

METHODOLOGY

CHAPTER-III

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3.1 INTRODUCTORY STATEMENT

Research work is an art of scientific investigation, research, in its common term refers to a search of knowledge. It can be defined as “Scientific information on a specific topic.” It is usually a voyage of discovery. The term ‘research’ refers to the systematic method consisting of enunciating the problem, formulating a hypothesis, collecting the facts or data, analyzing the facts and reaching certain conclusion either in the form of solution towards the concerned problem or in certain generalizations for some theoretical formulation.

Redman and Mory (1923) define research as a “systematized effort to gain new knowledge.” **D. Slesinger and M. Stephenson** in the encyclopedia of social science (1930) define research as “the manipulation of things, concepts or symbols for the purpose of generalizing to extend, correct or verify knowledge, whether that knowledge aids in construction of theory or in the practice of an art.”

Research is, thus, the pursuit of truth with the help of study, observation, comparison and experiment. In short, the search for knowledge through objective and systematic method of finding solution to a problem is called research. **According to P.V. Young** (1996), “We may define social research as a scientific undertaking which by means of logical and systematized methods, aims to discover new facts or old facts and to analyze their sequences, interrelationships, casual explanations and the natural laws which govern them.” The purpose of any research work is to discover the answer to the question through the application of a scientific procedure. The main aim of the research is to find out the truth which is hidden and which has not been discovered yet. The research is one way to penetrate deep into the fact leading to knowledge. Thus, in order to organize the facts collected, proper scientific methodology must be used.

According to Karl Pearson (1989), “The scientific method is one and same in the branches (of science) and that method is the method of all logically trained mind. The unity of all sciences consists alone in its methods, not its material. In scientific method, logic aids in formulating propositions explicitly and accurately so that their possible alternatives become clear. Further, logic develops the consequences of such

alternatives, and when these are compared with observable phenomena, it becomes possible for the researcher or the scientist to state which alternative is most in harmony with the observed facts. All this is done through experimentation and survey investigations, which constitute the integral parts of scientific method.

Research methodology is a way to systematically solve the research problem. It may be understood as a science of studying how research is done scientifically. In it we study the various steps that are generally adopted by a researcher in studying his research problem along with the logic behind them.

According to C.R. Kothari (2004), “Research methodology has many dimensions, when we talk of research methodology we not only talk of the research methods, but also consider the logic behind the methods used in the context of research study and explain why we are using a particular method or technique and why we are not using other. So that research result can be capable of being evaluated either by the researcher himself or by other.

Thus, it is clear that a methodology has two important aspects, one deal with method employed and other with the result achieved.

Scientific methodology is the pursuit of the truth as determined by the logical consideration. It has a special significance in social science research where measurements are not absolute, but are selective and there are chances of error at various point during the study.

According to George L. Lundeburg (1926), “Scientific method consists of systematic observation, classification and interpretation of data.

In pursuit of the research, the most important thing to be decided by the researcher is the selection of problem. The selection of topic is a commitment of ones time and efforts in a particular direction.

A researcher’s primary goal distant or explore and gain an understanding of human behaviour and social life and thereby gain a greater control over time.

3.2 HYPOTHESIS

In scientific research we have to make new discoveries, but we cannot proceed in complete ignorance. We must have some ideas as to new aspects that are likely to be discovered. Then of course, we proceed to find out whether the ideas conceived are true.

Those may be totally correct, as only partially correct or may be altogether false, but they do help us to get going and guide us in our study. These primary ideas may be termed as hypothesis as described by different authors.

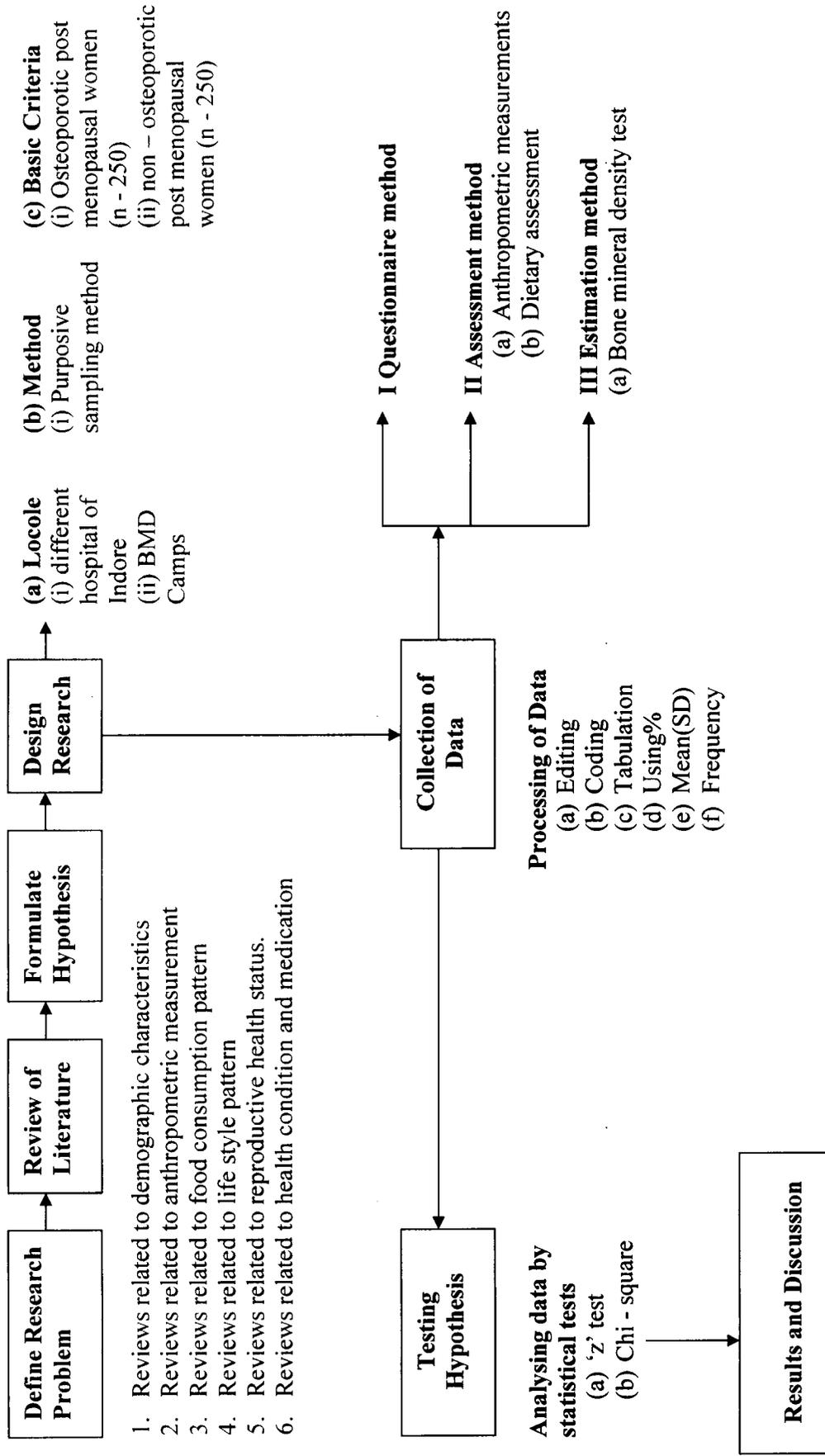
According to Goode and Hatt, “Hypothesis is a preposition which can be put to test to determine validity”.

According to George A. Lundberg, “A hypothesis is a tentative generalization, the validity of which remains to be tested. In its most elementary stage the hypothesis may be any bunch, guess, imagination, Idea, action or investigation.”

In present study, data have been collected, analyzed and conclusions have been drawn under the light of following hypothesis:

1. There shall be no difference in demographic characteristics of osteoporotic and non-osteoporotic post menopausal women.
2. There shall be no difference in anthropometric measurements of osteoporotic and non-osteoporotic post menopausal women.
3. There shall be no difference in food consumption of osteoporotic and non-osteoporotic post menopausal women.
4. There shall be no difference in life style pattern of osteoporotic and non-osteoporotic post menopausal women.
5. There shall be no difference in the reproductive health history of osteoporotic and non-osteoporotic post menopausal women.
6. There shall be no difference in health condition and medication of osteoporotic and non-osteoporotic post menopausal women.

Figure 3.1 DESIGN OF RESEARCH PROCESS AND METHODOLOGY



3.3 WORKING DEFINITION

Normal Post Menopausal Women- refers to women who were not suffering from osteoporosis and their bone mineral density was normal ($T > 1.0$ S D) and were grouped as non osteoporotic post menopausal women.

3.4 RESEARCH DESIGN

According to Claire Seltiz, Jahoda, Deutsch and Cook (1962), "A research design is the arrangement of condition for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure."

Thus the research design is the conceptual structure within which research is conducted. It constitutes the blue print for the collection, measurement and analysis of data. It also provides empirical and logical basis for gaining knowledge and drawing conclusion. In the present study, the research design has been developed systematically.

Sample and Sampling Techniques

According to P.V. Young (1954), "Sample is a miniature picture of the universe." When a small group is taken, it is called sample study.

The whole group from which sample drawn is technically known as universe or population and the group actually selected for the study is known as sample.

The study was a multicentre survey study conducted in selected hospitals, health centre and through camps. The sample was selected by **purposive sampling method**.

The osteoporotic group included post menopausal osteoporotic women who were identified as patients with bone density higher than -2.5 SD by using BMD (Bone Mineral Density) Ultrasound method according to WHO.

The non-osteoporotic group was selected from post menopausal women with normal bone mineral density that is above 1 SD by using BMD (Bone Mineral Density) ultrasound method according to W.H.O.

Sample Size and Grouping

In present study, in all 500 post menopausal women were studied and they were divided into two groups-

- (a) group I- osteoporotic post menopausal women
- (b) group II- non- osteoporotic post menopausal women

The study was preceded with the selection of 250 samples in each group.

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Age (yrs.)	Group	
50-70 yrs.	Osteoporotic post menopausal women (group-I)	Non- osteoporotic post menopausal women (group-II)
	250	250

Specification

- (a) In this study subjects with osteopenic bone density were excluded i.e. whose bone mineral density was T Score between -1.0 and -2.5 SD
- (B) Type and mode of treatment of the selected samples (both groups) was not controlled and no alteration was suggested

Locale

The study was conducted in following hospitals and camps.

- 1 Gurjar Hospital and Endoscopy Centre Pvt. Ltd, A.B. Road, Indore(M.P.)
- 2 Dr. Girish Gupta's clinic (Orthopedic Surgeon) Jaora Compound, Indore(M.P.)
- 3 Arpan Nursing Home, Rajwada, Indore(M.P.)
- 4 State bank of India, GPO, Indore(M.P.)
- 5 Bengali School, Navlakha, Indore(M.P.)
- 6 Suyog Hospital pvt. Ltd., Indore(M.P.)

Samples selected were recalled and interviewed for their consent to participate in this study.

3.5 TOOLS AND TECHNIQUES

Adopting proper tools and techniques for the collection of data is a foremost important step of the research design. The collection of data refers to a purposive gathering of the information relevant to the subject matter of the study from the samples under investigation. The method of collection of the data depends upon the nature, purpose and the scope of the study on one hand and the availability of resources and time on the other.

Following tools were used for the collection of data:

1. Questionnaire method
2. Assessment method
 - (a) Dietary assessment
 - (b) Anthropometric measurements
3. Estimation method
 - (a) Bone mineral density test

1. Questionnaire method

In this study, a structured questionnaire was used regarding demographic trends (marital status, education, income status, occupation and caste), life style pattern (smoking, alcohol intake, tobacco chewing, intake of aerated drinks, exercise, exposure to sunlight), reproductive health status (menarche age, age of menopause, parity and abortions) and health condition and medication (other health problems like B.P., arthritis, joint pain, diabetes, kidney disease.) (Appendix –I)

2. Assessment method

(a) Dietary assessment

Food frequency questionnaire was used and average daily nutrient intake for each post menopausal women was calculated. We defined six categories of food intake frequency as follows, daily, twice a day, twice a week, weekly, monthly, occasionally.

Daily intake of calories, protein, carbohydrate, fats and minerals (dietary calcium, phosphorus and magnesium) were calculated by 24 hour recall method. The nutrient was calculated by especially designed computer software based on nutritive value of Indian foods by **C. Gopalan**. The nutritional intake data were analysed with a computer software programme and z- test was used to analyze the intake of each nutrient obtained from the food frequency questionnaire. (Appendix-IV)

(b) Anthropometric measurements

Nutritional anthropometry is measurement of human body at various ages and levels of nutritional status. It is based on the concept that an appropriate measurement should reflect any morphologically variation occurring due to a significant functional physiological change.

For example, a significant reduction in fat fold measurement reflects a shift in the individual's energy balance.”

“The pattern of growth and the physical state of the body through genetically determined are profoundly influenced by diet and nutrition hence anthropometric measurements are useful criteria for assessing nutritional status”(Swaminathan - 1998)

Following procedures were adopted for it:

1. **Age:** The age of the subjects was taken up by asking date of birth. Those who did not know their date of birth then the age of the subject has been assessed by season, festival and important incident if any took place at that time of the birth.
2. **Weight:** The weight of the subject was measured in kg. on a spring weight machine. The subject was wearing minimum clothing and no shoes.
3. **Height:** The measurement of height was done by asking the person to stand the child on a plain surface and rating his back on fixed support. The height was measured using non stretchable tailoring tape. The subjects was not wearing shoes.the measured of height and weight was done by taking full precaution, which are as following-

- The zero error of the weighting scale was checked before taking the weight and was corrected as and when required.
- In the measurement of height, the subject was allowed to stand erect, looking straight and leveled surface, with out shoes, with heels together and toes apart.
- In the measurement of weight. The person was wearing minimum clothing and was without shoe.

Body mass index of subject was determined by using formula -

$$\text{BMI} = \text{Weight in kg} / \text{height in m}^2$$

3. Estimation method

(a) Bone mineral density test (BMD Test)

It is important for post menopausal women to get bone mineral density testing, also known as bone densitometry. Bone mineral density testing quickly and accurately measures the amount of calcium in certain parts of bones. From this information, the doctor can determine how strong your bones are and if you could be at risk for osteoporosis. Bone density test is the basic test done to recognize a bone disease, especially osteoporosis.

With the passing of age, human beings lose certain amount of bone mass. The bones simply get thinner and lose their normal density; this process is called as

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osteopenia. This happens due to the loss of calcium and such bone minerals. Osteopenia eventually leads to osteoporosis.

Bone density test actually calculates the density of the bone minerals, mainly calcium which is the most important bone mineral of all. Bone density test is performed using various methods. Our study based on ultrasound method for diagnosed osteoporosis.

Ultrasound method

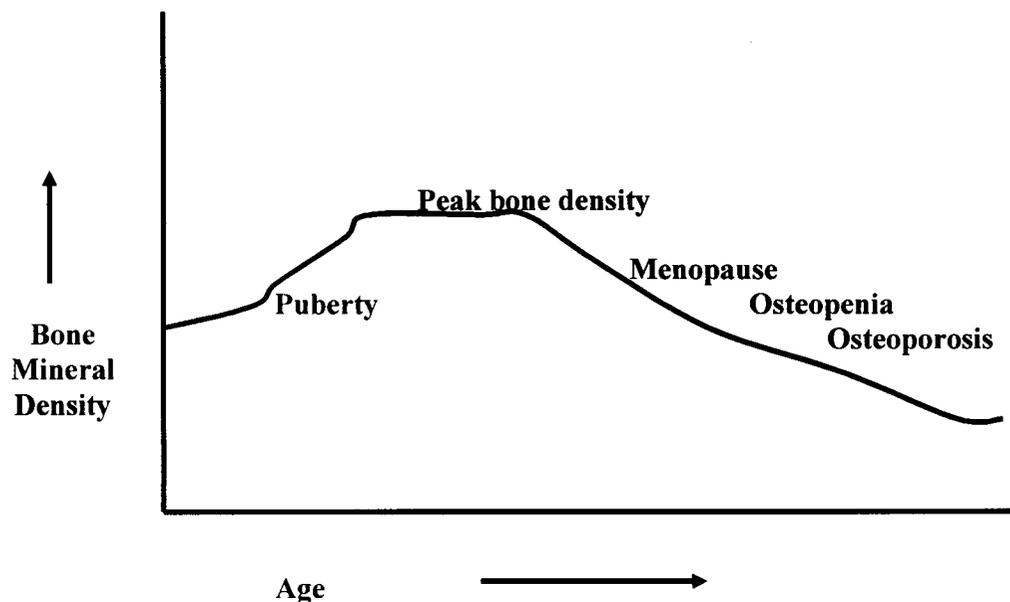
This is the most basic bone density test performed, in order to diagnose any primary bone related problem. An ultrasound machine uses sound waves of different frequencies through water or air, to perform the task. Bone density test is painless, fast and has no harmful radiations. Ultrasound is the most basic test and hence is unable to detect complicated bone problems and hence there are others that are capable of detecting the more complicated ones.

T-score

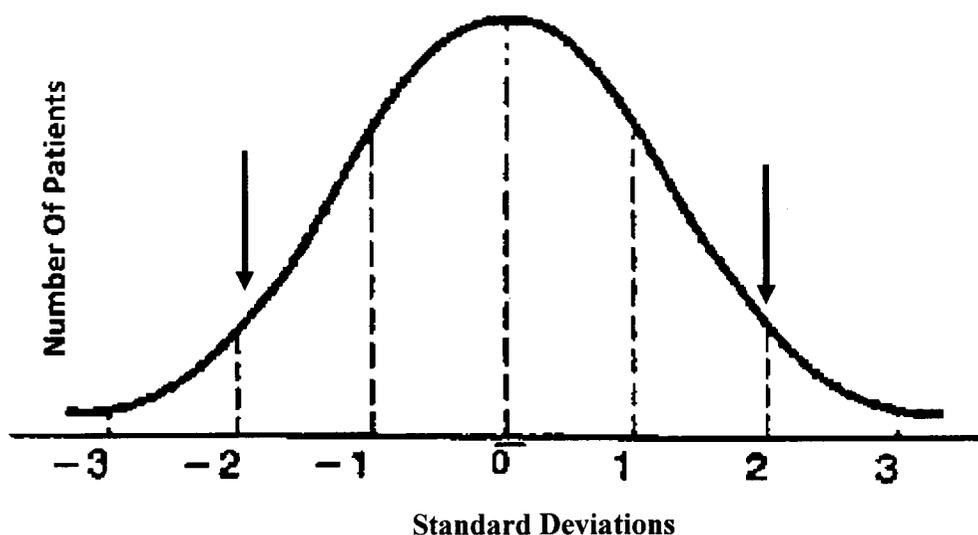
Bone mineral density (BMD) test are performed to determine whether a patient has osteoporosis or osteopenia, a low bone mass that puts her at risk for osteoporosis. To make this determination, the technologist will calculate the patient's T-Score. The world health Organization (WHO) established the criteria for determining the T-score.

T-score WHO Criteria for Osteoporosis in Women	
Normal	BMD > 1.0
Low Bone Mass (Osteopenia)	BMD is -1.0 to -2
Osteoporosis	BMD < -2.5 SD

BONE MINERAL DENSITY DECREASE AT MENOPAUSE



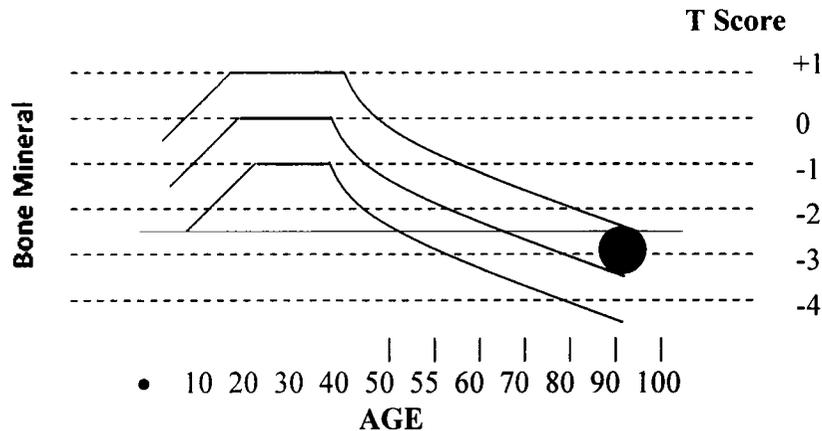
Bone mineral density increase until around age 35 and then levels off until menopause. During the first six to eight years of menopause, there is a sharp decline in bone mineral density. It is estimated that between 1% and 5% of bone density is lost at this time. The higher a woman's overall bone density, the less she will be affected when she loses bone density at menopause.



This diagram represents the usual (normal) distribution of biological variables – bone density included. 66% of normal values will fall between -1 and +1SD (and therefore

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34%, 17% above and 17% below). Commonly, bone density reports plot the age matched mean ± 1 SD. This serves to make a larger proportion of the population seem abnormal (osteoporotic) than is usual for most diagnostic tests. The reason for this is somewhat arbitrary, but it is generally regarded as appropriate to treat more than the lowest 2.5% of densities.



The above graph is a schematic of a typical normal bone density curve from virtually any bone in women (menopauses at 50). The horizontal lines are 1 SD (ie 1 “T” unit) apart, and the curve shows mentioned above, excludes 29% of “normals”. The thick horizontal line is -2.5 SD below the young normal mean, and therefore represents, by some definitions, the “Fracture Threshold”, or the upper limit of the osteoporotic range. Not also the increased loss rate immediately after the menopause.

3.6 STATISTICAL ANALYSIS

Mean and standard deviation of the data obtained on ordinal scale were found. Data obtained on nominal scale were classified in frequencies and in percentage. Significance of difference in frequency distribution of both groups have been found out using Chi-square test and difference in mean scores have been found out using ‘Z’-test. All statistical work has been done on computer with the help of a special software SPSS (Statistical Package For Social Sciences).