

IMPACT OF RURAL MEDICAL CARE IN REMOTE MOUNTAINOUS REGION OF PAKISTAN: CHALLENGES AND OPPORTUNITIES

A. Rehman Alvi¹

ABSTRACT

Objective: To share the experience of developing rural medical care and the impact on the health indicators of the population.

Methodology: The clinical data was collected prospectively using ICD-9 coding and data base was developed on a desk top computer. Information about the operative procedures and outcome were separately collected on an excel work sheet. The data from January 1998 to December 2001 were retrieved and descriptive analysis was done on epi info-6.

Results: Thirty one thousand seven hundred eighty two (31,782) patients were seen during this period, 53% were medical, 24% surgical, 16% obstetric and 7% with psychiatric illness. Out of 1990 surgical operations 32% were general surgery, 31% orthopedic, 21% pediatric, 12% obstetric and 4% urological cases. There were 21 surgical mortality including 6 operative deaths, 15 non operative deaths and 89% of the mortalities were unavoidable. The crude in hospital mortality decreased significantly from 5.5% in 1992 to 1.1% in 2001 and the contributing factors were improved structure and process of care.

Conclusion: The impact of secondary care rural medical centre (AKMC) is obvious from the clinical audit including accessibility, sustainability and quality of care. This could be a model of care in rural Pakistan where accessibility, affordability and quality of care is lacking.

KEY WORDS: Rural health care, Health care indicators, Rural surgery.

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1. Dr. A. Rehman Alvi, FRCS
Department of Surgery,
Aga Khan University Hospital,
Karachi - Pakistan.

Correspondence

Dr. A. Rehman Alvi, FRCS,
Department of Surgery,
Aga Khan University Hospital,
Stadium Road,
P.O. Box 3500,
Karachi - 74800,
Pakistan.
E-mail: rehman.alvi@aku.edu

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INTRODUCTION

The Northern Areas officially referred to by the government of Pakistan as the Federally Administered Northern Areas (FANA) has a population of one lac five hundred thousand (1,500,000 as per 2003 estimate). The nearest tertiary care hospitals are in Islamabad at a distance of 600 KM and a travel time of 16 hours through Karakorum highway and no air transport facilities are available. The Aga Khan Health Service, Pakistan (AKHS, P) is the largest non governmental organization (NGO) in health sector established in 1924. Today AKHS, P operates 35 health centers, two

family health medical centers and two secondary care hospitals in Gilgit and Ghizer district.

Ghizer district is the northern most part of FANA spread over 9,636 sq-km area. There are four administrative units (Thesil) Punial, Gupis, Ishkioman and Yasin with the capital town Ghakuch. All the units are connected through non metal road with traveling time of two to six hours to AKMCS. There are four government rural hospitals in the district but no facilities for in patient care.

METHODOLOGY

Setting: Aga Khan Medical Centre Singul (AKMCS) is a secondary care health facility in Punial valley of Ghizer district. AKMCS is the first health facility in Northern Areas to have computerized medical record, pharmacy and financial system.

Source of data: This is a prospective entry of data on soft ware Epi-Info version 6 using ICD -9 coding system. There was a separate data gathering system on Microsoft excel sheet for the surgical procedures and the outcome of surgery including morbidity and mortalities. The unit was generating monthly report and annual report about the clinical, academic activities, management information and financial indicators.

RESULTS

Total of thirty one thousand seven hundred eighty two (31,782) patients were seen during the audit period from January 1998 to 2001 at AKMCS with 8029 (25.26%) inpatient admission. About 53% of the patients were having medical disease, 24% surgical, 16% obstetric and 7% with psychiatric illnesses. When we look at the geographic distribution 68% were from Punial and the remaining patients from other units (Thsils) and 3% from out side Ghizer valley.

In 1986 a base line study was jointly conducted by Aga Khan Health Service Northern areas and Aga Khan University Hospital in Ghizer district and the subsequent follow up

by AKHSP and government health department have verified a significant improvement in health indicator in Ghizer district.

DISCUSSION

Pakistan is one of the densely populated developing country has a population of approximately 160 million, 67% live in rural areas and 21.6% are women in reproductive age. The crude birth rate of 30 per 100 and maternal mortality rate of 500 per 100,000¹² and the rural communities do not have accessibility and affordability to the minimal quality surgical care.³⁻⁶ On paper the state has system in place including basic health unit (5171) and maternal and child centre (852) to provide primary health care services. Rural health units (551) are supposed to provide secondary health facilities including emergency surgical and obstetric care but unfortunately there is very unreliable mechanism of implementation and monitoring system in place.⁵⁻⁷

In 1983 a survey of 19 districts of Pakistan was conducted to assess the health care system in the rural areas including infrastructure, spectrum of surgeries and the number of qualified surgeon. The study showed the overall rate of surgery 124 per 100,000 population and the commonest surgeries were gastrointestinal (38%), obstetrics (30%), Orthopedic (13%) and urological (19%).⁴ When we look at the case mix at AKMCS it is in some contrast from the

Table-I: Audit of surgical specialties

<i>Specialty</i>	<i>No.ofpatients</i>	<i>No. ofsurgeries</i>
General	2414 (18.9)	750(37.6%)
Surgery		
Orthopedic	2070 (16.2%)	601 (30.2%)
Obstetric	5084 (39.9%)	134 (6.7%)
& Gynae		
Paed-Surgery	1209(9.5%)	424 (21.3%)
Urology	1935(15.2%)	83(4.1%)

Total surgical patients =12712 and total surgeries =1990

OR = operation room

Table-II: Surgery for non-traumatic acute emergencies

<i>Diagnosis</i>	<i>procedures</i>	<i>No.</i>
Intestinal obstruction	Exploratory laparotomy	78
Peritonitis	Exploratory laparotomy	31
Appendicitis	Appendectomy	38
Cholecystitis	Cholecystectomy	19
Burn	Wound debridement & grafting	21
Osteomyelitis	Debridement & sequestectomy	31
Urological stones	Pyelo & uretro lithotomy	37
Septic arthritis	Arthrotomy & wash out	6
Benign prostatic Hyperplasia	Open prostatectomy	25

other districts of Pakistan. It shows that 37% were general surgeries, 30% orthopedic, 21% pediatric, 6.7% obstetrics and 4.1% urological surgeries. The orthopedic trauma seems to be a major contributor of the trauma and this is probably because of geographic conditions like mountainous region and exposure to agriculture injuries.

Injuries were the most common presentation comprising 36% (n=715) of all surgical interventions. Most of the injuries were minor in nature including closed long bone fractures (n=429) soft tissue injuries (n=210) and were managed in the minor operation room. The major surgical injuries were gunshot, blunt trauma, hand injuries, compound fractures and joint dislocation which required intervention in major operation room under general or spinal anesthesia. There were 216 emergency surgeries per 100,000 population including orthopedic trauma 77, abdominal emergencies 54 and obstetric emergency surgeries 25 per 100,000 populations. The trauma related mortalities were 8 including poly trauma, head injuries and gunshot abdomen. Most of the deaths could have been avoidable if tertiary

health care facilities available in Northern Areas and 4 of the patients with head trauma were intubated and shifted by road to Islamabad 600 KM from AKMCS. According to national survey the overall annual incidence of unintentional injuries was 45.5 per 1000 per year and an estimated 6.16 million suffered from unintentional injuries occur in Pakistan annually.³⁻⁷ However, the new wave of terrorism is changing the spectrum of trauma in this country and in unpublished report over 40,000 injuries were admitted in four tertiary care hospitals in Karachi over four year and most of them were penetrating injuries including gunshot and bomb blast. The trauma care system doesn't exist in Pakistan but the state is in the process to develop comprehensive disaster plan and trauma care system in mega cities and even at this stage there is no thinking about the trauma care system for the neglected rural communities.^{7,8} A community based survey of 118 villages was conducted in Ghizer district to estimate the prevalence of surgical emergencies and outcome related to acute surgical diseases which showed 138 injuries per 1000,000 population including burn, fall and road traf-

Table-III: Surgery for Obstetric Emergencies

<i>Diagnosis</i>	<i>No.</i>	<i>Procedures</i>	<i>No.</i>
1. Labor pain	1024	Deliveries	954
2. Incomplete abortions	28	Cesarean Section	74
3. Per vaginal bleeding	23	D & C	51
4. Others	7	Hysterectomy	4
		Others	3

fic accidents and 123 acute abdomen per 100,000. The report is quite alarming that the injuries related mortalities were 55 per 100,000 and acute abdomen of 53 per 100,000. The mortalities were contributed by non accessibility and affordability, but there is some error or limitation of the survey because the surveyor depended on the skill of the interviewer as happens in verbal autopsies.³

In this study non trauma acute emergencies were 286 which accounts for 54 surgeries per 100,000 population and the commonest operations were exploratory laparotomy, appendectomy and the other procedures were cholecystectomy, surgery for urological stone surgery and surgery for acute osteomyelitis and septic arthritis. The survey from other rural population of Pakistan showed appendectomy 7, fracture 7 and bladder stones 6 per 100,000 populations^{3,4} In Pakistan the District Hospitals are the focus of secondary surgical care and the variations in different districts could be because of differences in case mix, facilities available and the expertise of the surgeon. Since the overall rate of emergency surgeries were low as per international standards like appendectomy in developed countries are high 138 -150 per 100,000 population and same is true for surgery for groin hernia repair 141 -186 per 100,000 population.³⁻⁶

One of the most important objectives of AKMCS was to provide referral facilities to the entire population of Ghizer district including 16 health centers in 118 villages and four Government hospitals. As there is no other facilities in the district to provide emergency obstet-

ric care the obstetric emergencies were referred to AKMCS. Thirty one thousand seven hundred eighty two (31,782) patients were attended from 1997 to 2001. It included 12,712 surgical and obstetrics patients and 40% were obstetric cases (n=5085). A total of 132 surgeries were done for obstetric emergencies including cesarean section 74, dilatation & curettage 51, hysterectomy four and others three. The cesarean section rate was 7.7% of 954 deliveries. The cesarean section rate was 14 per 100,000 populations and the calculation was based on the crude birth rate of 27 per 100 population. There were no mortality related with obstetric surgeries but there were four maternal deaths during this period and the underlying causes were ruptured uterus, prolonged labor with sepsis and one patient died after hysterectomy for post partum hemorrhage. The national cesarean rate in rural population is reported as very low 0.51% and only 9.1% of the pregnant females have accessibility to emergency obstetric care.⁹⁻¹³ In another study the overall cesarean rate in Pakistan's rural population is 9 per 100, 1000^{12,13} and in the developed countries the rate is 236 per 100,000 population.^{14,15} The rate of cesarean section is variable in developing and developed countries.¹⁵⁻¹⁷ In urban Pakistan it has been reported between 13 -20% and interestingly 80% were emergency surgeries.⁹⁻¹² In developed countries the cesarean section rate also varies between 18% -27%.^{16,17} In one of the prospective study the cesarean section rate decreased from 17% to 11% by following a protocol and without increase in peri-natal morbidities.¹⁴

Table-IV: Impact Indicators

Indicators	1986*	1992	1996	1999	2001	2004**	2006
CBR/1000 population	44	33	32	28	24	30	23
CDR/1000 population	15	11	4	5	4	8.3	4
IMR/1000 Live births	158	44	45	45	44	80	29
Under five MR/1000 live births	NA	64	65	61	49	57	37
MMR/100,000 live births	550	490	175	160	130	500	95

CBR = Crude birth rate, CDR= Crude death rate, IMR= Infant mortality rate, MMR=Maternal mortality rate and * shows the base line study in Ghizer, ** Shows WHO figures for Pakistan.

According to UN recommendations, there should be at least one comprehensive and four basic emergency obstetrics care facilities per 500,000 population. A survey was conducted in 2004 to meet the UN's minimum standards for the population of rural Pakistan and the results showed poor state of obstetric care in rural Pakistan, only 9.1% pregnant females has accessibility to obstetric emergency care and the cesarean section rate were far below (0.05%) than UN recommendations (5-15%).¹³

Table-IV shows the impact indicators of AKMCS on the population of Ghizer district with an estimated population of 132000. A base line survey was conducted in 1986 which revealed a very poor state of health with maternal mortality of 550 per 100,000 and infant mortality of 158 per 1000 birth and in 2001 the maternal mortality decreased to 130 per 100,000 and infant mortality to 44 per 1000 live births.¹ We looked at Pakistan's national figures the basic health indicators are not encouraging with MMR of 500 per 100,000 population and IMR of 80 per 1000 live births.²

Mortality is perhaps unique among public health problems as its reduction depends on treatment rather than on prevention. This concept is further validated by this study that primary health care was started in this district in 1978 but the real reduction in maternal and infant mortality was achieved by establishing secondary surgical facility (AKMCS) in Ghizer district.¹ The second important question is the result of cesarean delivery by the general surgeon and trained family physician as in this study there was no mortality related with cesarean section and this is also supported by others.¹⁸⁻²⁰ In Ghizer district there is one general surgeon, family physician and anesthetist for the entire population and no pathologist, radiologist and internist in the entire district. Similar models have been reported from the developed and developing countries with positive impact on the health indicators of the population.²¹⁻²³

CONCLUSION

Developing rural surgical care is a challenging task for country like Pakistan where 67% are rural population and so far it has not achieved the UN goal of health for all by year 2000. Aga Khan Medical Centre, Singul achieved the desired objective and results with limited resources and budgetary provision. This model could be replicated in other rural areas of the country to provide accessible, affordable and standard surgical services

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REFERENCES

1. Annual reports. Aga Khan Health Service, Northern Areas of Pakistan 1998, 1999, 2000, 2001, 2006.
2. Federal bureau of statistics Government of Pakistan 2005.
3. Ahmed M, Shah MA, Luby S, Drago P, Wali S. Survey of surgical emergencies in a rural population in the Northern Areas of Pakistan. *Tropical Med Inter Health* 1999;4:846-56.
4. Robert J, Blanchard W, Madeline EE, Toussignan BP, Ahmed M, Smythe CM. The epidemiology and spectrum of surgical care in district hospitals of Pakistan. *Amer J Public Health* 1987;77:1439-45.
5. Memon, Amjad Siraj. Rural Surgery in Pakistan. *World J Surg* 2006;30:1628-29.
6. Ahmed M, Raja A. Surgery in South Asia. *BMJ* 2004;328:782.
7. Fatmi Z, Hadden WC, Razzak JA, Qureshi HI, Hyder AA, Pappas G. Incidence, patterns and severity of reported unintentional injuries in Pakistan for persons 5 years and older: results of the National Health Survey of Pakistan. *BMC Public Health* 2007;10:152.
8. Hang HM, Ekman R, Bach TT, Byass P, Svanstrom L. Community-based assessment of unintentional injuries: a pilot study in rural Vietnam. *Scand J Public Health Suppl* 2003;62:38-44.
9. Jokio AH, Winter HR, Cheng KK. An intervention involving traditional birth attendant and perinatal and maternal mortality in Pakistan. *New Eng J Med* 2005;352:2091-9.

10. Bashir A. Maternal mortality in Pakistan. A success story of Faisalabad District. *IPPF Med Bull* 1991;25:1-3.
11. Ali L, Tayyab S, Perveen F. Cesarean section rate: current trends. *J Surg Pakistan* 2007;12:64-6.
12. Qazi GR, Akhtar S. Obstetrical correlates of the first time cesarean section, compared with repeated cesarean section. *J Coll Physicians Surg Pak* 2007;17:611-4.
13. Ali M, Hotta H, Kuroiwa C, Ushijima H. Emergency Obstetric care in Pakistan. *Int J Gynae & Obst* 2005;91:105-12.
14. Myers SA, Gleicher. A successful program to lower cesarean section rate. *New Eng J Med* 1988;319:1511-16.
15. Fischer A, LaCoursire DY. Differences between hospitals in cesarean rates for term primigravida with cephalic presentation. *Amer Obstet Gynae* 2005;105:816-21.
16. Suwarath-Kengpol C. Effect of clinical practice guidelines on physician compliance. *Int J Quality in Health* 2004;16:327-32.
17. Linton A, Peterson MR, William TV. Clinical Case mix adjustment of cesarean delivery rates in U.S. Military Hospitals. *Amer Obstet & Gynae* 2002;53:598-606.
18. Aubery-Bassler K, Kewberry S, Kelly L, Weaven B, Wilson S. Maternal outcomes of cesarean sections: Do generalists' patients have different outcomes than specialists' patients? *Can Fam Physician* 2007;53:2132-38.
19. Li T, Rhoads GG, Smulian J, Demissie K, Wartenberg D, Kruse L. Physician cesarean delivery rates and risk-adjusted perinatal outcomes. *Amer College Obst Gynae* 2003;101:1204-11.
20. Nicholdon JM, Yeager DL, Macones G. A preventive approach to obstetric care in a rural hospital: association between higher rates of preventive labor induction and lower rates of cesarean delivery. *Ann Fam* 2007;5:292-3.
21. Okonkwo JE, Ibeh CC. The contribution of privately owned hospitals in the provision of essential obstetric care in Nigeria. *Emerg Med Austr* 2006;19:151-4.
22. Galandiuk S, Mahid SS, Polk HC, Turina M, Rao M, Lewis JN. Differences and similarities between rural and urban operations. *Surgery* 2006;140:589-96.
23. Zuckerman R, Doty B, Gold M, Bordely J, Dietz P, Jenkin P, et al. General surgery programs in small rural New York State hospitals: a pilot survey of hospitals administrators. *J Rural Health* 2006;22:339-42.

AUTHORSHIP CRITERIA

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