Chapter 4
Descriptive Studies

Mario Ulises Pérez-Zepeda and Lorena Jocabed Rocha-Balcázar

Abstract Descriptive studies are a group of designs that even they have a lot of limitations, in aging are particularly important to define the different conditions that affect older adults and are not well recognized or still are in very preliminary stages. There is a growing need of delimiting the dimension of conditions such as frailty, sarcopenia, cognitive decline among others; in order to alert both general public and in particular health professionals. On the other hand, smaller studies such as case series and case reports are needed in this age group to continuously describe diseases or other conditions that in the past were thought not to happen in older adults. Therefore this designs aid in increasing the recognition of health problems in older adults and the magnitude of them.

Keywords Descriptive-studies • Descriptive-research • Prevalence-studies • Ecological-studies

4.1 Introduction

There is a group of research reports that are very close to clinical practice and that are taken directly from daily practice, such as case studies and case series. Alternatively, and closer to epidemiology, are studies that look only at the frequency with which a phenomenon is present, most often illnesses in a fixed place and time, such as prevalence studies and ecological studies [1]. These studies may be derived either from new data or from databases, which in the hospital context are generally the patients' clinical records. The objective of this type of study is to observe and collect data about a given phenomenon in an individual or group of individuals [2]. Depending on the number of subjects and the presence of a reference group (or all

M.U. Pérez-Zepeda (✉)
National Institute of Geriatrics, Mexico City, Mexico
e-mail: ulises.perez@me.com; ulises.perez@salud.gob.mx

L.J. Rocha-Balcázar
South Medical Clinic Foundation, Mexico City, Mexico
e-mail: jocabed_3791@hotmail.com

C. García-Peña et al. (eds.), *Aging Research - Methodological Issues*,
DOI 10.1007/978-3-319-18323-7_4

of the subjects exposed to risk of suffering from the condition), these are divided into case studies, case series and prevalence studies. Only the latter contemplates taking an entire group of exposed subjects to learn the frequency with which the phenomenon of interest occurs in all of that population. They cannot yield data of causality, but they can suggest hypothesis.

4.2 Prevalence

One of the most important aspects of this type of study is the question of how representative a condition is within a given population. To have external validity, prevalence studies must start with a representative sample of the population to which it refers. However, this is not always possible in the case of older adults, since there are subgroups within this age group that are clearly differentiated from the rest, having a higher frequency of problems or illnesses, and the higher the age the higher will be the proportion with a particular illness. To this must be added the problem of survival, which could yield a false impression where a given condition has increased or decreased in frequency, depending on whether or not those who have died had the condition. When doing prevalence studies in older adults, not only the time and place of taking data must always be specified, but also the age group being referred to and whether there is a sampling strategy to avoid a misleading increase or decrease in groups of very advanced age. Knowing the type of place where the sample of older adults was taken is also very relevant in this age group because it is not the same to determine the prevalence of geriatric syndromes in residents of a personal care home as in ambulatory adults, since a larger prevalence of geriatric syndromes would always be found in the personal care home than in the ambulatory population [3].

One of the most common problems the researcher finds when developing prevalence studies in the senior citizen population is the lack of widely accepted definitions. Although this has been improving over time, as more consensuses are reached about the problems that concern the old, there is still a wide margin in the way in which geriatric processes are defined. One of the most common examples is frailty, where a multiplicity of definitions has been used, resulting in prevalence reports that differ enormously from one another, beyond the population variability itself [4].

Despite what these reports might contain arising from the records, many of the problems the researchers are trying to resolve might not be specified in the documents consulted, either because they are dealing with a recently defined condition or because the condition had a different name in earlier times. For example, in a 1990 article by Thorslund and collaborators, they were looking for the prevalence of protein energy malnutrition in older outpatient adults. However, the definitions used in this study make it almost impossible to compare the results with the current concepts. Worse, some of the criteria used for this condition might today be considered as part of frailty (inflammatory markers and skin test anergy) or sarcopenia (calorie and protein malnutrition). Even though it is an excellent study, its useful-

ness is questionable when trying to translate this knowledge to the present [5]. This example raises some of the problems described. There is no agreement on the definition of the term sarcopenia, and there are many definitions that might be found in the literature [6].

4.3 Case Study

This is the simplest design that can be made in clinical research where, from observation, a description is made from observation of an individual and of the clinical characteristics that are carriers of the phenomenon that is the object of the study. In general it is recommended that the classification be standardized and broadly accepted. In the case of studies of aging, an example is dementia, where many clinics would agree that it is appropriate to diagnose a subject with dementia using the DSM V criteria (even though new terminology of this edition changed). Most of these studies involve unusual cases that are not often seen in daily practice. However, especially in the case of old people, some illnesses are emerging that, while they might be considered common in younger groups, are uncommon in older adults. For example, a recently diagnosed case of Conn syndrome in an adult 95 years of age is a rare case in its own right, although the illness itself is not rare. Due to the increasing number of subjects of extreme age, the report of cases of different illnesses is useful for increasing available knowledge about the different manifestations that an older adult could present with an illness that is rare for this age group. Unlike prevalence studies, case studies may have a follow-up on the subject to learn the nature of the illness described; this aspect is shared in the case series design.

In the example chosen to illustrate a case study from the set of older adults, a case is described of systemic lupus erythematosus accompanied by primary biliary cirrhosis [7]. The illness in other age groups is not common, and much less so in older adults, so that in the description of the particular characteristics found, new knowledge from the case may be learned.

4.4 Case Series

This type of report groups similar cases that are presented during a fixed period of time. When similar cases of an illness are presented over a short time (days or weeks) they could raise an alert for an epidemic [1]. In the case of older adults a case series could be a substitute for clinical cohorts that require a larger number of subjects and that are difficult to put together in these age groups. As with the case study, definitions are very important; if no standard and accepted definition is available, the cases should be described completely instead of using a tag [8].

Both in this type of reporting and in the case studies, it is usual to review the available literature on the topic that supports the conclusions arrived at through the

case or cases presented. These need not to be systematic reviews; however, they would provide a general overview of the topic being studied.

The case series do not report only illnesses; they might also report on the development of a new intervention or therapy, or adverse effects of these, as in the example shown below. In that report, six cases of infections of the joints following injections in the knee joint are presented [9].

4.5 Other Descriptive Studies

Some texts include within this type of descriptive studies what are called ecological and surveillance studies [1]. Ecological studies correlate phenomena in populations, not in individuals. In the example presented below, visits to an emergency room are correlated with environmental pollution; a positive correlation is found between the number of visits to an emergency ward and the level of pollution [10]. Monitoring studies describe the appearance of a given phenomenon. In the example presented, a system for monitoring falls is implemented, which enables researchers to learn the frequency of falls within a specific community. While it might appear as a study of cohorts, in monitoring studies the goal is only to try to describe a phenomenon in terms of frequency without putting forward specific hypotheses of causal exposures [11, 12].

4.6 Example Summaries of Descriptive Studies in Aging

Below are some summaries of case series and case studies, presented as examples of what is reported on older adults at present.

4.6.1 Prevalence

Sarcopenia is a problem that is increasingly identified among older people. An algorithm was recently developed to identify this condition. The objective of our study was to determine the prevalence of sarcopenia in a group of senior citizens in Mexico City, using the algorithm for sarcopenia of the European working group. A cross-sectional study was carried out on senior citizens in the community using a sample of 345 adults 70 years of age or older, during 2008. The data were obtained by a group of standardized interviewers. With the goal of determining the presence of sarcopenia, muscular mass and strength were measured as well as physical performance. Muscular mass was measured by the circumference of the calf, muscular force by the strength of the grip, and physical performance by the speed of walking. The cutoff points used were as those suggested in the same European algorithm. A

total of 116 (33.6 %) of the subjects were found with sarcopenia, 75 (48.5 %) of them women and 41 (27.4 %) of them men, with higher prevalence in subjects 80 years of age or older (50.4 %). Sarcopenic obesity was found in five subjects (1.4 %), moderate sarcopenia in 21 patients (6 %) and severe sarcopenia in 94 subjects (27.2 %).

This study along many others on the topic of sarcopenia shows the actual difficulty that researchers and clinicians face when trying to define this entity, even that a clear definition was used, this is only one of about one dozen of definitions of this syndrome. Therefore, and appropriate description of how this algorithm was implemented is expected to be in the manuscript [6, 13].

4.6.2 Case Study

The report is of the case of a woman 69 years of age without a family history of autoimmune illness, only a history of hypertension. Over the previous 4 years she had presented transient arthralgia and arthritis. Later, she showed sensitivity to light, malar rash, and diffuse discoid lesions on her trunk and face, for which she was seeking medical attention. In addition, she reported a loss of weight of approximately 3 kg over the previous 3 months. The physical examination showed only synovitis of the wrists. The laboratory results were as follows: hyperglobulinemia (20 g/l), lymphopenia (850 cells/mm^3); with platelets, creatinine, and a general exam of urine normal. The immunology profile confirmed: positivity in the antinuclear antibodies (ANA) with titer 1:400 and anti-dsDNA 115 IU / ml, with serum complement normal. The following antibodies were negative: anti-La, anticardiolipin, lupus anticoagulant, anti-SM, anti-RNP, anti-SCL-70, anticentromere, rheumatoid factor, and anti-citrullinated peptide. With the foregoing, it was concluded that systemic lupus erythematosus (presence of 6 from 11 criteria of the American College of Rheumatology for lupus) was present.

One year later she developed liver dysfunction. The abdominal examination revealed hepatosplenomegaly, liver function tests found double the normal values. The antimitochondrial antibodies were positive (1:164), with anti-E2 positive fraction. Serology tests for the hepatitis B and hepatitis C virus were negative. The findings are consistent with the diagnosis of primary biliary cirrhosis so that, for testing and staging, a liver biopsy was carried out, which corroborated the diagnosis and was classified as being in stage 1. Treatment was given with 600 mg per day of ursodeoxycholic acid, normalizing liver function tests in a month.

Late onset of systemic lupus erythematosus is relatively rare, with a frequency of between 12 % and 18 %. Although the autoimmune mechanisms behind the association of these two autoimmune disorders are not completely understood, there are few cases reported for either illness. Moreover, the new onset of these diseases in older adults is still very rare, so descriptions found in clinical settings could aid at identifying them in daily routine work [7].

4.6.3 Case Series

Intra-articular injections of corticosteroids and hyaluronic acid in the knee are widely practiced as a conservative treatment for osteoarthritis. However, there are related side effects, in particular with the corticosteroids, mainly from infections. The microorganism most commonly encountered is Staphylococcus aureus, with the occasional participation of other organisms, including staphylococci and anaerobics.

In this report, the median age of the group was 75 years (64–87 years). Most of the patients had significant comorbidity. Three of the patients were treated with corticosteroids, and the other three with hyaluronic acid. All of the patients arrived in the emergency room 1–5 days after the injection. The main manifestations were pain, swelling of the extremities involved and difficulty walking. None of the subjects had fever at first.

The physical examination of the six patients revealed inflammation of the affected knee and pain with its movement (active and passive). Analysis of the synovial fluid revealed a lightly elevated white cell count (mostly neutrophils) in four of the patients; only two had positive Gram stain. Most patients had elevated erythrocyte sedimentation rate and C-reactive protein.

The resultant bacteria in the synovial fluid culture were staphylococcus or streptococcus. One patient had a sterile culture, probably because of oral antibiotic treatment before being admitted. Antibiotic treatment with cefazolin was started. It was adjusted according to the results of the culture. All of the patients were submitted to surgical treatment. In four of the patients the surgical intervention was carried out within the first 24 h. One patient, 64 years of age, refused surgery during the first 2 weeks of hospitalization and was initially treated only with antibiotics. Given that the condition did not improve, the patient finally consented and was intervened.

Three of the six patients were submitted to more than one surgery. Four patients were treated with formal arthrotomy and two with arthroscopy. The intraoperative findings in all cases were synovial congestion and purulent material. One patient, a man 86 years of age, was admitted to the intensive care unit following the operation after his second arthrotomy with progressive sepsis. Later he developed septic shock. He was again taken to the operating room for an urgent supracondylar amputation. He continued to deteriorate and finally died of septic shock.

Post-surgery, all the patients were treated in the same way: the antibiotics were administered for 4–6 weeks after surgery, the knees were immobilized for 3 days after surgery and were submitted to physiotherapy, drainage continued for several days. The median hospital stay was 22.5 days (9–40 days). The infection was finally resolved in five patients.

Intra-articular injection of the knee is not an inoffensive procedure and may be harmful and potentially fatal. In addition, its long-term benefit continues to be questionable.

This report shows rich information on septic arthritis secondary to intra-articular injections. This could give valuable information to clinicians on what to expect or bring up ideas to make new studies about the topic in researchers [9].

4.6.4 Ecological

The objective of this study was to investigate the effect of daily levels of air pollution (levels of carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide and other particles with an aerodynamic profile ≤10 μm) in morbidity and correlation with the daily number of visits to the emergency rooms due to lower respiratory illness in persons older than 64 years of age in the city of Sao Paulo, Brazil between 1996 and 1998. Generalized Poisson additive regression models were used and adjusted for the long-term trend and the climate, the days of the week and the daily number of admissions. Ozone and sulfur dioxide were the pollutants associated with visits to emergency department in older adults. These results reinforce the idea that air contamination can promote adverse health outcomes in older adults.

In this example the interaction between pollutants and health conditions seem to be related. Even though it provides with information, the descriptive nature of the study precludes from having any conclusion, and further studies with other designs could evidence if the association is true [10].

4.6.5 Monitoring

Falls are the main cause of fatal and non-fatal injuries among older people in the United States. Despite the importance of injuries caused by falls, epidemiological studies of them among older persons have not identified either their causes or the means of preventing them. Therefore, a system of monitoring was established in the community in Miami Beach, Florida, as part of a study to evaluate falls among old people. A total of 1,827 events of injury from falls were produced in this community between July 1985 and June 1986. More than 85 % (1,567) of the persons who fell received attention in an emergency room (the main source of information). The other cases were identified from one of the three sources utilized: reports from firemen, medical registers of hospitalized patients or from the medical report of the doctor who first provided primary care. Most of the falls (97 %) were listed as accidental.

More than 100 persons sought medical assistance because of a fall every month. The moment of the injury was known by 68 % (1,244) of the persons who fell. Seventy-four percent of these falls (921) occurred during daylight hours. Fifty-four percent of the falls (986) occurred in or near the house, and 38% of them recorded the specific place in the home where the fall took place: 42 % occurred in the bedroom, 34 % in the bathroom, 9 % in the kitchen, 5 % on the stairs, 4 % in the living room and the other 6 % in other areas. This monitoring system will help us use the study to clarify the causes of old people's falls and identify and evaluate the efforts of appropriate prevention. It will also help other persons in the design and implementation of other injury monitoring systems.

This study describes the different features of falls on a specific community of older adults. More than establishing inferences, the main goal of these studies is just to describe what to expect of a certain phenomenon [12].

4.7 Conclusions

While this type of studies does not allow for conclusions or inferences of causality, it is useful for describing a phenomenon in its early stages. As well, these studies are of low cost and with few ethical implications. As with other age groups, what ensures fidelity of information for older adults is planning the study properly, taking into account the peculiarities presented by a study on aging.

References

1. Grimes DA, Schulz KF (2002) Descriptive studies: what they can and cannot do. Lancet 359(9301):145–149. doi:10.1016/S0140-6736(02)07373-7
2. Gallin JI, Ognibene FP (2012) Principles and practice of clinical research, 3rd edn. Elsevier/Academic Press, Amsterdam/Boston
3. Dartigues JF (2005) Methodological problems in clinical and epidemiological research on ageing. Rev Epidemiol Sante Publique 53(3):243–249
4. Collard RM, Boter H, Schoevers RA, Oude Voshaar RC (2012) Prevalence of frailty in community-dwelling older persons: a systematic review. J Am Geriatr Soc 60(8):1487–1492. doi:10.1111/j.1532-5415.2012.04054.x
5. Thorslund S, Toss G, Nilsson I, von Schenck H, Symreng T, Zetterqvist H (1990) Prevalence of protein-energy malnutrition in a large population of elderly people at home. Scand J Prim Health Care 8(4):243–248
6. Arango-Lopera VE, Arroyo P, Gutiérrez-Robledo LM, Pérez-Zepeda MU (2012) Prevalence of sarcopenia in Mexico City. Eur Geriatr Med 3(3):157–160
7. Hammami S, Chaabane N, Mahmoudi H, Bdioui F, Saffar H (2013) Late-onset systemic lupus erythematosus-associated primary biliary cirrhosis. Int Arch Med 6(1):3. doi:10.1186/1755-7682-6-3
8. Carey TS, Boden SD (2003) A critical guide to case series reports. Spine (Phila Pa 1976) 28(15):1631–1634. doi:10.1097/01.BRS.0000083174.84050.E5
9. Shemesh S, Heller S, Salai M, Velkes S (2011) Septic arthritis of the knee following intraarticular injections in elderly patients: report of six patients. Isr Med Assoc J 13(12):757–760
10. Martins LC, Latorre MR, Cardoso MR, Goncalves FL, Saldiva PH, Braga AL (2002) Air pollution and emergency room visits due to pneumonia and influenza in São Paulo, Brazil. Rev Saude Publica 36(1):88–94
11. Rothman KJ, Greenland S, Lash TL (2008) Modern epidemiology, 3rd edn. Wolters Kluwer Health/Lippincott Williams & Wilkins, Philadelphia
12. DeVito CA, Lambert DA, Sattin RW, Bacchelli S, Ros A, Rodriguez JG (1988) Fall injuries among the elderly. Community-based surveillance. J Am Geriatr Soc 36(11):1029–1035
13. Perez-Zepeda MU, Gutierrez-Robledo LM, Arango-Lopera VE (2013) Sarcopenia prevalence. Osteoporos Int 24(3):797. doi:10.1007/s00198-012-2091-x