

ME-JAA

Middle East Journal of Age and Ageing

Contents

Editorial

- 1 From the Editor
Abdulrazak Abyad

Original Contribution/Clinical Investigation

- 3 Perceptions of Residents and Family Members of Oral Health Services in Nursing Homes: A Survey in Nursing Homes without On-Site Dental Services in Simcoe County, Ontario, Canada
Dr. David W. Matear, John Barbaro
- 12 Study of Serum Electrolytes in Surgical Patients Undergoing Intestinal Stoma
Manal M Khan, A K Verma, Shaista M. Vasenwala, Sheeraz M. Khan, Mr. Abrar Ahmad

Review Articles

- 29 Pressure ulcers: assessment and prevention (Part 1)
Dr. Almoutaz Alkhier Ahmed
- 34 Discharge Planning in A Geriatric Ward
Dr Ashraf Nasim, Dr B Mandal

Models and Systems of Elderly Care

- 38 Determinants of The Physical Problems of the Geriatric Population at Adamdigi Thana of Bogra District in Bangladesh
Tapan Kumar Roy and Md. Mosiur Rahman

Volume 6, Issue 1 January 2009

Chief Editor:

Abdulrazak Abyad MD, MPH, AGSF, AFCHS
Email: aabyad@cyberia.net.lb

Publisher:

Ms Lesley Pocock
medi+WORLD International
572 Burwood Road,
Hawthorn, Vic Australia 3122
Phone: +61 (3) 9819 1224:
Fax: +61 (3) 9819 3269
Email: lesleypocock@mediworld.com.au

Editorial enquiries:

aabyad@cyberia.net.lb

Advertising enquiries:

lesleypocock@mediworld.com.au

While all efforts have been made to ensure the accuracy of the information in this journal, opinions expressed are those of the authors and do not necessarily reflect the views of The Publishers, Editor or the Editorial Board. The publishers, Editor and Editorial Board cannot be held responsible for errors or any consequences arising from the use of information contained in this journal; or the views and opinions expressed. Publication of any advertisements does not constitute any endorsement by the Publishers and Editors of the product advertised.

The contents of this journal are copyright. Apart from any fair dealing for purposes of private study, research, criticism or review, as permitted under the Australian Copyright Act, no part of this program may be reproduced without the permission of the publisher.

Editorial

Editor:

Dr Abdulrazak Abyad

Chief editor

This is the beginning of the year and we are looking forward for a successful year with the help of the editorial team, the authors and the production companies. A number of initiatives took place last year in regard to geriatrics and Gerontology in the region including the start of the second postgraduate course of the MEAMA where the first session of the course started. In addition Middle East Network on Health care services for the elderly was launched as well in 2008. We are looking forward as well for the 2nd Middle East Congress on Age, Aging and Alzheimer's that will take place in Nov 2009 in Lebanon where the journal is being one of the organizer.

In this issue a paper from Bangladesh attempted to investigate determinants of the physical problems of the elderly population in Bangladesh by examining the situation prevailing in one particular area. The authors revealed that the physical health status of the elderly are not so fair. The logistic regression model unveils that rural elder's were more than 2 times more likely to suffer from physical problems with compared to those elderly lived in urban areas. The other contributing factors found to affect the physical problems of the elderly were education, family type, problems to use the latrines, old age salary and any kinds of bad habits of the elder population.

A paper from Al Ain U AE and Ontario looked at the perception of Residents and Family Members of Oral Health Services in Nursing Homes: A Survey in Nursing Homes without on-site dental services in Simcoe County, Ontario, Canada. The authors stressed that much has been written regarding access to care of the growing elderly population and their needs. There appears to be an imbalance between the need for care and access to care. The authors concluded that residents in the nursing homes studied and their family members share similar views in the types and frequency of dental services that should be provided in the nursing home setting. They describe a basic dental service of check-ups and preventive care, with restorative, denture and surgical intervention where necessary. Complex care is not a priority. Services should be available once or twice a year.

A paper from India looked at serum electrolytes in surgical patients undergoing intestinal stoma. The present study was conducted in 70 patients undergoing intestinal stoma creation. The aim of the present study was to assess and quantify the serum electrolyte changes in patients following ileostomy or colostomy, to identify and estimate need of electrolyte replacement and to develop a regime for electrolyte supplementation based on the findings of this study if indicated.

A paper from the UK looked at discharge planning in a geriatric ward. It discussed the various issue linked with discharge planning. The authors concluded that discharge or transfer of care of an Older Adult from the hospital to the community is one of the most satisfying aspects of Geriatric Medicine. The complex health and social needs of this group

requires the experience and skills of a large number of professionals from a range of different organisations. Without careful coordination this process can disintegrate to the detriment of the patient and their family

A paper from Saudi Arabia looked at pressure ulcer in two parts the first part will appear in this issue and the second part will appear in the issue 2 of this year. In the first part the author discuss assessment and prevention including epidemiology, etiology, assessment tools and risk assessment tools.

Perceptions of Residents and Family Members of Oral Health Services in Nursing Homes: A Survey in Nursing Homes without on-Site Dental Services in Simcoe County, Ontario, Canada

Authors:

Dr. David W. Matear, BDS, BMSc, DDPH(RCS Eng.), MSc

President

Solumedix Management Consultancy LLC

Al Ain, United Arab Emirates

John Barbaro, BA, MSc

Research Officer

Simcoe County District Health Unit

Ontario

Correspondence:

Dr. David W. Matear

Solumedix Management Consultancy LLC

PO Box 24744

Al Ain, United Arab Emirates

Tel. +971 50 721 6443

Fax. +971 3 767 7685

E-mail. dmatear@solumedix.com

Introduction

Much has been written regarding access to care of the growing elderly population and their needs^{1,2}. There appears to be an imbalance between the need for care and access to care. The elderly population are less likely reported to utilize dental services than any other population group in the United States³. Similarly, the 1978-79 Canadian Health Survey showed that 67% of the elderly had not visited a dentist within the previous 5 years⁴. A comparison of the attendance of elderly Canadians with their U.S. and U.K. counterparts over a one year period indicates the level of attendance in Canada (23%) is half that of the other countries⁵. Some studies indicate that attitudes towards dentistry and oral health may be changing. Several authors have stated^{6,7,8,9}, that in the future the elderly will be better educated than previous generations of older adults, and have higher expectations about maintaining and preserving their natural dentition.

The institutionalized or medically or physically compromised elderly, however, is a special type of population, which is subject to the approvals of gatekeepers to care before care can be accessed. When the client is cognitively impaired, a new set of variables are introduced in the form of designated family members, caregivers or administrators, who are responsible for the oral health care of the client and the treatment the client will receive. The problems are interdependent and inextricably related, but for the purposes of academic consideration can be grouped as follows:

- Access to care
- Perceptions of the importance and need for oral health care

services

- The delivery of dental services
- The benefit of providing dental services

Kiyak suggests that the reasons for low utilization patterns in the elderly are related to perceived need for care and perceived importance of oral health, as well as the number of natural remaining teeth and knowledge of the available dental resources in the community. The more traditionally cited barriers of - cost, fear and physical access are thought to be less important. Although this may be the case for the well elderly, surrogate decision-makers govern access to healthcare services for those who are medically or physically compromised. Differences in attitudes and perceptions, with respect to oral health, may lead to better or worse access for these clients. The key stakeholders for consideration in the control of access to care would include the following groups:

- Clients or residents of homes
- Caregivers
- Family members
- Nursing staff
- Physicians
- Administrative staff
- Dental professionals
- Faculties of dentistry
- District Health Units
- Local government-health advisers
- Federal government-health advisers
- Professional dental organizations

- Professional dental licensing authorities

The stakeholders may affect the delivery of dental services to elderly populations because of the positive or negative effects on the provision of services for the populations, for which they are responsible. Negative influences may be governed by the perceptions held by stakeholder groups. These perceptions should be explored and defined, in terms of their cause, which may vary from lack of education in the importance of oral health care, to perceived lack of benefit from oral health services for the elderly population.

The goals associated with this investigation, which can be related to the provision of oral health care:

- Better understanding the demands of the elderly population.
- Better understanding of the barriers to care faced by the various population types and their location.
- Improved information on where and how to target educational and service resources, in order to reduce barriers.

This report describes the perceptions of stakeholders on the importance of and need for oral health care services. The specific objective is to:

- Investigate the perceptions of the clients and family members in the provision of oral health care to elderly populations.

Methods

The population studied was institutionalized elderly people, i.e. those over the age of 65 years, resident in nursing homes. The populations investigated were from chronic care facilities without a dental program. A sample size of 100 was taken from nursing homes willing to be included in the study.

The method included a structured interview with clients/residents and family members regarding the importance and priorities of dental services for elderly people in institutions.

Consent was obtained from all participants.

Exclusion criteria were:

- Cognitive impairment
- Unidentified or inaccessible caregiver or designated family member
- More than one main caregiver
- Client in extremely poor health, with a poor prognosis, i.e. less than 2 years
- Those unwilling to participate in the study

Inclusion criteria were:

- Clients resident in institutions willing to participate in the study
- Cognitively competent clients

Interviews were performed by the same person throughout the study. All information was collected by a dental health care professional.

Data was obtained via a variety of methods according to category:

- Client characteristics via interview and medical charts
- General health information via interview and medical chart

- Perceptions of oral health via interview

Procedure

Health perceptions and opinions were collected on questionnaires used in an interview with either the client or stakeholder. The nursing homes in Simcoe County were identified and those homes were contacted to ascertain whether or not the home had access to on-site dental services. The administrator of the homes without dental services were contacted by letter to ask whether they would participate in a survey of perceptions of dental care for the residents of institutions for the elderly.

The homes were followed-up by telephone within a week of sending out the letter and the administrator of the home was asked whether or not he or she would be willing to participate in the study. Once a commitment was made by the home, to participate, the administrator was asked to provide a list of cognitively intact residents who may be asked to participate directly in the study. The residents were then contacted in person to gain consent for participation.

Appointments were made with each of the residents to answer questionnaires regarding perceptions of importance and priorities of dental services. Data were collected in hard copy and then subsequently entered into Excel for descriptive analysis of the importance of the dental services questionnaire data.

Results

Importance and priorities of dental services

Residents

Results from each home were tabulated separately and also a cumulative report was produced. The residents of the nursing homes participating in the study categorized 16 types of dental services as essential, important, of value, of little value or unimportant.

The responses showed a general trend that the residents felt that dental services were of value, with 893 responses representing 72% of all valid responses (not including missing values) being placed in the essential or important categories. In total 170 responses (12%) were missing values, the majority of these (140 or 82% of the missing values) were for three services: root canals, implants into the bone to replace missing teeth and implants into the bone to stabilize dentures. Figures 1-3 separate the perceived importance of services into high, medium and low, respectively.

Dentures to replace teeth, denture relines and adjustment, fillings, cleanings, pain relief treatment, tooth removal, and check-ups were all highly important for the nursing home residents (80% or above scored these services as essential/important). Advanced treatment of gum disease, emergency treatment, instructions to caregivers and seniors, and complex treatment to restore teeth were of moderate importance (between 50-80% scored these services as essential/important). Dental services provided by a specialist, root canal treatment, implants into bone to replace teeth or stabilize dentures were deemed low in importance to the residents. Lack of knowledge of the potential benefits of dental implants could possibly account for the high number of non-responses to these

two questions (60% non-response for these two questions combined).

More specific information can be seen from responses to the question regarding the priorities of dental services. In providing the top 3 service priorities the residents were able to identify the most important dental services for the nursing home environment, in their opinion. On amalgamating the responses of the 3 categories those services, which have been determined as most important can be readily identified (Figure 4).

The residents reported the following services more frequently as being in the top 3-priority list (reported in order of most frequency): Cleanings to prevent mouth disease, check-ups including X-rays, fillings, dentures to replace teeth, and denture relines and adjustments. Figure 4 further illustrates the priority breakdown within each service category (1st, 2nd, or 3rd).

When asked about the necessary frequency of the provision of dental services in the nursing home environment, the majority (79%) of the residents thought that either 6 months or 1 year would be desirable. The majority (17% of the total and 85% of the remainder) of the other respondents felt that a more frequent service should be maintained (Figure 5).

There was a general consensus that the Government or state should provide nursing home dentistry and that it should be free (Figure 6). However, most of the residents felt that Nursing home dentistry, where it is provided, was value for money. Though 7% felt that the Government should not provide dental services in nursing homes and 5% thought it was currently not value for money. Thirteen percent even thought that nursing home dentistry should not be provided free of charge.

The age range of the residents giving these opinions was between 69 and 99 years of age (Figure 7). The majority of these residents classified themselves as irregular attendees (23%), or those who only attended the dental professional when in pain (64%).

Not surprisingly most of the residents (70%) were females. This reflects the demographic trends related to life expectancy of those over the age of 65 years¹.

Family members

A similar pattern of responses was found when family members of nursing home residents were asked the same questions.

Again the vast majority (70%) of responses relating to the importance of the various dental services listed were deemed to be essential or important. This indicates the general value attached to dental services in the nursing home environment.

Figures 8-10 show the breakdown of the 16 services into high, medium and low importance groupings. The groupings are very similar to those identified by residents. However, caregivers rated a few services higher in importance - emergency dental services, treatment of advanced gum disease, and services by a specialist.

While caregivers and residents rated similar services high in importance, caregivers rated these services as essential

more frequently than did residents (44% vs. 11%). When examining responses to the 16 services individually, categories were collapsed into two groupings, positive responses (essential/important/of value) and negative responses (of little value/unimportant). Chi-square testing revealed that residents and caregivers were significantly different in their responses to only three services (see Table 1).

The priorities identified by the sample of family members also gives an indication of those services deemed most important. Again the most frequently cited dental services in the "top 3 services" provide a summary of the most prioritized services (Figure 11). Caregiver priorities were more diffusely spread across service areas than residents' priorities. However, in common with residents, caregivers rated cleanings, check-ups, and fillings the highest in priority. Dentures to replace teeth and denture adjustments were also high in priority for caregivers, but to a lesser degree than for residents.

A clear majority of family members (70%) thought that dental services should be available on a biannual basis, with the majority of others stating that yearly would be adequate (23%). Caregivers also had a stronger preference for 6-monthly availability of services than did residents (70% vs. 44%). Both groups preferred either 6-monthly, or annual availability of services.

Almost all of the family members (39 out of 40) felt that the Government or State should provide dental services for nursing homes, the services should be free, and that nursing home dentistry is value for money (Figure 14).

The majority of the family members who participated (78%) classified themselves as regular dental attendees (have attended annually and in the last year). Only 2 people admitted to attending only when in pain (5%). Although the majority of participating family members were female (55%), 45% were males, which suggests a representative view is provided.

Discussion

Perceptions of the importance and priorities of dental services have not been reported in the literature. The importance of these perceptions lies in the exploration of the concept of access¹¹. Part of the concept includes the notion of acceptability of the services to the potential patient. This can only be determined through interviewing prospective users of the services to determine what is important and acceptable to them. The views of residents and other major stakeholders, including family members, are extremely important to access to care. As would be expected, the results indicate that where services are not made available to the institutionalized population, attendance falls and a pattern of interventive care when in pain replaces preventive dental behaviors. The availability of dental services, however, in institutions is something that is desired by most residents, who also suggested that the service should be funded by the government (>70%), it should be free of charge (>70%) and that services should be available either once or twice every year (>80%). Even though the pattern of attendance is markedly different in the family members interviewed (>80% are regular attenders), their perceptions are in very close agreement with the residents group, perhaps suggesting that if services were available the residents would utilize them, as both groups desire the same

type and pattern of services. The value of dental services appears to be recognized in the same way.

In order to improve access and utilization an additional aspect should be investigated to establish what type of services are desired, and would be utilized. Residents and family members graded the importance of a list of dental services and prioritized them, to identify the most important services in this setting. Over 70% of responses from all participants in both groups placed the dental services listed in either the essential or important categories, indicating the general appreciation of dental services in the institutionalized setting.

Those services, which were identified as essential most often, were very similar in both groups, with the top 3 being identical - Cleanings, Check-ups and Fillings. The first 2 relate to prevention, which is contrary to the oral health behavior in institutions within the study, possibly as a result of lack of availability of services. The remaining 2 positions in the top 5 important services were the provision of dentures and relines and adjustments of dentures, for residents, and the relief of dental pain and the provision of dentures for family members. A combined list of most important dental services for both groups would therefore include cleanings, check-ups, fillings and the provision of dentures.

The reliability of this assumption is undermined by the categorization of the services into categories of essential or important. The services with the most responses in these categories for the residents are (in order of most responses first) provision of dentures, denture relines or adjustments, fillings, cleanings, relief of pain, tooth removal and check-ups. This is similar to the priority list above.

The family members identified the following services as being classified as having the most responses in the essential or important categories - provision of dentures, denture relines or adjustments, relief of pain, emergency dental services, check-ups, fillings and cleanings at the same level. This follows a similar pattern to residents' responses, with denture care being a top priority, but the treatment of pain and emergency dental care is considered more important to family members. Other than this the list is almost identical with that of the residents.

A profile of the desired services in nursing homes from this study would probably be one which provided emergency and regular preventive care - with the capability of providing simple restorative and denture care as necessary. Complex care was not seen as a priority in either group.

Those services, which appear in the categories of little value or unimportant can also provide information on the types of services, which, perhaps, would not be utilized. Residents identified the following services in these categories most often - tooth implants, specialist services, root canal therapy, oral hygiene education and implant stabilized dentures. This is comparable with those identified by family members - tooth implants, implant stabilized dentures and root canal treatments. There is an agreement between the groups around the lack of importance of implants and root canal therapies. Specialist services were not thought to be important by the residents and generally both groups did not regard complex treatments as important as basic treatments.

The inference of these responses is that a basic program is desired, not one providing a comprehensive list of services. If this truly reflects the desires and needs of this population then a modest range of services could be provided at minimal cost with utilization by the whole dental team as follows:

Diagnosis/restorative care/extractions - Dentist and Dental Nurse.
Prevention - Dental Hygienist
Dentures - Dentist/Denturist and Dental Technician dependent on cost of services

Conclusion

The residents in the nursing homes studied and their family members share similar views in the types and frequency of dental services that should be provided in the nursing home setting. They describe a basic dental service of check-ups and preventive care, with restorative, denture and surgical intervention where necessary. Complex care is not a priority. Services should be available once or twice a year.

References

1. Matear DW. The importance of oral health in the elderly. *Mature Medicine, Canada* 1998; 1(5): 34-37.
2. Matear DW, Barbaro J. Oral health of an institutionalized elderly population without access to oral healthcare services. *Ontario Dentist*, January/February 2005: 25-29.
3. National Institute for Dental Research. *Oral Health of US Adults: 1985-86*. 1987. Washington, DC: Government Printing Office.
4. *Canadian Health Survey*. Ottawa. Minister of Supply and Services Canada, 1979.
5. Drummond JR, Newton JP, Yemm R. *Colour atlas and text of dental care of the elderly*. 1995. Mosby-Wolfe.
6. Kilmartin CM. Managing the medically compromised geriatric patient. *J Prosth Dent* 1994(Nov); 72(5): 492-499.
7. Meskin LH, Dillenberg J, Heft MW, Katz RV, Martens LV. Economic impact of dental service utilisation by older adults. *J Amer Dent Assoc* 1990(Jun); 120(6): 665-668.
8. Schwab D, Pavlatos CA. The geriatric population as a target market for dentists. In: Papas T, Niessen LC, Chauncey HH. (eds.), *Geriatric dentistry: Ageing and oral health*. 1991; pp. 331-334. St. Louis: Mosby.
9. Gift HC, Newman JF. How older adults use oral health care services: results of a national health interview survey. *J Amer Dent Assoc* 1993(Jan); 124(1): 89-93.
10. Kiyak HA. Reducing barriers to older persons' use of dental services. *Int Dent J* 1989; 39: 95-102.
11. Penchansky, R. and Thomas, J.W. The Concept of Access - Definition and relationship to Consumer Satisfaction. *Medical Care* 1981; 19(2): 127-140.

Figure 1. High Importance

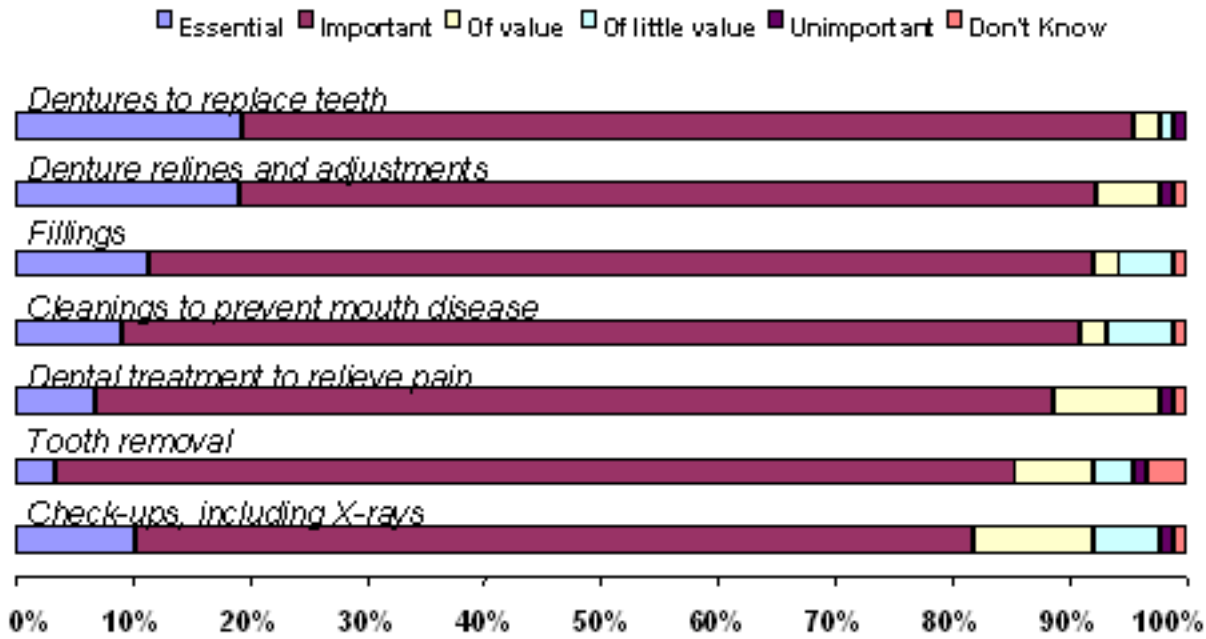


Figure 2. Medium Importance

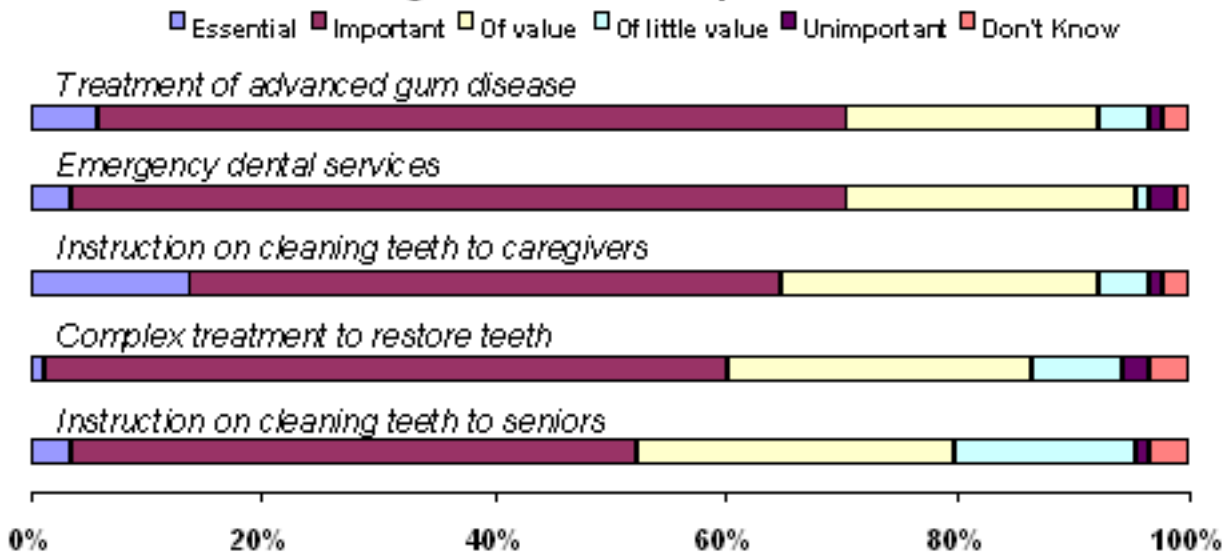


Figure 3. Low Importance

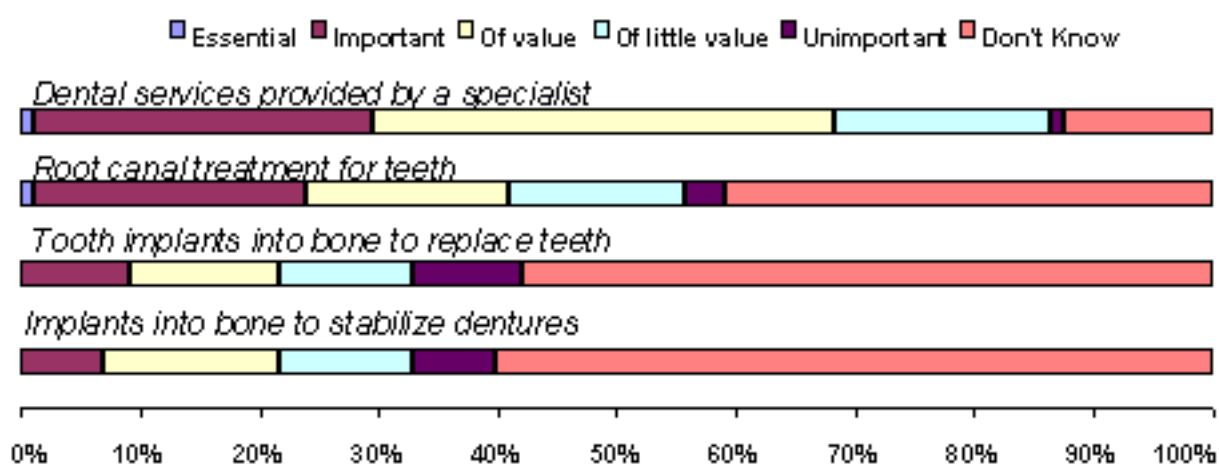


Figure 4. Priorities of Services (Non-Scalar)

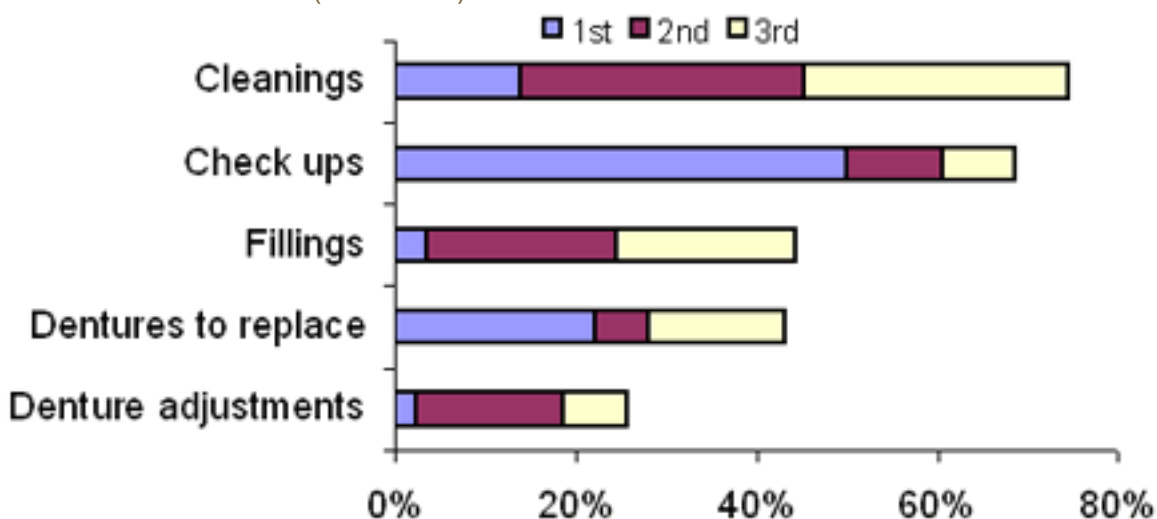


Figure 5. Desired Availability of the Services

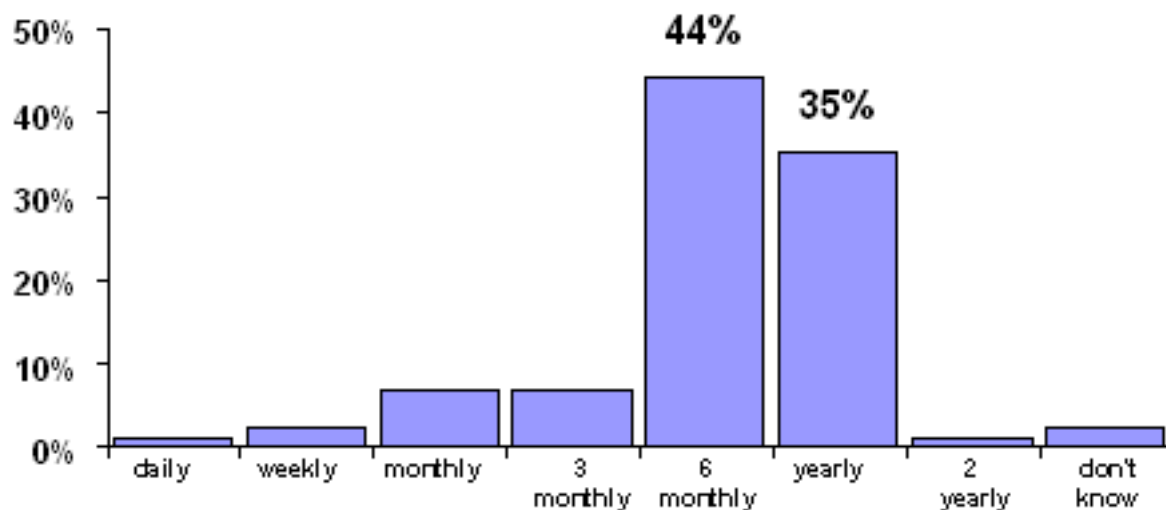


Figure 6. Percentage that agree with the following statements

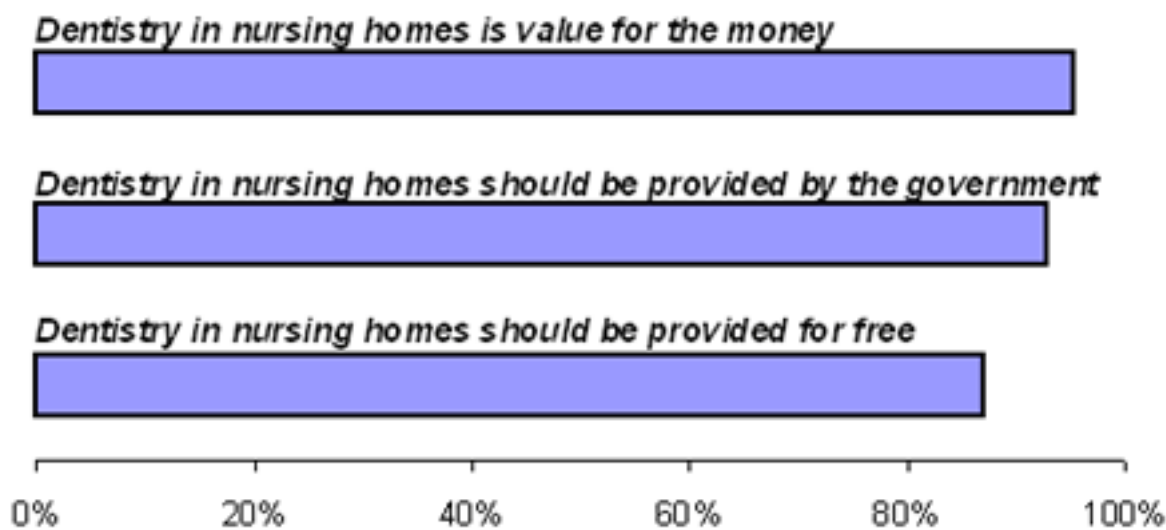


Figure 7 Age of the residents

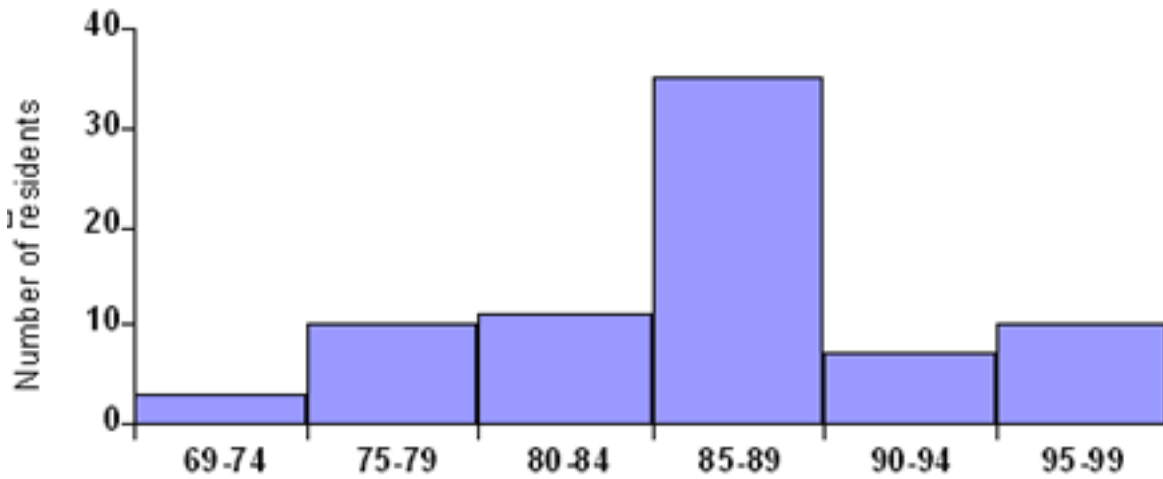


Table 1	Positive responses		
	Resident %	Caregiver %	p-value
Service			
Instruction to seniors	82	97	0.02
Implant into bone to replace teeth	51	18	0.003
Services by a specialist	78	97	0.006

Figure 10. Low Importance Services

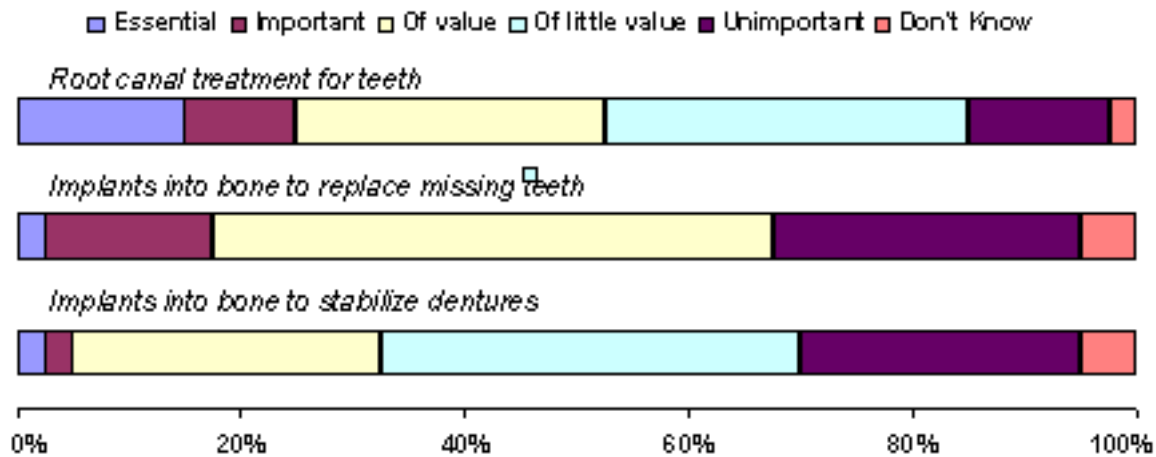


Figure 3. Comparison of overall performance of DAT and aphasic patients in naming task

Figure 8. High Importance Services

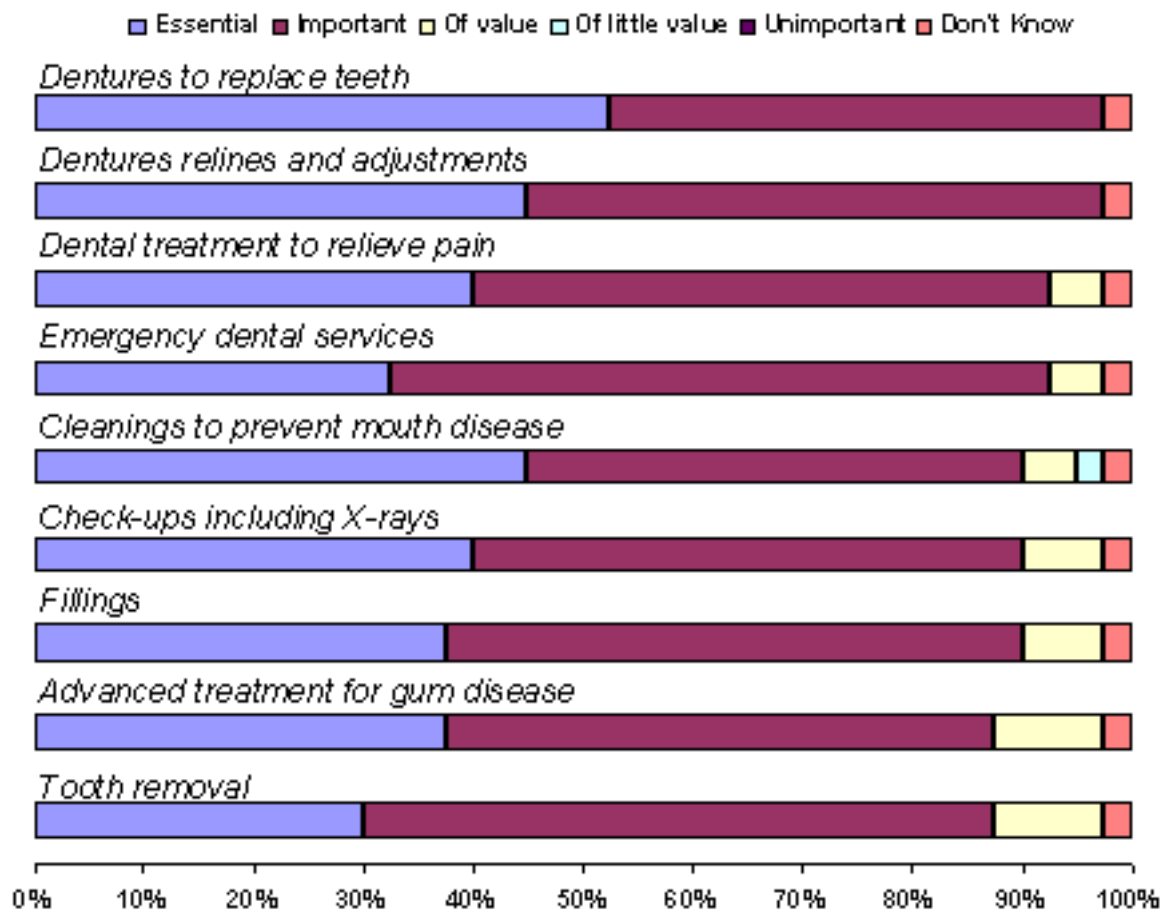


Figure 9. Medium Importance Services

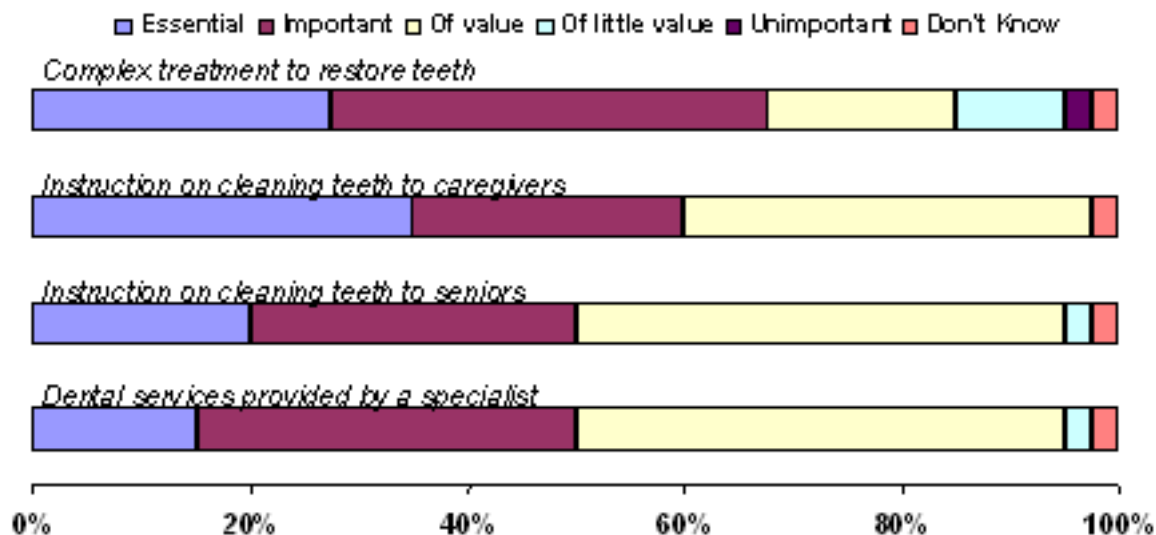


Figure 11 Priority of service (non-scalar)

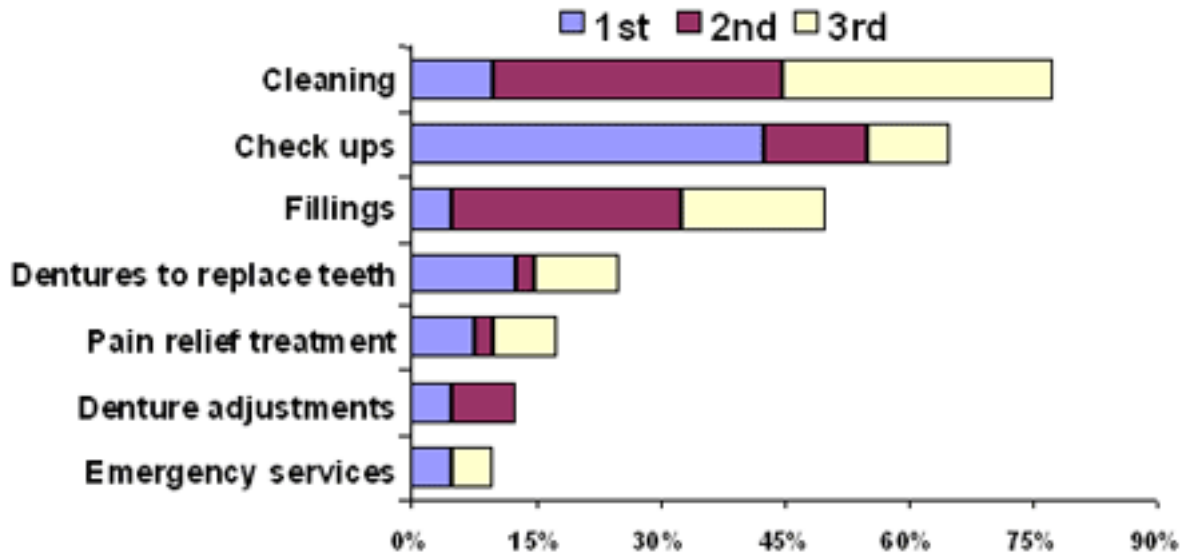


Figure 13 Desired availability of services

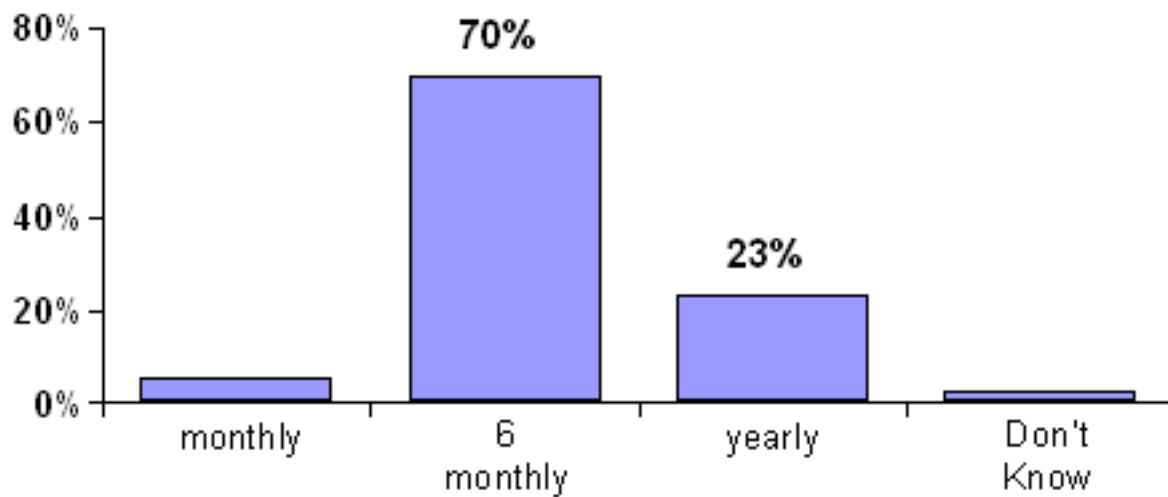
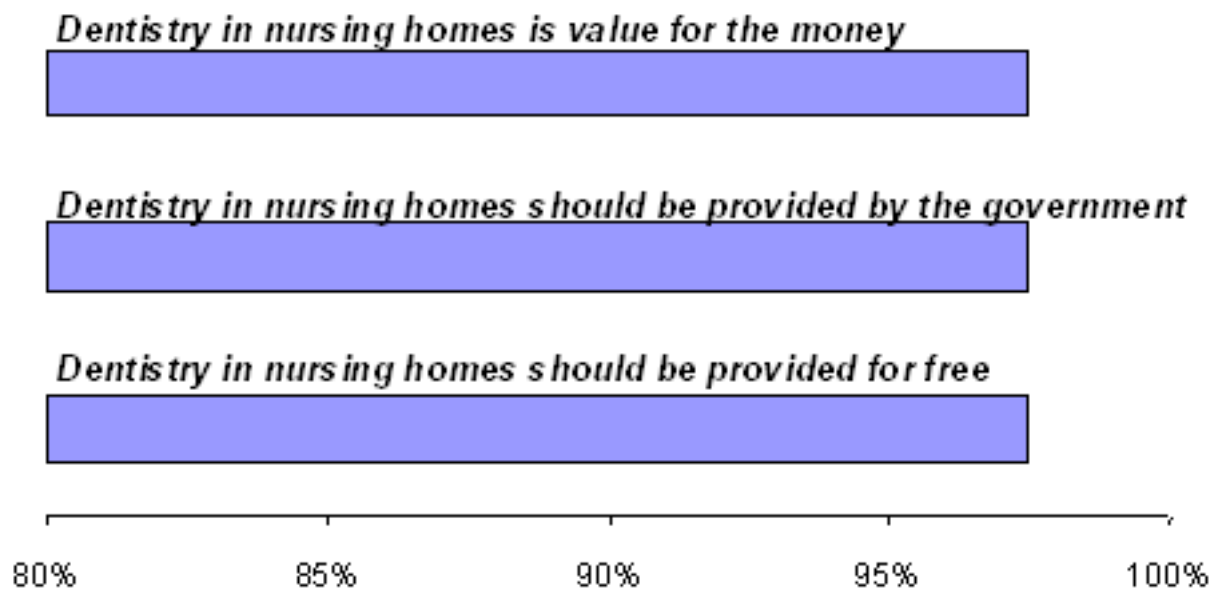


Figure 14 Do you agree with the following statement



Study of Serum Electrolytes in Surgical Patients Undergoing Intestinal Stoma

Authors:

Manal M Khan, A K Verma, Shaista M. Vasenwala, Sheeraz M. Khan

**Mr. Abrar Ahmad

All belongs to Jawaharlal Nehru Medical College, Aligarh Muslim University, India

** Statistical Cell, Maulana Azad National Urdu University, Hyderabad, India

ABSTRACT

The present study was conducted on 70 patients undergoing intestinal stoma creation, in the Department of General Surgery, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh, India. The aim of the present study was to assess and quantify the serum electrolyte changes in patients following ileostomy or colostomy, to identify and estimate need of electrolyte replacement and to develop a regime for electrolyte supplementation, based on the findings of this study, if indicated.

Serum electrolytes namely serum sodium, serum potassium, serum calcium, serum magnesium and serum chloride were estimated in patients who underwent stoma creation, in the postoperative period, on postoperative day 1, day 3 and day 5. For the purpose of study and comparisons, the intestinal stoma patients were further divided into groups based on (1) type of stoma (ileostomy or colostomy), (2) those with ileal segmental resection along with ileostomy and (3) amount of daily stoma output. All the patients received the same intravenous fluid and electrolytes regime until the 3rd postoperative day. However, no patient was allowed to go into a fluid deficit.

Key words: Serum electrolytes, sodium, potassium, calcium, magnesium, chloride, t-test, ileostomy, colostomy postoperatively.

Introduction

Chief electrolytes in the human body are Sodium, Potassium, Calcium, Magnesium, Chloride, Bicarbonate, etc. (Na⁺, K⁺, Ca²⁺, Mg²⁻, Cl⁻, HCO₃⁻). The maintenance of optimal function of body physiology depends on proper concentration or proportion of these electrolytes within a narrow normal range. Derangement i.e. excess or depletion of electrolytes in the body leads to derangement of physiological function.

Maintaining fluid and electrolyte balance requires understanding of normal intake and output of major electrolytes required for body economy, including the consideration of abnormal losses of fluids (Intestinal stomas, fistulas, gastric aspiration, drains etc.), their electrolyte content and the deficiencies acquired thereby. An intestinal stoma is an opening of intestinal tract on to the abdominal wall. It mainly functions to divert the faeces and flatus to the exterior. It may be an ileostomy or colostomy depending on the exteriorisation of either ileum or colon respectively. In rare instances, proximal small bowel can be taken out as a jejunostomy.

A stoma may be a low volume stoma, in which daily volume is around 500 ml or a high volume stoma, in which daily

volume is one litre or more (Hill et al, 1974). Patients with stoma output less than one litre daily are seldom troubled. On the other hand patients with high output stomas are prone to salt and water depletion. If a significant amount of ileum is resected at the time of an ileostomy operation, output from the resulting ileostomy tends to be unusually profuse (Nuguid et al, 1961, Hill et al, 1974).

The omission of an intestinal stoma may result in morbidity or even mortality - this must be weighed against the physical, metabolic and psychological complications of an ileostomy or colostomy. One of the biochemical parameters is the study of serum electrolytes, namely serum sodium, serum potassium, serum calcium, serum magnesium and serum chloride, in surgical patients undergoing intestinal stoma creation, either ileostomy or colostomy postoperatively.

Aims and Objectives of The Study

1. To assess and quantify the serum electrolyte changes in patients following ileostomy/ colostomy.
2. To identify and estimate need for electrolyte replacement.
3. To develop a regime for electrolyte supplementation based on the findings of this study, if indicated.

This study was carried out in the postoperative period of surgical patients who underwent stoma creation and who were maintained on intra-venous fluid and electrolyte regime followed in this hospital (dextrose and ringer lactate) until the 3rd postoperative day, and blood transfusion done wherever indicated. However no patient was allowed to go into a fluid deficit.

Material and Methods

This study was conducted on 70 surgical cases admitted in the Department of General Surgery, J.N. Medical College, A.M.U., Aligarh and who went for the creation of intestinal stomas. Clinical examination and investigations i.e. serum sodium, serum potassium, serum calcium, serum chloride and serum magnesium, and quantity of stoma output, were done postoperatively at 24 hrs (1st day), 96 hrs (3rd day) and 120 hrs (5th day). Patients who were below 12 years of age were not included in this study.

Intestinal Stoma Output Quantity in ml

Serum Values: Electrolytes

Serum Sodium: Normal value of serum sodium taken was 135-145 mEq/L or 135- 145 mmol/L

Serum Potassium: Normal values of serum potassium was taken between 3.5-5.0 mEq/L or 3.5-5.0 mmol/L

Serum Calcium: Normal value of serum calcium was 2.1-2.6 mmol/L (8.5-10.5 mg/dL) (conversion factor 0.25) (Young DS, 1987). [Calcium: mmol/L=mEq/Lx0.5=mg/dlx0.25]

Serum Magnesium: Normal value of serum magnesium was taken as 0.75-1.25 mmol/L or 1.8-3.0 mg/dL or 1.4-2.2 mEq/L (Young DS, 1987). [Magnesium: mmol/L =mEq/Lx0.5=mg/dLx0.41]

Serum Chloride: Normal value of serum chloride was taken as 98-107 mmol/L (mEq/L) (Young DS, 1987).

Estimation of Serum Electrolytes (sodium, potassium, magnesium, calcium and chloride) was done.

Statistical Analysis

Processing of data: All the observations have been statistically analyzed. The standard deviation has been calculated using the formula:

$$S = \sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}}$$

The Students -test of significance is applied to test the significance of difference of values between different samples the value of 't' was calculated by the following formula:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

where,

\bar{X}_1 = Mean of first sample

\bar{X}_2 = Mean of second sample

S_1 = Standard deviation of first sample

S_2 = Standard deviation of second sample

n_1 = Number of cases in first sample

n_2 = Number of cases in second sample

The value of 't' and P are seen from the table. The value is less than 0.05 and is considered to be significant.

Observations

The estimation of serum electrolytes, namely serum sodium serum potassium, serum calcium, serum magnesium and serum chloride were done postoperatively at 24 hours (1st postoperative day), 72 hours (3rd postoperative day) and 120 hours (5th postoperative day). During the postoperative study period, two patients expired, one on the 4th and the other on the 5th postoperative day, respectively. All of the patients in this study had their stoma created on operation for emergency conditions.

Table 1 reveals that the maximum number of patients were in the 13-25 years of age group i.e. 28 (16 males and 12 female) and the youngest patient was 13 years old and the oldest was 80 years old. The mean age of the patients was 33.14 years. (Males 35.36 years and females 29.82 years).

Table 2 depicts that out of the total 70 patients, 58 patients underwent ileostomy (33 males, 25 females), and out of these 16 patients underwent resection of small bowel in addition to ileostomy (10 males and 6 females). Twelve patients had colostomy (9 males and 3 females) as the operative procedure. Patient having stoma without additional resection of small intestine were 54 (colostomy patients +patients having ileostomy with no resection of small bowel) (32 males and 22 females).

From Table 3 the majority of the patients who underwent stoma creation were of perforation peritonitis 43 (61.6%) patients following typhoid, tubercular or non-specific enteritis. Twenty patients (28.6%) presented with intestinal obstruction, out of these 7 cases had malignancy. Ten cases in addition to obstruction had associated peritonitis (6 cases of adhesion obstruction, 2 of malignancy and one each of caecal and sigmoid volvulus). The remaining 7 cases had stoma creation due to gun shot abdomen (3), septic abortion (2) and rectal and perineal injury (2)

From Table 4, the average daily quantity of stoma output in all patients on the 3rd postoperative day was 441.4 ml and on the 5th postoperative day was 641.1 ml. **Stoma** output on the first postoperative day was not taken into consideration as most of the stomas were not functioning at that time.

The average daily stoma output in patients having stoma with no resection of small bowel was 416.7 ml and 586.8 ml on the 3rd and 5th postoperative days respectively and in patients having ileostomy with resection of small bowel was 525 ml on the 3rd postoperative day and 833.3 ml on the 5th postoperative day.

The average daily stoma output in patients having ileostomy with no resection of small bowel was 476.2 ml on the 3rd day

postoperative and 670.7 ml on the 5th postoperative day.

The average daily stoma output in all patients having ileostomy was 489.6 ml on the 3rd postoperative day and 714.3 ml on the 5th postoperative and in patients having colostomy was 208.3 ml on the 3rd postoperative 300 ml on the 5th postoperative day.

Quantity of stoma output between ileostomy and colostomy patients showed a highly significant lower amount in colostomy patients on both the 3rd and 5th postoperative days ($p < 0.001$).

Patients who underwent additional intestinal resection had a significantly higher stoma output. Stoma output of patients without any resection of small intestine showed a significant lower amount on the 3rd postoperative day ($p < 0.05$) and a highly significant lower amount on the 5th postoperative day ($p < 0.001$).

On the 3rd postoperative day, out of 42 patients of ileostomy with no resection of small bowel 22 (52.4%) had stoma output less than 500 ml and rest 20 (47.6%) had stoma output between 500-1000 ml with a mean of 476.2 ± 190.9 ml and on the 5th postoperative day out of 41 patients 6 (14.6%) had stoma output less than 500 ml, 33 (80.5%) between 500-1000 ml and 2 (4.9%) more than 1000 ml with a mean output of 670.7 ± 161.2 ml (Tables -4 & 5).

In 16 patients having ileostomy with resection of small bowel, 5 (31.2%) had stoma output less than 500 ml and 11 (68.8%) had stoma output between 500-1000 ml on the 3rd postoperative day with a mean of 525 ± 126.2 ml. On the 5th postoperative day out of 15 patients of ileostomy with resection of small bowel 10 (66.7%) had stoma between 500-1000 ml and 5 (33.3%) had stoma output more than 1000 ml with a mean of 833.3 ± 194.6 ml (Tables -4 & 5).

In 54 patients of stoma with no resection 34 (63%) had stoma output < 500 ml and the rest 20 (37%) had stoma output between 500-1000 ml on the 3rd postoperative day. On the 5th postoperative day, of the 53 patients, 18 (34%) had stoma output < 500 ml, 33 (62.5%) had stoma output between 500-1000 ml, and 2 (3.5%) had stoma output > 1000 ml.

In a total 12 patients of colostomy, the stoma output was less than 500 ml on both the 3rd and 5th postoperative days with a mean of 208.3 ± 90.9 ml on the 3rd and 300 ± 95.7 ml on the 5th postoperative day. (Tables -4 & 5).

Group (1): All stoma patients containing all ileostomy and colostomy patients ($n=70$).

Group (2): All ileostomy patients ($n=58$).

Group (3): Ileostomy patients who underwent additional resection of small bowel ($n=16$).

Group (4): Stoma (Ileostomy+Colostomy) patients having no resection of small bowel ($n=54$).

Group (5): All colostomy patients ($n=12$)

Group (6): Patients having stoma output ≥ 1000 ml on postoperative day 5 ($n=7$).

Serum Electrolytes

(i) Serum Sodium:

- In the group having all stoma patients, when postoperative day 1 reading was compared to postoperative day 3 and day 5 readings, a significant lower reading was observed on day 3 ($p < 0.05$) and day 5 ($p < 0.001$). When postoperative day 3 reading was compared with postoperative day 5 reading a significant lower reading was observed on postoperative day 5 ($p < 0.01$). [A:B=S, A:C=S, B:C=S; (S=significant, NS=not significant)].
- In the group having all ileostomy patients, when postoperative day 1 reading was compared to postoperative day 3 and day 5 readings, a significant lower reading was observed on postoperative day 3 ($p < 0.05$) and day 5 ($p < 0.001$). When postoperative day 3 reading was compared with postoperative day 5 reading a significant lower reading was observed on postoperative day 5 ($p < 0.01$). [A:B=S, A:C=S, B:C=S].
- In the group having ileostomy with resection of small intestine, when postoperative day 1 reading was compared to postoperative day 3 and day 5 readings, a significant lower value was observed on postoperative day 3 ($p < 0.05$) and day 5 ($p < 0.001$). When postoperative day 3 reading was compared with postoperative day 5 reading a significant lower value was observed on day 5 ($p < 0.01$). [A:B=S, A:C=S, B:C=S].
- In the group having stoma with no resection of small intestine no statistically significant change ($p > 0.05$) was observed when postoperative day 1 and day 3 readings were compared. However, a statistically significant lower reading was observed on postoperative day 5 ($p < 0.05$). Changes in serum sodium level between postoperative day 3 and day 5, though lower on postoperative day 5, were not statistically significant. [A:B=NS, A:C=S, B:C=NS].
- In the group having colostomy, no significant change ($p > 0.05$) was observed when postoperative day 1, day 3 and day 5 readings were compared to each other. [A:B=NS, A:C=NS, B:C=NS].
- In the group having daily stoma output ≥ 1000 ml (on 5th day), no significant change ($p > 0.05$) was noted when postoperative day 1 reading was compared to postoperative day 3 reading. A statistically significant lower value was observed on postoperative day 5 when postoperative day 1 and day 3 readings were compared to the postoperative day 5 reading ($p < 0.05$). [A:B=NS, A:C=S, B:C=S].

In comparison of group (2) ileostomy and group (5) colostomy patients, no significant change ($p > 0.05$) was observed when postoperative day 1 readings were compared. When postoperative day 3 and day 5 readings were compared between groups (2) and (5), the readings in the ileostomy group were found to be significantly lower than in the colostomy group ($p < 0.001$). [A:A=NS, B:B=S, C:C=S].

In comparison of group (3) ileostomy with resection of small intestine and group (4) stoma with no resection of small intestine, no significant change ($p > 0.05$) was observed when postoperative day 1 readings were compared. When postoperative day 3 and day 5 readings were compared

between these groups (3 and 4), the reading in group (3) ileostomy with resection of small intestine, were found to be significantly lower than in group (4) ($p < 0.05$). [A:A=NS, B:B=S, C:C=S].

Except for the patients of group (3) ileostomy with resection of ileal segment and (6) stoma patients with output ≈ 1000 ml/day who on the 5th day had a mean serum sodium level below 135 mmol/m on postoperative day 5, all other groups of stoma had mean serum sodium levels in normal range in the postoperative period.

The value of serum sodium ranged from 134-143 mmol/L on postoperative day 1, 132-145 mmol/L on postoperative day 3 and 132-144 mmol/L on postoperative day 5.

Three out of 70 patients on postoperative day 1 and five out of 70 patients on postoperative day 3 had serum sodium values less than 135 mmol/L. On postoperative day 5, 9 out of 68 patients had serum sodium values less than 135 mmol/L. The rest of the patients had values in the normal range of 135-145 mmol/L.

(ii) Serum Potassium:

1. In the group having all stoma patients, when postoperative day 1 reading was compared with postoperative day 3 and day 5 reading, a significant lower value was observed, on postoperative day 3 ($p < 0.05$) and day 5 ($p < 0.001$). When postoperative day 3 reading was compared with postoperative day 5 reading, there was no significant change ($p > 0.05$) observed. [A:B=S, A:C=S, B:C=NS].
2. In the group having all ileostomy patients, when postoperative day 1 reading was compared with postoperative day 5 reading, a significant lower value ($p < 0.05$) was observed on postoperative day 5. When postoperative day 3 reading was compared with postoperative day 1 and day 5 readings, no significant change was observed ($p > 0.05$). [A:B=NS, A:C=S, B:C=NS].
3. In the group having ileostomy with resection of small intestine, when postoperative day 1, reading was compared to postoperative day 3 and day 5 readings, a significant lower value ($p < 0.05$) was observed on postoperative day 3 and day 5. When postoperative day 3 reading was compared with postoperative 5 day reading, no significant change ($p > 0.05$) was observed. [A:B=S, A:C=S, B:C=NS].
4. In the group having stoma with no resection of small intestine, when postoperative day 1 reading was compared to postoperative day 3 and day 5 readings, postoperative day 3 ($p < 0.05$) and day 5 ($p < 0.001$) readings were found to be significantly lower than day 1. No significant change ($p > 0.05$) was observed when postoperative day 3 reading was compared to postoperative day 5 reading. [A:B=S, A:C=S, B:C=NS].
5. In the group having colostomy, no significant change ($p > 0.05$) was observed when postoperative day 1, day 3 and day 5 readings were compared to each other. [A:B=NS, A:C=NS, B:C=NS].
6. In the group having daily stoma output ≈ 1000 ml on the 5th postoperative day, when postoperative day 1 reading was compared to postoperative day 5, postoperative day 5 reading was observed to be significantly lower ($p < 0.05$).

No significant change ($p > 0.05$) was observed when postoperative day 3 reading was compared to postoperative day 1 and day 5 readings. [A:B=NS, A:C=S, B:C=NS].

In comparison of group (2) ileostomy and group (5) colostomy, no significant change ($p > 0.05$) was observed when postoperative day 1, day 3 and day 5 readings were compared between these groups. [A:A=NS, B:B=NS, C:C=NS].

In comparison of group (3) ileostomy with resection of small intestine and group (4) stoma without resection of small intestine no significant change ($p > 0.05$) was observed when postoperative day 1, day 3 and day 5 readings were compared between these groups. [A:A=NS, B:B=NS, C:C=NS].

The mean values of serum potassium remained within the normal range in the postoperative period in all groups.

The values of serum potassium ranged from 3.4-5.0 mmol/L on postoperative day 1, 3.3-5.2 mmol/L on postoperative day 3 and 3.2-5.0 mmol/L on postoperative day 5.

Two out of 70 stoma patients on postoperative day 1, and four out of 70 patients on postoperative day 3 had serum potassium values less than 3.5 mmol/L. One patient on postoperative day 3 had serum potassium values more than 5.0 mmol/L. Five out of 68 patients on postoperative 5 had serum potassium values less than 3.5 mmol/L. The rest of the patients had serum potassium values in the normal range of 3.5-5.0 mmol/L.

(iii) Serum Calcium:

No significant change ($p > 0.05$) was observed when postoperative day 1, day 2 and day 3 readings were compared within the groups in the following groups.

1. Group having all stoma patients [A:B=NS, A:C=NS, B:C=NS].
2. Group having all ileostomy patients [A:B=NS, A:C=NS, B:C=NS].
3. Group having ileostomy with resection of small intestine [A:B=NS, A:C=NS, B:C=NS].
4. Group having stoma patients with no resection of small intestine [A:B=NS, A:C=NS, B:C=NS].
5. Group having all colostomy patients [A:B=NS, A:C=NS, B:C=NS].
6. Group having patient with stoma output ≈ 1000 ml on the 5th postoperative day, [A:B=NS, A:C=NS, B:C=NS].

In comparison of postoperative day 1, day 3 and day 5 readings between group (2) ileostomy and group (5) colostomy, no significant change was observed ($p > 0.05$). [A:A=NS, B:B=NS, C:C=NS].

In comparison of group (3) ileostomy with resection of small intestine and group (4) stoma with no resection of small intestine, no significant change was observed ($p > 0.05$) [A:A=NS, B:B=NS, C:C=NS].

The mean values of serum calcium remained within the normal range in the postoperative period in all groups.

The values of serum calcium ranged from 2.12-2.58 mmol/L on postoperative day 1, 1.94-2.57 mmol/L on day 3 and 1.91-

2.56 mmol/L on postoperative day 5.

Out of 70 patients, 3 patients developed carpopedal spasm and tetany. (2 on the 4th day and 1 on the 3rd postoperative day). Two of these three patients had serum calcium values less than 2.1 mmol/L on the 3rd and 5th postoperative days. The rest of the patients had serum calcium values to a normal range of 2.1-2.6 mmol/L.

(iv) Serum Magnesium:

No significant change ($p>0.05$) was observed when postoperative day 1, day 3 and day 5 readings were compared within the groups in the following groups:

1. Group having all stoma patients [A:B=NS, A:C=NS, B:C=NS].
2. Group having all ileostomy patients [A:B=NS, A:C=NS, B:C=NS].
3. Group having ileostomy with resection of small intestine [A:B=NS, A:C=NS, B:C=NS].
4. Group having stoma patients with no resection of small intestine [A:B=NS, A:C=NS, B:C=NS].
5. Group having all ileostomy patients [A:B=NS, A:C=NS, B:C=NS].
6. Group having patients with stoma output ≥ 1000 ml on the 5th postoperative day [A:B=NS, A:C=NS, B:C=NS].

No significant change ($p>0.05$) was observed when postoperative day 1, day 3 and day 5 readings were compared between the following groups: [A:A=NS, B:B=NS, C:C=NS].

- Group (2) ileostomy and group (5) colostomy and
- Group (3) ileostomy with resection of small intestine and group (4) stoma with no resection of small intestine.

The mean values of serum magnesium remained within the normal range in the postoperative period in all groups. The values of serum magnesium ranged from 0.75-1.23 mmol/L on postoperative day 1, 0.75-1.24 mmol/L on day 3 and 0.75-1.26 mmol/L on day 5. In one patient serum magnesium value was more than 1.25 mmol/L on postoperative day 5. The rest of the patients had serum magnesium value in normal range of 0.75-1.25 mmol/L.

(v) Serum Chloride:

No significant change ($p>0.05$) was observed when postoperative day 1, day 3 and day 5 readings were compared within the groups in the following groups: [A:B=NS, A:C=NS, B:C=NS].

- (1) Group having all stoma patients.
- (4) Group having stoma patients with no resection of small intestine.
- (5) Group having colostomy patients.
- (6) Group having patients with stoma output ≥ 1000 ml on the 5th postoperative day.

In group (3) having all ileostomy patients, no significant change ($p>0.05$) was observed when postoperative day 1 reading was compared to postoperative day 3 and day 5 readings. When postoperative day 3 and day 5 readings were

compared, the postoperative day 5 reading was found to be significantly lower ($p<0.05$). [A:B=NS, A:C=NS, B:C=S].

In group (3) having ileostomy with resection of small intestine, no significant change ($p>0.05$) was observed when the postoperative day 1 reading was compared to the postoperative day 3 reading. Postoperative day 5 reading was found to be significantly lower ($p<0.05$) when it was compared to postoperative day 1 and 3 readings. [A:B=NS, A:C=S, B:C=S].

In comparison of group (2) ileostomy and group (5) colostomy postoperative day 3 and day 5 readings were found to be significantly lower ($p<0.05$) in the ileostomy group, but no significant change ($p>0.05$) was observed when postoperative day 1 reading was compared between these groups. [A:A=NS, B:B=S, C:C=S].

In comparison of group (3) ileostomy with resection of small intestine, and group (4) stoma with no resection of small intestine, postoperative day 1, day 3 and day 5 readings were found to be significantly lower ($p<0.05$) in group (3) having ileostomy with resection of small intestine. [A:A=S, B:B=S, C:C=S].

The mean values of serum chloride remained within the normal range in the postoperative period in all groups.

The value of serum chloride ranged from 98-107 mmol/L on postoperative day 1, 97-107 mmol/L on day 3 and 97-107 mmol/L on day 5. Two patients had serum chloride values less than 98 mmol/L, one on day 3 and the other on day 5. The rest of the patients had serum chloride values in the normal range of 98-107 mmol/L.

Discussion

The age of the patients in the study was in the range of 13-80 years, with a mean of 33.14 years. Most of the patients in our study (61.5%) were in the 13-35 year age group. The majority of the patients (>90%) underwent stoma creation for perforation peritonitis (Enteric, Tubercular and other causes) (61.6%) and intestinal obstruction (28.6%). There were no cases of Crohn's and ulcerative colitis or diverticulitis.

It is in contrast to the study of G. Swaninger et al 1991, where most of the patients were of Crohn's disease (mean age 41 years) and ulcerative colitis (mean age 38 years) who were operated for ileostomy.

In the study of Thomas L.B et al, 2003, most patients were elderly (above 70 years) and ostomy was created for cancer (33.0%), IBD (21.9%), diverticulitis (14.9%) and only 2.3% for perforation peritonitis. In our study, there were only 7 cases (10%) of malignancy and 43 (61.6%) cases were of the perforation peritonitis, who underwent stoma creation.

Quantity of Daily stoma output in postoperative period:

In the previous studies the volume of daily ileostomy output was reported in the range of 200-500 ml (Welch et al 1936; Brooke 1957; Smiddy et al 1960; Kramer et al, 1962; Kanaghinis et al, 1963). Low volume ileostomy was defined as daily output around 500 ml and high volume ileostomy as a daily volume of a litre or more, by Hill et al 1974, 1975c.

In our study the average stoma volume in ileostomy patients

was 489.6(\pm 176.8) ml on the 3rd day and 714.3(\pm 182.9) ml on the 5th postoperative day.

The ileostomy output tended to be unusually profuse if additional ileal resection had to be performed (Nuguid et al, 1961; Hill et al, 1974, 1975). In our study the ileostomy patients in which resection of ileum was done, the mean output on the 3rd postoperative day was 525(\pm 126.2) ml and on the 5th day was 833.3(\pm 194.6) ml and was significantly higher than patients having stomas with no resection of the ileum ($p < 0.05$).

New ileostomy may produce a diarrhoea of 1-2 litre/day as reported by Wright et al, 1973. In this study, 7 (10%) of ileostomy patients had \approx 1000 ml/day of stoma output on 5th postoperative day; 5 of these 7 patients had ileostomy with ileal resection. The output from colostomy was significant lower than ileostomy and the metabolic changes were mostly confined to the ileostomy patients. Similar results were reported by P.G. Reasbeck et al (1989).

Serum Sodium

The present study revealed a significant decrease in serum sodium concentration postoperatively in patients who underwent stoma creation. Ileostomy patients had significantly lower serum sodium levels compared to colostomy patients on the 3rd and 5th postoperative days ($p < 0.001$).

Ileostomy patients having resection of small intestine had significantly lower serum sodium levels compared to stoma patients with no resection of small bowel on the 3rd and 5th postoperative days ($p < 0.05$). No significant difference was found on postoperative day 1.

The mean value of serum sodium on postoperative day 1, day 3 and day 5 remained within the normal range in all groups of stoma patients except the group having ileostomy with resection of small intestine, and the group of patients having stoma output \approx 1 litre on postoperative day 5, in which mean serum sodium level decreased below normal on postoperative day 5.

In the group having all stoma patients, there was a decrease in the mean serum sodium level from postoperative day 1 to day 5. The differences between postoperative day 1, day 3 and day 5 were statistically significant ($p < 0.05$).

In the group having all ileostomy patients, there was a decrease in mean serum sodium levels from postoperative day 1 to day 5 which was found to be statistically significant ($p < 0.05$).

In the group having ileostomy with resection of small intestine, there was a decrease in mean serum sodium levels from postoperative day 1 to day 5 reaching below normal range on postoperative day 5 (134.30 \pm 1.1 mmol/L). The difference between postoperative day 1 and day 3 was significant and the difference between postoperative day 5 and postoperative day 3 ($p < 0.01$) and day 1 was highly significant ($p < 0.001$).

In the group having stoma with no resection of the small bowel, postoperative day 5 values of serum sodium were significantly lower than day 1 values ($p < 0.05$), but no significant difference was found between comparison of other postoperative values.

In the group having colostomy, no significant difference was found in serum sodium values in the postoperative period.

In the group having stoma output \approx 1000 ml/day on the 5th postoperative day, there was a significantly lower value of mean serum sodium on the 5th postoperative day as compared to postoperative day 1 and day 3. The mean serum sodium value was lower than the normal range on the 5th postoperative day (133.6 \pm 1 mmol/L).

The above findings correspond to the works of Hill G-L et al, 1974, Gallagher et al, 1962, Clarke et al, 1967, 1969 who also observed decrease in serum levels in the postoperative period in patients with ileostomy. Nuguid et al, 1961, Wright et al, 1973, Hill et al, 1974, 1975, also observed that resection of ileum with ileostomy increases stoma output and electrolyte losses. P.G. Reasbeck et al, 1989, also observed that metabolic complications are mostly confined to ileostomy patients.

Serum Potassium:

In our study, no significant change was observed when postoperative day 1, day 3 and day 5 serum potassium values were compared between ileostomy and colostomy patients and between patients having ileostomy with resection of ileum and stoma patients with no resection of ileum.

The mean values of serum potassium of postoperative day 1, day 3 and day 5 remained within the normal range in all groups of stoma patients.

In all the groups of stoma patients, the value of serum potassium decreased slightly from postoperative day 1 to day 5 but remained within the normal range.

Significantly lower serum potassium values of postoperative day 3 and day 5 were observed compared to postoperative day 1 in the groups of all stoma patients, ileostomy patients with resection of small intestine and ileostomy patients with no resection of small bowel ($p < 0.05$). No significant change was observed between postoperative day 3 and day 5 values.

In the groups having all ileostomy patients and patients with stoma output more \approx 1000 ml on the 5th day, the postoperative day 5 value of serum potassium was found to be significantly lower than the day 1 value ($p < 0.05$). No significant change was found in the postoperative period in the colostomy patients.

This is in agreement with the results documented by various authors L.O Nilsson et al, 1982, Turnberg L.A et al, 1978, J.C. Goligher 1975, who observed a slight decrease in serum potassium levels in ileostomy patients but found no signs of potassium depletion in patients with ileostomy.

However, some other authors have observed an increase in serum potassium level in patients with ileostomy (N.D Gallagher et al, 1962, Swaniger et al, 1991). No such increase was noted in this study.

Serum Calcium:

No significant change was observed when postoperative day 1, day 3 and day 5 serum calcium values were compared between ileostomy and colostomy patients groups and between patients having ileostomy with resection of ileum and patients having stoma with no resection of ileum.

The mean values of serum calcium on postoperative day

1, day 3 and day 5 remained within the normal range in all groups of stoma patients.

No significant change was observed when the postoperative day 1, day 3 and day 5 serum calcium values were compared with each other within the various intestinal stomas groups.

The above findings are similar to work done by Daly, DW 1968; Singer et al, 1973; K.J. Kennedy, Compston et al, 1983 who studied changes in serum levels of calcium in ileostomists and found no significant changes.

During this study three patients of ileostomy developed carpopedal spasm and tetany, but only two had hypocalcemia and the third had normal serum calcium value. Their mean stoma output was 800 ml/day but none had undergone additional resection and this aberration remained unexplained although some workers noticed this rare complication of decreased serum calcium level in high output stomas. (Healton et al, 1967; Daly DW, 1968; Hill GL et al, 1976; Prasad ML et al, 1984).

Serum Magnesium:

In this study, no significant change was observed when postoperative day 1, day 3 and day 5 serum magnesium values were compared between ileostomy and colostomy patients groups and between patients having ileostomy with resection of ileum and patients having stoma with no resection of ileum.

The mean serum magnesium values on postoperative day 1, day 3 and day 5 remained within the normal range in all groups of stoma patients.

No significant change was observed when the postoperative day 1, day 3 and day 5 serum magnesium values were compared with each other within the various intestinal stomas groups.

The above findings are similar to work done by H.J. Kennedy, Compston et al, 1983; Hill GL et al, 1976; who studied serum magnesium levels in patients with ileostomy and found no significant changes although magnesium depletion occasionally is seen in patients with high volume ileostomies (Heaton et al, 1967; Hill GL et al, 1976; Prasad ML, 1984).

Serum Chloride:

In our study, significantly lower values of serum chloride on postoperative day 3 and day 5 were found in ileostomy patients groups compared to the colostomy group ($p<0.05$).

Also, significantly lower serum chloride levels on postoperative day 1, day 3 and day 5 were found in patients having ileostomy with resection of ileum as compared to patients having stoma with no resection of ileum ($p<0.05$).

The mean serum chloride values of all stoma groups remained within the normal range on postoperative day 1, day 3 and day 5.

No significant changes were found when the postoperative day 1, day 3 and day 5 serum chloride values were compared with each other within the groups of all stoma patients, stoma patients with no resection of small intestine, colostomy patients and patients with stoma output more than 1 litre on the 5th postoperative day.

In the group having all ileostomy patients, postoperative day 5 serum chloride values were found to be significantly lower than postoperative day 3 values ($p<0.05$).

In the group having ileostomy with resection of small intestine, postoperative day 5 serum chloride value was found to be significantly lower than postoperative day 1 and day 3 values ($p<0.05$).

These above findings are similar to the work done by Hill G.L, 1967, Clarke et al, 1967, Kramer P, 1966, Pearl RK, Prasad ML et al, 1984, who reported decreased sodium and chloride levels in patients following ileostomy.

Serum electrolytes and their relationship to quantity of stoma output, and resection of small intestine:

The average quantity of postoperative stoma output in patients with ileostomy was significantly higher than the colostomy patients ($p<0.05$). Significantly lower levels of serum sodium and serum chloride were found on postoperative day 3 and day 5 in patients with ileostomy compared to colostomy patients ($p<0.05$). In addition, in the ileostomy group, a significant decrease in levels of serum sodium, serum potassium and chloride occurred in the postoperative period but usually remained within the normal range.

The average quantity of postoperative stoma output was significantly higher in patients having ileostomy with resection of small intestine, compared to stoma patients with no resection of small intestine ($p<0.05$). Significantly lower levels of serum sodium and chloride were observed postoperatively in patients having ileostomy with resection of small intestine compared to stoma patients with no resection of small intestine ($p<0.05$). In addition, in the group having ileostomy with resection of small intestine, a significant decrease in levels of serum sodium, serum potassium and serum chloride was observed in the postoperative period but their levels remained in normal range, except for serum sodium which was below normal on postoperative day 5.

The above observations must be viewed in the context that these intestinal stomas patients were receiving intravenous fluid and electrolytes till the 3rd day postoperatively. It may, however be noted that no patient was allowed to go into a fluid deficit.

Serum electrolytes losses in patients following creation of intestinal stomas have been reported by several workers. (Gallagher et al, 1962; Kramer P, 1966; Clarke et al, 1967; Hill GL, 1967; LO Nilsson et al, 1982; Pearl RK, Prasad ML et al, 1984; G. Swaninger et al, 1991).

These losses if not adequately replaced, may lead to electrolyte deficient status. The findings in the present study are similar to the previously reported findings. Since the study of serum electrolytes in the stoma effluent was not done in this study, relationships showing the quantitative loss of electrolytes and serum electrolytes concentrations was not possible.

Conclusions

The stoma output was found to be higher in patients having ileostomy and was significantly higher in patients who had additional ileal segment resection done.

Serum sodium and serum chloride levels in patients with ileostomy, especially ileostomy with additional resection of ileal segment, showed a significant decrease in serum sodium and serum chloride levels on all days in the postoperative period as compared to patients with no resection of ileum or those undergoing colostomy.

Serum potassium level showed a significant decrease in patients with ileostomy, especially those having additional resection of ileal segment in the postoperative period, on the 5th postoperative day.

Serum calcium and serum magnesium concentration showed no significant change in the postoperative period in all groups of patients.

The patients with colostomy showed no significant change in serum electrolyte concentrations in postoperative period.

In the group of patients, having high output ileostomy (≈ 1 litre/day), there was a significant decrease in serum sodium and serum potassium on the 5th postoperative day.

The mean serum sodium level remained within the normal range on postoperative day 1, day 3 and day 5 in all groups of stoma patients, except in patients having ileostomy with additional resection of ileal segment and patients with high ileostomy output (i.e. ≈ 1 litre per day), in which serum sodium level decreased below normal range by the 5th postoperative day.

The serum levels of potassium, calcium, magnesium and chloride remained within normal range in the postoperative period in all groups of stoma patients.

From this study, it can be concluded that:

1. Patients undergoing colostomy have low stoma output i.e. below 500 ml/day; they do not develop fluid or electrolyte derangements in the early postoperative period and need no monitoring.
2. Patients undergoing ileostomy have average stoma output higher than colostomy patients i.e. around 500-600 ml/day; all these patients showed a fall in electrolyte values in the early postoperative period but the mean values tend to remain in the normal range.
3. Patients who underwent ileal resection in addition to ileostomy, have a significantly higher stoma output. These patients showed a significant fall in serum electrolyte levels, especially of sodium, chloride and potassium. Serum sodium values fell below normal range by the 5th postoperative day.
4. Patients with high output stomas (>1000 ml/day) developed significant derangement of serum electrolytes namely sodium and potassium.

In conclusion on the basis of this study, it is recommended that:

- In all ileostomy patients, serum electrolytes should be routinely estimated on the fifth postoperative day.
- In all patients who undergo ileal resection along with ileostomy or who have high ileostomy output, should be closely monitored for electrolyte derangements from the third postoperative day onwards.

- No definite regimen of serum electrolytes replacement can be recommended. Replacements of fluids and electrolytes have to be individually tailored based on postoperative serum electrolyte monitoring.

References

1. Abbot, WE, Krieger H, Babb. Metabolic alteration in surgical patients I. The effect of altering the electrolyte, carbohydrates, and amino acid intake. *AMA Annals of Surgery*, 1963; 138: 434.
2. Addendum: Bernard Claude (1938): Cited by Sudrania, S.P. (1966). Bischoff, E., et al (1963): Cited by Sudrania, S.P. (1966). Wootton, I.D.P. *Microanalysis in Medical Biochemistry*. 4th ed. Churchill; 1964.
3. Aurbach, GD, Potts, JT (Jr.), Chase LR, and Melson PH. Polypeptide hormones and calcium metabolism. *Ann Intern Med* 1969; 70: 1243.
4. Balakrishna BN, Banerjee AK. Serum Potassium in surgical stress. *Indian Journal of Surgery* 1962; 24(1): 60-65.
5. Benedict FG. A study of prolonged fasting. Publication 203, Washington, DC. Carnegie Institution of Washington 1915.
6. Berry, REL, Iob V, Campbell, KN. Potassium metabolism in the immediate postoperative period. *Arch Surg* 1948; 57: 470.
7. Bodansky O (1949): Cited by Sudrania SP (1966).
8. Carmichael D, Few J, Peart S, Unwin R. Sodium and water depletion in ileostomy patients. *Lancet* 1986; 13: 625.
9. Carmichael DJS, Unwin RJ, Few JD, et al. Sodium depletion in ileostomy patients. *Lancet* 1986; ii: 364.
10. Delin K, Fasth S, Andersson H, Aurell M, Hulten L, Jagenburg. Factors regulating sodium balance in proctocolectomized patients with various ileal resections. *Scand J Gastroenterol* 1984; 19: 145-149.
11. Echelberger and Hastings. Quoted by Rosenthal SM and Herbert Tabor. In: *Electrolyte changes and chemotherapy Archives of Surgery* 1945; 244.
12. Elkinton JR and Winkler AW. Transfers of Intracellular potassium in experimental dehydration. *J Clin Invest* 1944; 23: 93.
13. Elkinton JR, Winkler AW and Danowski TS. The importance of volume and toxicity of body fluids in electrolyte shock. *J Clin Invest* 1947; 26: 1002.
14. Fazio VW, Tjandra JJ. Prevention and management of ileostomy complications. *Journal of et Nursing* 1992; 19(2): 48-53.
15. Finnisterer U, Luehr HG and Goetz E. Electrolyte studies in major abdominal surgery. *Anaesthestie (Berl)* 1976; 25(12): 563-571.
16. Fowler DI, Cooke WT, Brooke BN, Cox EV. Ileostomy and electrolyte excretion. *Am J Dig Dis* 1959; 4: 710-720.
17. Franks K. Colectomy or resection of the large intestine for malignant disease. *Med Chir Trans* 1889; 72: 211-232.
18. Gallagher ND, Harrison DD, Skyring AP. Fluid and electrolyte disturbances in patients with long established ileostomies. *Gut*

1962; 3: 219-223.

19. Hill GL, Goligher JC, Smith AH and Mair WSJ. Long-term changes in total body water, total exchangeable sodium and total body potassium before and after ileostomy. *Br J Surg* 1975; 62: 524-527.

20. Hill GL, Goligher JC, Smith AH, Mair WS. Long term changes in total body water, total exchangeable sodium and total body potassium before and after ileostomy. *Br J Surg* 1975; 62: 524-7.

21. Hill GL, Mair WSJ, Goligher JC. Cause and management of high volume output salt-depleting ileostomy. *Br J Surg* 1975; 62: 720-726.

22. Jenkins MT, Giesecke AH and Johnson ER. Postoperative patient and his fluid and electrolyte requirements. *Br J Anasth* 1975; 47: 143.

23. Kanaghinis T, Lurban M and Coghill NF. The composition of ileostomy fluid. *Gut* 1963; 3: 322-338.

24. Kaplan SA and Carmen FT (1959): Cited by Thakur PS (1965). Study of serum electrolytes in diarrhoea in infants and children with special reference to season changes. A thesis for MD. (Paed.) Univ Indore.

25. Kenney HJ, Compston J, Heynen G, et al. Calcium Magnesium in subjects living with a permanent ileostomy. *Digestion* 1983; 26: 131-136.

26. King LR, Knowles HC, Jr. and McLaurin RL. Calcium, phosphorous and magnesium metabolism following head injury. *Ann Surg* 1973; 177: 126-131.

27. Krane SM and Michael FH. Disorders of bone and Mineral Harrison's Principles of Internal Medicine, Metabolism 16th Edition 2005; 2192.

28. Lockwood JS and Randall HT. The place of electrolyte studies in surgical patients. *Bull New Y Acad* ed 1949; 25: 228.

29. Zimmermann B. Fluid and Electrolytes balance in surgical patients. *Christophers Text Book of Surgery*. Saunders & Co. 1972.

30. Zimmermann, B. Pituitary and Adrenal functions in relation to surgery. *Surgical Clinics of North America*. 1965; 45: 299.

Table 1: Case Distribution according to Age and Sex

Age	Male (%)	Female (%)	Total
<25 yrs	16 (38.0)	12 (42.9)	28 (40.0)
25-35	07 (16.6)	08 (28.4)	15 (21.5)
35-45	07 (16.6)	04 (14.2)	11(15.7)
45-55	02 (4.8)	02 (7.1)	04 (5.7)
55-65	05 (12.0)	01 (3.7)	06(8.5)
65-75	04 (9.6)	01 (3.7)	05(7.1)
>75	01 (2.4)	0	01(1.5)
Total	42	28	70

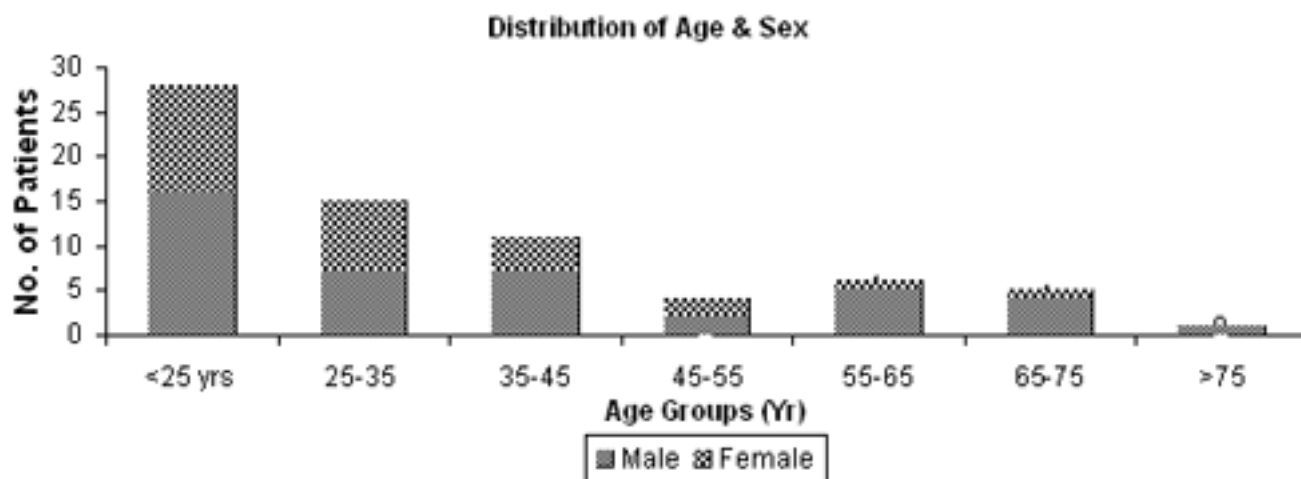
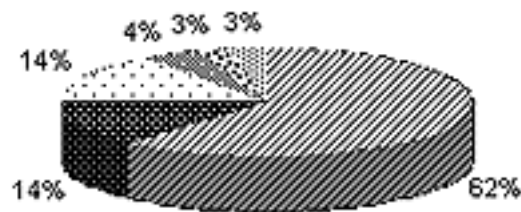


Table 2: Case distribution according to operative procedure and sex

Operative procedure	Male	Female	Total
(1) Ileostomy	33	25	58
(2) Ileostomy with no resection of small bowel	23	19	42
(3) Ileostomy with resection of small bowel	10	6	16
(4) Colostomy	9	3	12
(5) Stoma with no resection of small bowel	32	22	54

Table 3: Case distribution according to diagnosis

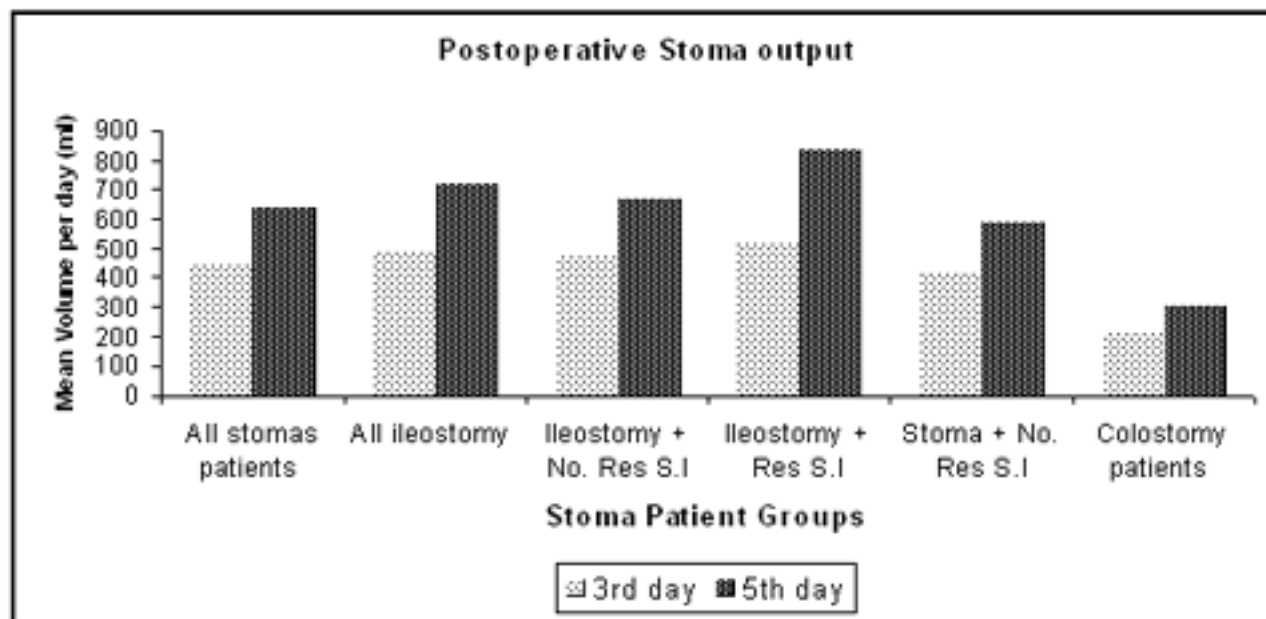
Diagnosis	No. of cases	Percentage
(1) Perforation peritonitis (Enteric/ T.B/others)	43	61.6
(2) Intestinal obstruction	10	14.3
(3) Intestinal obstruction with peritonitis	10	14.3
(4) Gun shot abdomen with bowel injury	3	4.2
(5) Septic abortion with bowel injury	2	2.8
(6) Rectal/perineal injury	2	2.8
Total	70	

Case distribution according to diagnosis

▨ Perforation peritonitis (Enteric/ T.B/others)	▩ Intestinal obstruction
▧ Intestinal obstruction with peritonitis	▨ Gun shot abdomen with bowel injury
▩ Septic abortion with bowel injury	▧ Rectal/perineal injury

Table 4: Postoperative stoma output (in ml)

Post-op. day	(Mean±S.D.)					
	All stomas patients	All ileostomy	Ileostomy + No. Res S.I	Ileostomy + Res S.I	Stoma + No. Res S.I	Colostomy patients
3rd day	441.4±196.4 (n=70)	489.6±176.8 (n=58)	476.2±190.9 (n=42)	525±126.2 (n=16)	416.7±206.4 (n=54)	208.3±90.9 (n=12)
5th day	641.1±234.2 (n=68)	714.3±182.9 (n=56)	670.7±161.2 (n=41)	833.3±194.6 (n=15)	586.8±80.6 (n=53)	300±95.7 (n=12)

**Table 6:** Various groups of intestinal stoma patients (n=no. of patients)

Groups	Post-op. day (n)	Day 3rd (n)	Day 5th (n)
(1) All stoma patients	70	7	68*
(2) All ileostomy patients	58	58	56*
(3) Ileostomy+Res S.I	16	16	15*
(4) Stoma + No Res. S.S.	54	54	53*
(5) Colostomy	12	12	12
(6) Stoma output 1000 ml on 5th post-op. day	7	7	7

*2 patients expired, 1 on the 4th day and the other on the 5th post-op. day.

Table 5: Distribution according to stoma output and procedure done

	3rd day			5th day		
	<500	500- <1000 ml	>1000ml	<500	500- <1000 ml	>1000ml
All stoma patients	39(55.7%) n=70	31(44.3%) n=70	0	18(26.5%) n=68	43(63.3%) n=68	7(10.2%) n=68
All ileostomy patients	27(46.5%) n=58	31(53.5%) n=58	0	6(10.7%) n=56	43(76.8%) n=56	7(12.5%) n=56
Ileostomy (No Res. S.I)	22(52.4%) n=42	20(47.6%) n=42	0	6(14.6%) n=41	33(80.5%) n=41	2(4.9%) n=41
Ileostomy + Res. S.I	5(31.2%) n=16	11(68.8%) n=16	0	0	10(66.7%) n=15	5(33.3%) n=15
Stoma with no Res. S.I	34(63%) n=54	20(37%) n=54	0	18(34%) n=53	33(62.5%) n=53	2(3.5%) n=53
Colostomy	12(100%) n=12	0	0	12(100%) n=12	0	0

Res. S.I = Resection of small intestine.

Table 7: Comparison of serum sodium (in mmol/L) in various groups of intestinal stoma patients (mean±S.D)

Patient Groups	Post-op. day 1 (A)	Day 3 (B)	Day 5 (C)
(1) All stoma patients	138±2.5	137.23±2.7	136.20±2.5
(2) All ileostomy patients	137.80±2.5	136.60±2.3	135.40±1.7
(3) Ileostomy + Res S.I	137.60±2.5	135.90±1.5	134.30±1.1
(4) Stoma + No Res. S.I	138.20±4.4	137.6±2.8	136.70±2.5
(5) Colostomy	139.30±3.8	140.00±2.6	139.60±1.8
(6) Stoma output ≥ 1000 ml on 5th day	137.10±2.5	135±1.7	133.6±1

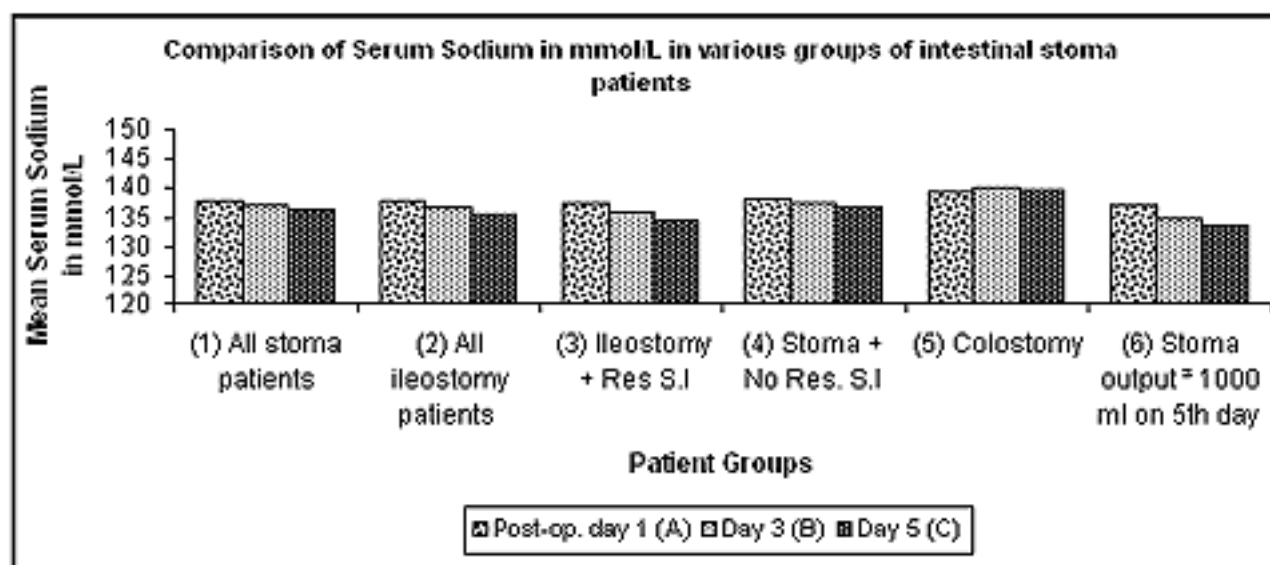


Table 8: Comparison of serum potassium (in mmol/L) in various groups of intestinal stoma patients (mean±S.D)

Patient Groups	Post-op. day 1 (A)	Day 3 (B)	Day 5 (C)
(1) All stoma patients	3.9±0.1	3.79±0.32	3.75±0.32
(2) All ileostomy patients	3.9±0.33	3.8±0.33	3.7±0.33
(3) Ileostomy + Res S.I	3.9±0.19	3.7±0.19	3.7±0.3
(4) Stoma + No Res. S.I	3.9±0.12	3.8±0.34	3.7±0.3
(5) Colostomy	3.9±0.3	3.8±0.23	3.8±0.22
(6) Stoma output ≥ 1000 ml on 5th day	4±0.3	3.7±0.6	3.6±0.2

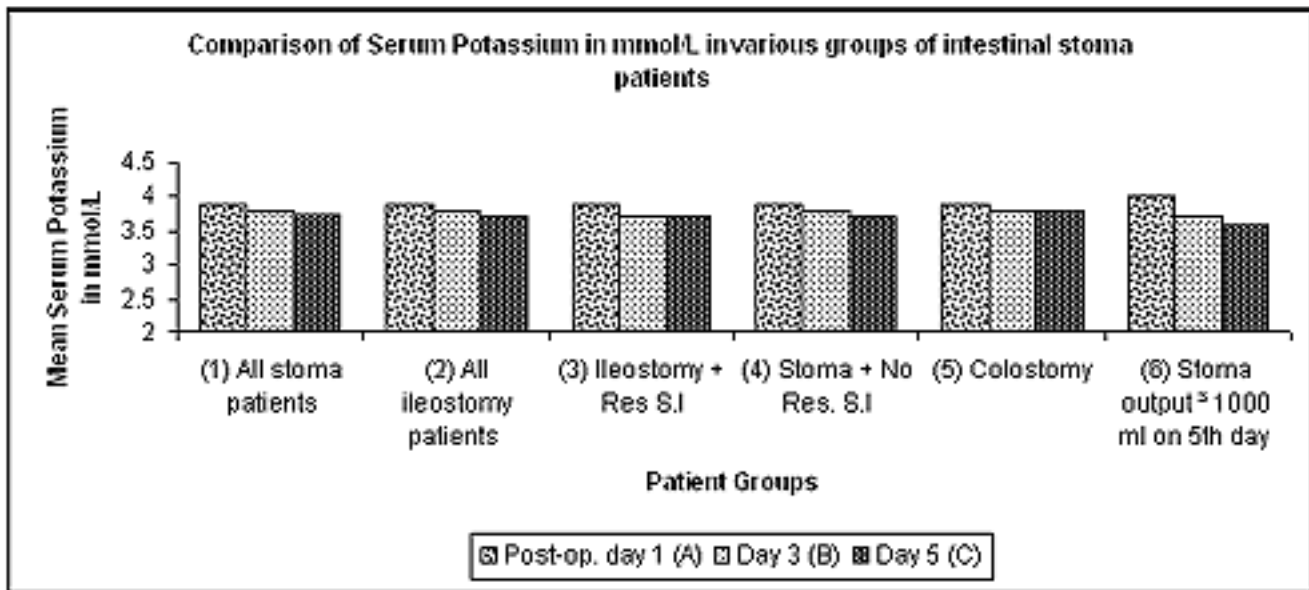


Table 9: Comparison of serum calcium (in mmol/L) in various groups of intestinal stoma patients (mean±S.D)

Patient Groups	Post-op. day 1 (A)	Day 3 (B)	Day 5 (C)
(1) All stoma patients	2.38 ±0.13	2.37 ±0.15	2.36 ±0.15
(2) All ileostomy patients	2.4 ±0.13	2.4 ±0.14	2.4 ±0.15
(3) Ileostomy + Res S.I	2.3 ±0.14	2.3 ±0.13	2.3 ±0.15
(4) Stoma + No Res. S.I	2.4 ±0.13	2.4 ±0.14	2.4 ±0.14
(5) Colostomy	2.4 ±0.15	2.4 ±0.2	2.4 ±0.13
(6) Stoma output ≥ 1000 ml on 5th day	2.4 ±0.11	2.3 ±0.11	2.3 ±0.12

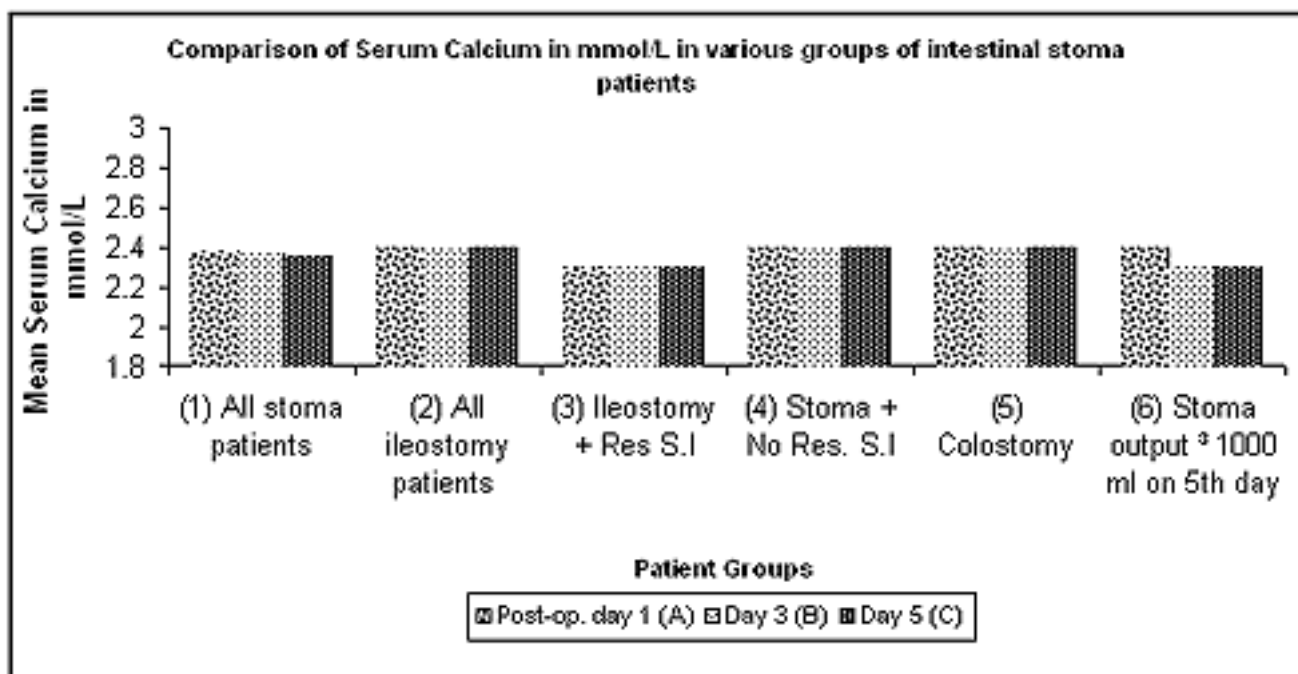


Table 10: Comparison of serum magnesium (in mmol/L) in various groups of intestinal stoma patients (mean±S.D)

Patient Groups	Post-op. day 1 (A)	Day 3 (B)	Day 5 (C)
(1) All stoma patients	0.94 ±0.15	0.92 ±0.02	0.93 ±0.16
(2) All ileostomy patients	0.93 ±0.15	0.91 ±0.13	0.92 ±0.15
(3) Ileostomy + Res S.I	0.95 ±0.14	0.93 ±0.13	0.94 ±0.17
(4) Stoma + No Res. S.I	0.93 ±0.15	0.92 ±0.14	0.92 ±0.15
(5) Colostomy	0.97 ±0.14	0.97 ±0.18	0.97 ±0.13
(6) Stoma output ≥ 1000 ml on 5th day	1.00 ±0.14	0.96 ±0.12	0.99 ±0.16

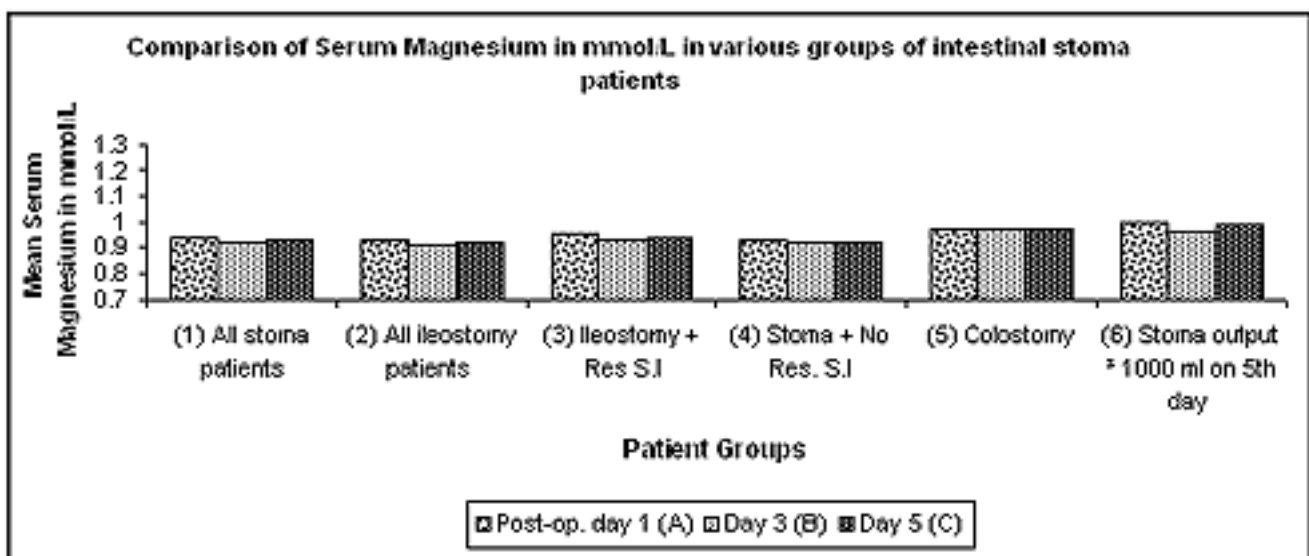
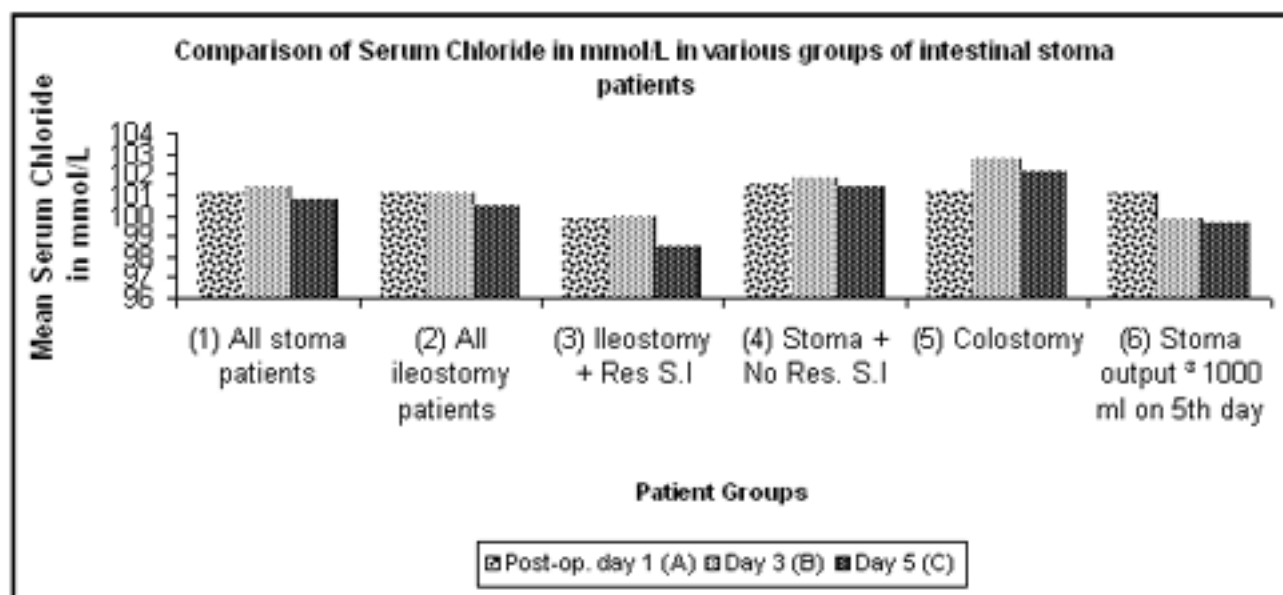


Table 11: Comparison of serum chloride (in mmol/L) in various groups of intestinal stoma patients (mean±S.D)

Patient Groups	Post-op. day 1 (A)	Day 3 (B)	Day 5 (C)
(1) All stoma patients	101.08 ±2.5	101.37 ±2.8	100.79±2.9
(2) All ileostomy patients	101.1 ±2.4	101.1 ±2.7	100.5±2.9
(3) Ileostomy + Res S.I	99.8 ±1.9	99.9 ±1.9	98.5±1.1
(4) Stoma + No Res. S.I	101.5 ±2.5	101.8 ±2.9	101.4±2.9
(5) Colostomy	101.2 ±1.5	102.75 ±2.8	102.1±1.6
(6) Stoma output ≥ 1000 ml on 5th day	101.1 ±2.5	99.8 ±2.6	99.6±2.9



Pressure Ulcers: Assessment and Prevention (Part 1)

Author

Dr. Almoutaz Alkhier Ahmed

Saudi Arabia / Gurayat north

Diabetic Center

e.mail:khier2@yahoo.com

Epidemiology:

Pressure ulcers are considered among the main problems in healthcare settings in the United States. Estimates of the prevalence and incidence across all care settings continue to vary, ranging from 0.4 - 38% in general acute care, 2.2 - 23% in long term care and 0.0 - 17% in home care⁽¹⁾.

Pressure ulcer has been defined as any lesion caused by unrelieved pressure resulting in damage to underlying tissue. Although pressure as an external force is a key causative factor, other contributing factors that add insult to skin or tissue integrity cannot be diminished or overlooked.

Kroger et al worked to find the prevalence of pressure ulcers in hospitalized patients in Germany during the year 2005 using the National Statistics published by the Federal Statistical Office. They found that 0.6% were referred with pressure ulcer as principal diagnosis and 1.19% had at least one additional diagnosis pressure ulcer. Also they noticed that pressure ulcers occasionally occurred in elderly people and the most common site for their occurrence was the ischium, the sacrum and the heel respectively⁽²⁾.

Since 1989, results from the International Pressure Ulcer Prevalence Surveys conducted by Hill - Rom, have been used to document aggregate prevalence rates of pressure ulcer⁽³⁾.

During each of the nine surveys conducted between 1989 and 2005, clinical teams, mostly from USA (teams from Canada and Saudi Arabia participated after 2003) assessed admitted patients on assigned dates. The results of these surveys showed that nosocomial pressure ulcer prevalence ranged from 5.6 - 9.2% in the year 1989 and became 15.5% in the year 2003 and dropped to 10% in the year 2004.

Also they noticed in these surveys that the most common sites for pressure ulcer to occur were the sacrum, heels and buttocks respectively⁽³⁾. Unfortunately no data was available from the Middle East countries on the current situation of pressure ulcers among hospitalized patients. Most of the small data are personal observations or small cross-sectional hospital based studies.

Etiology:

The pathophysiology of pressure ulcers is a complex one. A lot of factors participate in its occurrence. Some of them are external and not related to the patient and others are internal

factors related to the patient (Table 1).

Good understanding of these factors helps in understanding the pathophysiology of pressure ulcers⁽⁴⁾.

Table 1: factors increase the risk for pressure ulcers:

- Being bedridden or in wheelchair
- Fragile skin
- Having a chronic condition such as diabetes
- Inability to move certain parts such as after spinal injury
- Malnutrition
- Mental disability from certain conditions
- Older age
- Urinary incontinence or bowel incontinence

Due to the importance of the external factors, I will discuss them in some details.

External factors or forces contributing to pressure ulcer formation:

Pressure:

Definition:

It is the perpendicular force that results in compressing the soft tissue over bony prominences against outside surfaces (Figure 1).

“Reproduction of the National Pressure Ulcer Advisory Panel (NPUAP) materials in this document does not imply endorsement by the NPUAP of any products, organizations, companies, or any statements made by any organization or company.”

Pathophysiology:

Usually there is equilibrium between capillary beds and outside pressures. When the external pressure exceeds that of the pressure within the capillary beds, this causes disruption in the flow of blood and nutrients to the body tissues.

Continuation of the pressure and sustained disruption in the flow result in localized ischemia, hypoxia, tissue acidosis, edema and eventually cellular necrosis.

High risk areas:

- Areas over bony prominence such as occipit, shoulders, scapulae and escheat tuberosities.

- Areas in contact with foreign bodies such as catheters or malpositioned extremities.

Shear:

Definition:

This is the force produced when adjacent surfaces slide across one another (Figure 2).

Pathophysiology:

Skin and superficial fascia remains fixed against the external surface while the deep fascia and skeleton slide down. This situation can cause stretching, pulling and change to the angle of the vessels, resulting in tissue ischemia.

High risk:

- Bed bound individual, particularly when bed heads are elevated more than 30 degrees.
- Chair bound individual.

Friction:

Definition:

This is the force resulting from repeated movement of the skin over surfaces (Figure 3).

Pathophysiology:

This force alone does not account for deeper pressure ulcers, but contributes to the onset of ulceration. Frequent friction could lead to frequent skin breaks resulting in increase potential of bacterial invasion and damage from moisture

High risk:

- Bed bound individuals
- Chair bound individuals

Moisture:

Pathophysiology:

Prolonged exposure to moisture may lead to maceration of skin layers or at worst, denuded or broken skin through prolonged exposure to moisture, particularly moisture from a caustic origin.

High risk:

- Patients with urine and / or fecal incontinence
- Patients with wound drainage

Assessment tools:

Assessment is an essential procedure that helps clinicians to make correct decisions. Ongoing assessment of the patient risk status coupled with the progress in healing may change the needs related to dressing, support surfaces and other interventions. Also assessment of wound healing coupled with assessment of the specific wound parameters will change the choice of topical treatment or adjunctive therapies.

Assessment of pressure ulcer status falls into 3 main categories:

1) Assessment of the degree of tissue destruction or wounding

There are numbers of classification systems which have been developed to assess wounds; some use stages, some

use grades and some use wound characteristics and color to determine treatment.

The 4 stage system:

This system has become widely accepted and used. It originated with Shea in 1975⁽⁵⁾ and was updated in 1987 by the International Association of Enterostomal Therapy (now Wound, Ostomy and Continence Nurses Society)⁽⁶⁾. In 1989, the National Pressure Ulcer Advisory Panel (NPUAP) further updated the system⁽⁷⁾. The NPUAP further revised the system in 1998 by adapting a change in the language related to Stage 1 pressure ulcers⁽⁸⁾.

The stages are defined (Figure 4):

- Stage 1: Skin intact but reddened for greater than 1 hour after relief of pressure.
- Stage 2: Blister or other break in dermis with or without infection (partial thickness skin loss).
- Stage 3: Subcutaneous destruction into muscle with or without infection (full thickness skin loss).
- Stage 4: full thickness skin loss with involvement of bone or joint with or without infection.
- Stage 5: Unstageable where there is a shear or complete tissues necrosis.

2) Assessment of healing

Through the years, several tools have been developed for assessing the healing wound.

Among them, two tools have been validated.

These tools are:

a) Pressure Sore Status Tool (PSST):

This is a research-based instrument for assessing and documenting pressure ulcers that incorporates multiple indices for pressure ulcer assessment, provides for quantification of observations and allows for tracking the condition of pressure ulcer over time⁽⁹⁾.

The PSST contains 15 wound-assessment indices, with location and shape indicated at the top of the form, then 13 other indices with possible scores of 1-5 for each wound characteristic, with 1 being the more positive characteristic and 5 being the least. Upon completion is a total score between 1- 65, with 1 indicating tissue health and 65 indicating wound degeneration.

b) Pressure ulcer scale for healing (PUSH Tool 3.0):

It is validated for use in ulcer healing assessment⁽¹⁰⁾.

The PUSH tool is designed as a quick, reliable tool to monitor changes in pressure ulcer status over time.

The tool comprises 3 different records and directions.

The first record is for assigning sub-scores to 4 different wound characteristics:

- i) Length and width of the ulcer
- ii) Exudates amount (none, light, moderate and heavy).
- iii) Tissue type (closed, epithelial, granulation, slough, necrotic tissue)

Once sub-scores are added, the scores are plotted on pressure ulcer healing records and graph to demonstrate healing status. If the score goes up, the wound is deteriorating, if the scores go down the wound is healing.

3) Pressure ulcer assessment documentation forms:

It is a form that provides an orderly and logical review of important parameters and characteristics of the pressure ulcer. This is the most frequently used method of documentation of a pressure ulcer assessment.

It helps to collect complete, comprehensive information which enables the practitioner to compare subsequent evaluations to confirm improvement in the pressure ulcer or to alert the practitioner to deterioration.

Recommended parameters / characteristics to be included in pressure ulcer assessment in almost all health care settings are:

- Location
- Size
- Peri-wound appearance
- Ulcer edge
- Tissue type
- Exudates description
- Exudates amount
- Odor
- Structure
- Pain

3) Assessment of the wound itself

Reliable wound assessment remains a clinical challenge for wound care clinicians. The MEASURE mnemonic (Table 2) presented a simple conceptual framework that may act as a basis for a consistent approach to local wound assessment⁽¹¹⁾.

Conclusion

Prevention of pressure ulcers is the ultimate goal in all patients who are at risk. Recognition of patients at risk is an important issue. Health care providers work with patients at risk of developing pressure ulcers should be taught how to recognize the risk factors and how to neutralize these factors.

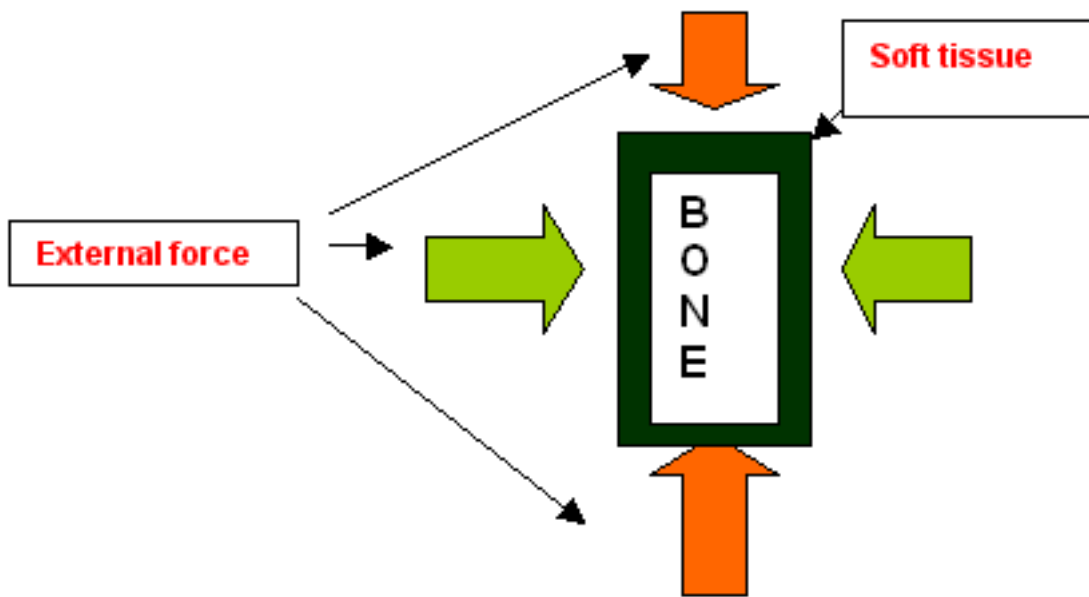
Systematic approach in the assessment of pressure ulcers and documentation of the assessment is an important helper to right decision making. Using tools that assess healing is a good practice that enables health providers to evaluate their plan of management.

Realistic goals must be well thought out and appropriate to the specific patient.

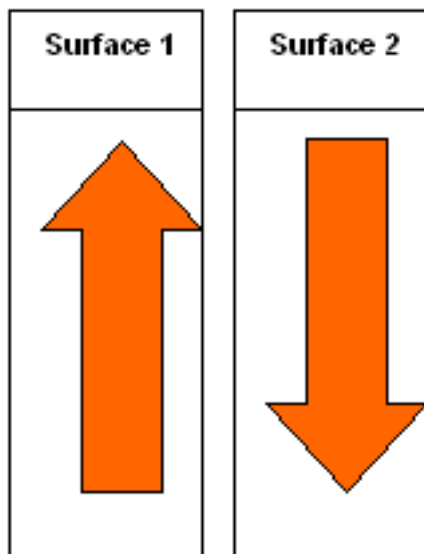
Reference

1. Cuddigan J, Ayello EA, Sussman C, eds. Pressure ulcers in America: Prevalence, /incidence and Implication for the Future. Reston, Va: NPUAP; 2001:184
2. Bergstrom N, Bennett MA, Carlson CE, et al. Clinical Practice Guideline Number 15: Treatment of Pressure Ulcers. Rockville, Md: Agency for Health Care Policy and Research, US Department of Health and Human Services; 1994. AHCPR publication 95- 0653.
3. Kroger K , Niebed W, Maier I, Stausberg J, Gerber V, Schwarzkopf A. Prevalence of pressure ulcers in hospitalized patients in Germany in 2005: Data from the federal statistical office. *Gerontology*.2008
4. Vangilder C, Macfarlane GD, Meyer S. Results of nine international pressure ulcer prevalence surveys: 1989 to 2005. *Ostomy Wound Manage*.2008;54 (2) : 40- 54.
5. Shea, J.D. (1975). Pressure sores classification and management. *Clinical Orthopaedics*, 112, 89-100.
6. International Association of Enterostomal Therapists. (1988). Dermal wounds: Pressure sores: Philosophy of the IAET. *Journal of Enterostomal Therapy*, 15, 4-17.
7. National Pressure Ulcer Advisory Panel (NPUAP). (1989). Pressure ulcer prevalence, cost, and risk assessment. Consensus Development Conference Statement. *Decubitus*, 2, 24-28.
8. National Pressure Ulcer Advisory Panel (NPUAP). (1997). 1997 NPUAP Consensus Development Conference Definition. Washington DC: Author.
9. Bates - Jensen BM. Pressure ulcer assessment and documentation: the pressure sore status tool. In: Krasner D, Kane D, eds. *Chronic wound care: A clinical source Book for healthcare professionals*.2nd Ed. Wayne, Pa: Health Management Publications, Inc: 1997:38.
10. The National Pressure Ulcer Advisory Panel > PUSH tool. Available at <http://www.npuap.org/pushins.html>. Accessed March 6, 2007.
11. Keast DH, Bowering K, Evans W and et al. Measure: A Proposed assessment framework for developing best recommendations for wound assessment. *Wound Repair Regen*. 2004; 12: S1 - S17.

Pressure - Figure 1:



Shear - Figure 2:



Friction - Figure 3:

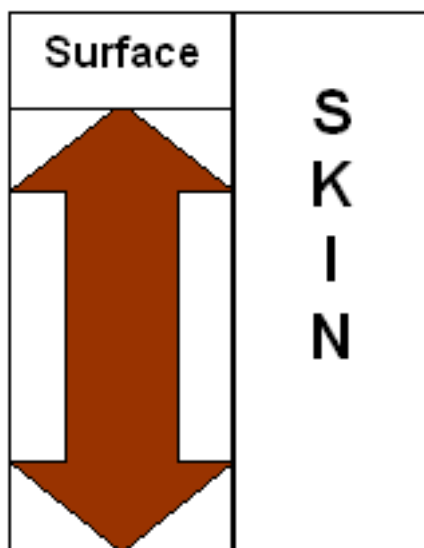


Figure 4: Stages of pressure ulcer

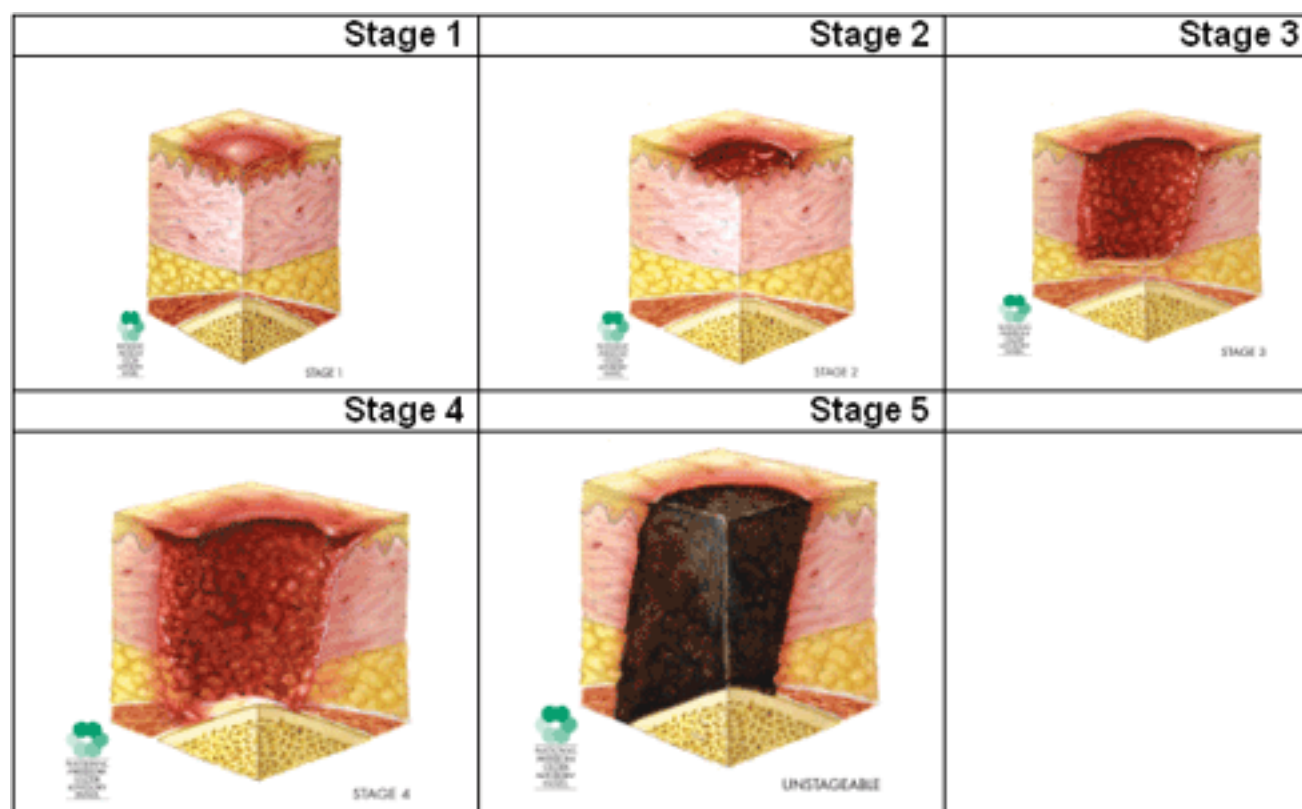


Table 2: MEASURE mnemonic

Measurement parameters	Clinical observation
M easure	Length , width, depth, area
E xudate	Amount , quality
A ppearance	Wound bed appearance, tissue type and amount
S uffering	Patient pain level using validated pain scale
U ndermining	Presence or absence
R e-evaluate	Monitor all parameters on regular basis – every one to four weeks
E dge	Condition of wound edge and surrounding skin

Discharge Planning in A Geriatric Ward

Author

Dr Ashraf Nasim

Staff Grade Physician
Medicine/ care of the Elderly
Ashford & St Peter's NHS trust

Dr B Mandal

Consultant Stroke Physician
Ashford & St Peter's NHS trust

I could clearly see the anxiety and dread on Mrs D's face when I broke the news about the planned discharge date this morning. Mrs D had been under our care for the past 12 weeks after she suffered a major stroke. Though she made a good recovery she still has a long way to go. The stroke has affected her left side rendering her partially paralysed on that side. She at present needs assistance of one to manage her ADL's; her speech is also dysarthric with continuing difficulty in expressing herself. Mrs D expressed her wish to live with her husband but her daughter raised the issue about the safety and her ability to manage things after this setback. Mrs D lives with her 84-year-old husband who has Parkinson's disease. Mrs. D had been doing the cooking and cleaning, as well as assisting her husband with dressing and bathing before she suffered a stroke. She claims they have been doing "just fine" before this admission. She herself has declined in her health due to diabetes, hypertension and arthritis.

Mrs. D's daughter Ms F, who works full time, takes the patient shopping on weekends. Ms F told the nurse that her parents have been having some difficulty managing lately, so she has been encouraging them to move to a nearby nursing home. Limited finances make assisted living and hiring help unaffordable options. Mrs. D will be discharged in a few days and with this background she is more nervous now than at the beginning when she was brought to the A&E with a stroke.

The above outlined arbitrary scenario is commonly encountered in our geriatric wards almost all over. This is one of many common discharge dilemmas we face in our day to day medical practice. The role of a geriatrician does not end in the hospital; it continues well into the community post discharge. We as geriatricians are the few generalists left in today's modern medicine. Our role is not only confined to the medical treatment but taking the leadership role in facilitating safe discharge and regular follow ups in the community.

Hospitalization can be an arduous undertaking and sometimes hazardous for vulnerable elderly patients^(2,3,4). Too often their treatment is complicated by delirium, depression, adverse drug reactions, malnutrition, and loss of precious physical strength especially after an acute illness. These patients make good progress from the acute event but

seldom regain the full independence they once had enjoyed. This is mainly related to decline in physiological reserves as we age. Aging is commonly associated with functional and physiological changes, such as a decline in muscle strength and aerobic capacity; vasomotor instability; reduced bone density and joint mobility; diminished pulmonary ventilation; altered sensory, continence, appetite, and thirst; and a tendency toward urinary incontinence. For many older persons, hospitalization results in functional decline despite cure of the medical condition for which they were admitted. Hospitalization often results in complications unrelated to the problem that led to admission or to its specific treatment for reasons that are explainable and avoidable⁽⁸⁾. Hospitalization and bed rest commonly superimpose factors such as enforced immobilization, reduction of plasma volume due to dehydration, accelerated bone loss, and sensory deprivation. Any of these factors may thrust vulnerable older persons into a state of an irreversible functional decline thereby making the discharge process more complex and time consuming.

Henceforth facilitating safe discharge from the hospital is a critical transition point in a patient's care, who has suffered an acute and major event. Incomplete handoffs at discharge can lead to adverse events for patients as well as for the family and usually result in avoidable re-hospitalisation, anxiety, general deterioration, loss of confidence and complaint. Care transitions are especially important for frail elderly patients who have multiple co-morbidities.

People aged 65 years and over are the largest consumer group of hospital and social care in the UK⁽¹⁾. An important component of their treatment is facilitating safe transfer back into the community. Preparation and planning for discharge is, therefore, an integral aspect of the care of older people in any hospital in the UK. Anyone involved in the discharge planning process knows that special challenges are inherent in discharging an elderly patient from hospital to care at home, proffering considerable challenges for those concerned about the current mandate of quality management. A great many professionals with different priorities and organizational commitments are involved to aid a safe and event free discharge.

A multidisciplinary, comprehensive approach to geriatric assessment has evolved over the past years as a way to improve the care of frail elderly patients with complex conditions^(2,3,4,5,6,7). As the counterpart to hospital admission, hospital discharge is a necessary process experienced by each patient individually. For all patients except those being transferred to a continuing care facility, discharge is a period of transition from hospital to home that involves a transfer in responsibility from the hospital team to the patient and his GP⁽¹⁰⁾. Self-care responsibilities also increase in number and importance, presenting new challenges for patients and their families as they return home.

The interval between hospital discharge and the continuity provider's first post hospital patient visit is being increasingly recognized as a hazardous hiatus⁽¹¹⁾. The patient is vulnerable to diverse factors that may result in morbidity or hospital readmission, including the recurrence of symptoms that prompted the initial hospitalization, adverse drug events from new medications, new drug-drug interactions, or issues of care coordination, such as follow-up visits and tests. Inadequate social support can further exacerbate the medical complexity of care transition from the inpatient to the outpatient setting.

Many post discharge complications are preventable or "ameliorable" by careful discharge planning and timely follow-up⁽¹¹⁾.

The dilemma in any discharge planning is one of conflicting values. On one hand, our society deeply values an individual's autonomy and independence - that personal liberty wherein the individual has the right to choose his or her own course of action if he is mentally competent to decide about his future. For those assisting with discharge, this value creates an obligation to provide full information and viable alternative means like social and community support among which the patient may choose what is right for them. On the other hand, the professionals involved in discharge planning are also obliged to contribute to the patient's safety, health, and well-being after discharge.

It is important to remember that decisions made about discharge can have profound impact on the patient's sense of well-being for the remainder of his or her life. So it is essential to respect the patient's wishes and, whenever possible, make a reasonable effort to honour them. As for Mrs. D, going home is most likely a viable choice. However, it would also be appropriate for the physician to insist that Mrs D be amenable to additional assistance, either from her daughter or community services, at least for the time being. This solution would be respectful of Mrs. D's need to return home, yet would also attend to the safety of those around her.

The discharge process starts right from the day the patient is admitted; a complete comprehensive assessment is made at all levels assessing the patient's needs and identifying resources available. This process incorporates the "Multidisciplinary" team approach where different members of the teams contribute and offer holistic patient care.

MDT Team member's

- Lead Clinician: as the team leader
- Core Members: Nursing staff, Physiotherapist, Occupational therapist, Discharge coordinator, Dietician/ SALT,

Pharmacist, Social services,

- Non core members: GP's, District nurses, ICT's, Community rehab team

The MDT team comprises - Physician, as team leader, Nursing staff, Physiotherapist, Occupational therapist, Discharge coordinator, Dietician/ SALT, Pharmacist and Social support worker. Each member has an important role to play in order to make the discharge a success. Communication in the form of weekly meetings and discussion paves the way towards quick, safe and successful discharge. The role of our GPs, district nurse and community rehabilitation team is vital especially when the patient is sent off into the community.

The role of occupational therapist and discharge coordinator is paramount during the initial evaluation of the patient's needs, their potentials and abilities to carry out the basic tasks of daily living safely and with ease. These members undertake various measures like family meetings, in-patient assessment of various tasks, access visits, and home visit. The report that they usually submit outlines the boundaries of the safe discharge.

Objective of discharge planning

- Identifying patient's needs.
- Identifying the resources & available support.
- Identifying the level of involvement of Pt/ family in preparation of continuing care.
- Identifying the discharge team members.
- Education: patient, family members. care-givers (wheelchairs, catheters, NG Tube, PEG tubes).
- Strengthen the coordination & communication within the family and MDT members.
- Develop a framework for the support of the health care worker & other service providers.

The role of a physiotherapist is to assess the mobility of the patient and to flag up increase falls risk and other mobility problems. Their main role is also of confidence building and providing necessary mobility advice and arranging for equipment. Taking preventative measures to minimise the risks and effects of illnesses in the future is a much better way of living life than waiting for problems to arise and reacting to a crisis.

Longterm illnesses are also a major cause of dependency, low self esteem and depression in our elderly patients. Building "Good self esteem" is another important aspect of promoting health. It is known that those with high self esteem, and who feel 'good about themselves' manage life's normal ups and downs far better than those with low self esteem. They also manage change better and actually see change as a challenge to enjoy and perform. Whether we like it or not, change and problems are part of normal life, so having good self esteem is important for us all. With good mobility and building self-confidence we will not only inject self esteem in our elderly patient but also help them be self reliant and self caring.

The discharge or transfer of care of an Older Adult from the hospital to the community is one of the most satisfying aspects of Geriatric Medicine. The complex health and social needs of this group requires the experience and skills of a large number

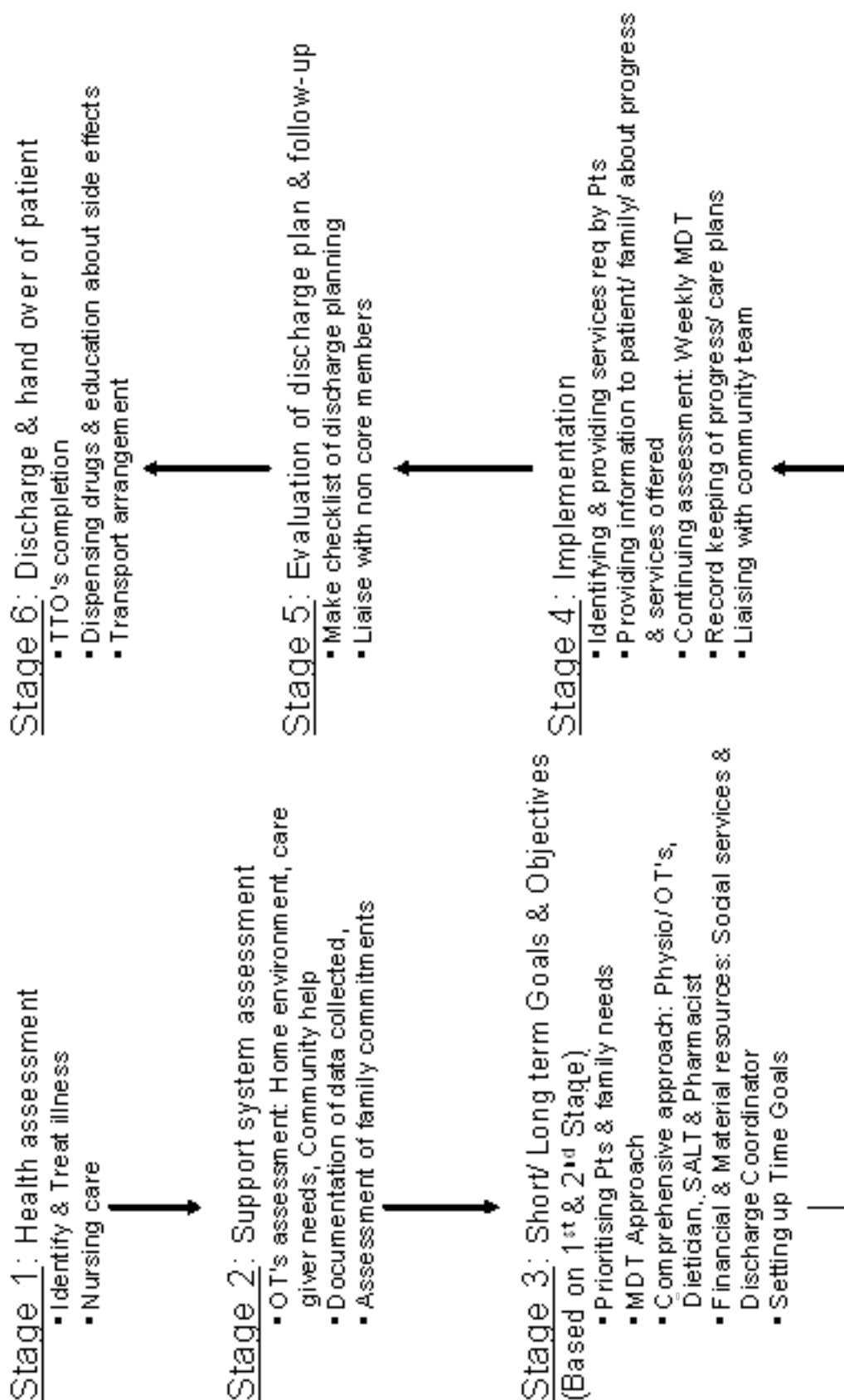
of professionals from a range of different organisations. Without careful coordination this process can disintegrate to the detriment of the patient and their family^(12,13).

References

1. Preparing the elderly for discharge from hospital: A neglected aspect of patient care? Age and Ageing Volume 17, Number 3 Pp. 155-163.
2. Kane RA, Kane RL. Assessing the elderly: a practical guide to measurement. Lexington, Mass.: Lexington Books, 1981.
3. Epstein AM, Hall JA, Besdine R, et al. The emergence of geriatric assessment units: the “new technology of geriatrics.” Ann Intern Med 1987; 106:299-303.
4. Applegate WB, Deyo R, Kramer A, Meehan S. Geriatric evaluation and management: current status and future research directions. J Am Geriatric Soc 1991; 39: Suppl:2S-7.
5. Stuck AE, Siu AL, Wieland D, Adams J, Rubenstein LZ. Comprehensive geriatric assessment: a meta-analysis of controlled trials. Lancet 1993; 342:1032-1036.
6. Champion EW. The value of geriatric interventions. N Engl J Med 1995; 332:1376-1378.
7. Unguru G, Feinberg M. Geriatric assessment teams: a review of the literature. Consult Pharm 1998; 13:553-63.
8. Hazards of Hospitalization of the Elderly Morton C. Creditor; February 1993 | Volume 118 Issue 3 | Pages 219-223.
9. Promoting Effective Transitions of Care at Hospital Discharge: A Review of Key Issues for Hospitalists. Sunil Kripalani, Amy T. Jackson, Jeffrey L. Schnipper, Eric A. Coleman; Journal of Hospital Medicine; 2007; 2:314-323. © 2007 Society of Hospital Medicine.
10. Coleman EA, Smith JD, Frank JC, Min SJ, Parry C, Kramer AM. Preparing patients and caregivers to participate in care delivered across settings: the Care Transitions Intervention. J Am Geriatric Soc. 2004; 52:1817-1825.
11. Forster AJ, Murff HJ, Peterson JF, Gandhi TK, Bates DW. The incidence and severity of adverse events affecting patients after discharge from the hospital. Ann Intern Med. 2003; 138:161-7.
12. Discharge from Hospital Pathway, Process and Practice (2003), Health and Social Care Joint Unit and Change Agent Team, Department of Health, London.
13. Achieving timely simple discharge from hospital: A toolkit for the multi-disciplinary team (2004), Department of Health London.



Stages in Discharge Planning:



Determinants of The Physical Problems of The Geriatric Population at Adamdigi Thana of Bogra District in Bangladesh

Authors:

Tapan Kumar Roy¹ and Md. Mosiur Rahman¹,

Institutions¹Department of Population Science and Human Resource Development, University of Rajshahi, Rajshahi-6205, Bangladesh.

ABSTRACT

This paper makes an attempt to investigate determinants of the physical problems of the elderly population in Bangladesh by examining the situation prevailing in one particular area at Adamdigi of Bogra district, using the information from 400 elderly populations of aged 60 and over. Findings reveal that the physical health status of the elderly is not so fair, with the majority of them suffering from eye diseases followed by back pain, heart diseases, kasi, diabetes, dysentery, high blood pressure, hapani and paralysis. It was also observed that the major portion of the elderly population received allopathic and homeopathic treatment (97%) and only a few of them received kobiraji treatment (3%). From contingency analysis it was found that age is significantly associated with eye vision, hearing ability, physical fitness, and present job, working ability, main food and use of latrine. The logistic regression model unveils that rural elders were more than 2 times more likely to suffer from physical problems compared to those elderly living in urban areas. The other contributing factors found to affect the physical problems of the elderly were education, family type, problems in using latrines, old age, salary and any bad habits of the elderly population.

Key words: Elderly population, physical health status, nature of treatment, Adamdigi thana and logistic regression analysis.

Introduction

Aging of population is gradually emerging as an issue in Bangladesh. It is a formidable problem of rural Bangladesh as well as a national problem (Abedin S, 1994). It has many socio economic effects on national development. In the demographic context and view of age structure, aged people are considered as a dependent portion of manpower (Amin and Sajeda, 1998). Health is a major concern of old age. The overall level of health of older persons in Bangladesh is not so good. They are prone to age related diseases. In old age the elderly are found to suffer from diseases like arthritis, back pain, high blood pressure, diabetes, asthma, peptic ulcer and so on. Prevalence of malnutrition, eyesight problems, hearing problems and mental disorders among the old are also observed (Kabir M and Humayun, 1993). The health problems in old age are often compounded by attributing ailment to onset of old age. Every elderly population has the right to lead a healthy, active life with minimal suffering. For this they need clothing, housing facilities, medical and social care. Many of the health problems can be overcome or delayed by changing their lifestyle (Sattar MA, 1996). This thesis aims to investigate the determinants of physical problems of elders in Bangladesh by examining the situation prevailing in one particular area at Adamdigi thana of

Bogra district.

Materials and Methods

The data were collected from a field survey conducted at Adamdigi thana in the district of Bogra in Bangladesh. These data were collected from both, rural and urban areas of Adamdigi thana. Information was collected of 400 elderly (Population aged 60 and over) by interview method, 200 of them were taken from rural areas and 200 from the urban areas respectively. Respondents were selected by purposive sampling method. For rural areas we have selected three villages under Adamdigi thana, and for urban areas we have selected 3 wards under Adamdigi thana. Data analytic methods envisaged in this paper are percentage distribution and logistic regression analysis.

Results

Deterioration of one's physical well-being is a natural part of aging. From Table 1 we see that among all the major health problems faced by the elderly population a major portion of them suffered from eye diseases (19.7%) followed by back pain (16.3%), heart diseases (12.7%), kasi (11.0%), others (7.0%), diabetes (9.7%), dysentery (6.7%), high pressure (6.0%), hapani

(6.0%) and paralysis (5.0%). Therefore, the present study reveals that health conditions of the elderly are not fair.

Medical services are limited in Bangladesh and create greater problems for the elderly. As a part of a vulnerable group, the older population has a greater need for, but less access to, health care. The medical facilities are not adequate to meet the health care requirements of 129 million people, let alone the 7.8 million elderly.

From Table 2 it is observed that majority of the elderly received Allopathic treatment (82.7%) and only a few received kobiraji treatment (3.0%).

Table 3 contains the results of contingency analysis. From this Table it can be seen that elder's educational qualification is statistically significantly associated with occupation, type of latrine, house type, family type, habit, income, expenditure and treatments. Thus, from a statistical point of view, the above socio-economic variables collected from the elderly are greatly influenced by education. The degree of association between education and occupation is higher. It is true that education is the only single most predominant variable, which has an inhibiting effect on the above variables. But education has a statistically insignificant effect on children ever born. Hence the degree of association with education and this variable is poor. With respect to the age of elderly, age is significantly associated with eye vision, hearing ability, physical fitness, present job, working ability, main food and use of latrine but insignificantly associated with talking ability, digestion, and sleep. From Table 3 we see that major diseases are statistically significantly associated with health status of the elderly. The significant health states such as eye vision and physical fitness are highly significant with disease. So we conclude that, health status of the elderly is mostly influenced by disease.

Table-4 shows the factors associated with the determinants of physical problems of the elderly population. Six variables were found to influence the physical problems of the elderly. It can be seen from Table 4 that elders who were literate were 0.963 times less likely to be affected by physical problems than illiterate persons. Elders who lived in family units were 1.605 times more likely to suffer from physical problems compared to those elderly who lived in joint families. The table also reveals that rural elders were 2.253 times more likely to suffer from physical problems than their urban counterparts. With regard to occupation, elders who have business were 0.489 times less likely to have any physical problems than those elders who were engaged in service and elders who have agricultural occupations and who were day labourers were 0.698 and 0.385 times less likely to have any kind of physical problem than the service holder elderly population.

Discussion

The study revealed that health conditions of elderly are not so good. Among all the major health problems faced by the elderly population a major portion of them were suffering from eye diseases followed by back pain, heart diseases, kasi, diabetes, dysentery, high blood pressure, hapani and paralysis. In Bangladesh the medical facilities are not adequate to meet the health care requirements of 129 million people, let alone the 7.8 million elderly. It is observed from our study that a

major portion of the elderly received allopathic treatment and only a few of them received kobiraji treatment and since most of the kabiraji treatment has no appropriate training to identify diseases but still serving as a good doctor in Bangladesh, as a result, very often valuable lives are lost by receiving such kinds of treatment. In contingency analysis we have found a significant association between education and some other socio-economic variables, such as education with occupation, type of latrine, house type, family type, habits, income, expenditure and treatments. Thus, from a statistical point of view, the above socio-economic variables collected from the elderly are greatly influenced by education. With respect to the age of elderly, age is significantly associated with eye vision, hearing ability, physical fitness, present job, working ability, main food and use of latrine; also the health status of the elderly in such areas as eye vision and physical fitness, are highly significant with disease. So we conclude that, the health status of the elderly population is mostly influenced by disease. The logistic regression model unveils that elders who lived in a family unit were one and half times more likely to suffer from physical problems compared to those elderly lived in joint families. It was also found that rural elders were suffering more from various kinds of physical problems than their counterparts in urban areas. This is likely to be attributed to unavailability of healthcare facilities in rural areas. Moreover, in Bangladesh, especially in rural areas, there is a problem of communication and transportation, which involves both, time and cost (Ahmed et al., 1998). Education of the respondents shows strong positive association with physical problems of the elder population. The educated elders are usually more conscious about their health and thereby seek assistance from health professionals. The other contributing factors found to affect the physical health status of the elderly were family type, problems in using latrines, old age, salary and any kinds of bad habits of the elder population.

The overall scenario of the health status of the geriatric population is not satisfactory. Still much work has to be done in this arena to improve health status of the elders. In the light of the above discussions, the following recommendations are made:

- The traditional joint family system should be strengthened in order to provide basic needs and psychosocial support to the elderly.
- The government should take necessary steps to enhance the care-giving capacity of family where appropriate.
- The government should take necessary steps for the welfare of the aged by undertaking mass education programs and awakening the people about the duty towards people.
- Government should give economic security (like pension, medical allowance, recreational facility etc.) for geriatrics.
- Government, NGOs and all other organizations have to build care homes and have available recreational facilities there for elders.
- Access to treatment facilities should be available and cheap for elders and special emphasis on care of geriatrics should be taken in health centers, medical colleges, and community clinics in both rural and urban areas.

References

Abedin S (1994). The demographic aspects of aging in South Asia with special reference to Bangladesh: Trends and implication. Paper Present at the conference of CMIG, Calcutta.

Ahmed, S., Sobhan, F. & Islam, A. (1998) Neonatal morbidity and care-seeking behaviour in rural areas in Bangladesh. Operational Research Project- Health and Population Extension Division. Working Paper No. 148. Dhaka: International Center for Diarrhoeal Diseases Research, Bangladesh.

Amin A (1998). Family structure and change in rural Bangladesh. Population Studies, vol. 8 No. 3.

Kabir and Humayan (1993). Local level of policy development to deal with the consequences of population aging in Bangladesh. ESCAP, UN New York, Asian Population Studies Center.

Sattar MA (1996). Aging population of Bangladesh and its policy implication in an overview. The elderly in Bangladesh and India. Department of Statistics, University of Rajshahi, Bangladesh.

Table-1: Percentage distribution of respondent's diseases

Diseases	Percent
Pain back	16.3
Dysentery	6.7
Diabetes	9.7
High pressure	6.0
Hapani	6.0
Eye problem	19.7
Heart disease	12.7
Paralysis	5.0
Kasi	11.0
Others	7.0

Table-2: Percentage distribution of respondent's treatment

Treatment	Percent
Allopathic	82.7
Homeopathic	14.3
Kobiraj	3.0

Table-3: Results of contingency analysis with degrees of freedom and significant level

Attribute	Value of	d.f	Tabulated	Asymp. Sig. (2-sided)	Sig. of association at 5% level
Education Vs Occupation	11.41	4	9.49	0.022	Significant
Education Vs House type	10.889	1	3.84	0.001	Significant
Education Vs Latrine	13.896	3	7.89	0.003	Significant
Education Vs Family type	8.187	1	3.84	0.004	Significant
Education Vs Habits	24.615	4	9.49	0.000	Significant
Education Vs Children	0.956	2	5.99	0.620	Insignificant
Education Vs Monthly income	12.197	3	7.89	0.007	Significant
Education Vs Monthly spend	12.114	3	7.89	0.007	Significant
Education Vs Treatment	35.789	2	5.99	0.000	Significant
Age group Vs Habit	12.136	8	15.51	0.145	Insignificant
Age group Vs Children	10.207	4	9.49	0.037	Significant
Age group Vs Eye vision	13.682	4	9.49	0.008	Significant
AG Vs Hearing ability	11.409	4	9.49	0.022	Significant
AG Vs Talking ability	2.265	4	9.49	0.687	Insignificant
AG Vs Physical fitness	13.165	4	9.49	0.010	Significant
AG Vs Sleep	5.163	4	9.49	0.271	Insignificant
AG Vs Digestion	4.949	4	9.49	0.293	Insignificant
Age Vs Present job	63.568	10	18.31	0.000	Significant
Age Vs Working	49.684	2	5.99	0.000	Significant
Age Vs Main food	11.873	2	5.99	0.003	Significant
Age Vs Use Latrine	24.104	2	5.99	0.000	Significant
Disease Vs Eye vision	90.253	18	28.87	0.000	Significant
Disease Vs Hearing ability	36.325	18	28.87	0.006	Significant
Disease Vs Taking ability	36.489	18	28.87	0.007	Significant
Disease Vs Physical Fitness	53.345	18	28.87	0.000	Significant
Disease Vs Sleep	16.656	18	28.87	0.547	Insignificant

Disease Vs Digestion	27.321	18	28.87	0.073	Insignificant
----------------------	--------	----	-------	-------	---------------

Note: At 5% level of significance, if the Asymp. Sig (2-sided) value is less than 0.05 then the test of association is significant, otherwise insignificant.

Table-4: Results of logistic regression analysis according to physical problem of aging people by selected characteristics

Characteristics	Co-efficient (β)	S.E.	Odds Ratio $Exp(\beta)$
Educational status			
Illiterate (Ref)	--	--	1.000
Literate	-.038	.621	0.963**
Family Type			
Joint (Ref)	--	--	1.000
Unit	.473	.527	1.605***
Place of residence			
Urban (Ref)	--	--	1.000
Rural	0.968	0.253	2.253***
Occupation			
Service (Ref)	--	--	1.000
Business	-.715	1.159	.489
Agriculture	-.360	1.164	.698
Day labor	-.955	1.092	.385
Others	7.226	44.301	1.17
Electricity facility			
No (Ref)	--	--	1.000
Yes	.144	.523	1.155
Problem to use			
Latrine			
No (Ref)	--	--	1.000
Yes	-1.536	.649	0.215*
Old age salary			
No (Ref)	--	--	1.000
Yes	-7.455	26.305	.001***
Any bad habit			
Yes (Ref)	--	--	1.000
No	.078	.494	0.925**

Note: (Ref)=Reference category, Here ***, ** and * indicates p<. 001 (highly significant), p<. 01 (significant), and p<. 05 (less significant)

