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Evaluation of various factors for extraction of teeth in a rural dental college



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ABSTRACT

Aims and objectives: To investigate the various major and minor reasons for extraction of permanent teeth, taking into consideration various factors such as age, gender, type of teeth being extracted, extent of pathology and non willingness of the patient to save the teeth.

Materials and methods: This study consisted of 1608 patients out of which 840 were males and 768 were females. All these patients had reported to the College of Dental Science & Hospital, Rau, Indore, for extraction of teeth during October 2011 to May 2012. All possible reasons for extraction of teeth were considered and noted down in a preformed chart.

Results: A total of 1790 teeth were extracted in 1608 patients. Males underwent more extractions as compared to females. Middle age group patients of 30–40 years of age had the maximum number of extractions. Dental Caries was the main reason for extraction of teeth.

Conclusion: Dental Caries and Periodontitis still remain the two most important reasons for extraction of teeth. Knowing the etiologic factors will help us treat and prevent them so as to improve the dental health of the general population.

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1. Introduction

It is a well accepted fact that loss of teeth is an inevitable part of human life. There are many reasons for extraction of teeth such as dental Caries, Periodontitis, impacted teeth, supernumerary and over retained teeth, intentional extraction of teeth for orthodontic and prosthetic treatment, trauma inflicted teeth and root canal failure teeth which cannot be retained by any treatment modalities that are presently available. This study was undertaken to evaluate the various major and minor factors for extraction of permanent teeth in a rural population and to find out its correlation to factors as age, gender and type of teeth being extracted.

Over all dental Caries and Periodontitis remain the two most important reasons for extraction of teeth regardless of the age of the patient.[1] Extraction of single or multiple teeth has significant effect on masticatory efficiency, esthetics, speech as well as occlusal harmony and periodontal health of the individual.

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Findings and result of various earlier studies clearly indicate that dental Caries and Periodontitis are the two main reasons for extraction of teeth and molars are extracted more in number among all other teeth.

2. Materials and methods

1608 patients came for extraction of teeth in the Department of Oral and Maxillofacial Surgery, College of Dental Science and Hospital. Rau, Indore, during a period, October 2011 to May 2012. Out of 1608 patients, 840 were males and 768 were females. Patients were included from 6 years of age to more than 75 Yrs of age. The total patients were divided into eleven groups with a range of 6 years difference in each age group.

Group 1: 6–12 Yrs, Group 2: 13–19 Yrs, Group 3: 20–26 Yrs, Group 4: 27–33 Yrs, Group 5: 34–40 Yrs, Group 6: 41–47 Yrs, Group 7: 48–54 Yrs, Group 8: 55–61 Yrs, Group 9: 62–68 Yrs, Group 10: 69–75 Yrs, Group 11: >75 Yrs.

All the possible reasons and aspects involved in the extraction of teeth were taken up in this study. These included Carious and Periodontally involved teeth that were not restorable and were hopeless for periodontal treatment, impacted, supernumerary, over retained teeth, intentional extractions for orthodontic and prosthetic treatment, teeth with extensive abrasion and attrition and trauma inflicted teeth that could not be saved by any restorative means. Many a time's patients were not willing to save the teeth even if it could be saved. This aspect was also taken into consideration.

All the patients were informed regarding this follow up study and duly signed consent was obtained for their participation in the study. A detailed medical and dental history was taken for all patients. All the patients were found to be fit for extraction under local anesthesia. Complete medical dental history and examination were carried out by only one investigator and findings were noted in the printed proforma so as to avoid biasness. Teeth were extracted following the normal aseptic measures under local anesthesia.

2.1. *Clinical examination*

Clinical examinations of the patients were performed by only one investigator as mentioned above.

2.2. *Periodontal examination*

Periodontal examination was carried out by considering the tooth mobility, severity of periodontal attachment loss and furcation involvement in multirooted teeth. These above were considered the main criteria which indicated the need for extraction of periodontally involved teeth.[2,3]

2.3. *Caries*

The criteria for teeth extraction due to dental Caries included initial caries, recurrent caries its sequel root stump remains in cases where crown was lost due to dental caries or fracture of crown due to weakening by dental Caries.[4]

Root fracture as a result of trauma, impacted teeth, extractions for prosthetic treatment, were diagnosed by radiographic examination. Failed root canal treated teeth and fracture of teeth which could not be restored were also diagnosed by radiographic examination. The criterion for tooth extraction due to orthodontic reasons was lack of space as recommended by orthodontist.

2.4. *Statistical analysis*

The main outcome variable was the reason for teeth extraction. Relations of variables such as age & gender with reasons for extraction were analyzed by chi-square test. This test was applied to calculate the "P" value for total number of patients, total number of teeth extracted and reasons for extractions by gender. The "P" value calculated was less than 0.0001 which is extremely significant statistically.

3. Results

A total of 1790 teeth were extracted from 1608 patients. 840 were males and 768 were females. In a total of 1790 teeth, 935 teeth were extracted in males and 851 in females (Table 1 and 2). The chi-square value for total number of patients was 53.094 and 68.144 for total number of extractions done. The "P" value calculated for both above finding was less than 0.0001 which indicates that the results of the study are extremely statistically significant as regards number of patients and number of teeth extracted is concerned.

The male patients reported more in number for extractions than females and therefore also reported more number of extractions. This study reveals that middle age group patients of 30–40 Yrs had the maximum number of extractions. The incidence of extraction increases with age but those over 75 Yrs of age reported a lower number of extractions. This difference in the number of extractions in various age groups shows a lot of statistical significance ("P" value < 0.001) as regards the number of teeth extracted in each age group (Fig. 1).

It is evident from the results that dental Caries was the main reason for extraction of teeth (53.96%) followed by Periodontitis (33.12%). In both males and females, the main reason for extraction of teeth was dental Caries (47.49%) and (61.22%) respectively. Extraction of teeth due to Periodontitis in males amounted to (37.91%) where as in females (32.07%) of extractions was due to Periodontitis.

Over all, maximum extractions were done because of dental Caries and Periodontitis as compared to all the other reasons for extraction. This difference as regards the various reasons for extraction also shows a statistical difference a "P" value of <0.0001. As regards reasons for extraction by gender, the "P" value in this table also is the same <0.0001 and is again statistically very significant.

Extractions for orthodontic reasons were more in females (1.76%) as compared to males (0.53%), while surgical extractions of impacted teeth were more in males (3.63%) as compared to females (2.45%). Failure of root canal treated teeth or fracture of teeth after root canal treatment also comprised to a few (0.22%) percent. Extractions due to other reasons such as attrited, abraded teeth, supernumerary, over

Table 1 – Comparison of different age groups and number of teeth extracted.

	Total number of patients				Total number of teeth			
Age range	Males	Females	Total	%	Males	Females	Total	%
6–12	6	2	8	0.49	6	2	8	0.44
13–19	20	34	54	3.35	19	36	55	3.07
20–26	108	110	218	13.55	113	116	229	12.79
27–33	111	132	243	1.51	120	141	261	14.58
34–40	127	162	289	17.97	136	182	318	17.76
41–47	110	71	181	11.25	125	78	203	11.34
48–54	87	99	186	11.56	97	108	205	11.45
55–61	128	93	221	13.74	153	115	268	14.97
62–68	81	33	114	7.08	95	35	130	7.26
69–75	50	26	76	4.72	59	30	89	4.97
>75	12	6	18	1.11	16	8	24	1.34
Total	840	768	1608		939	851	1790	
	52.23%	47.76%			52.45%	47.54%		
Chi^2 value	25.358	27.735	53.094		32.397	35.747	68.144	

The P value less than 0.0001.

retained teeth were also reported more in males (5.47%) (Fig. 2).

As regards the type of teeth concerned, both mandibular molars (37.26%) and maxillary molars (29.55%) were the teeth that were extracted more in number as compared to all other teeth (Table 3 & Fig. 3).

4. Discussion

Despite progress in various preventive and conservative treatments in dentistry, extraction of teeth still remains one of the common procedures in everyday practice. Several past and present studies have reported dental Caries and Periodontitis as the two main reasons for extraction of teeth. This statement was supported by Shigli, Hebbal[5] in their study regarding contribution of dental Caries and Periodontitis as reasons for tooth loss in teaching institute in Belgaum. A similar finding was reported in a study on reasons for extraction of teeth by Caldas.[6] Akhter, Hassain, Aida,[7] in their study in an adult population group in Bangladesh also held dental Caries and Periodontitis as the two main reasons for extraction of teeth.

A study by Byahatti and Ingafou[8] in a group of Libyan patients claimed that loss of 89% of all teeth is due to dental Caries & Periodontitis. Org, Yeo,[9] in a study in an adult population in Singapore, also blamed dental Caries & Periodontitis to be the two main reasons for loss of teeth.

Our study differs from the above findings as it clearly states dental Caries to be the main reason for extraction of teeth. Few past studies also state that dental caries is the main reason for extraction. Similar findings were reported by Jovino, Caldas,[10] & Richard[11] in a study in group of population in South Wales wherein they reported that dental Caries is the main reason for extraction of teeth. Earlier reports as the one given in 1929 stated that dental Caries was the main reason for tooth loss prior to 35 Yrs and Periodontal disease was the main etiologic factor for extraction of teeth after 35 Yrs of age. This data was a conventional wisdom for many years and was supposed to be based on old dubious data which supported that "periclasia" was the main reason for tooth loss after matuarity.[12]

But more recently this conventional wisdom has been turned upside down. A series of studies now unanimously report dental Caries as the principal cause for tooth loss at

Table 2 – Reasons for extraction by gender.

Reasons for extraction	Males	Females	Total	%
Periodontal	356	237	593	33.12
Without pulp involvement	65	114	179	33.01
With pulp involvement	198	214	412	23.01
Root stumps	182	193	375	20.94
Orthodontic reasons	5	15	20	1.11
Impactions	65	44	109	6.08
Fail. R.C.T	2	2	4	0.22
Others	66	32	98	5.47
Total	939 (52.45%)	851 (47.54%)	1790	
Chi^2 value	26.093	28.792	54.885	

P value less than 0.0001.

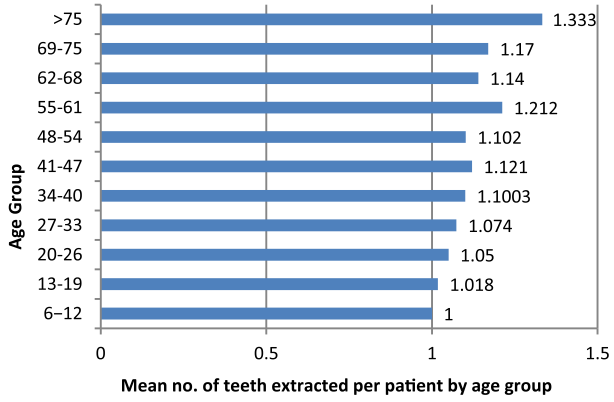


Fig. 1 – Mean number of teeth extracted by age group.

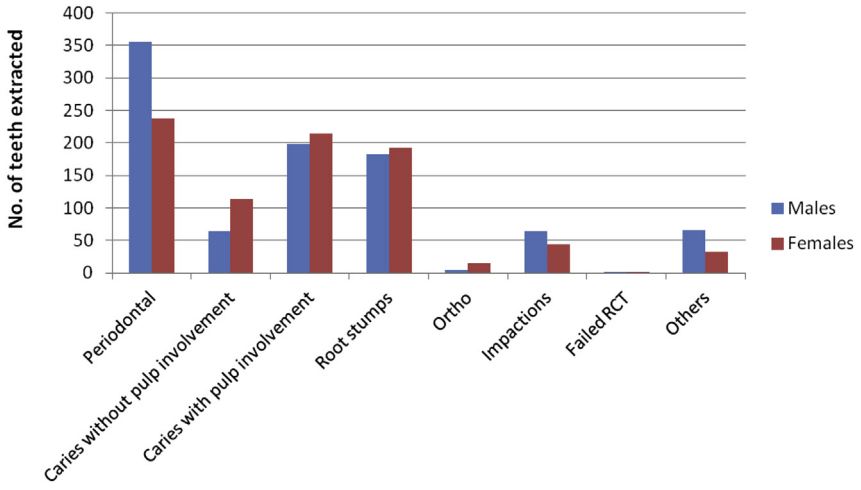


Fig. 2 – Reasons for extraction by gender.

almost all ages with the exception of oldest age group of above 65 Yrs of age.

Our study is in accordance with the above finding that dental Caries is the main reason for extraction of teeth irrespective of the age. Allen,[13] also reported similar findings in their statistical study for primary cause of extraction. Chaunccy, Glass,[14] in their study in a sample of U S. Male adults, also stated dental Caries to be the main reason for extraction of teeth. Anand, Kuriakose,[15] in a study on reasons for extraction of teeth in a teaching institute in south India also reported that dental Caries is the main cause for extraction of teeth.

Few other past studies also agree that dental Caries is the main cause for extraction of teeth followed by Periodontitis. Periodontitis effects more of older age group. Few patients who retain teeth till a very old age are more susceptible to Periodontitis and so Periodontitis is the main reason for extraction of teeth in the elder age group. Burt, Ismail, Morrison[16] reported in their study that Periodontitis is the main reason for extraction of teeth as compared to dental Caries. Reich, Hiller,[17] in their study in German population regarding reasons for extraction, reported that main reason for extraction of teeth is Periodontitis (27.5%) as compared to dental Caries (20.7%). Although with a very marginal difference, still, Ong,[18] in a study also held Periodontitis (35.8%) as main reason for extraction as compared to dental Caries (35.4%). Matthews[19] in a study also supported Periodontitis as the main reason for extraction. Our study shows that dental Caries (53.96%) is the main reason for extraction as compared to Periodontitis (33.12%). The caries that affected the teeth was in various stages from caries not involving the pulp till root stumps remains of a tooth after caries.

Other reasons for tooth loss as impacted teeth, intentional extraction for orthodontic and prosthetic treatment, root canal failure teeth, unrestorable, attrited and abraded teeth, comprised a few number (5.47%) of reasons for extraction. Among the other reasons for extraction as intentional extraction for orthodontic treatment were clearly more in females (1.76%) as compared to males (0.53%). This could be attributed to more of awareness and concern regarding facial esthetics on the part of females. As regards surgical extraction of impacted teeth, these were performed more in males (3.63%) as compared to females (2.45%). No specific reason was noted for the same.

Males reported more in number for extractions (52.23%) as compared to females (47.76%) and also underwent more extractions, males (52.45%), females (47.54%). Reasons for extraction in males due to Periodontitis were more (37.91%) as compared to females (27.34%). Farelal[20] in a study also reported that, extractions in males are more due to

Table 3 – Reasons for extraction by tooth type.

Teeth type	Number of extractions
Maxillary central & lateral incisors	111
Maxillary canines	51
Maxillary premolars	144
Maxillary molars	529 (29.55%)
Mandibular central & lateral incisors	104
Mandibular canines	52
Mandibular premolars	132
Mandibular molars	667 (37.26%)
Total	1790

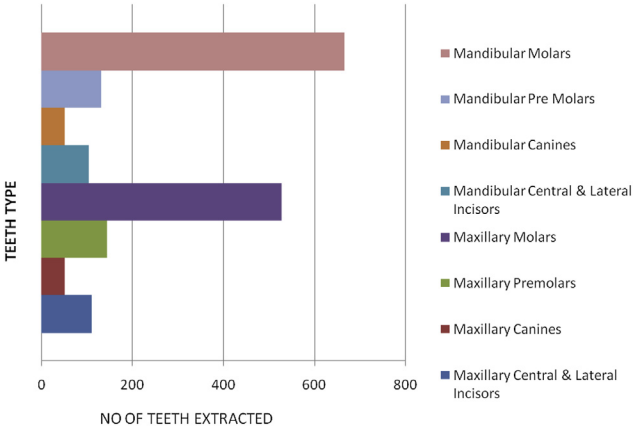


Fig. 3 – Reasons for extraction by type of teeth.

Periodontitis. This can be because oral hygiene in males is generally poor due to tobacco, pan and betel nut chewing gutkha and smoking habits.

In this study molars were the teeth that need to be extracted more as compared to other teeth. Among the molars mandibular molars were extracted more (37.26%) as compared to maxillary molars (29.55%). The reason can be attributed to early eruption of molars which predisposes them to the environment which is prone to dental Caries at an early age and to Periodontitis at a later age group. A pioneering Hagerstown study shows the rank order of susceptibility of teeth to dental Caries. The study states that maxillary and mandibular molars are the teeth most susceptible to caries which finally leads to their extraction in the absence of timely intervention and prevention. Klein, Palmer,[21]reported the above findings in their study on comparison of caries susceptibility of permanent teeth. Oginni,[22] also reported that molars are highly susceptible to dental Caries from a very early age group till the older age group. Upadhvava, Humagain,[23] agreed to the above findings stating that molars are the teeth that are extracted more in number as compared to all other teeth.

Present study also shows that premolars were extracted the most next to molars. Among premolars, maxillary premolars (8%) were extracted more than mandibular premolars (7.3%). Incisors were the next group of teeth that were extracted more due to Periodontitis that too at an older age. Incisors, in general do not get carious, but are prone to Periodontitis at an older age group if retained. Daameh,[24] in a study also reported that incisors are extracted more because of Periodontitis in the elderly age group. Canines were the least extracted because of their anatomic features and periodontal attachment.

Many studies have been done in the past to find out various reasons for extraction of teeth. Most of the studies claim different findings and results. Few factors can be attributed to these differences: these include, type and methodology of the study, socio economic status of the patient, type of tooth being extracted, extent of pathology affecting the tooth, age and gender of the patients, statistical analysis, results etc. These differences in findings and results also reflect patient's attitude, dentist's attitude, availability and accessibility of care with prevailing philosophies of care.[25]

5. Conclusion

In the study, findings reveal that dental Caries is the main causative factor for extraction of teeth irrespective of the age of the patient. Dental Caries affects all age groups except for a very elder age group while Periodontitis is the cause of extraction specifically in the older age group. Males reported more in number for extractions and also had more number of teeth extracted. Molars, both maxillary and mandibular were extracted more as compared to other teeth.

The main purpose of conducting this study was to evaluate various major and minor reasons for extraction of teeth so as to take effective measures to further minimize the etiological factors for extraction of teeth in general and to improve the overall dental health of the population at large.

Conflicts of interest

All authors have none to declare.

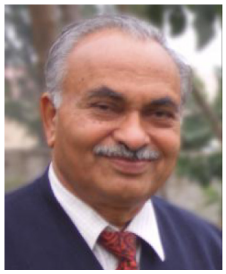
REFERENCES

1. Chrysanthakopoulos Nikolaosandr. Reasons for extraction of permanent teeth in Greece; a five year follow up study. *Int Dent J*. 2011;61:19–24.
2. The Periodontal Pocket, Ch 27 Fermin A, Paulo M. *Text Book of Carranzás Clinical Periodontology by Nweman, Takei, Carranza*. 10th ed. Elsevier Publications; 2013:438–439.
3. Phipps KR, Stevens VJ. Relative contribution of caries and periodontal diseases in adults tooth loss for an HMO dental population. *J Public Health Dent*. 1995;55:250–252.
4. Murray H, Locker D, Kay EJ. Patterns and reasons for tooth extraction in general dental practice in Ontario, Canada. *Community Dent Oral Epidemiol*. 1996;24:196–200.
5. Shigli K, Hebbal M, Angadi GS. Relative contribution of caries and periodontal disease in adult tooth loss among patients reporting to institute of dental sciences Belgaum, India. *Gerodontology*. 2009;26:214–218.
6. Caldas AF. Reasons for extraction of teeth in Brazilian dental population. *Int Dent J*. 2000;50:267–273.
7. Akhter R, Hassan NM, Aida J, et al. Risk indicators for tooth loss due to caries and periodontal diseases in recipients of free dental treatment in an adult population in Bangladesh. *J Oral Health Prev Dent*. 2008;6:199–207.
8. Byahatti Sujata M, Ingafou Mohd SH. Reasons for extraction in a group of Libyan patients. *Int Dent J*. 2011;61:199–203.
9. Ong G, Yeo JF, Bhole S. A survey of reasons for extraction of permanent teeth in Singapore. *Community Dent Oral Epidemiol*. 1996;24:124–127.
10. JovinoSilveria RC, De souza EH, Caldas Ade F, et al. Primary reasons for tooth extraction in a Brazilian dental population. *Oral Health Prev Dent*. 2005;3:151–157.
11. Richard W, Ameen J, Coll A, et al. Reasons for extraction of teeth in four dental practices in south Wales. *Br Dent J*. 2005;198:275–278.
12. Brekhus PJ. Dental diseases and its relation to the loss of human teeth. *J Am Dent Assoc*. 1929;16:2237–2247.
13. Allen EF. statistical study of primary causes of extraction. *J Dent Res*. 1944;23:453–458.
14. Chauncey H, Glass RL, Alman JE. Dental caries as principal cause of tooth extraction in a sample of US male adults. *J Car Res*. 1989;23:200–205.
15. Anand PS, Kuriakose S. Causes and patterns of loss of permanent teeth among patients attending a dental teaching institution in south India. *J Contemp Dent Pract*. 2009;10:57–64.
16. Burt BA, Ismail AI, Morrison EC, et al. Risk factors for tooth loss over a 28 year period. *J Dent Res*. 1990;69:1126–1130.
17. Reich E, Hiller KA. Reasons for extraction of teeth in western states of Germany. *Community Dent Oral Epidemiol*. 1993;21:379–383.
18. Ong G. Periodontal reasons for tooth loss in an Asian population. *J Clin Periodontol*. 1996;23:307–309.
19. Matthews DC, Smith CG, Hanscom SL. Tooth loss in periodontal patients. *J Can Dent Assoc*. 2001;67:207–210.
20. Fardal O, Johanessen AC, Linden GJ. Tooth loss during maintenance following periodontal treatment in a periodontal practice in Norway. *J Clin Periodontol*. 2004;31:550–555.
21. Klein H, Palmer CE. Studies on dental caries xii, comparison of the caries susceptibility of the various morphological types of permanent teeth. *J Dent Res*. 1941;20:203–216.

22. Oginni FO. Tooth loss in a suburban Nigerian population; causes and patterns of mortality revisited. *Int Dent J*. 2005;55:17–23.
23. Upadhvava C, Humagain M. The pattern of tooth loss due to dental caries and periodontal diseases among patients attending dental department (OPD), Dhulikhel Hospital, Kathmandu University Teaching Hospital (KUTH), Nepal. *Kathmandu Univ Med J*. 2009;7:59–62.
24. Dáameh D. Reasons for permanent teeth extraction in north of Afghanistan. *J Dent*. 2006;34:48–51.
25. *Tooth Loss, Ch 7 Burt. Text Book of Dentistry, Dental Practice and the Community by Burt, Eklund*. 4th ed. Philadelphia: W B Saunders Publications; 2001:83–84.

Dr. Nasib Chand Mann Passed Away

25 May 1943 - 5 February 2014



Fellow Dr.Nasib Chand Mann passed away on February 5,2014.

Dr. Nasib Chand Mann born on 25 May 1943, in Punjab passed BDS in 1967 from Dental Wing, Govt. Medical College, Patiala. He joined Punjab Civil Medical Services in 1968. He completed MDS in Pedodontics from Govt. Dental College & Hospital, Guru Nanak Dev University, Amritsar in the year 1976. He was promoted as Senior Dental Officer in 1979. He was awarded National Overseas Scholarship for higher studies by Govt. of India at Royal College of Surgeons London (UK) in the year 1980.

He was Affiliate Fellow of Royal Society of Medicine, London (UK), was also Fellow of the International College of Dentists and Pierre Fauchard Academy. He retired from state services as additional Director health Services and he worked as Senior Consultant in the faculty of Christian Dental College, Ludhiana from 2001 to 2010.

He received the National Overseas Scholarship for higher studies by Govt. of India and completed Special Advanced Course in Basic Medical Sciences of the Royal College of Surgeons, London. He developed, implemented and monitored a comprehensive oral health care programme by the name of Intensive Dental Health Care Programme in Punjab and launched 17 fully equipped mobile dental clinic vans, one for each district, in the year 1994-95, a unique example of oral health services in India.

Always in pursuit of research, he also completed an ICMR Financed Research Project on Comparative Study of Periodontal Health of People living in sub-mountainous & plain areas of Punjab in the year 2004. In recognition of his services and contributions to dental services and dental education, he was presented with Lifetime Achievement Award, by the Hon'ble Chief Minister of Punjab, S Prakash Singh Badal on 31st March 2013.

Dr. N C Mann will always be remembered, for his approachability, compassion, fearlessness, and mannerism.

May GOD bless the departed soul an Eternal peace and grant courage to his wife Mrs.Vijay Mann and children Dr.Urvashi, Dr.Vidushi and Dr.Harmunish to bear this irreparable loss.