The present research work is an attempt to investigate the nutritional status and nutrient intake of adults residing urban and rural area of Varanasi district. The main objective was to compare nutrient intake specially oxalate, calcium, and phosphorus which are the major constituent of stone formation in urban and rural respondents. An effort was made to explore the socio demographic factors affecting nutritional status and nutrient intake.

An overview of the available literature related to nutritional status of adults and nutrient intake indicate that the majority studies have conducted on adults considering a special group but in the present study general population of adult is consider. A very few literature available on comparative study of urban and rural population and intake of oxalate, calcium and phosphorus. Hence in the present study it is plan to compare the nutritional status and nutrient intake specially oxalate, calcium, and phosphorus in adults of urban and rural area of Varanasi district.

Nutritional status is the current body status of a person or a population groups related to their state of nourishment (the consumption and utilization of nutrients). The nutritional status is determined by a complex interaction between internal/constitutional factors and external environmental factors. Internal factors like age, sex, nutrition behaviour, physical activity and diseases. External environmental factors, as food safety, cultural, sociological and economic circumstances. An optimum nutritional status is a powerful element in promoting health, preventing and treating diseases and improving the quality of life.

Adult nutritional status can be assessed by dietary, anthropometric, biochemical and clinical methods. A combination of methods should be used assessing nutrition status using standardized techniques. Anthropometric
measurements (such as height and weight) are used to construct indices for malnutrition. BMI is the most established anthropometric indicator used for assessment for adult nutritional status. BMI is most widely used because its use is inexpensive, non-invasive and suitable for a country with diverse ethnic groups such as India. It is also a good indicator of socioeconomic condition of adult population of developing countries (Ferro-Luzzi et al. 1992). In low income countries BMI can be used in the assessment of difference in standards of living between population groups (Nub et al. 1998). Household income has considerable impact on nutritional status of individual as well as plays a very important role in making food choices (Bowman, 2007). Changes in eating habits and sedentary life styles are attributed to the increased prevalence of overweigh and obesity which leads to stone formation. (Prentice and Jebb, 2001).

Nutritional status of adult integrate related to their dietary intake which is determined by availability of foods in terms of quantity and quality and their ability to digest, absorb and utilize food. Food availability is influenced by food pattern, cultural tradition, family structure, meal pattern, political environment and food allocation. At the same time digestion and absorption can be impeded by infection or metabolic disorders. Adequate nutrition is one of the factors which help each person to attain his potential as an adult and it depends to a great extent on the quality and quantity of food. Adult from the most poor communities of developing countries like India have low body weight and standard stature.

Calcium and phosphate both are the important mineral for human body. They are necessary for bones and teeth and also perform many physiological functions. While oxalate has no such type of nutritional importance. Oxalate is naturally occurring substance found in plants, animal and humans. In chemical term oxalate belong to a group of molecule called organic acids and are routinely made by plants, animals, and humans. In addition to the oxalate that
are made inside of our body oxalate can arrive at our body from out through certain foods that contain them.

Excessive intake of foods rich in oxalate, calcium and phosphate may predisposes to formation of stone in the form of calcium oxalate, calcium phosphate, magnesium ammonium phosphate. Green leafy vegetable, coffee cocoa, chocolates, cold drink, etc. are rich sources of oxalate. The richest source of calcium among animal foods is milk and milk products and among vegetables sources it is green leafy vegetables. Phosphate is a mineral found almost in all foods. Large amount is found in milk, cheese, nuts, dried, beans, banana and peas.

The nutritional risk factors for stone formation include an inadequate intake of fluids or excessive intake of foods rich in oxalates, calcium or animal protein. Diet influences urinary constituents and pH which may affect stone nucleation and growth. Personality, emotional status, stress, exercise and dietary habit are known to influence urinary pH. Uric acid stone are easily form in acidic urine while calcium phosphate and magnesium ammonium phosphate formed in alkaline urine.( Vijay Bharti P.S & Amirthaveni, 2008).

Holmes et al. (2001) presented evidence that dietary oxalate may contribute up to 50% of the oxalate excreted in urine. Thus dietary oxalate may play a more significant role in calcium oxalate urine formation. Oxalate is present in large quantities in foods of vegetable origin, cereal grains and some roots. Food stuffs that contain high level of oxalate include spinach, rhubarb, beetroot, black tea, cocoa powder and nuts. Urban diet of the upper income group in India were reported to contain 600 mg oxalate per day and seasonal rural diets 2000 mg. Rural diet low in oxalate but seasonal vegetable increases the oxalate content. Unfortunately knowledge of the extent of gastrointestinal absorption of oxalate, especially from high oxalate diets is still limited. Apart from the amount and chemical form in the ingested food stuff the amount of
free oxalate in gastrointestinal tract or physiological parameters of the individual such as intestinal pH and transit time, oxalate absorption also depends on the amount of divalent cation such as calcium and magnesium simultaneously present in the chyme. These cations derived from ingested food stuffs, liquids and digestive secretions are able to bind oxalate in the gut and decrease oxalate absorption. (Zimmerman, D.J., 2005)

Stone formers exhibit a higher role of oxalate absorption than nonstone formers. Foods containing greater more than 10 mg of oxalate per serving are considered high oxalate foods by the American Dietetic Association (Ismail, A. et al. 2005).

Modern lifestyle changes, sedentary habits, lack of easiness, an unhealthy dietary plan, and overweight problems of the affluent societies-emerge to be the important promoters of the "stone-boom" in the new millennium both in developed and underdeveloped countries. Major risk factors that contribute to stone formation and its recurrence include “classic” risk factors in the urine (low urine volume, hypercalciuria, hyperoxaluria, hyperuricosuria, hypocitrurateuria, and hypomagnesuria), epidemiological factors are climate, race, ethnicity, age, sex and body weight. Although the incidence rates are three times higher in men than in women, individual with a family history of stone disease have a nearly threefold higher risk of stone formation in those without a family history. Recent evidence suggests that the risk of stone disease increases with increasing body weight.

Several studies from West indicated that in the industrial countries, kidney stones are a common problem affecting 1 person in 1,000 annually, and the incidence is increasing in tropical developing countries too (Robertson et al. 1982). Factors such as age, sex, ethnic and geographic distribution determines prevalence. The Afro-Asian stone-forming belt stretches from Sudan, the Arab Republic of Egypt, Saudi Arabia, the United Arab Emirates, the Islamic
republic of Iran, Pakistan, India, Myanmar, Thailand, and Indonesia to Philippines. The prevalence of calculi ranges from 4 to 20 percent (Hussain et al. 1995).

There has been upsurge in the incidence of stone disease in Europe and United state over the past twenty years. The incidence of stone formation in India is very high in North, Northwest, and central India, moderate in Deccan plateau and for less in Southern part. Epidemiological survey has shown a very high incidence of urolithiasis in Rajsthan and Jodhpur (Verma, D., Singh, H., Bhatia, B., & Bhatia, R., 1990).

Since the incidence of stone formation is increasing in most of the population of world affecting adults. So there is a need to sensitize the people to realize this epidemic problem and to pay attention to prevent this problem. A better understanding of the relationship between diet rich in oxalate, calcium and phosphate and calculus formation will have the potential to provide simpler and more cost effective measures of prevention. Viewing this present study is being undertaken with the following objectives -

**OBJECTIVES**

- To study the socioeconomic profile of the respondents.
- To study the food consumption pattern of the respondents
- To study the health, hygiene and cooking practices of the respondents
- To assess the nutritional knowledge of the respondents
- To study the occurrence and knowledge related to stone formation
- Assessment of the clinical and nutritional status of the respondents.
- To study the nutrient intake of the respondents with special reference to (calcium, oxalate and phosphorus).
- To study the effect of some basic factors (eg. age, sex, type of family, education, occupation, income) on nutrient intake.
SCOPE OF THE STUDY

An adequate diet must satisfy human needs for energy and all essential nutrients. Adequate nutrition in the right proportion of food nutrients needed for growth, energy and maintenance. Improved nutritional status plays an important role in the well being of individual and critical for socioeconomic development.

Present study is a baseline survey. In reality nutritional survey is the mirror of nutrition and diet is the major determinant of the nutritional status. So the value of nutritional assessment is greatly enhanced when it is supplemented by an assessment of food consumption and calculated on scale of quantitative and qualitative. Survey of the diet and nutritional status of the population is an important component of a public health approach to informing nutrition policy promoting healthy eating and reducing health problems.

Adult are at risk for stone formation due to many physiological, psychological, social, dietary and environmental risk factors. Diet plays an important role in preventing and controlling many of the health problems of man. The role of diet in stone formation is very important in treatment of stone formation.

Majority of the studies has been conducted on adult considering a special group but in the present study general adult population is consider.

This is the comparative study of rural and urban adult population conducted with the objective of nutritional assessment and socio-demographic factors affecting the nutrient intake. The present study is conducted with the special reference to stone formation nutrient like as calcium, oxalate and phosphate.
LIMITATIONS

- As the population of this study was confined to Banaras district, so the generalization of the findings will be limited to this area.
- The present study was carried out by a single person within a limited time period hence educational intervention program and follow up span could not be carried out.
- Twenty four hour recall method of dietary survey has been used. The three or seven day diet survey would have give more representative picture about diet by covering day to day variation in the diet of the study subject.
- It is a cross sectional study so the demerits of cross sectional study incorporated in it.