

## Study on Nutrition Status and Urinary Tract Infection in Elderly People at Nursing Home

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### Abstract

Malnutrition is a common problem among nursing home residents and encompasses adverse outcomes. This study was conducted to determine malnutrition and urinary tract infections as well as antibiotic resistance of isolated bacteria at Kahrizak nursing home in Tehran city, capital of Iran. Nutritional status was determined by direct detection of kitchen, checking the menu of weekly foods, quality and quantity of each meal for each person. The mean age of patients in this descriptive study was 77.2 years old, (ranging from 60 to 103). Samples of midstream urine from these patients were collected and bacteria were identified by standard bacteriological methods. Then, antibiotic resistance of bacteria was determined. On the basis of nutritional status, the quality and quantity of food for each meal was good and enough. From 520 samples of urine, bacteria were grown only from 81 samples. *E. coli* was the most common bacteria and the other bacteria were *Proteus*, *Klebsiella*, *Staphylococci aureus*, *Alcaligenes faecalis*, *Pseudomonas aeruginosa* and *Providencia*. All of bacteria were resistant at different rate to ampicillin, tetracycline, cephalothin and co-trimoxazol, but sensitive to ciprofloxacin and nitrofurantoin. Malnutrition in this study was less than 30%. This may be due to people helping, qualified foods, well nursing and suitable facility at Kahrizak nursing home.

**Keywords:** Nursing home, Elderly nutrition, Urinary tract infection, Iran

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### Introduction

Malnutrition is a common problem among nursing home residents and of adverse outcomes. Studies in different countries have shown that elderly people, both in their own home and in institutional care centers are at risk for nutritional deficiencies (1, 2). The number of elderly people is constantly increasing in the western world. Many of them spend their last years in nursing homes. Numerous studies have determined that many nursing home residents have an inadequate intake of calories, proteins, vitamins and minerals (3, 4). The prevalence of protein – calorie malnutrition (PCM) in nursing home residents has reached 85% in some nursing homes and is linked to increased mortality among them (5). Nurses in nursing homes were found to lack sufficient nutrition knowledge to

meet dietary needs of elderly residents. An education program for nurses can decrease the prevalence of protein-calorie malnutrition (6).

Urinary tract infection (UTI), including cystitis, pyelonephritis and catheter-associated infections are among the most common nursing home acquired infections. Asymptomatic bacteriuria can be identified in 20 to 50% of nursing home residents (7).

Diagnostic tests for nursing home patients with suspected UTI include urine culture and sensitivity testing. Treatment of cystitis can usually be managed in the nursing home with oral antibiotics. Initial therapy with a parenteral agent is often recommended in nursing home-acquired pyelonephritis (7). Antibiotic resistant bacteria such as methicillin-resistant *Staphylococcus aureus* (8, 9), vancomycin resistant *Enterococ-*

*cus*, *Clostridium difficile*, extended-spectrum beta-lactamase producing gram negative bacilli (10), fluoroquinolone-resistant strains of *Salmonella* are reported in nursing homes (11).

The aim of this study was to determine nutrition status by direct survey of kitchen and menu of weekly foods, quality and quantity of each meal for each person and also, identified urinary tract infection and resistance of bacterial antibiotics at Kahrizak nursing home.

### Materials and Methods

This descriptive study was done on the nutritional status of 520 elderly residents at Kahrizak nursing home in 1999-2000 in Tehran city, capital of Iran. The nutritional status were determined randomly by direct survey of kitchen at different times, looking at menu of weekly foods, quality and quantity of each meal for each person, then consulting with dietician.

Voided midstream urine specimens obtained from suspected UTI before treatment. The loop – streak plate culture method was used to detect bacteria in urine. The culture was done by inoculating on blood and McConkey agar. Plates were incubated at 37°C for 24 h. All isolated bacteria were identified by routine biochemical testing. Antibio gram tests (diffusion disk) were performed for all isolated bacteria to determine the resistance or sensitive pattern of them against common antibiotics.

### Results

On the basis of nutritional status detection, the quality and quantity of food for each meal was good and enough. Consulting with dietician, demonstrated that the prevalence of malnutrition was less than 30%.

From 520 samples of urine, bacteria were grown only from 81 cases (15.5%), and the number of colonies were higher than  $10^5$ /ml. Of 81 patients, 51(62.9%) were female, v.s 30 (37.1%) males. The mean age of patients were 77.27 (ranging from 60 to 103) years old. Pyuria and epithelial cells were detected in 30% of

patients. *E. coli* was the most common bacteria (64.4%). The other bacteria were *Proteus mirabilis*, *Klebsiella*, *Proteus vulgaris*, *Staph. aureus*, *Alcaligenes faecalis*, *Pseudomonas aeruginosa* and *Providencia* (Table 1).

All isolated bacteria were resistant to ampicillin (100%), but 83.5% were resistant to tetracycline, 81.29% to cephalotin, 78.1% to cotrimoxazol, 22.6% to ciprofloxacin, 25.5% to amikacin and 37.4% to nitrofurantoin.

**Table 1:** Prevalence of isolated bacteria from UTI in elderly patients

Bacterial species	Per cent
<i>E. coli</i>	64.4
<i>Proteus mirabilis</i>	15.7
<i>Klebsiella</i>	6.1
<i>Proteus vulgaris</i>	6.1
<i>Staph. aureus</i>	2.6
<i>Alcaligenes faecalis</i>	1.7
<i>Pseudomonas aeruginosa</i>	1.7
<i>Providencia</i>	1.7

### Discussion

The current approach to assessing nutritional intake requires nursing home staff to document total percentage of food and fluid consumed at each meal and nursing home staff tends to significantly overestimate total food intake (12). It was not possible to record the diet of each resident, since all the meals came from the same kitchen and a dietician selected the menu item. In any case, many residents left food on the plates and the wastage was difficult to quantify. De Groot et al suggested a reference value of 1500 kcal as a minimum daily energy intake level for an adequate micronutrient supply for elderly people. This reference value has been used to evaluate whether the energy intake of elderly people is adequate (13). Malnutrition in this study according to consult with the dietician was less than 30%. This may be due to people helping, qualified foods, well nursing and suitable facility at Kahrizak nursing home.

Evans et al suggested that if home-like atmosphere, high levels of staff-resident interaction, and increased attention to safety and ethical issues will result to improve the quality of nutritional status (14).

Physical environment and atmosphere of dining room, food service organization of the nursing staff assistance can effect on nutrition status and improvement of elderly life (15).

Taste and smell losses occur with aging. These changes may decrease the enjoyment of food and may subsequently reduce food consumption and negatively influence the nutritional status of elderly persons, especially those who are frail. Adding flavor enhancers to the cooked meals is an effective way to improve dietary intake and body weight in elderly nursing home residents (16).

Infectious diseases are a common cause of increased morbidity and mortality in elderly patients. Infections in the elderly are quite different from infections in a younger population. These differences are due to age-related alterations in immunity. Incidence and bacterial spectrum depends on the site of infection and whether the patient is hospitalized, living in a nursing home or in the community. Pneumonia, UTI and pressure ulcer infections are more frequent in patients living in nursing homes than in community dwelling older people (17).

In a study, of 262 nursing home residents, 3.4%, 1.9%, 1.1%, and 1.9% had urinary tract, skin, respiratory and eye infection (18). In comparison, our results showed higher urinary tract infection rate (15.5%). The reason may be due to the higher number of women in this study than men and because males are less prone to UTI, possibly because of their longer urethra and the presence of antimicrobial substances in prostatic fluid (19). Urinary tract infection is the most frequent bacterial infection in residents of long-term care facilities. Most infections are asymptomatic, with a remarkable prevalence of asymptomatic bacteriuria of 15%-50% among all residents (20). The use of antimicrobials for treatment of urinary infection is

a part of the larger concern about appropriate antimicrobial use in long-term care facilities and the impacts of the selective pressure of antimicrobials on colonization and infection with resistant organisms.

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