ECOG PERFORMANCE SCORE AND SOCIOECONOMIC STATUS AFFECTING PATIENT SATISFACTION IN PATIENTS UNDERGOING CRANIAL SURGERY

THESIS

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NEUROSURGERY

JUNE, 2022 **DR. NITIN KUMAR**

AIIMS, JODHPUR

ALL INDIA INSTITUTE OF MEDICAL SCIENCES, JODHPUR

CERTIFICATE

This is to certify that the thesis titled **"ECOG PERFORMANCE SCORE AND SOCIOECONOMIC STATUS AFFECTING PATIENT SATISFACTION IN PATIENTS UNDERGOING CRANIAL SURGERY"** is the bonafide work of Dr. Nitin Kumar carried out under guidance and supervision, in the Department of Neurosurgery, All India Institute of Medical Sciences, Jodhpur, Rajasthan.

Dr. Deepak Kumar Jha
Professor and Head
Department of Neurosurgery
All India Institute of Medical Sciences, Jodhpur

ALL INDIA INSTITUTE OF MEDICAL SCIENCES, JODHPUR

CERTIFICATE

This is to certify that this thesis, titled **"ECOG PERFORMANCE SCORE AND SOCIOECONOMIC STATUS AFFECTING PATIENT SATISFACTION IN PATIENTS UNDERGOING CRANIAL SURGERY"** is a *bona fide* work of **Dr. Nitin Kumar**, performed under our guidance and supervision, in the Department of Neurosurgery at All IndiaInstitute of Medical Sciences (AIIMS), Jodhpur, during the period of study for degree of **Magister Chirurgiae (M.Ch) Neurosurgery,** from July 2019 to June 2022.

GUIDE

Mayank Garg.

Dr. Mayank Garg
Associate Professor
Department of Neurosurgery,
AIIMS, Jodhpur

CO-GUIDES

Dr. Deepak Kumar Jha
Professor & Head
Department of Neurosurgery
AIIMS, Jodhpur

S. Bhaskar

Dr. Suryanarayanan Bhaskar
Additional Professor
Department of Neurosurgery
AIIMS, Jodhpur

Dr. Pankaj Bhardwaj
Additional Professor
Department of Community & Family Medicine
AIIMS, Jodhpur

Jaskarn

Dr. Jaskarn Singh Gosal
Assistant Professor
Department of Neurosurgery
AIIMS, Jodhpur

All India Institute of Medical Sciences (AIIMS), Jodhpur

DECLARATION

I hereby declare that this project, titled **"ECOG PERFORMANCE SCORE AND SOCIOECONOMIC STATUS AFFECTING PATIENT SATISFACTION IN PATIENTS UNDERGOING CRANIAL SURGERY"** is a *bona fide* record of my original research work. It hasnot been submitted to any other institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

Dr. Nitin Kumar

Department of Neurosurgery,
All India Institute of Medical Sciences
(AIIMS)Jodhpur 342005

INTRODUCTION

The relation between patients and doctors in India has been well narrated from instances unknown. The Aryans personified term "Vaidyo Narayano Harihi" (which means doctors are equal to Lord Vishnu). However, doctor patient relationship has increasingly been below stress in recent years probably because of globalization of health-care services. The connection of patient with the doctor is mirrored image of the society[3]. A society that is orienting itself toward "rating" and "comments" has made this physician–patient relationship, a customer–service issuer relationship. This perhaps is due to commercialization of health that typically accompanies globalization. On the one hand, encouragingly, consequently, public cognizance of medical negligence in India is growing. Other hand alternatively, much of the awareness is received from misguided sources including internet and education content for patient often mistaken to be evidence for health care standards. This misguided source information often results in grievances and assaults by the family members on doctors, underestimating standards of expert competence, and inappropriately judging treatment given. The consumer protection act and medical service commercialization may additionally well have had an unfavourable impact at doctor and patient relationship.[1]

Medical neuroscience has made superb advances over the few past decades. Neuroscience as a discipline is still considered difficult challenging and at instant risky due to the progressive course and natural history of some neurological diseases. Encouragingly, the affected person and their caretaker are now increasingly willing to be actively included in decisions making which related to his/her health due to massive influx of facts (even though not always a proper understanding) via media and the global Web. Therefore, good clinical practice has moved from being physician–patient relationship to physician–patient–caregiver relationship.[1]

Surgery per se, is a stressful event, not only for the patients but also for their relatives. The hospital environment, repeated examinations performed by doctors, cannulation, injectable antibiotics, withdrawal of blood samples, filling of consent forms, all add to the anxiety of the procedure. At times, patients cannot express themselves due to neurological deficit, thus their representative plays the role of an important link between the patients and the healthcare professionals. The role and

expectations of patient and their representatives have changed drastically over a few decades. Today the treatment is more of a family centric approach rather than the classical patient centric.[2] Poor communication can adversely have an effect on clinical decision-making, psychological outcomes and the satisfaction of family members.[3]

All the health care systems aim at provision of best quality of care to their patients. But the quality of surgical patient care varies from one system to another regardless of best efforts. These variations can occur between the departments, surgeons, hospitals and from one region to another. The evaluation of quality of care at frequent intervals can help in continuing improvements of the health care services.[4]

The patient satisfaction is quite complex concept and is because of range of things consisting of lifestyle, previous experience from hospitalisation and future expectations as well as individual values and culture of society.[5] A variety of factors which include beliefs, values and earlier expectations influences the patient satisfaction.[6] The satisfied patients are more likely to seek medical advice and enhances the compliance with treatment. A study had noted that, patient satisfaction research serves as a mean of the holding accountability for the physicians. The competitive environment in the medical field has pushed the hospitals to strive for satisfying the patient's requirements. The service quality, decreased expenditure, patient retention, enhanced profitability and customer satisfaction decides the international ranking of the health institutions.[7]

Patient satisfaction assessment surveys serve a crucial role in promoting patient-oriented health-care offering and bringing transparency to a consumer market in search of a high standard health-care experience, the expansion of their use beyond their valid usefulness is a concern. Patient-satisfaction assessment measures are paramount with a view to measure patient contentment with health-care interaction and service, but aren't correct measures of overall quality, safety, effectiveness or value of neurosurgical care. As per the Institute of Medicine (IOM), health-care quality is defined as safe, effective, patient-targeted, equitable and timely care.[2]

The interventions aimed towards increasing access to neurosurgical care generally benefits the needy and vulnerable population. The socioeconomic and cultural elements affect the patient attitude towards health and thereby limiting access to neurosurgical care and resulting to health outcome inequities.[8, 9] The patients from

high income nations has tendency to have high literacy rates and less utilization of alternative medicine, higher social protection and access to better advanced neurosurgical care and hence have good attitude towards the neurosurgery.[10, 11] Subsequently , patients from high earning nations are much more likely to trust their neurosurgeons if they acquire strong suggestions from other doctors, if the neurosurgeons has multiple degree and if the neurosurgeon is affiliated with an educational training centre.[12]

In a study of patient satisfaction after neurosurgery service, 76.7% of the patient had been satisfied with the service. Following implementation of measures for improvement which including personnel training, conferences and poster improves satisfaction to 90.6%.[13.] Another study had shown that, the patient satisfaction depends on education, gender and monthly family income.[14]

In neurosurgery each case is different, with varying degree of complexity, comorbidities, and expected outcomes based on the stages of disease and diversity of pathologies. Apart from technically challenging and delicate surgeries, neurosurgery offers a completely different pre and postoperative patient management. The caseload of neurosurgery is increasing exponentially. Nowadays, prognosis of intracranial lesions has improved due to advancement in the techniques and technologies in micro-neurosurgery. Here at AIIMS Jodhpur we operate approximately 550 patients a year, which includes almost all subspecialties of neurosurgery.

Even though the patient satisfaction studies of the different health related services help health institutions to improve the level of care. Monitoring of quality of health care and patient satisfaction is difficult in cranial surgery. The assumption made is that health care quality can by presumed by tracking patient satisfaction. There is a shortage of studies looking at this assumption in cranial neurosurgery. Hence this study was undertaken in order to study the patient satisfaction in a neurosurgery department who underwent cranial surgery.

REVIEW OF LITERATURE

Historical perspectives

The history of neurosurgery traces back to the period of Hippocrates where the school was first to codify treatment for head injury in De capitis vulneribus with skull fractures being classified by type and the severity of injury.[15]

Jacopo Beregario da Carpi (1460 – 1530) an Italian physician, surgeon and anatomist first published a monograph dedicated to head injury De fractura Carnii.[16] With the advances in Anaesthesia, Antisepsis and Haemostasis, The medieval physicians thought the functions of brain are discharged by "psychic pneuma" the cerebral ventricles.[17] George Heuer (1882 – 1950) originally developed the frontotemporal craniotomy in 1914.[18] Gazi Yasargil played a major role in the refinement of fronto temporal approaches with the use of an operative microscope.[19] Donald H Wilson was the first neurosurgeon to use the term "key hole surgery" in 1971.[20] In 1910, Victor Lespinasse, a Chicago Urologist was first to perform the neuroendoscpic procedure on a neonate with hydrocephalus.[21]

Epidemiology

The estimates have shown that, about 13.8 million essential neurosurgical cases develop each year, of which more than 80% arise in low and middle-income countries. The neurosurgical cases include brain tumours, spinal tumours, TBI, TSI, Stroke, HCP, NTD, Vascular anomalies, infection and epilepsy.[22] In every year approximately 3.5 to 3.7 million new cases are expected in South east Asia and the Western Pacific regions. Among the neurosurgical procedures, TBI (Burr holes, craniotomy/ craniectomy etc.) accounts for 45%, cerebrovascular accident for 20%, hydrocephalus for 7% and brain tumours for 5%. Vascular anomalies (2.2%), neural tube defects (0.3%) and spinal tumours (0.1%) occupy a modest proportion of the global neurological need.

Neurosurgery

In spite of low morbidity and mortality rates, neurosurgery is still considered as a high risk filed.[23, 24] Considering the high demands of treatment quality, evidence-based guidelines for neurosurgical treatment and perioperative quality handling are sti

ll surprisingly scarce.[25, 26] The neurosurgical procedures can be broadly divided in to c ranial surgery and spine surgery. Neurosurgical procedures are usually long duration, need a proper assessment prior to surgeries and require further postoperative support i n intensive care unit.[27] The end outcomes and patient satisfaction after neurosurgery ar e to a great extent dependent on timely access to and availability of elective services.

The patient reported outcomes are increasingly recognized as valid and meanin gful measures of successful care. This is in contrast to traditional surgeon – centred outcome parameters including morbidity, mortality, complications and post-operative imaging findings. The patient satisfaction is a type of patient report outcome different from reports of health, disability and quality of life. The patient satisfaction i s a measurement reflecting the patient's perception of outcome of care and has been c onsidered for use in future reimbursement schemes. Contrary to intuition, satisfaction does not depend only on conventional measures of surgical outcomes. There is a comp lex interplay that depends on preoperative factors, the interpersonal relationship betwe en the patient and physician, nurses and other hospital staff and other more traditionall y measured outcomes that determine patient's satisfaction.[28]

Patient satisfaction

The satisfaction can be defined as the extent of an individual's in-hospital experience compared with his/her expectations. The patient satisfaction is rela ted to the extent to which general health care needs and condition specific needs are m et. It is need of the hour to evaluate to what extent the patients are satisfied with the he alth service and is clinically relevant, as satisfied patients are more likely to comply w ith the treatment and take an active role in their own care, continue using medical care services and stay within a health care system.[29]

Patient satisfaction is an important patient centred outcome measure and it is a ccepted as a standard measure of quality of care and is steadily gaining in popularity. The consumer satisfaction studies can be used for three related but distinct purposes: a s evaluations of the quality of care, as outcome variables and as indicators to which as pect of a service needs to be changed to improve the patient response.[30]

NEUROSURGERY

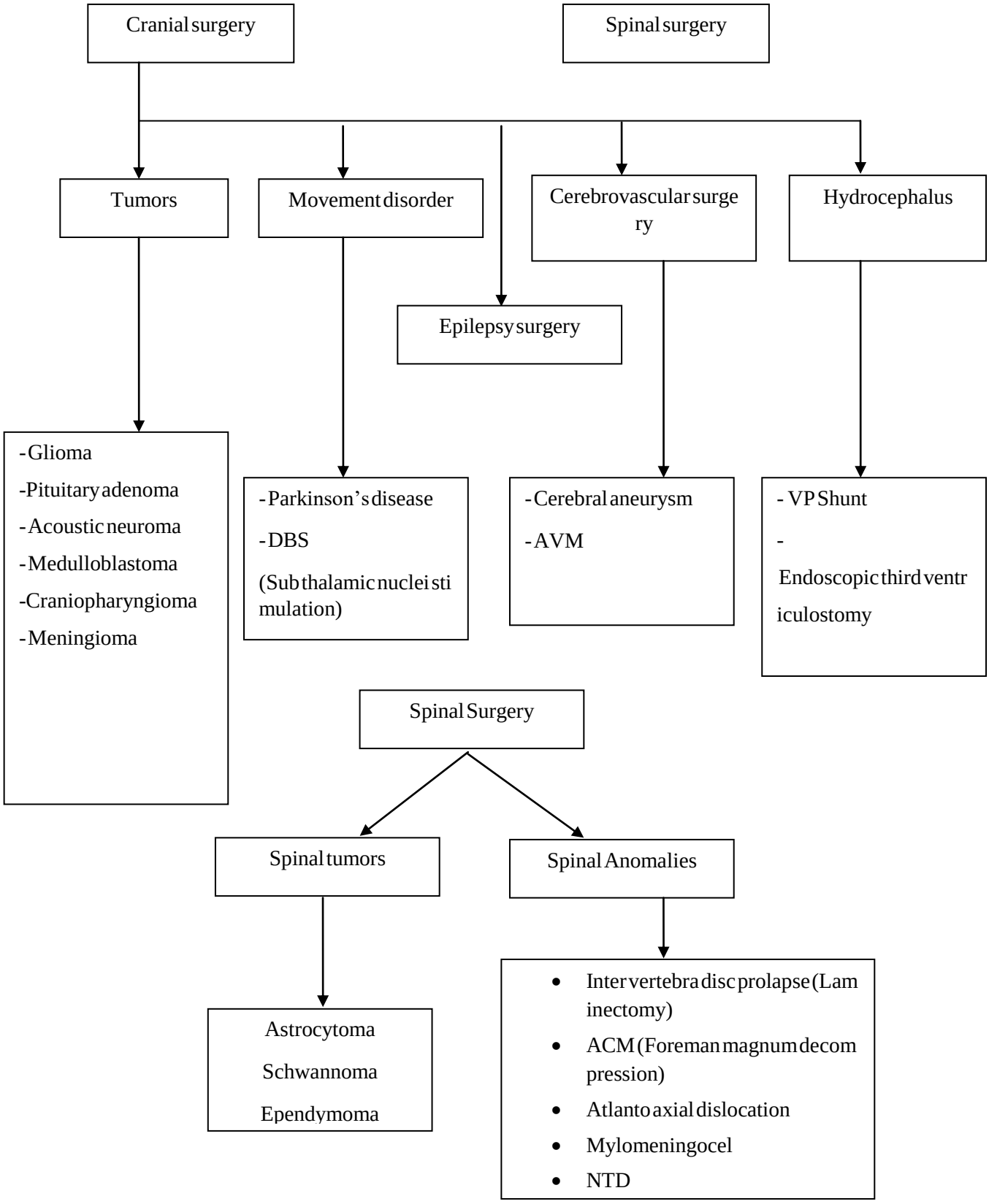


Figure 1. Different surgeries performed in Neurosurgery

Donabedian[31] had theorized that quality of medical care could be evaluated fro m three perspectives

1. Process – How and what things are done.
2. Structure – setting in which care is administered.
3. Outcome – the effects of health status and patient satisfaction.[31]

In general most of quality measures can be placed in two subject groupings. T his includes the process measures and outcome measures. The process measure reflect s the quality of activities (preparations, interaction and interventions) that occur prior t o and during care. This process of care thus includes the infrastructure as well as the d irect delivery of care to the patients. The outcome measures reflect the result of care (whether intended or unintended). This result could manifest at time during or after the patient's stay.[32]

The patient satisfaction has been consistently found to correlate with overall sa tisfaction with care and has been defined as the patient subjective evaluation of the co gnitive and emotional response which result from interaction of the patient's expectati ons and their perception of actual behaviour of health professional and characteristics. [33] Measuring patient satisfaction with care is instrumental to the success of providing patient centred care and allows consumers to participate in the evaluation process. Maj ority of the studies in patient satisfaction has been cross sectional and descriptive in na ture. Characteristics of providers and organizations that result in more personal care h as been associated with higher level of satisfaction.[34]

The patient should be allowed to define their own priorities and evaluate their care accordingly, rather than having criteria's selected by professionals. The satisfacti on studies can function to give providers of care some idea of how they would have to modify their provision of services in order to make their patients more satisfied. The extent to which consumer opinion can influence policy makers and health care person nel is not only dependent upon collecting the right kind of data, it also requires that po licy makers and health personnel accept the value of the consumer's point of view.[35]

The main indication for measuring satisfaction with health care is to identify th e areas for improvement.[36] The working environment of health workers is directly or i

ndirectly responsible for the patient satisfaction.[37] The patient cared in hospital, which health workers characterized as having adequate staff, good administrative support of health care and good physician-
patient relation were report high satisfaction with their care. Patient satisfaction has al so been found to be associated with patient adherence to care provider recommendatio ns and intent to return for /referral service.[38]

The patient satisfaction has been interpreted as the art of care, technical quality of care, accessibility, convenience, efficacy of outcomes of care, cost of care, physica l environment, availability and continuity of care[39].

Quality neurosurgical care

Health care reform measures have potentially profound effects on neurosurger y which is one of the most expensive areas in medicine.[39, 40, 41] With the health care ref orm has come a greater emphasis on capitation of payment for care risk sharing amon g the stakeholder, that has forced health systems, hospital and clinicians to identify op portunities along the continuum of care to lower costs and keep patients from being re admitted to the hospital. These efforts include standardized protocols, drug formularie s and safety checklists, all of which may be most efficiently coordinated and impleme nted when physicians are financially or contractually aligned with the health systems i mplementing them.[42]

The neurosurgeons provide individualized care to patients. However, the major ity of the regulations affecting relative value of patient related care are drafted by poli cy experts which are typically system and population based. A central, prospectively g athered, national outcomes –
related database serves as neurosurgery's best opportunity to bring patient centred out comes to the policy arena.[43]

Neurosurgical care is a major component of health care delivery system. The f our essential realms of contemporary neurosurgical practice are

- Attention to the full range of human experiences and response to disease.
- Integration of objective data with knowledge gained from an understanding of client's or group's subjective experience.

- Application of scientific knowledge to the process of diagnosis and treatment.
- Provision of caring relationship that facilitates health and healing.

The neurosurgical practice requires a combination of intellectual achievement, ethical standards, scientific knowledge, technological skill and personal compassion.

Quality of the health activities is the complete satisfaction of needs of those w ho are in most need of health services, for the lowest organizational cost, within the gi ven limits and guidelines of higher administrative bodies.[44]

The goals of quality assurance in neurosurgery include[45] -

- ❖ Improve and maintain the patient good state of health
- ❖ Improve and maintain the patient functional abilities
- ❖ Develop patient's psychological condition or well – being
- ❖ Gain the patient satisfaction

The findings from recent studies identified the following variables as most sig nificant for female patient satisfaction: listening, responding to the patient's uniquenes s; being perceptive and supportive of the patient's concerns: being physically present; having attitudes and displaying behaviours that made the patient feel valued as a huma n being not as an inanimate object or a thing on display; returning to the patient volunt arily without being asked; showing concern that is comforting and relaxing; using a so ft gentle voice and mannerisms and invoking feelings of security [43].

In male patients, the following behaviours were important: being physically pr esent so the patient felt concern as a valued person: returning voluntarily without solic itation; making the patient feel comfortable, relaxed and secure; attending to comfort a nd needs of the patient before doing tasks: and using a kind, soft pleasant, gentle voice and attitude.

Patient centred neurosurgical care

The concept of person centeredness has become established in approaches to t he delivery of health care. Being persons centred requires the formation of therapeutic relationship between the professionals, patient and health care worker. These relation ships are built on mutual trust, understanding and sharing collective knowledge.

The person-centred neurosurgical care framework comprises of four constructs:

- Pre-requisites
- Care environment (Context in which care is delivered)
- Person centered process (Delivering care)
- Expected outcome (results and effectiveness)

Prerequisites

The pre-requisites focus on the attributes of the neurosurgeon and include being professionally competent, having developed good surgical skills, interpersonal skills, being committ ed to the job, being able to demonstrate clarity of beliefs and knowing self. Profession al competence focuses on the knowledge and skills of the neurosurgeon to make good decisions and prioritize the case. It also includes competence in physical or technical a spects of care and developed interpersonal skills reflect the ability to communicate at a variety of levels. Commitment to the job is indicative of dedication and a sense that t he neurosurgeon wants to provide care which is best and timely for the patient. Clarity of beliefs and values highlights the importance of knowledge in their own views and being aware of how these can have an impact on decisions made by the patient.[45 46]

The care environment

The care environment construct focuses on the context in which care is deliver ed and includes an appropriate skill mix: systems which facilitate shared decision mak ing: effective staff relationships: supportive organizational systems, the sharing of po wer, the potential for innovation and risk taking. These characteristics of context are c onsistent with the conceptual development of the concept undertaken by McCormack

et al.[47] Key characteristics of context arising from these studies include the culture of t he workplace, the quality of neurosurgical care leadership and the commitment of the organization to the use of multiple sources of evidence to evaluate the quality of care delivery. [47]

Person centred processes

Person centred processes focus on delivering care through a range of activities and includes working with patient's beliefs and values, engagement, having sympathet ic presence, sharing decision –
making and providing physical needs. This component of framework mainly focuses on patient, describing person centred care in context of care delivery. Working with pa tients' beliefs and values reinforces one of the fundamental principles of person-centred care, placing importance on developing a clear picture of what the patient valu es about their life and how they make sense of what is happening. This is closely linke d to shared decision making i.e., caregivers facilitating patient's participation through giving information and integrating newly formed perspectives into established practic e. McCormack[48] illustrates the links between these processes stating that, 'knowing w hat is important forms a foundation for decision making that adopts a 'negotiated' app roach between practitioner and patient.[48] Furthermore, Hedberg and Larsson [49] eviden ce the link between environmental elements (the care environment) and decision-making processes, concluding that interruptions and work procedures are two of the e nvironmental elements which caregivers face in their daily work and that contributes t o the complexity of decision making.[49]

Outcomes

Outcomes are the results expected from effective person-
centred care and include satisfaction with care, involvement in care, feeling of wellbei ng and creating a therapeutic environment described as one in decision making is shar ed, staff relationships are collaborative, leadership is transformational and innovative practices are supported. The patient satisfaction reflects the evaluation of a patients pl ace on their care experience.[50 51]

Dimensions of patient satisfaction

Cure is fundamental health service expectation. Specifically, patient satisfactio n is defined as an evaluation of distinct healthcare dimensions. It may be considered a s one of the desired outcomes of care and so patient satisfaction information should be indispensable to quality assessments for designing and managing healthcare. The pati ent satisfaction enhances hospital image, which in turn translates into increased servic e use and market share. The satisfied customers are likely to exhibit favourable behavi oural intentions, which are beneficial to the healthcare provider's long term success.

Components of satisfaction consists of

- Structural
- Technical
- Interpersonal aspects of care

The structural aspects include: assess, physical setting, costs, convenience and treatment by non – clinical staff/ insurers.

The technical aspects include knowledge, competence/ quality of care, interve ntions and outcomes.

The interpersonal aspects include: Communication, empathy and education.

There are seven main dimensions that have been addressed in the literature as crucial in measurement of patient's satisfaction. The dimensions are:

- Respect for patients' values, preferences and expressed needs
- Coordination, integration and information flow
- Information and education
- Physical comfort
- Emotional support and alleviation of fear and anxiety
- Involvement of family and friends
- Transition and continuity

Perioperative patient satisfaction

Perioperative care

The perioperative care comprises of preoperative care/ teaching, intraoperative care and post-operative care.[53] The care in theatre is believed to be stressful: Patients are anxious and they are not sure of the outcome of the surgery and fear lifelong complications which may result in stated that the patients find the day of surgery as the last day in their life and this is the reasons why theatre serves as the shop window to any healthcare service provided to the patients.

Pre-operative care

Preoperative care is considered as mainly focusing on expectations of the surgical procedure, medication and food restrictions before the procedure, as well as providing instructions for after care once a patient operated. The patient education is carried out in various situations and within different frameworks therefore, the aim of education is very important.[54]

Patient who undergoes surgery experience acute psychological anxiety in the preoperative and post-operative period found that patient anxiety was highest before surgery, decreased immediately after surgery and increased again postoperatively.[55]

Intraoperative care

Intraoperative care is a pre-requisite and a tight coordination of all theatre staff is mandatory with doctors, surgeons and nurses working hand in hand for the better patient's outcome. When intraoperative care is well performed, it may facilitate the procedure, promotes patient safety and also prevent infection and aiding the patient's physiological well – being.[56]

Post-operative care

It is defined as immediate care after surgical procedure, it last for the duration of hospital stay or after discharge.

Level of patient's satisfaction based on dimensions

A tool has been designed to assess the five dimensions of patient satisfaction i ncluding information offered to the patient, discomfort and needs of the patient, staff p atient relationship, fear and concern of the patient then service offered to the patient.[57]

The dimension of information involves explanation and amount of information provided to the patient's regarding disease and surgery. A study[57] had shown that, 72 % of the male patients were more satisfied that other groups with the amount and qual ity of information received.[57]

Discomfort and needs: This dimension investigates the adverse outcomes of anaesthe sia, which influence patient satisfaction. It was found that be 28.8% of the patients had complaints of severe pain in their post-operative period.

Fear and concern: This dimension assess the degree of fear and concern among patie nts with respect to some situations, such as awaking during the operation, seeing the o perating room and pain level due to administering anaesthetics. In a study[57], the group of patients who received local anaesthesia were more satisfied that other groups.

Staff –

patient relationship: This dimension assesses the relationship between patients and hospital staff, the amount of care shown to the patients and the magnitude of patient e xpectations of the attitude and behaviour of the staff towards them. A study[58] had repo rted that, the patients above the age of 50 years, retired and orthopaedic patients were more satisfied with the staff – patient relationship.[58]

Service: This dimension comprises of two items, the first assess the patient's percepti on for the waiting time before surgery and the second discusses the operation time. A study [59] reported that, about 58.7% of the patient operated on the planned date and sch eduled operation were more satisfied.[59]

Factors affecting patient satisfaction

A number of factors influence or affect the patient satisfaction with the health care. They can be classified as

- Patient related factors

- Physician related factors and
- Health care setting system related factors

Patient related factors

Age, gender, socioeconomic status, education as well as health status may positively or negatively affect the patient satisfaction.

Age: Some studies have been done to assess the patient satisfaction with the care as related to age. A study [60] identified that the adults showed the high level of satisfaction with the care as compared to the young patients. The aged patients tend to interact more with the health care providers.[60]

Gender: A study had shown that, the females tends to be less satisfied that males.[61] Another study [63] show male were more satisfied than female.

Socio economic status and education: Ignorance and lower level of education were poor prognostic factors upon satisfaction.[61]

Health status: The Patients with chronic disease were found to be less satisfied with the health care[62].

Surgeon related factors: The surgeon can also determine the patient satisfaction. High level of satisfaction can be achieved by improving the way the patients and surgeon interact.

Expectations: A study [62] documented expectation to be the most important factor. They realized that when physicians acknowledge and guide patient expectations, satisfaction is better.[62]

Communication: The physician patient communication can also affect the patient satisfaction. A good communication, the patients think that the physician takes their problem seriously, explains the medical condition clearly, tries to understand the patient needs and gives the advice to improve the patient health. Pain, anxiety, worry was found to be reduced for the patients who received a good communication.[63]

Decision making and time spent: Medical decision making was found to influence patient's satisfaction. The patient expressed a preference for physicians who approache

d their complaints more holistic with a social and mental care as much as their physica l functioning.

Technical skills: Patient's assessment of their surgeons' technical skills and the effect on satisfaction has been evaluated by various studies with divided thoughts.

Health system related factors: The team in which the patient care is provided is also important along with patient and surgeon related factors. They include clinical team, r eferral and the continuity of the care.

Khan et al (2014)[66] conducted a questionnaire-based cross-sectional study to plan improvement in service provision of patient. In their study satis faction with the neurosurgery service was 76.7% (n=115). Following implementation of measures for improvement, which included staff education, meetings and posters, t his figure increased to 90.6%. In conclusion, patient satisfaction should be at the crux of patient care, with a strong focus on effective communication skills, and can be impr oved by identification of issues by direct patient feedback and subsequent action base d on this.[66]

Reponen et al (2015)[64] studied association of overall patient satisfaction and s urgical outcome and evaluated the applicability of overall patient satisfaction as a pro xy for quality of care in elective cranial neurosurgery in an observational study. They concluded that, overall patient satisfaction with elective cranial neurosurgery is high. Even nine of ten patients with postoperative major morbidity rated high overall patient satisfaction at 30 days. Overall, patient satisfaction may merely reflect patient experie nce and subjective postoperative health status, and therefore it is a poor proxy for qual ity of care in elective cranial neurosurgery.[64]

Jalal et al (2019)[14], conducted hospital based cross sectional study in Neurosu rgery outpatient department of Ghazi khan Medical College, Dera, Ghazi Khan. Data was collected using preformed, pretested questionnaire from 326 patients. The proport ion of patients having very good level of satisfaction was 27.3% while 17.2% had sati sfactory level of satisfaction. They concluded that, education, gender and monthly fam ily income are key determinants of patient's satisfaction with healthcare services.[14]

In a study, **Halliday et al (2019)**[65] determined the effect of pooling of patients for elective non-

instrumented lumbar decompression on patient satisfaction and waiting times. There was no significant difference in patient satisfaction levels between pooled and non-pooled patients at 3($p = .052$) and 12 months ($p = .5$) post primary elective lumbar dec ompression (significance $p < .05$). [65]

In a study by **Chen et al (2019)**[67]**,** retrospective Press Ganey survey review wa s performed to identify patient demographics and patient visit characteristics in neuros urgical spine clinic patients and neurosurgical non-
spine clinic patients. They concluded that the spine clinic cohort reported less satisfact ion than nonspine cohort in all satisfaction questions on the Press Ganey survey. The f indings suggest that efforts should be made to further study and improve patient satisf action in spine clinics.[67]

A study by **Louis et al (2020)**[69] found that, Patients reported significantly high er ratings for overall satisfaction who understanding their medical condition and treat ment plan. The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) scores for physician communication, hospital rating, and hospital recomme ndation were 23%, 24%, and 23%, respectively, higher than the national average. A 3 2% improvement in patient retention and conversion rates resulted from consultations with patient
specific VR models of their lesions (P < .0001). They concluded that, VR is a powerfu l tool for enhancing patient engagement and education.[69]

Almujalwel et al (2020)[70] in their study, a total of 85 questionnaires were com pleted. The mean for patient satisfaction for the cranial cases was 88.4%. Cranial patie nts were least satisfied with the consultant's explanations of the procedure and most sa tisfied with how their privacy was respected. Spinal patients were least satisfied with t he availability of the resident and most satisfied with the availability of the nursing sta ff. Overall, 91.8% of the patients indicated that they were satisfied with the service tha t they received. They concluded that, majority of the patients were satisfied with the c are provided by the neurosurgery team with the results of the surgery. The majority of the patients who underwent spinal surgery did not seek a second opinion from another neurosurgeon, whereas the majority of the cranial patients sought a second opinion.[70]

In a systematic review by **Kanmounye et al (2021)** [68] available data base was searched for studies identified patient attitudes toward neurosurgical practitioners, dis

eases, and interventions. Six out of 1,175 articles met the inclusion criteria. In which i ncluded study population from Brazil, Ethiopia, India, Nigeria, South Korea, and Sub-Saharan Africa. Ethiopian and Nigerian patients believed cranial diseases to be otherw orldly and resorted to traditional medicine or spiritual healing first, whereas Brazilian patients were more comfortable with cranial diseases and even more so if they had ha d a previous craniotomy.[68]

AIM AND OBJECTIVES

AIM

1. To evaluate the applicability of overall patient satisfaction as a proxy for quality of care in cranial surgeries.

OBJECTIVES

1. To identify factors affecting satisfaction among patients/relatives undergoing cranial surgery.
2. To correlate the **patient satisfaction** with **ECOG score** (pre and post-treatment) and **socioeconomic status** among the patients/relatives undergoing cranial surgery.
3. To correlate the patient satisfaction with socio demographic variables among the neurosurgery patients
4. To study association of overall patient satisfaction and surgical outcome in elective neurosurgery for intracranial space occupying lesion.

MATERIAL AND METHODS

A hospital based cross sectional study was conducted in All India Institute of Medical Sciences, Jodhpur which is the tertiary care centre present in the Western Rajasthan from January 2020 to June 2021. Clearance from institutional ethics committee was obtained before the study was started. An informed, written, bilingual consent was obtained from all the patients before they were included in to the study.

SAMPLING AND SAMPLE SIZE:

The cases fulfilling the inclusion criteria was serially included for the study by consecutive sampling until at least desired sample size achieved.

According to a study by Vural[67] et al, the anticipated satisfaction level was 68.7%

By using this information, a sample size for comparison of paired data has been calibrated with the following assumption-

Confidence interval = 95%

Margin of error = 8 %

Anticipated satisfaction = 68.7%

$x = Z(^{c}/_{100})^{2} r(100-r)$

$n = {}^{N\,x}/_{((N-1)E^{2} + x)}$

$E = [{}^{(N-n)x}/_{n(N-1)}]$

Where,

N = the population size, r =The fraction of responses that is interested in,

$Z(c/100)$ = Critical value for the confidence level c.

The minimum sample size calculated is 129.

Inclusion Criteria

1. Patients undergoing cranial surgery.

Exclusion Criteria

1. Patient not willing to participate in the study.
2. Patients undergoing surgeries in follow up period of earlier surgeries.

DATA COLLECTION:

Subjects were included in study by consecutive sampling from those who fulfils inclusion and exclusion criteria. A valid written informed consent was taken. Data was collected using a predesigned, semi structured proforma. Preoperative data comprised of basic patient characteristics, routine preoperative measurements, and details of the planned surgery including the surgical indication and the site of the lesion. The study tool consisted of socio demographic information, socioeconomic status of the family using Modified Kuppuswamy Scale[71] and patient's ECOG[72] (Eastern Cooperative Oncology Group) performance score at admission which represents status of current quality of life. The current income group of Modified Kuppuswamy Scale will be calculated as per the current price index[71] of October 2019 (147.2) using the formula[73] original family income group of Kuppuswamy (1976) × current price index × 0.0735 (multiplication factor).[74]

Outcome Measures

Outcomes were assessed based on patient performance ECOG score at the time of hospital discharge. A patient satisfaction survey shall be recorded on satisfaction questionnaire (SAPS- short assessment of patient satisfaction) [74] at the time of discharge.

STATISTICAL ANALYSIS:

Data collected was entered into MS Excel spreadsheet. Categorical variables were summarized as frequency and proportion and 95% CI was calculated while continuous variables were summarized as mean and standard deviation. Chi square and Fischer exact test were employed for qualitative data and Mann Whitney and student independent 'T' test for quantitative data. A p value less than 0.05 was taken as statistically significant. All statistical analyses were done using Statistical Package for Social services (SPSS vs 20).

RESULTS

During the study period, a total of 194 patients were assessed for eligibility. Of these, 170 patients satisfied the selection criteria and were included in the study. The other 24 patients either declined to participate, or could not submit satisfaction questionnaire.

Demographic and Clinical Data

In this study majority of study population who underwent cranial surgery were between 41-50 year of age group (23 %) , followed by 18-30 year of age group (18.2 %) and 12.9 % of study population below age of 18 year. The mean age of the study population was 40.61 years (range 4 month to 81 years). (Table 1).

There were 93 (54.71 %) males and 77 (45.29%) females. In study population 79.41 % (n= 135) were married. Most of patients belonged to rural area (78.24%) and 58.24% were literate. About 18.2 % of study population had pre-existing co-morbidity in form of hypertension (11.8%) followed by diabetes mellitus, hypothyroidism and tuberculosis. About 27% population had experience of previous extra-cranial surgery. (Table 2).

The indication for cranial surgery was classified as shown in Table 3. Most common indication for craniotomy in this study was neoplasm (n=108; 63.53%). Majority of the patients underwent craniotomy for supratentorial lesions (n=128; 75.3%), out of which most common was supratentorial tumours (n=75; 58.59%) followed by traumatic head injury (n=29; 22.7 %) and supratentorial vascular pathology such as aneurysms and arteriovenous malformations (AVM) (n=20; 15.63%). Craniotomy for infratentorial lesions was done in 42 (24.7%) patients out of which most common was infratentoraial neoplasm (n= 33, 78.57 %) followed by infratentorial vascular pathology. (Table 3).

Socioeconomic data –

In our study as per modified Kuppuswamy scale (Annexure -2) Majority of study population belonged to upper lower class (n=75, 44.1%) followed by lower middle class (n=46, 27.1%). Only 3.5% of study population belonged to upper class in this study. (Table 4).

When we analyzed all three components of modified kuppuswamy scale we found that education of head of family was up to middle school in 52.35% (n=89) and only 6.47% (n=11) had professional degree. About half of head of family occupation was farming/ shop/ skilled work as in real estate construction, plumber (50.6%) followed by unskilled labourer (20.0%). Only 15.3% head of family occupation was professional and semiprofessional and 1.18% head of family was unemployed. 52.9% of family per capita per month income was $\leq$ 3404 rupees. (Table 5)

SAPS and ECOG score-

Mean pre op ECOG score was 2.34 and post op ECOG was 2.04.

Mean SAPS score of study population was 23.17.

On analysis of 7 different SAPS questionnaire component, 32.4 % patient/ caregiver thought time they had with doctor or health care worker was too short, 22.4% not satisfied with choices they had in decisions affecting their health care and 14.3%. not satisfied with explanation given about results of treatment and care .(Table 6)

Level of satisfaction, socioeconomic status and ECOG score-

In this study 48.8% patients or caretaker were satisfied, 32.4% very satisfied, 17.6 % dissatisfied and 1.2% very dissatisfied. Overall 81.2% satisfaction was seen in study population. (Table 7)

In upper class of socioeconomic status satisfaction was better than lower class (100% vs 66.7%) but it not found statistically significant due to small number of study population in upper class group of SES. In lower middle and upper lower class level of satisfaction was 80.4% and 82.7% respectively. (Table 8)

In modified kuppuswamy scale head of family with higher education (graduate and professional), having professional/ semiprofessional occupation and $\geq$ 11351 rupees per month per capita income were more satisfied than head of family with education up to VIIIth standard , having unskilled or semiskilled occupation and $\leq$ 1146 rupees per month per capita income but not found statistically significant. (Table 9,10,11)

Mean pre op ECOG score in satisfied patient group was 2.37+1.41 and in very satisfied patient group was 1.94+1.16. Mean Post op ECOG score in satisfied was

1.89+1.49 and in very satisfied was 1.43+1.15. Pre op and Post op ECOG score found statistically significant in satisfied and very satisfied group. (Table 12 and 13)

Mean pre op ECOG score in dissatisfied patient group was 2.83+1.41 and in very dissatisfied patient group mean pre op ECOG score was 4.00+0.00. Post op ECOG score in dissatisfied group was 3.36+1.69 and in very dissatisfied group was 5.00+0.00. Pre op and Post op ECOG score not found statistically significant in dissatisfied and very dissatisfied group. (Table 12 and 13)

In 41 patients ECOG score increased in post op period due to post op morbidity, Out of these 41.9 % (n=18) were dissatisfied and this was found statistically significant. Out of 32 dissatisfied patients, 18 (n=56.2%) had higher ECOG score at the time of discharge and was found statistically significant. (Table 12 and 13)

Level of satisfaction and demographic data-

Higher satisfaction was noted in female, married rural residence and who were educated. but no statistical significance found between level of satisfaction and age, sex, marital status, area of residence and education of patient.

In this study around 53.7% patients had some kind of post op morbidity like new or worsened weakness (15.9%), pneumonia (15.9%) followed by CSF leak (15.2%) as pseudo-meningocele or from wound. Occurrence of morbidity associated with dissatisfaction of patient and it found statistically significant. (Table 14 and 15)

Table 1: Distribution of age group

Age group (yrs)	Frequency	Percent
< 18	22	12.9
18 – 30	31	18.2
31 – 40	24	14.1
41 – 50	39	22.9
51 – 60	30	17.6
61 – 70	19	11.2
71 – 80	4	2.4
> 80	1	0.6
Total	170	100

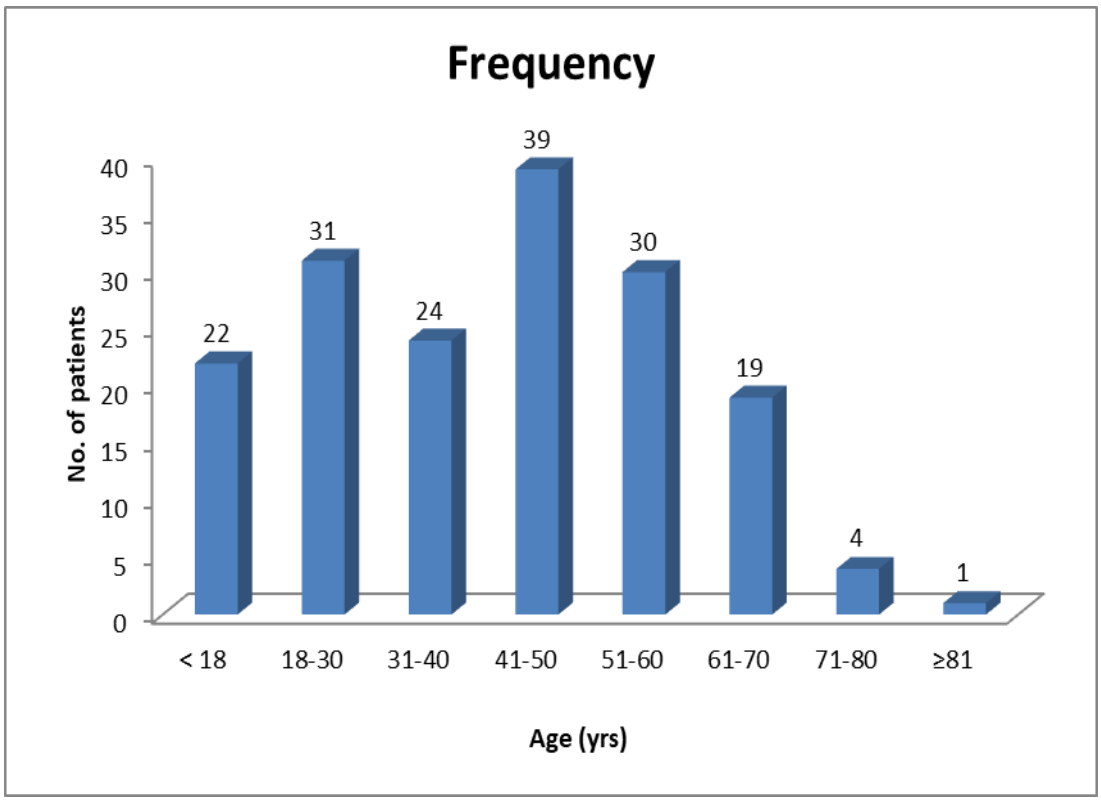


Chart 1: Distribution of the study group according to age group

Table 2: Distribution of demographic variables

Demographic variables		**No. of patients**	**Percentage**
Gender	Male	93	54.71
	Female	77	45.29
Marital status	Married	135	79.41
	Unmarried	35	20.59
Residence area	Rural	133	78.24
	Urban	37	21.76
Educational status of patients	Educated	99	58.24
	Illiterate	62	36.47
	Not applicable	9	5.29
Pre-existing co morbidity	Yes	31	18.24
	No	139	81.76
Any previous surgery (Cranial/Extra cranial)	Yes	46	27.06
	No	124	72.94

Table 3: Indication of craniotomy

Indication of craniotomy	Supratentorial lesion		Infratentorial lesion		Total	
	N	%	N	%	N	%
Trauma	29	22.66	0	0.00	29	17.06
Vascular	20	15.63	5	11.90	25	14.71
Tumor	75	58.59	33	78.57	108	63.53
Infective	2	1.56	1	2.38	3	1.76
Others	2	1.56	3	7.14	5	2.94
Total	128	100.00	42	100.00	170	100.00

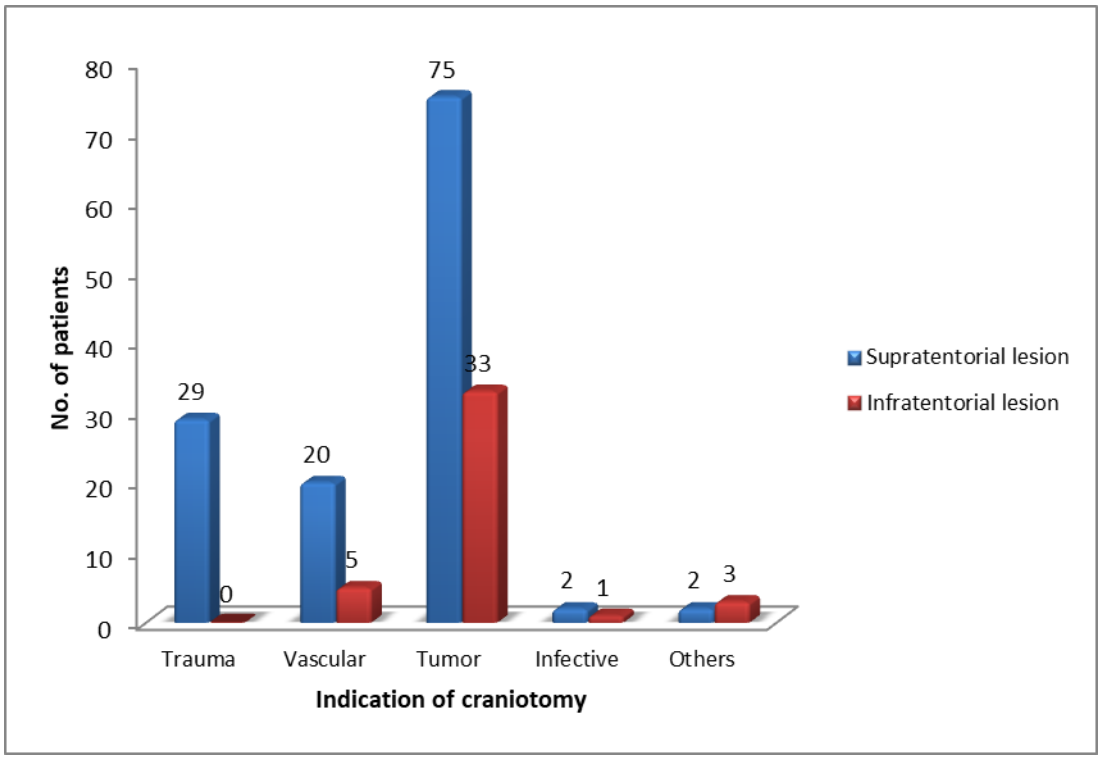


Chart 2: Indication of craniotomy

Table 4: Distribution of the study group according to modified Kuppuswamy 's scale (Socioeconomic status)

Modified Kuppuswamy scale	Frequency	Percent
Upper class	6	3.5
Upper middle class	25	14.7
Lower middle class	46	27.1
Upper lower class	75	44.1
Lower	18	10.6
Total	170	100

Table 5: Socioeconomic Data as per Kuppuswamy's scale

Socioeconomic scale		No. of patients	Percentage
Education of head of family	Illiterate	26	15.29
	Primary	25	14.71
	Middle	38	22.35
	High school	32	18.82
	Intermediate/ diploma	8	4.71
	Graduate	30	17.65
	Professional degree	11	6.47
Occupation of head of family	Unemployed	2	1.18
	Unskilled worker	34	20.00
	Semi skilled worker	22	12.94
	Skilled worker	37	21.76
	Clerical/Shop/Farm	49	28.82
	Semi professional	17	10.00
	Professional	9	5.29
Per capita income (per month)	≤1146	30	17.65
	1147-3404	60	35.29
	3405-5675	33	19.41
	5676-8512	17	10.00
	8513-11350	16	9.41
	11351-22702	9	5.29
	≥22703	5	2.94

Table 6: Distribution of patients in different domain of SAPS score

SAPS domain		No. of patients	Percentage
1	0	0	0.00
	1	7	4.12
	2	5	2.94
	3	43	25.29
	4	115	**67.65**
2	0	11	6.47
	1	4	2.35
	2	8	4.71
	3	47	27.65
	4	100	**58.82**
3	0	0	0.00
	1	7	4.12
	2	14	8.24
	3	54	31.76
	4	95	**55.88**
4	0	18	10.59
	1	4	2.35
	2	16	9.41
	3	49	28.82
	4	83	**48.82**
5	0	1	0.59
	1	4	2.35
	2	13	7.65
	3	40	23.53
	4	112	**65.88**
6	0	13	7.65
	1	21	12.35
	2	21	12.35
	3	55	32.35
	4	60	**35.29**
7	0	0	0.00
	1	5	2.94
	2	7	4.12
	3	37	21.76
	4	121	**71.18**

Table 7. Distribution of the study group according to level of satisfaction

Level of satisfaction	Frequency	Percent
Very dissatisfied	2	1.2
Dissatisfied	30	17.6
Satisfied	83	48.8
Very satisfied	55	32.4
Total	170	100

Table 8: Distribution of the study group according to level of satisfaction and socio-economic status

Level of satisfaction	Upper class n (%)	Upper middle n (%)	Lower middle n (%)	Upper lower n (%)	Lower n (%)
Very dissatisfied	0	0	1 (2.2)	1 (1.3)	0
Dissatisfied	0	4 (16.0)	8 (17.4)	12 (16.0)	6 (33.3)
Satisfied	3 (50.0)	8 (32.0)	24 (52.1)	41 (54.7)	7 (38.9)
Very satisfied	3 (50.0)	13 (52.0)	13 (28.3)	21 (28.0)	5 (27.8)
Total	6 (100)	25 (100)	46 (100)	75 (100)	18 (100)

χ^2 value = 11.504 df=12 p value=0.486, NS

Table 9: Level of satisfaction according to education of head of family in Modified kuppuswamy scale-

Education of head of family	Total No. of patients	Level of satisfaction							
		Very dissatisfied		Dissatisfied		Satisfied		Very satisfied	
		N	%	N	%	N	%	N	%
Illiterate	26	0	0.00	8	30.77	11	42.31	7	26.92
Primary	25	1	4.00	4	16.00	10	40.00	10	40.00
Middle	38	0	0.00	5	13.16	26	68.42	7	18.42
High school	32	1	3.13	8	25.00	15	46.88	8	25.00
Intermediate/ diploma	8	0	0.00	2	25.00	4	50.00	2	25.00
Graduate	30	0	0.00	2	6.67	11	36.67	17	56.67
Professional degree	11	0	0.00	1	9.09	6	54.55	4	36.36
Total	170	2	1.18	30	17.65	83	48.82	55	32.35

Chi square 24.59, P value 0.136

Table 10: Level of satisfaction according to occupation of head of family in Modified kuppuswamy scale

Occupation of head of family	Total No. of patients	Level of satisfaction							
		Very dissatisfied		Dissatisfied		Satisfied		Very satisfied	
		N	%	N	%	N	%	N	%
Unemployed	2	0	0.00	0	0.00	1	50.00	1	50.00
Unskilled worker	34	0	0.00	8	23.53	16	47.06	10	29.41
Semi skilled worker	22	0	0.00	6	27.27	12	54.55	4	18.18
Skilled worker	37	0	0.00	7	18.92	21	56.76	9	24.32
Clerical/Shop/Farm	49	2	4.08	8	16.33	21	42.86	18	36.73
Semi professional	17	0	0.00	1	5.88	8	47.06	8	47.06
Professional	9	0	0.00	0	0.00	4	44.44	5	55.56
Total	170	2	1.18	30	17.65	83	48.82	55	32.35

Chi square 16.47, P value 0.559

Table 11: Level of satisfaction according to Per capita income in Modified kuppuswamy scale

Per capita income (per month)	Total No. of patients	Level of satisfaction							
		Very dissatisfied		Dissatisfied		Satisfied		Very satisfied	
		N	%	N	%	N	%	N	%
≤1146	30	0	0.00	9	30.00	12	40.00	9	30.00
1147-3404	60	0	0.00	8	13.33	33	55.00	19	31.67
3405-5675	33	2	6.06	6	18.18	18	54.55	7	21.21
5676-8512	17	0	0.00	2	11.76	9	52.94	6	35.29
8513-11350	16	0	0.00	3	18.75	5	31.25	8	50.00
11351-22702	9	0	0.00	1	11.11	4	44.44	4	44.44
≥22703	5	0	0.00	1	20.00	2	40.00	2	40.00
Total	170	2	1.18	30	17.65	83	48.82	55	32.35

Chi square 17.87, P value 0.463

Table 12. Distribution of the study group according to Pre and post-operative ECOG performance score

Level of satisfaction	No. of patients	ECOG		Mean difference	t value	p value
		Pre op (Mean±SD)	Post op (Mean±SD)			
Very dissatisfied	2	4.00±0.00	5.00±0.00	1.000	-	-
Dissatisfied	30	2.83±1.41	3.36±1.69	-0.533	1.743	0.092
Satisfied	83	2.37±1.41	1.89±1.49	0.481	3.117	**0.002**
Very satisfied	55	1.94±1.16	1.43±1.15	0.509	2.835	**0.006**

Table 13: Level of satisfaction in relation to pre and post op ECOG score

Level of satisfaction	Total no. of patients	ECOG					
		No change		Decrease		Increase	
		N	%	N	%	N	%
Very dissatisfied	2	0	0.00	0	0	2	100.00
Dissatisfied	30	7	23.33	7	23.33	16	53.33
Satisfied	83	21	25.30	47	56.63	15	18.07
Very satisfied	55	15	27.27	32	58.18	8	14.55
Total	170	43	25.29	86	50.59	41	24.12

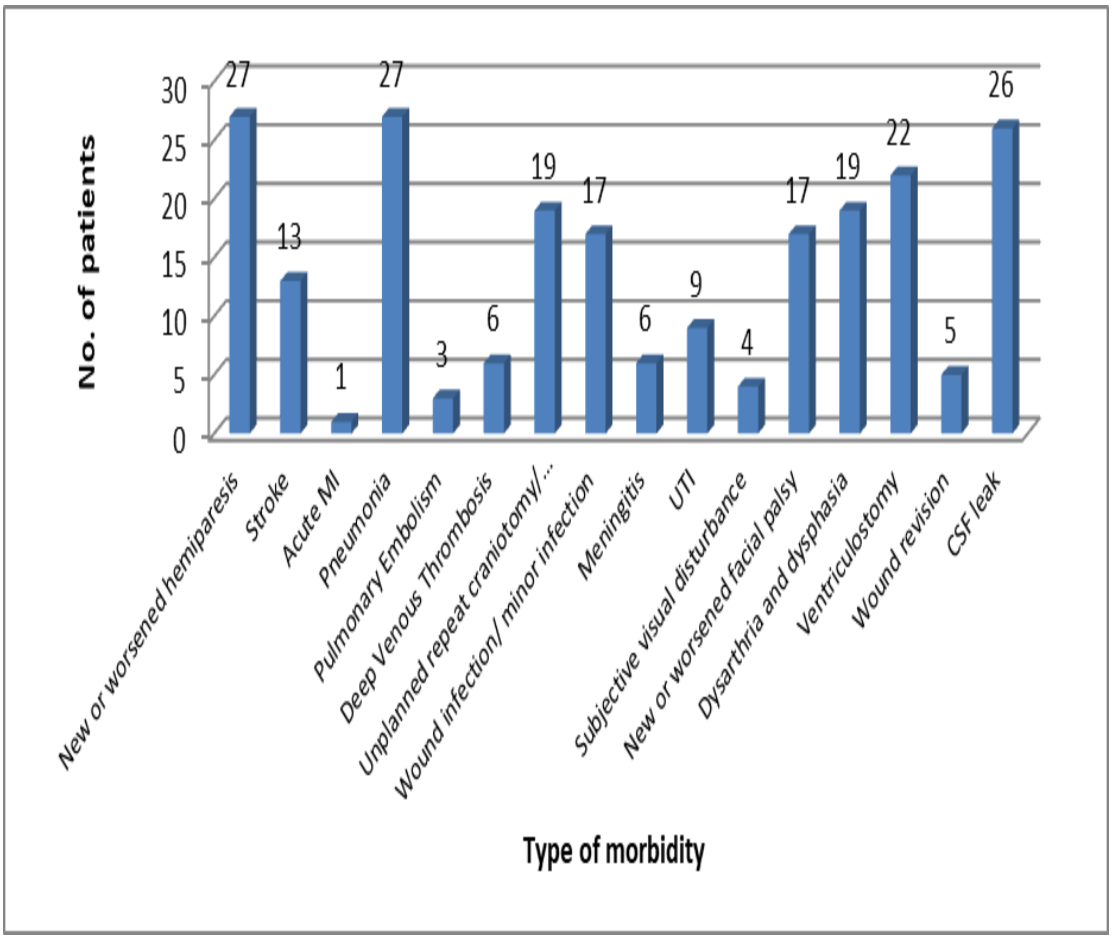
Chi square 26.01, P value 0.0002 (S)

Table 14: Level of satisfaction in relation to demographic data and post op morbidity

		Total No. of patients	Level of satisfaction								P value
			Very dissatisfied		Dissatisfied		Satisfied		Very satisfied		
			N	%	N	%	N	%	N	%	
Gender	Male	93	2	2.15	16	17.20	43	46.24	32	34.41	0.526
	Female	77	0	0.00	14	18.18	40	51.95	23	29.87	
Residence area	Rural	133	1	0.75	22	16.54	66	49.62	44	33.08	0.673
	Urban	37	1	2.70	8	21.62	17	45.95	11	29.73	
Education of patient	Educated	99	2	2.02	17	17.17	49	49.49	31	31.31	0.9
	Illiterate	62	0	0.00	11	17.74	29	46.77	22	35.48	
	Not applicable	9	0	0.00	2	22.22	5	55.56	2	22.22	
Post operative morbidity	Yes	97	2	2.06	25	25.77	48	49.48	22	22.68	**0.001***
	No	73	0	0.00	5	6.85	35	47.95	33	45.21	

Table 15: Distribution of the study group according to type of Post op morbidity

Type of morbidity	Frequency	Percent
New or worsened hemiparesis	27	15.88
Stroke	13	7.65
Acute MI	1	0.59
Pneumonia	27	15.88
Pulmonary Embolism	3	1.76
Deep Venous Thrombosis	6	3.53
Unplanned repeat craniotomy/ endovascular intervention	19	11.18
Wound infection/ minor infection	17	10.00
Meningitis	6	3.53
UTI	9	5.29
Subjective visual disturbance	4	2.35
New or worsened facial palsy	17	10.00
Dysarthria and dysphasia	19	11.18
Ventriculostomy	22	12.94
Wound revision	5	2.94
CSF leak	26	15.29
No morbidity	72	42.35


No. of patients
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New or worsened hemiparesis
Stroke
Acute MI
Pneumonia
Pulmonary Embolism
Deep Venous Thrombosis
Unplanned repeat craniotomy/...
Wound infection/ minor infection
Meningitis
UTI
Subjective visual disturbance
New or worsened facial palsy
Dysarthria and dysphasia
Ventriculostomy
Wound revision
CSF leak
Type of morbidity

DISCUSSION

The relationship between doctors and patients is increasingly under strain in recent times may be due to globalization of health care delivery services. The public awareness of medical negligence is also growing with the growing medical science. Much of this awareness is often obtained from inaccurate sources including internet and patient education content often mistaken as standards of patient care. The misleading information often leads to patient grievances and assault.[1]

In neurosurgery each case is different, with different levels of complexity, comorbidities, and expected outcomes based on the stages of disease and diversity of pathologies. It involves technically challenging and delicate surgeries and completely different pre and post-operative patient management. The patient satisfaction towards any surgery often depends on the patient characteristic including socio economic and cultural factors.[8, 9] The patients from high income countries tends to have high advanced neurosurgical care and have high literacy rates and lower utilization of alternative medicine and have good attitude and satisfaction towards neurosurgery. [10, 11] In India we have plenty of work to do to fix many of the serious issues in health care. We are a long way from achieving universal access to safe, affordable, high-quality, and well-coordinated, health care. Focusing more attention to patient satisfaction is actually disaster for patients because it will get in the way of doctor and health care nurses attending to serious life and-death issues. No one will want to deliver bad news, perform painful but medically indicated treatments, or challenge patient's demands for inappropriate treatments to boost their satisfaction scores. In the end, patients will suffer from attempts to make them happier.

Monitoring of quality of health care and patient satisfaction is difficult in cranial surgery. The assumption made is that health care quality can by presumed by tracking patient satisfaction. There is a shortage of studies looking at this assumption in cranial neurosurgery.

In order to accomplish the study objectives, a hospital based cross sectional study was undertaken in the Department Of Neurosurgery AIIMS, Jodhpur. A total 170 cases were included in the study for level of satisfaction in patients undergoing cranial surgery. The pre-operative details were obtained from all the patients and the

details regarding socioeconomic status of the family using Modified Kuppuswamy Scale and patient's ECOG (Eastern Cooperative Oncology Group) performance score at admission which represents status of current quality of life.

The calculated sample size for this study was 129. A total of 194 patients were assessed for the eligibility of which 170 patients satisfying the selection criteria were included in to the study.

Demographic and clinical characteristics

This study has shown that, about 23% of the patients who underwent cranial surgery belonged to 41 – 50 years of age group. The mean age was 40.61 years. In a neurosurgery outpatient-based study by Jalal et al, the mean age of the respondents was 26.48 years and highest proportion of the men and women were between 21 – 25 years of age group.[14] In a study of patient satisfaction with the general Surgery department, most of the cases belonged to 41 – 60 years age group similar to the results of this study.[75] In a study by Khan et al, the median age group in the neurosurgery department was 51 - 65 years.[76]

Males outnumbered females in this study (M:F 1.2:1). Majority of cases were from rural background and more than half of the patients were literate. In a study by Jalal et al, almost three forth of the outpatients were males.[14] whereas in study by Almehman et al, majority of the cases were females.[75] In a study by Khan et al males outnumbered females both in pre-intervention and post intervention studies.[76]

About 18.2% of the cases in this study had pre-existing comorbidity including diabetes mellitus, hypothyroidism and tuberculosis. No similar study reported these findings.

The most common indication of the cranial surgery was intracranial neoplasm in both supratentorial as well as infratentorial compartment followed by traumatic head injury. Similar studies were not available to compare the findings.

Socio economic data

Majority of the patients in this study belonged to upper middle class of modified Kuppuswamy classification. About half of the patents had skilled work as means of occupation. More than half of the families had per capita income of $\leq$ 3404

rupees per month. In a study by Jalal et al, almost 83.5% of the cases had monthly family income of less than 50,000.[14]

SAPS and ECOG score-

Mean pre-op ECOG score was 2.34 and post op ECOG was 2.04.

Mean SAPS score of study population was 23.17.

On analysis of 7 different SAPS questionnaire component, 32.4 % patient/ caregiver think that time they had with doctor or health care worker was too short, 22.4% not satisfied with choices they had in decisions affecting their health care and 14.3% not satisfied with explanation given about results of treatment and care.

Most "patient satisfaction scores" are based on Consumer Assessment of Healthcare Providers and Systems surveys are too long and questions focus on superficial things and don't address the important aspects of the doctor–patient relationship. None of these survey questions ask whether the surgeon's technique was expert or whether the right medication was prescribed. Instead, there are questions, such as: "Did doctor/ health care worker listen carefully to you?" "Did this doctor/ health care worker explain things in a way that was easy to understand?" and "Did this doctor/ health care worker show respect for what you had to say?" Patients can certainly judge these aspects of care.

Level of satisfaction, socioeconomic status and ECOG score

The current study has shown that, about 48.8% of the patients or caretakers were satisfied and 32.4% were very satisfied. The satisfaction was better in upper class of socioeconomic status than lower class but not statistically significant. In outpatient-based study by Jalal et al, about 43.9% of the patients had good satisfaction and 27.3% had very good satisfaction.[14] Another study by Vural et al also noted that, major proportion of the patients were very much satisfied with the health care services of the hospital.[67] In a study by Almehman in a general surgery department, about 47.9% of the cases were satisfied and 45.9% were very satisfied with the surgery.[75] The patients from high income countries tend to have high advanced neurosurgical care and have high literacy rates and lower utilization of alternative medicine and have good attitude and satisfaction towards neurosurgery. [10, 11]

The patient belonging to family heads with higher education, professional/ semi-professional occupation and ≥ 11351 rupees per month per capita income were more satisfied than others. Incidentally, the patients who were dissatisfied with the neurosurgery majority belonged to lower socio-economic status.[14]

The study shows mean pre – op ECOG score of 2.37 and post ECOG score of 1.89 in satisfied cases which was statistically significant. The patients in this study had demonstrated decrease in ECOG score indicating improvement in functional outcome. This study has shown that, ECOG scores increased in post op period due to post op morbidity in the dissatisfied group. The higher ECOG score at the time of discharge was found statistically significantly associated with dissatisfaction. The lack of improvement in a patient's functional status despite the surgery had a negative effect on overall patient satisfaction.

In our study higher proportion of high grade tumour and acute trauma cases may have played a role in both decreasing functional outcome (ECOG score) and lowering the patient satisfaction rating.

A study by Reponen et al, showed completely opposite result that even 9 of 10 patients with post-operative major morbidity rated high overall patient satisfaction at 30 days[67].

Level of satisfaction and demographic data

This study has shown higher satisfaction in female, married, rural residence and who were educated, but no statistical significance found. In a study by Jalal et al, the patients with male cases and with primary education had good level of satisfaction.[14] In a study by Almehman et al, there was no significant difference in level of satisfaction with respect to gender, age and level of education.[75]

Level of satisfaction and Post Op morbidity

About 53.7% of the cases had post-operative morbidity including new or worsened weakness, pneumonia and CSF leak (including pseudomeningocele formation). The post-operative morbidity decreases the ECOG score, SAPS score and patient satisfaction. A study by Reponen et al, shown nearly similar overall post-operative morbidity of 44.1 % in advanced tertiary center at Helsinki, Finland.[67] I In

our study higher proportion of high grade tumour and acute trauma cases may have played a role in post op morbidity because these patients needs prolong intensive care.

If the patient is satisfied at discharge, there must have been a good outcome provided by a professional practitioner. If this is true, patients with a poor surgical outcome should reliably report being dissatisfied, and patients with a good surgical outcome should almost uniformly report their satisfaction with the surgery but in our study 70 % patients even with post morbidity were satisfied in which indicates complex nature of factors contributing to patient satisfaction. Due to our study design, it was beyond the scope of this study to address these factors.

Mean length of hospital stay in our study was 12.93 days and Readmission rate within 30 days was 27.6 %. A study by Wilson MP et all shown 19.4% were readmitted to the hospital within 30 days of discharge[76]. In literature 30 days readmission rate in neurosurgery varies between 6.9% -11.8%.

After all, hospitals are not restaurant, and doctors are not filmy characters, so health care should not be rated like a restaurant or a plumber. Doctors are professionals, not "service providers." Patients come to a doctor for a reason—doctors know things they do not—so how can it possibly make sense to turn around and ask them whether the doctor got it right?

The essence of medical professionalism is acting in the best interest of the patient. Doctors have always done so, even when faced with potential financial and lifestyle advantages of serving themselves. The unacknowledged truth is that providing a better satisfaction for patients and families—by being more attentive to their physical and emotional needs; treating them with respect, dignity and empathy; and engaging them as trusted partners in their own care—is real medicine. Considerable evidence demonstrates that patients who enjoy trusting therapeutic relationships with their caregivers that are built on good communication, respect, and empathy heal better and faster.

Strength and limitation of our Study:

The strengths of the study include its prospective design, unselected consecutive cohort, and outcome measures tailored for cranial neurosurgery. The major limitation of this study is that for identifying significant associations between low overall patient satisfaction rates and specific complications, the cohort size is still too small. However, because a vast majority of all patients and patients with major morbidities reported high overall satisfaction, the cohort size may be somewhat irrelevant with regard to the conclusions drawn.

CONCLUSION

In neurosurgery each case is different, with varying degree of complexity, comorbidities, and expected outcomes based on the stages of disease and diversity of pathologies. Monitoring of quality of health care and patient satisfaction is difficult in cranial surgery. Proper monitoring of health care quality and patient's satisfaction presents the need for long-term follow-up, as some operative decisions, such as subtotal tumor resection, may work out well for patient in short term, but may cause serious problems in long term.

This study was undertaken as an effort to study the patient satisfaction in relation to functional outcome (ECOG score) and socioeconomic status (Modified Kuppuswamy Scale). This study has shown that, overall patient satisfaction with elective cranial neurosurgery is high (81.2 %). The satisfaction was also evident with the improvement in post op ECOG score (functional outcome) but no statistical significant relation with socioeconomic status. The mixture of demographic variables influences the patient satisfaction as evident in this study.

What we found was that complex natures of factors contribute to patient satisfaction. What now? Should we ignore patient satisfaction surveys? In our opinion, the answer is No. Patient satisfaction surveys should be used for what they are, just focusing on patient satisfaction may actually be a disaster for patients because it will get in the way of doctors and health care nurses who deal with serious life and-death issues .We all want our patients to be satisfied (much more importantly, we want them to be safe), and satisfaction surveys may point out common problems like patient long operative waiting times and insufficient communication in our practice that may dissatisfy patients. We should never lose sight of our (and our patient's) real goal, the best possible functional and long-term outcome. We can better track patient satisfaction by tracking our actual risk-adjusted surgical outcome. Since the studies are scant in this area a greater number of studies can be undertaken in order explore more in this direction.

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INSTITUTE ETHICS COMMITTEE (IEC) APPROVAL

अखिल भारतीय आयुर्विज्ञान संस्थान, जोधपुर
All India Institute of Medical Sciences, Jodhpur
संस्थागत नैतिकता समिति
Institutional Ethics Committee

No. AIIMS/IEC/2020/2115 **Date: 01/01/2020**

ETHICAL CLEARANCE CERTIFICATE

Certificate Reference Number: **AIIMS/IEC/2019-20/**1034

Project title: **"ECOG performance score and socioeconomic status affecting patient satisfaction in patients undergoing cranial surgery- An observational study"**

Nature of Project:	**Research Project**
Submitted as:	**M.Ch. Dissertation**
Student Name:	**Dr.Nitin Kumar**
Guide:	**Dr.Mayank Garg**
Co-Guide:	**Dr.Suryanarayanan Bhaskar, Dr. Jaskaran Singh Gosal, Dr. Deepak Kumar Jha & Dr. Pankaj Bhardwaj**

This is to inform that members of Institutional Ethics Committee (Annexure attached) met on **17-01-2020** and after through consideration accorded its approval on above project. Further, should any other methodology be used, would require separate authorization.

The investigator may therefore commence the research from the date of this certificate, using the reference number indicated above.

Please note that the AIIMS IEC must be informed immediately of:

- Any material change in the conditions or undertakings mentioned in the document.
- Any material breaches of ethical undertakings or events that impact upon the ethical conduct of the research.

The Principal Investigator must report to the AIIMS IEC in the prescribed format, where applicable, bi-annually, and at the end of the project, in respect of ethical compliance.

AIIMS IEC retains the right to withdraw or amend this if:

- Any unethical principle or practices are revealed or suspected
- Relevant information has been withheld or misrepresented

AIIMS IEC shall have an access to any information or data at any time during the course or after completion of the project.

On behalf of Ethics Committee, I wish you success in your research.

Dr. Praveen Sharma
Member secretary
Institutional Ethics Committee
AIIMS,Jodhpur

Enclose:
1. Annexure 1

Page 1 of 2

Basni Phase-2, Jodhpur, Rajasthan-342005, **Website:** www.aiimsjodhpur.edu.in, **Phone:** 0291-2740741 Extn. 3109
Email: ethicscommittee@aiimsjodhpur.edu.in

Annexure 1

Institutional Ethics Committee
All India Institution of Medical Sciences, Jodhpur

Meeting of Institutional Ethics committee held on **17-01-2020 at 10:00** AM at Committee Room, Admin Block AIIMS Jodhpur.

Following members were participated in the meeting:-

S/No.	Name of Member	Qualification	Role/Designation in Ethics Committee
1.	Dr. F.S.K Barar	MBBS, MD (Pharmacology)	**Chairman**
2.	Justice N.N Mathur	LLB	Legal Expert
3.	Dr. Varsha Sharma	M.A (Sociology)	Social Scientist
4.	Mr. B.S.Yadav	B.Sc., M.Sc. (Physics), B.Ed.	Lay Person
5.	Dr. K.R.Haldiya	MD (General Medicine)	Clinician
6.	Dr. Arvind Mathur	MBBS, MS (General Medicine)	Clinician
7.	Dr. Sneha Ambwani	MBBS, MD (Pharmacology)	Basic Medical Scientist
8.	Dr. Kuldeep Singh	MBBS, MD (Paediatric), DM (General Medicine)	Clinician
9.	Dr. Abhinav Dixit	MBBS, MD (Physiology), DNB (Physiology)	Basic Medical Scientist
10.	Dr. Pradeep Kumar Bhatia	MBBS, MD (Anaesthesiology)	Clinician
11.	Dr. Tanuj Kanchan	MBBS, MD (Forensic Medicine)	Basic Medical Scientist
12.	Dr. Pankaj Bhardwaj	MBBS, MD (CM&FM)	Clinician
13.	Dr. Praveen Sharma	M.Sc., Ph.D. (Biochemistry)	Member Secretary

Dr. Praveen Sharma
Member Secretary
Institutional Ethics Committee
AIIMS,Jodhpur

ANNEXURE-2

DATA COLLECTION SHEET

Patient name:

Age- <18, 18-30, 31-40, 41-50, 51-60, 61-70,71-80, >80

Sex- Male/ Female

Patient registration number-- AIIMS/JDH/----/--/------

Married:

Address:

Mobile number:

Area of residence- Rural/ Urban

Educational Status- Illiterate, till 5^{th} standard, till $VIII^{th}$ standard, Matric,

Higher secondary, Graduation, Post-Graduation

Employment status-

Pre-existing co-morbidity: (a) DM - (b) Hypertension - (c) tuberculosis – (d) Others

Any Previous surgery:

Presenting complain-

Indication of surgery- Supratentorial lesion

Infratentorial lesion

Radiological diagnosis—

Clinical diagnosis---

Frozen section- Biopsy (final diagnosis)---

MODIFIED KUPPUSWAMY SCALE

Education of head of family	Score	Occupation of head of family	Score
Professional degree	7	Professional	10
Graduate	6	Semi profession	6
Intermediate/diploma	5	Clerical/shop/farm	5
High school	4	Skilled worker	4
Middle school	3	Semiskilled worker	3
Primary school	2	Unskilled worker	2
Illiterate	1	Unemployed	1

Total score	Socioeconomic class
26–29	Upper class
16–25	Upper middle
11–15	Lower middle
5–10	Upper lower
Below 5	Lower

Current total per capita income per month according to Current Price Index of India in October 2019.

S. No.	Total income	Score
1	22703 and above	12
2	11351-22702	10
3	8513-11350	6
4	5676-8512	4
5	3405-5675	3
6	1147-3404	2
7	1146 and above	1

ECOG PERFORMANCE STATUS*	
Grade	**ECOG**
0	Fully active, able to carry on all pre-disease performance without restriction
1	Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature, e.g., light house work, office work
2	Ambulatory and capable of all selfcare but unable to carry out any work activities. Up and about more than 50% of waking hours
3	Capable of only limited selfcare, confined to bed or chair more than 50% of waking hours
4	Completely disabled. Cannot carry on any selfcare. Totally confined to bed or chair
5	Dead

Pre-op ECOG performance status---

Post -op ECOG performance status---

Length of hospital stays- DOA--

DOD—

Readmission in 30 days of discharge- YES/ NO

If yes- reason-

Patient satisfaction-

(SAPS- short assessment of patient satisfaction questioner)

English:

Instructions: After reading each question, circle the answer that best describes you. The order of the answers varies between the questions, so take a moment to read each question carefully. We know that sometimes answers may not describe you exactly, so please pick the answer that most closely describes you. When you have finished, please check that you have answered all questions.

1.	How satisfied are you with the effect of your {treatment/care}?	Very satisfied
		Satisfied
		Neither satisfied nor dissatisfied
		Dissatisfied
		Very dissatisfied
2.	How satisfied are you with the explanations the {doctor/other health professional} has given you about the results of your {treatment/care}?	Very satisfied
		Satisfied
		Neither satisfied nor dissatisfied
		Dissatisfied
		Very dissatisfied
3.	The {doctor/other health professional} was very careful to check everything when examining you.	Strongly agree
		Agree
		Not sure
		Disagree
		Strongly disagree
4.	How satisfied were you with the choices you had in decisions affecting your health care?	Very satisfied
		Satisfied
		Neither satisfied nor dissatisfied
		Dissatisfied
		Very dissatisfied
5.	How much of the time did you feel respected by the {doctor/other health professional}?	All of the time
		Most of the time
		About half the time
		Some of the time
		None of the time
6.	The time you had with the {doctor/other health professional} was too short.	Strongly agree
		Agree
		Not sure
		Disagree
		Strongly disagree
7.	Are you satisfied with the care you received in the {hospital/clinic}?	Very satisfied
		Satisfied
		Neither satisfied nor dissatisfied
		Dissatisfied
		Very dissatisfied

रोगी की संतुष्टि- (SAPS- रोगी संतुष्टि प्रश्नकर्ता का संक्षिप्त मूल्यांकन)

1.	अपने {उपचार / देखभाल} के प्रभाव से आप कितने संतुष्ट हैं?	बहुत संतुष्ट
		संतुष्ट
		न संतुष्ट न असंतुष्ट
		असंतुष्ट
		बहुत असंतुष्ट
2.	आप कितना संतुष्ट हैं की स्पष्टीकरण के साथ {डॉक्टर / स्वास्थ्यकर्मी} ने आपको अपने उपचार / देखभाल के परिणामों से सम्बंधित जानकारी के बारे में बताया है?	बहुत असंतुष्ट
		असंतुष्ट
		न संतुष्ट न असंतुष्ट
		संतुष्ट
		बहुत संतुष्ट
3.	आप कितना सहमत हैं की डॉक्टर / स्वास्थ्यकर्मी ,आपकी जांच करते समय सब कुछ जांचने के लिए बहुत सावधान थे।	दृढ़तापूर्वक सहमत
		सहमत
		निश्चित नहीं
		असहमत
		दृढ़तापूर्वक असहमत
4.	आपकी स्वास्थ्य देखभाल को प्रभावित करने वाले निर्णयों में आपके द्वारा दिए गए विकल्पों से आप कितने संतुष्ट थे?	बहुत असंतुष्ट
		असंतुष्ट
		न संतुष्ट न असंतुष्ट
		संतुष्ट
		बहुत संतुष्ट
5.	डॉक्टर / स्वास्थ्यकर्मी द्वारा आपको कितना समय सम्मानित महसूस हुआ?	हमेशा
		लगभग हमेशा
		लगभग आधा समय
		कुछ समय
		कभी भी नहीं
6.	आप कितना सहमत हैं की डॉक्टर / स्वास्थ्यकर्मी ने आपको बहुत कम समय दिया था।	दृढ़तापूर्वक सहमत
		सहमत
		निश्चित नहीं
		असहमत
		दृढ़तापूर्वक असहमत
7.	क्या आप अस्पताल / क्लिनिक में प्राप्त देखभाल से संतुष्ट हैं?	बहुत संतुष्ट
		संतुष्ट
		न संतुष्ट न असंतुष्ट
		असंतुष्ट
		बहुत असंतुष्ट

Scoring

1. Reverse the scores for items #1, #3, #5, #7
2. Sum all scores. The score range is from 0 (extremely dissatisfied) to 28 (extremely satisfied)

Interpreting Scores -The literature on patient satisfaction shows that between 70-90% of patients are satisfied with their health care. This should be kept in mind when interpreting SAPS scores. In general, SAPS scores can be interpreted as follows:

- 0 to 10 = Very dissatisfied. To obtain a score in this range, a person must have indicated that they are dissatisfied or very dissatisfied on four or more items. Any patient obtaining scores in this range is indicating that their health care has failed them badly and that they are in need of urgent help.
- 11 to 18 = Dissatisfied. To obtain a score in this range, a person must have indicated that they are dissatisfied or very dissatisfied on at least two items (i.e. two aspects of their health care), or that they have refused to endorse being very satisfied on any item. Patients obtaining scores in this range are indicating health care failure in several areas of their health care and are in need of help in these areas.
- 19 to 26 = Satisfied. To obtain a score in this range, a person must have indicated that they are very satisfied or satisfied on over half SAPS items (4/7). These patients should be asked about those areas of health care they found unsatisfactory and efforts made to improve such areas.
- 27 to 28 = Very satisfied. To obtain a score in this range, a person must have indicated they are very satisfied or satisfied on all seven SAPS items. These patients are indicating that all aspects of their health care have met or exceeded their expectations. In a recent study (Sansoni et al., 2011) the average score for all patients receiving incontinence treatment (N = 139) was 21.96 (SD 4.85); for females it was 21.75 and for males it was 23.09

CONSENT FORMS

All India Institute of Medical Sciences, Jodhpur, Rajasthan

Title of Thesis/Dissertation: ECOG Performance Score and Socioeconomic Status Affecting Patient Satisfaction in Patients Undergoing Cranial Surgery – An Observational Study

Name of investigating Student : Dr. Nitin Kumar Ph.no. 6378992424

Patient/ Volunteer Identification No. : _____

I, _____ S/o or D/o _____R/o _____

Give my full, free, voluntary consent to be a part of the study: "Correlation of Patient Satisfaction with ECOG Performance Score and Socioeconomic Status in Patient Undergoing Cranial Surgeries", the procedure and nature of which has been explained to me in my own language to my full satisfaction. I confirm that I have had the opportunity to ask questions. I understand that my participation is voluntary and I am aware of my right to opt out of the study at any time without giving any reason. I understand that the information collected about me and any of my medical records may be looked at by responsible individual from _____(Company Name) or from regulatory authorities. I give permission for these individuals to have access to my records.

Date: _____ _____

Place: _____ Signature/Left thumb impression

This to certify that the above consent has been obtained in my presence.

Date: _____ _____

Place: _____ Signature of PG Student

Witness 1	Witness 2
_____	_____
Signature	Signature
Name: _____	Name: _____
Address: _____	Address: _____

INFORMED CONSENT (IN HINDI)

परियोजना का शीर्षक : ईसीओजी के प्रदर्शन स्कोर और सामाजिक स्थिति के साथ क्रेनियल सर्जरी में से गुजरने वाले रोगी की संतुष्टि सहसंबंध

प्रधान अन्वेषक का नाम : डॉ . नितिनकुमार दूरभाष नंबर :6378992424
Patient/ Volunteer Identification No. :_____

मैं_____ ओ / डी या ओ / एस _____ ,
आर _____ ओ /
अध्ययन का एक हिस्सा बनने के लिए मेरी पूर्ण, स्वतंत्र, स्वैच्छिक सहमति दें "ईसीओजी के प्रदर्शन स्कोर और सामाजिक स्थिति के साथ क्रेनियल सर्जरी में से गुजरने वाले रोगी की संतुष्टि सहसंबंध", जिस प्रक्रिया और प्रकृति को मुझे अपनी पूरी संतुष्टि के लिए अपनी भाषा में समझाया गया है। मैं पुष्टि करता हूं कि मुझे प्रश्न पूछने का अवसर मिला है।मैं समझता हूं कि मेरी भागीदारी स्वैच्छिक है और मुझे किसी भी कारण दिए बिना किसी भी समय अध्ययन से बाहर निकलने का मेरा अधिकार है। मैं समझता हूं कि मेरे और मेरे मेडिकल रिकॉर्ड के बारे में एकत्रित की गई जानकारी को _____ (कंपनी नाम) या विनियामक प्राधिकरणों से जिम्मेदार व्यक्ति द्वारा देखा जा सकता है। मैं इन लोगों के लिए मेरे रिकॉर्डों तक पहुंच की अनुमति देता हूं।

तारीख : _____

जगह: _____ _____
हस्ताक्षर / बाएं अंगूठे का छाप

यह प्रमाणित करने के लिए कि मेरी उपस्थिति में उपरोक्त सहमति प्राप्त की गई है
तारीख : _____

जगह: _____ _____
पीजी छात्र के हस्ताक्षर

गवाह 1

_____
हस्ताक्षर
नाम: _____
पता: _____

गवाह 2

_____
हस्ताक्षर
नाम : _____
पता : _____

PATIENT INFORMATION SHEET

Name of the patient: **Patient ID.:**

Aim of the study: ECOG Performance Score and Socioeconomic Status Affecting Patient Satisfaction in Patients Undergoing Cranial Surgery - An Observational Study.

Study site: Inpatient services of Department of Neurosurgery- All India Institute of Medical Sciences Jodhpur, Rajasthan.

Study procedure: first written consent of individual participating in study will be taken followed by data collection (demographic profile complete history, examination and investigation) will be done relevant to our study.

Likely benefit: It will help in the overall quality improvement in health care delivery system and patient doctor relationship. The factors highlighted in the study can be improved upon in future practice

Confidentiality: All the data collected from each study participant will be kept highly confidential.

Risk: Enrollment in above study poses no substantial risk to any of the study participant and if any point of time participant wants to withdraw himself/ herself, he/ she can do so voluntarily at any point of time during the study.

For further information / questions, the following personnel can be contacted:

Dr. Nitin Kumar, Senior Resident, Department of Neurosurgery, All India Institute of

Medical Sciences, Jodhpur, Rajasthan. Ph: 6378992424

अखिल भारतीय चिकित्सा विज्ञान संस्थान जोधपुर, राजस्थान

भाग लेने वालों के लिए सूचना पत्र (पीआईएस)

रोगी का नाम: रोगी आईडी:

अध्ययनकाउद्देश्य: ईसीओजी के प्रदर्शन स्कोर और सामाजिक स्थिति के साथ क्रेनियल सर्जरी में से गुजरने वाले रोगी की संतुष्टि सहसंबंध

अध्ययन स्थल: न्यूरो सर्जरी विभाग की अखिल भारतीय सेवाएँ- अखिल भारतीय आयुर्विज्ञान संस्थान जोधपुर, राजस्थान।

अध्ययन प्रक्रिया: अध्ययन में भाग लेने वाले व्यक्ति की पहली लिखित सहमति के बाद डेटा संग्रह (जनसांख्यिकीय प्रोफ़ाइल पूरा इतिहास, परीक्षा और जांच) लिया जाएगा जो हमारे अध्ययन के लिए प्रासंगिक होगा।

संभावित लाभ: यह स्वास्थ्य देखभाल वितरण प्रणाली और रोगी चिकित्सक संबंधों में समग्र गुणवत्ता सुधार में मदद करेगा। अध्ययन में प्रकाश डाला गया कारकों को भविष्य के अभ्यास में सुधार किया जा सकताहै

गोपनीयता: प्रत्येक अध्ययन प्रतिभागी से एकत्र किए गए सभी डेटा को अत्यधिक गोपनीय रखा जाएगा।

जोखिम: उपरोक्त अध्ययन में नामांकन से अध्ययन के किसी भी प्रतिभागी को कोई भारी जोखिम नहीं होता है और यदि किसी भी समय प्रतिभागी स्वयं / खुद को वापस लेना चाहता है, तो वह अध्ययन के दौरान किसी भी समय स्वेच्छा से ऐसा कर सकता है। अधिक जानकारी / प्रश्नों के लिए, निम्नलिखित कर्मियों से संपर्क किया जा सकताहै:

डॉ. नितिनकुमार, वरिष्ठ निवासी, न्यूरोसर्जरी विभाग,

अखिल भारतीय संस्थान चिकित्सा विज्ञान, जोधपुर, राजस्थान।

Ph: 6378992424