the investigator could not ascertain whether they had knee or hip arthroplasty (undetermined group). This second stage allowed identification of individuals with lower limb arthroplasty that was not a cause of difficulty.

A random sample of 100 of these subjects was selected. Another investigator (SP) independently examined the interview data of these subjects to exclude those with a prosthesis unrelated to study, severe neurological conditions, or whose condition remained undetermined. The degree of agreement between the 2 assessors was determined with the kappa coefficient. Discrepancies among reviewers regarding the definition of the study group were resolved by consensus.

Statistical analysis. Data were used to generate estimations representative of the French population by the application of a weighting factor. For calculation of statistical parameters, weights were rescaled so that the average weight equals 1. These adjustments did not affect parameter estimates such

as odds ratio (OR), but allowed for variance estimates to be more conservative while retaining the unequal probability of case selection.

Descriptive statistics included means with standard deviation and proportions. The comparisons of findings for restriction of participation, contextual factors, and satisfaction of adults with hip and knee arthroplasty to the general population were estimated from a multiple logistic regression equation adjusted for the confounding factors (OR and 95% confidence interval, CI). In these models, the dependent variables were: a participation restriction in a specific domain (e.g., being able or unable to go places because of health problems during the last 3 months), a contextual factor (e.g., having or not having access to public transportation), or satisfaction (e.g., being satisfied or unsatisfied with assistance received); independent variables were: having or not having hip/knee prosthesis and confounding factors. The confounding factors in this analysis were: sex, age, and number of chronic conditions, since individuals with lower limb prostheses were more likely to report more chronic conditions (OR 5.0, 95% CI 3.4–7.2) than the general population²⁵, and because risk of having difficulties with activities of daily living increases with the number of chronic conditions²⁸. Separate models were created for each participation restriction, contextual factor, and satisfaction.

All data analyses were performed using version 8.2 of the Statistical Analysis System.

RESULTS

Identification of the study group. Eight hundred fifteen individuals were identified as having lower limb prosthesis, representing an estimate of 691,000 persons (prevalence 1.2%) in the French non-institutionalized population. There was a strong degree of agreement between the 2 assessors (kappa = 0.77). Therefore, the level of disagreement between them did not result in changes to the way the remaining cases were assessed.

Description of the Participation Restrictions and Environmental Factors of Individuals with Lower Limb Arthroplasty

Demographic characteristics, chronic conditions, and economic situation of the arthroplasty group. Demographic characteristics of the arthroplasty population have been described²⁵. Briefly, mean age was 71.5 ± 11.7 years (minimum 26 yrs; maximum 98). This population reported a median of 3 chronic conditions per person (range 0–11). At least 2 chronic conditions were reported by 81.2% of the arthroplasty population (Table 1). Education levels were low, with primary school (i.e., < 5 yrs of education) being the highest education level for 79.4%, and most participants (77.9%) were retired.

Most participants had a low family income (64.4% < 19,207 euros/yr). Compensation for health problems was received by 11.8%, and 56.9% were exempt from paying patient contributions to medical expenses for some or all of their treatments.

Living conditions. Living conditions were very satisfying for 30.2%, satisfying for 42.3%, acceptable for 13.4%, and insufficient for 7.9%. Almost 10% had moved, and 8.9% were going to move, because of their health problems.

About 10% reported difficulty entering their home from the street unassisted. Among them, 71.1% said that this was

Table 1. Demographic characteristics and number of chronic conditions of individuals with lower limb arthroplasty and the remaining participants.

Characteristics	Arthroplasty Population			Remaining Participants		
	n	Estimated Population* Frequency	%	n	Estimated Population* Frequency	%
Sex						
Women	497	426,000	61.6	7557	29,037,000	51.2
Men	318	265,000	38.4	8544	27,645,000	48.8
Age, yrs						
< 65	186	133,000	19.2	9168	48,310,000	85.2
65–74	270	231,000	33.4	3336	4,907,000	8.7
> 75	359	327,000	47.3	3597	3,466,000	6.1
Number of chronic conditions ≥ 2	670	560,800	81.2	8362	10,430,000	18.4
Total	815	691,000	100	16101	56,683,000	100

* Data are rounded to the nearest thousand; group totals vary slightly due to rounding error.

due only to their health status. Almost 12% reported difficulty getting around inside their homes. Nineteen percent had specific fittings within the home because of health problems, and 8.9% reported they needed some special fittings. Assistive devices were used by 46.6%, and 3.4% reported they needed devices. About 47% used or needed a walking stick and 3.3% a walking frame.

Getting around. About 45% drove regularly or occasionally, but 10.2% did not drive any more, the main reason being health problems for 54.9%. Only 4.2% needed to adapt their cars. Accessing public transportation was difficult for 16% and impossible for 28.3%.

Only 40.1% had no difficulty getting around. About 20% had difficulty getting around but could go everywhere on their own; 17.7% could not go everywhere on their own, and 20% could not go out unassisted. Nearly 44% had not gone out the day before the interview. In all, 22.3% wished to go out more often.

Social relationships, holidays, leisure, and social life. About 55% never or hardly ever went on holiday and 40% went at least once every 2 years. Only 10.5% played some type of sport; 37.5% did not play a sport because of health problems, 34.9% because of their age, 15% because they did not want to, and 2% because it was too time-consuming. Nearly 5% were attending free sports events, 15.4% the cinema, 8.4% the theater, and 4.7% classical concerts. About 36% took part in associations.

Helpers. Helpers were all persons regularly helping perform common daily activities. The arthroplasty population reported a median of 1 helper per person (range 0–8). About 24% were helped by professionals only, 37.6% by a close relation only, and 38.3% by either professionals or close relations. The tasks performed with at least one helper were housework (41%), shopping (35.5%), financial and administrative tasks (25%), personal care (20.4%), attending to their health problems (17.3%), alleviating loneliness

(16.8%), going outside (14.4%), defending their rights (14.1), and entering their home from the street (3.1%). The helper population is described in Figure 1.

Comparison with the general population. Differences between the arthroplasty group and the remaining participants were important regarding age, sex, and the number of chronic conditions (Table 1). We therefore made adjustments for these variables.

Economic characteristics of the arthroplasty group (Table 2). After adjustment for sex, age, and the number of chronic conditions, income levels for the arthroplasty population did not differ from those of the general population. The arthroplasty population did not receive more compensation for health problems, but was more likely to be exempted from patient contributions to medical expenses for some or all of their treatments (OR 1.5, 95% CI 1.1–2.0).

Living conditions (Table 3). After adjustment for confounding factors, the arthroplasty population did not have greater participation restrictions entering their homes from the street and getting around inside their homes than the general population. Access to the home from the street was more often on the same level (OR 1.7, 95% CI 1.2–2.4) and stairs were less frequent (OR 0.7, 95% CI 0.5–0.9). Moreover, specific fittings were more frequent within the arthroplasty population (OR 2.9, 95% CI 2.0–4.2), as were assistive devices (OR 5.2, 95% CI 3.7–7.2), compared with the general population. The specific fittings concerned the toilet (OR 1.5, 95% CI 1.1–1.9) and the bathroom (OR 1.4, 95% CI 1.0–1.8), while the assistive devices were mainly walking sticks (OR 3.0, 95% CI 1.9–4.6).

Overall, the arthroplasty population was as satisfied as the general population with their living conditions, and did not move out more often because of health problems.

Getting around (Table 4). The arthroplasty population had more difficulty getting around inside the home (OR 2.1, 95% CI 1.5–2.9). Access to public transportation was more

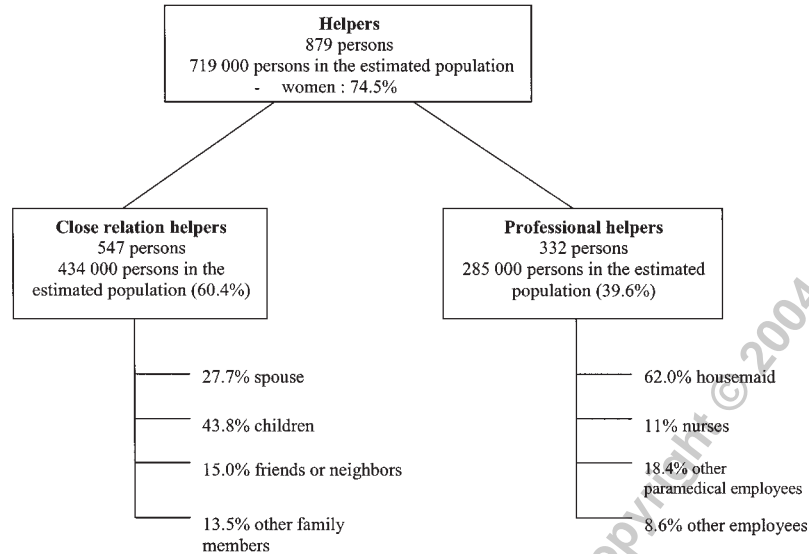


Figure 1. Description of helpers.

Table 2. Economic characteristics of the arthroplasty group: comparison with the remaining participants (OR and 95% CI). OR (95% CI) adjusted for age, sex, and number of chronic conditions.

	OR	95% CI
Income level		
Incomes < 19,207 euros/yr	1.3	0.9–1.8
Administrative situation		
Receiving compensation for health problems	0.7	0.5–1.2
Exempted from patient contribution to medical expenses for some or all of their treatment	1.5 [†]	1.1–2.0

[†] Significant.

difficult (OR 2.0, 95% CI 1.5–2.8) and being unable to go to places because of health problems was more often reported (OR 2.1, 95% CI 1.3–3.2). Going out the day before the interview was reported less often (OR 0.6, 95% CI 0.5–0.9). The most frequent explanation reported for staying home was that they “had to stay home” (OR 2.2, 95% CI 1.2–4.1) and especially that “nobody could go out with them” (OR 4.1, 95% CI 2.4–7.1). However, there was no difference in the 2 groups’ wanting to go out more often.

Social relationships, holidays, leisure, social life and helpers (Table 4). Although living with someone was reported less often by the arthroplasty population (OR 0.4, 95% CI 0.3–0.5), there was no difference between the 2 groups concerning relationships with their families or other proxy. Going on holidays was reported as often as in the general population. However, the arthroplasty population was less likely to play sports (OR 0.5, 95% CI 0.3–0.8) and reported going to free sports events (OR 0.5, 95% CI 0.2–0.9), the cinema (OR 0.6, 95% CI 0.4–0.9), and

concerts (OR 0.5, 95% CI 0.2–0.9) less frequently. Moreover, this population was more likely to take part in an association (OR 1.5, 95% CI 1.1–2.0).

It was more often reported that at least one person was helping with common daily activities (OR 1.8, 95% CI 1.3–2.5). Overall, individuals with hip and knee arthroplasty were as satisfied as the general population with the technical, financial, and human assistance they received.

DISCUSSION

To our knowledge, this is the first time that participation restrictions and environmental factors of adults with hip and knee arthroplasty have been described in a national random sample and compared to the general population. Most studies have compared the level of disability before and after operations, and have revealed that arthroplasty does result in an improvement in the level of disability. The results of the Handicap, Disability, Dependence Survey involving a national representative sample showed that after adjustments for confounding factors, activity limitations were greater among individuals with arthroplasty²⁵. Our study was based on a complementary approach and showed that despite the higher level of disability reported in individuals with hip and knee arthroplasty²⁵, this population did not have more disadvantages than the general population for several dimensions such as economic situation, living conditions, social relationships, and holidays.

The economic situation of the arthroplasty group compared to the general population showed that, although this group did not receive more compensation for health problems, annual incomes (comprising compensations and pensions) were similar in both groups. This may be partly related to the fact that most patients with total joint arthro-

Table 3. Living conditions and environmental factors for the hip and knee arthroplasty group: comparison with the remaining participants (OR and 95% CI). OR (95% CI) adjusted for age, sex, and number of chronic conditions.

	OR [†]	95% CI
Participation restriction		
Entering home alone from the street with difficulty	1.4	0.8–2.4
Entering home from the building entrance with difficulty	2.3	1.2–4.6
Needing help to enter home from building entrance	0.6	0.3–1.1
Difficulty moving from room to room in the flat or house	1.6	1.0–2.6
Environmental factors		
Living conditions		
Living in a house	1.0	0.7–1.3
Living in a flat	1.0	0.7–1.3
Housing accessibility		
Home accessibility from the street		
On the same level	1.7	1.2–2.4
With an access rail	0.5	0.2–1.5
With stairs	0.7	0.5–0.9
With a lift	1.7	0.4–6.8
Flat accessibility from the building entrance		
On the same level	2.3	1.3–4.1
With an access rail	0.5	0.1–3.7
With stairs	0.5	0.3–0.9
With a lift	0.7	0.4–1.2
Specific fittings within the home		
Having or needing specific fittings for health problems	2.9	2.0–4.2
Toilet modifications	1.5	1.1–1.9
Bath or shower modifications	1.4	1.0–1.8
Kitchen modifications	0.6	0.2–2.0
Seat modifications	0.7	0.4–1.1
Technical device to open or close doors	1.4	0.6–3.3
Assistance devices		
Having or needing assistance devices for personal mobility	5.2	3.7–7.2
Walking stick	3.0	1.9–4.6
Walking frame	0.8	0.5–1.2
Satisfaction		
Being satisfied or very satisfied with the living conditions	0.9	0.7–1.3
Having moved out because of health problems	1.3	0.8–2.2
Are going to move out because of health problems	1.7	1.0–2.9

[†] Significant OR are in bold type.

plasty were retired and their work was probably not interrupted more because of health issues than the general population. Thus, their retirement pension was not lower. Moreover, they were more often exempted from the patient contribution to medical expenses for some or all their treatments. These results may explain why they were as satisfied as the general population with the financial assistance they received. The working status of the arthroplasty population was not analyzed because only 69,000 persons (10%) held jobs.

Individuals with hip or knee arthroplasty did not report participation restrictions associated with housing more often. Better accessibility to homes, more specific fittings, assistive devices, and persons helping with common daily activities probably reduced the impact of disability.

If participation restrictions were not reported more often

by the arthroplasty population for several dimensions, this was not true for all the domains being studied. Indeed, individuals living in flats more often reported having difficulty getting from the building's entrance to their flat unassisted. Regarding the ability to get around within the environment, the arthroplasty population was more likely to report participation restrictions. These participation restrictions were probably the result of the interaction between a higher level of disability and poorer access to public transportation. Nevertheless, this situation seems to be well accepted as the arthroplasty population probably became accustomed to this participation restriction. It seems that giving up an activity can be observed in several situations³¹. This is highlighted by the fact that despite getting around less often, individuals with hip and knee arthroplasty did not want to go out more often. Less ability to get around could also explain why this

Table 4. Findings on transportation and getting around in the hip and knee arthroplasty group: comparison with the remaining participants (OR and 95% CI). OR (95% CI) adjusted for age, sex, and number of chronic conditions.

	OR [†]	95% CI
Transportation		
Drive a car	1.4	0.8–2.4
Special features within the car	1.6	0.7–3.4
Difficulties or no access to public transportation	2.0	1.5–2.8
Getting around		
Getting around with difficulty	2.1	1.5–2.9
Unable to go places because of health problems in the last 3 months	2.1	1.3–3.2
Going out at least once yesterday	0.7	0.5–0.9
Not going out yesterday because:		
I did not need to	0.7	0.5–0.9
I did not wish to	0.8	0.6–1.2
I was temporarily unable	1.0	0.6–1.9
I was totally unable	0.8	0.4–1.4
I had to stay home	2.2	1.2–4.1
There was no accessible transportation	1.3	0.1–10.6
There was nobody to go with me	4.1	2.4–7.1
Wanting to go out more often	1.0	0.7–1.5

[†] Significant OR are in bold type.

Table 5. Findings on community, social and civic life, and helpers, in the arthroplasty group, versus the remaining participants (OR and 95% CI). OR (95% CI) adjusted for age, sex, and number of chronic conditions.

	OR [†]	95% CI
Relationships		
Living with someone	0.5	0.4–0.7
Having relationships with family members	1.5	0.9–2.2
Having relationships with friends, neighbors	1.3	0.9–1.9
Holidays, leisure, and social life		
Taking holidays at least every 2 yrs	0.8	0.6–1.0
Practicing sports	0.5	0.3–0.8
Going to free sports events	0.5	0.2–0.9
Going to cinema	0.6	0.4–0.9
Going to theater	0.6	0.3–0.9
Going to classical concerts	0.5	0.2–0.9
Taking part in an association	1.5	1.1–2.0
Helpers		
Having a least one helper	1.8	1.3–2.5
Satisfaction with the assistance received		
Having all the help needed	0.8	0.6–1.0
Having all the help needed for the main points	1.2	0.9–1.8
Lacking equipment	1.2	0.5–2.7
Lacking money	1.4	0.9–2.1
Lacking human help	0.7	0.4–1.3

[†] Significant OR are in bold type.

population was less likely to go to sports events, cinema, theater, and concerts. Moreover, the arthroplasty population was less likely to practice sports. This could be the result of their disability mainly concerning the function of the lower limb.

Our study has the usual limitations of descriptive surveys based on self-reported chronic conditions. The identification of the study group can be difficult if the questions used to solicit the self-reported chronic conditions are misunderstood. In our analysis, the arthroplasty group may be underestimated if some persons did not understand the question, “Do you have a prosthesis replacing a part of your body?” and if yes, “Is it a lower limb prosthesis?” Nevertheless, the arthroplasty population represented an estimated 691,000 persons, which is consistent with the number of patients with arthroplasty living in France³². As our results are based on patients’ reports, we cannot provide information about the different indications for surgery, surgical procedure, rehabilitation programs, postoperative complications, or the revision rates. Moreover, we could not distinguish between hip and knee arthroplasty and compare disability in these 2 groups.

It should be mentioned that this analysis was performed only in the French non-institutionalized population, and therefore the prevalence of arthroplasty in France might be underestimated. However, the French institutionalized population is estimated as 660,000 persons, with 22,400 persons having hip or knee arthroplasty (data not shown). All these limitations are counterbalanced by the fact that this descriptive survey gives the first detailed data ever gathered on the participation restrictions and environmental factors in a representative sample of the entire arthroplasty population in France.

In conclusion, our study showed that individuals with hip and knee arthroplasty did not report social participation restrictions in several domains such as economic situation, living conditions, social relationships, and holidays. Two hypotheses could explain these results: environmental factors such as specific fittings, assistive devices, and human help could compensate for the higher level of disability and help reduce the social participation restrictions; it could also be that individuals may become accustomed to participation restrictions. For example, although they were going out less often, individuals with hip and knee arthroplasty did not want to go out more often. These results may have contributed to the level of satisfaction and quality of life reported by these patients in several studies.

However, individuals with hip or knee arthroplasty reported participation restrictions in other domains such as getting around and leisure. Efforts should be made in future policies to control these disadvantages in order to increase this population’s participation.

ACKNOWLEDGMENT

Our study design is the result of intensive cooperation between Ministry of Employment and Solidarity, National Social Security (INSEE), and leading research institutes in the field including INSERM and particularly the Réseau Fédératif de Recherche sur le Handicap. The authors thank the INSEE division Enquêtes et études démographiques and especially Pierre Mormiche, who is responsible for the Handicap, Incapacité, Dépendance (HID) project task force.

REFERENCES

1. World Health Organization. International classification of impairments, disabilities and handicaps. Geneva: WHO; 1980.
2. World Health Organization. International classification of functioning, disability and health (ICF). Geneva: WHO; 2001.
3. Praemer A, Furner S, Rice DP. Arthroplasty and total joint procedures. In: Praemer A, Furner S, Rice DP, editors. Musculoskeletal conditions in the United States. Rosemont, IL: American Academy of Orthopaedic Surgeons; 1999:119-38.
4. Callahan CM, Drake BG, Heck DA, Dittus RS. Patient outcomes following tricompartmental total knee replacement. A meta-analysis. *JAMA* 1994;271:1349-57.
5. Harris WH, Sledge CB. Total hip and total knee replacement (1) [review]. *N Engl J Med* 1990;323:725-31.
6. Harris WH, Sledge CB. Total hip and total knee replacement (2)[review]. *N Engl J Med* 1990;323:801-7.
7. Seagroatt V, Tan HS, Goldacre M, Bulstrode C, Nugent I, Gill L. Elective total hip replacement: incidence, emergency readmission rate, and postoperative mortality. *BMJ* 1991;303:1431-5.
8. Soderman P, Malchau H, Herberts P, Johnell O. Are the findings in the Swedish National Total Hip Arthroplasty Register valid? *J Arthroplasty* 2000;15:884-9.
9. Havelin LI, Engesaeter LB, Espehaug B, Furnes O, Lie SA, Vollset SE. The Norwegian Arthroplasty Register: 11 years and 73,000 arthroplasties. *Acta Orthop Scand* 2000;71:337-53.
10. Charnley J. The long-term results of low-friction arthroplasty of the hip performed as a primary intervention. 1972. *Clin Orthop* 1995;319:4-15.
11. Schulte KR, Callaghan JJ, Kelley SS, Johnston RC. The outcome of Charnley total hip arthroplasty with cement after a minimum twenty-year follow-up. The results of one surgeon. *J Bone Joint Surg Am* 1993;75:961-75. Erratum in *J Bone Joint Surg Am* 1993;75:1418.
12. Herberts P, Malchau H. Long-term registration has improved the quality of hip replacement: a review of the Swedish THR Register comparing 160,000 cases. *Acta Orthop Scand* 2000;71:111-21.
13. Kirwan JR, Currey HL, Freeman MA, Snow S, Young PJ. Overall long-term impact of total hip and knee joint replacement surgery on patients with osteoarthritis and rheumatoid arthritis. *Br J Rheumatol* 1994;33:357-60.
14. Fortin PR, Clarke AE, Joseph L, et al. Outcomes of total hip and knee replacement: preoperative functional status predicts outcomes at six months after surgery. *Arthritis Rheum* 1999;42:1722-8.
15. NIH consensus conference: Total hip replacement. NIH Consensus Development Panel on Total Hip Replacement [review]. *JAMA* 1995;273:1950-6.
16. Franzen H, Johnsson R, Nilsson LT. Impaired quality of life 10 to 20 years after primary hip arthroplasty. *J Arthroplasty* 1997; 12:21-4.
17. Soderman P, Malchau H, Herberts P. Outcome after total hip arthroplasty: Part I. General health evaluation in relation to definition of failure in the Swedish National Total Hip Arthroplasty register. *Acta Orthop Scand* 2000;71:354-9.
18. Ritter MA, Albohm MJ, Keating EM, Faris PM, Meding JB. Comparative outcomes of total joint arthroplasty. *J Arthroplasty* 1995;10:737-41.
19. Rissanen P, Aro S, Slati P, Sintonen H, Paavolainen P. Health and quality of life before and after hip or knee arthroplasty. *J Arthroplasty* 1995;10:169-75.
20. Towheed TE, Hochberg MC. Health-related quality of life after total hip replacement [review]. *Semin Arthritis Rheum* 1996;26:483-91.
21. Lavernia CJ, Guzman JF. Relationship of surgical volume to short-term mortality, morbidity, and hospital charges in arthroplasty. *J Arthroplasty* 1995;10:133-40.
22. Kreder HJ, Deyo RA, Koepsell T, Swiontkowski MF, Kreuter W. Relationship between the volume of total hip replacements performed by providers and the rates of postoperative complications in the state of Washington. *J Bone Joint Surg Am* 1997;79:485-94.
23. Hawker G, Wright J, Coyte P, et al. Health-related quality of life after knee replacement. *J Bone Joint Surg Am* 1998;80:163-73.
24. Jones CA, Voaklander DC, Johnston DW, Suarez-Almazor ME. Health related quality of life outcomes after total hip and knee arthroplasties in a community based population. *J Rheumatol* 2000;27:1745-52.
25. Boutron I, Poiraudou S, Ravaut J-F, et al. Disability in adults with hip and knee arthroplasty. A French national community based survey. *Ann Rheum Dis* 2003;62:748-54.
26. Mormiche P. L'enquête HID de l'INSEE. Objectifs et schéma organisationnel. *Courrier des statistiques* 1998;87-88:7-18.
27. United Nations, Statistics Division. Manual for the development of statistical information for disability programs and policies. New York: UN publication; 1996.
28. Verbrugge LM, Lepkowski JM, Imanaka Y. Comorbidity and its impact on disability. *Milbank Q* 1989;67:450-84.
29. Kane RA, Kane RL. Assessing the elderly: A practical guide to measurement. Lexington, MA: D.C. Heath and Co.; 1981.
30. Katz S, Ford AB, Moskowitz RW, Jackson BA, Jaffe MW. Studies of illness in the aged: the index of ADL: a standardized measure of biological and psychosocial function. *JAMA* 1963;185:914-9.
31. Cott CA, Gignac MA. Independence and dependence for older adults with osteoarthritis or osteoporosis. *Can J Aging* 1999; 18:1-25.
32. Courpied JP, Caton J, Bouee S, Charpak Y, Thomine JM. Bone and joint disease in adults in France: a survey in 2000 persons [French]. *Rev Chir Orthop Reparatrice Appar Mot* 2001;87:424-36.