Original Article

Prevalence & risk factors in delirium: A tertiary care hospital based study

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Abstract : *This is a prospective hospital based cross-sectional study to look at the prevalence, risk factors, referral pattern ,validation of DRS-98 for delirium in local population in tertiary care hospital . Referred patien from various clinical departments were included and their sociodemographic data, risk factors and referral patterns were noted. Validation of DRS-R-98 was done using ROC analysis .Linear regression analysis was used to study the individual strength of prediction among risk factors. The average mean age was 44.04 (SD= 19.296) years. Prevalence of delirium was 24.2 % and mean age of patient was 44.09 Cut off for severity score of DRS-R-98 was 9.8 (sensitivity=0.89; specificity=0.86) and for total score was 12.5 (sensitivity=0.92; specificity=0.85) . Majority of referred cases (58.3%) were from medicine indoor and from surgery ward (19.4%). 27.7% delirium cases were referred for abnormal excited behavior and 27.7% for altered sensorium. Causative factors present were infections (22.2%), trauma (25%), ingestion of toxic or poisonous substances (11.1%) and metabotic / endocr abnormality (13.8%). The physicians suspected and referred delirious subjects much more and earlier than surgeons .The referral pattern (source) and reaso of referral and the medico surgical diagnoses were similar to other studies.*

Keywords*: Delirium, Prevalence, Risk factors, Rating Scale, Validation*

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INTRODUCTION

Delirium is an organic brain syndrome and is defined by the acute onset of fluctuating cognitive impairment and a disturbance of consciousness along with inability to concentrate (disorientation), thought &language defects, recent memory deficits, hypo-or hyperactivity, diurnal variation and abrupt onset of symptoms and mood changes.[1] The earliest known references to delirium in medical literature are found in the writings of Hippocrates 2,400 years ago, who described a case of delirium. The word delirium was first used in the formal medical context by Celsus in the first century AD.[2]

The confusion surrounding the use and definition of the term delirium is further compounded by the existence of clinical subtypes referred to as the hyperactive, hypoactive, and mixed states of psychomotor activity. Misconceptions regarding all of these terms are a significant concern as they may result in a failure to correctly diagnose and manage the delirious patient. Estimates of this misdiagnosis have been between 40-60% depending on the setting studied. [2]

Western research has reported a prevalence rate of 10-30 % in general medical setting [3,4] 16 - 74% in the ICU (medical & surgical**),** 16-34% in cardiac surgery inpatients, 33% of orthopedic surgery patients, 7-10% of Emergency department, 23-28% of terminally ill cancer patients and 44% of elderly institutionalized

patients. The 3 months mortality rate of patients with delirium is 23-33% and 1year mortality rate is as high as 50%.[2]

Among Indian studies, Chaudhury et al [5] reported an incidence of 4.3% in a 1 year prospective study of post-cataractomy patients. 27% cases of delirium were above 65 years in medicine ward.[6] Sood et al reported delirium in 3% of 528 inpatients aged more than 65 years.[7] Grover et al [8] reported referred cases diagnosed as delirium varied from 30.77%-38.95% of the cases, giving an annual prevalence rate of Delirium in inpatients ranging from 0.28% to 53%.

Various studies have identified various risk factors associated with delirium.[2,3,9] Predisposing factors for delirium are vision impairment, cognitive impairment, medical illness, age more than 70 years, use of iatrogenic agents. Present medical/ surgical/psychiatric/ any other illness (nature, severity), use of physical restraints, malnutrition, more than 3 medications added, hypertension, COPD, alcohol abuse, smoking, past history of delirium, preoperative use of benzodiazepines, narcotic analgesics, epidural anesthesia and abnormal electrolytes etc. [2]

DSM IV-TR [1] provides an unambiguous definition, which could be considered "gold standard" for diagnosing delirium but they do not provide assessment of symptom severity .For that several diagnostic instruments have been validated. To name a few are Delirium Rating Scale (DRS),[10] Delirium Rating Scale Revised version - 98 (DRS-R-98), [11] Confusion Assessment Method (CAM),[12] Mini Mental State Exam (MMSE).[13]The DRS-R-98 is a widely used delirium rating instrument that specifically ,sensitively and reliably measures delirium symptoms as rated by the psychiatrist.

If delirium is picked up early, many unintended deaths can be prevented. In India, a search of the literature on delirium by the investigators on EBSCO, MD –consult, Medline and Pub Med yielded very few results regarding the prevalence and risk factors and referral pattern in tertiary hospital patients to the psychiatrists and so this study was planned with following aims & obejectives.

1) Prevalence and severity of delirium in the referred population in a tertiary care hospital.
2) Identification of the factors in the referral patterns which would lead to early diagnosis of Delirium
3) Validation of DRS-R-98 in the local hospital based population in a tertiary care hospital.
4) Early identification of the risk factors for delirium.

MATERIAL AND METHODS

All the patients referred to the Psychiatry Department for any behavioral abnormality from other specialties like medicine, surgery, orthopedics, gynecology etc of age 18 years and above were included in the study.

Terminally ill patients and patients who were uncooperative in filling the forms were excluded.

Instruments:

a) Semi structured Performa to record sociodemographic details of the subjects , presenting complaints, duration of admission, list of risk factors, referral patterns
b) DSM IV- TR criteria for Delirium
c) DRS-R-98 Score sheet.[11] DRS-R-98 scale is an already established valid and reliable tool for severity assessment of delirium. It is a 16 item observational clinician rated scale with two sections and a score sheet. The 13 item severity section can be scored separately from the 3-item diagnostic section. The Severity items cover language and thought processes, two items on motoric presentation and five items concerning cognition. Severity items are rated from 0 to 3 points and a diagnostic item from 0 to either 2 or 3. At times an intermediate rating with a 0.5 point interval may be needed if the rater cannot decide between two choices.

Whenever an item of the DRS-R-98 could not be rated, which usually dependents upon the degree of cooperation, it was so noted and later scored midway, that is, as 1.5 points. The maximum total scale score of 46 points and a maximum severity score of 39 points.

The study was approved by the Medical Ethics Committee of our institution. The total duration of the study was of one-year and the sample size of 149 tertiary care hospital participants. The written informed consent of patients or proxy consent was obtained from the close relative if patient was unable to do so, both in English as well Gujarati.

DRS-R-98 rating was done by the psychiatrist who was blind to diagnosis and trained to use this instrument. The rating made use of information from all available sources, including discussions with caregivers or visitors to obtain information, as well as limited chart review under supervision of the research assistant to maintain blindness to diagnosis. Delirium scale ratings covered a 24hr period. A psychiatric diagnosis according to DSM-IV criteria, based on all available clinical information was made by consulting psychiatrist.Statistical analysis was done using SPSS-14 software version.

RESULTS

Total number of patients was 149, the mean age was 44.04(SD=19.296) years, males were 87(58.4%)and females were 62(41.6%), 75(50.3%) participants from urban area and 74 (49.7%) from rural area,134 (89.9%)were married subjects and 11(7.4%) unmarried; 4(2.7%) were widows, 71(47.7%)were earning and 78(52.3%) were unemployed . Out of 36 delirium subjects 17(47.2%) were males,19(52.7%)were females, 17(47.2%)were from urban and 19(52.7%) were from rural area; 30(83%)were married, 2(5.5%) were unmarried and 4(11%)were widowed,[12] (33.3%) were earning and 24(66.6%)were unemployed. There was no statistical difference in above sociodemographic data.

Table 1 shows number of referrals from other departments. 85(57%) indoor referrals from medicine, 17(11.4%) from surgical and 10(6.7%) from orthopedic ward ,12(8%) from gynecology ward, 2(1.3%) from ENT ward, 5(3.35%) from TB chest ward, and 2(1.3%) from skin(dermatology) indoor patients. The same table shows referral source for delirium positive cases .Majority cases 21(58.3%) cases were Medicine indoor patients and 1(2.7%) from medicine OPD, 7(19.4%) from surgery ward, 3(8.3%) from orthopedic ward, 3(8.3%) from gynecology ward, 1(2.7%) from TB chest ward.

Of the total 85 patients referred from the department of Medicine 21 diagnosed positive for delirium which meant (24.7%) positivity rate.

Among the psychiatric reasons cited for referral in delirium positive cases 10(27.7%) were referred for abnormal excited behavior, 10(27.7%) for altered sensorium , 2(5.5%) for hallucinations, 5(13.8%) for irrelevant talk, 2(5.5%) for sleep disturbance, 5(13.8%) for drug addiction and 2(5.5%) for other reasons.In medical and surgical diagnoses in delirium positive subjects. 8(22.2%) had infections, 9(25%) had history of trauma, 4(11.1%) had history of ingestion of toxic/ poisonous substance, 5(13.8%)had metabolic/ endocrine abnormality, 1(2.7%) had epilepsy, 7(19.4%) had multiple (equal to or more than 2) diagnoses and 2(5.5%) had other conditions.

Table 2 shows referral patterns from other departments. Among them 24(16.1%) were referred with statement like a) only request for examination, 64(43%) were referred for b) request for expert opinion with clinical notes and 61(40.9%) were referred for c) active intervention with a probable diagnosis and comments on patients behavior and necessary investigations. Most of the doctors 125(84%) had a good idea (b+c) about delirium which was reflected in the language of the referral.

Table 2 also shows referral patterns in relation with delirium. 8 (22.2 %) out of 36 delirium positive subjects made only request for examination, rest

TABLE 1

REFERRAL SOURCE IN TOTAL SAMPLE AND DELIRIUM POSITIVE CASES

Branch /Faculty	IPD N (%)	OPD N (%)	Delirium positive IPD N (%)	Delirium positive OPD N (%)
MEDICINE	85 (57)	15(10)	21 (58.3)	1(2.7)
SURGERY	17 (11.4)	0	7 (19.4)	0
ORTHOPEDICS	10(6.7)	0	3 (8.3)	0
GYNAECOLOGY	12(8)	0	3(8.3)	0
ENT	2(1.3)	0	0	0
TB&CHEST	5 (3.35)	0	1(2.7)	0
DERMATOLOGY	2 (1.3)	0	0	0

28(77.7%) referrals were sent for expert opinion with clinical notes and for active intervention with a probable diagnosis and comments on patients behavior and necessary investigations.Thus out of 24 referrals with only request for examination 8 (30%)were delirium positive cases where consultants were not aware about delirium. Out of 61 referrals with probable diagnosis of delirium only 12(19.67%) were actually delirious and rest 49(80.32%) were misdiagnosed.Of the 16 risk factors studied viz. 1) vision impairment 2) present medical/ surgical/psychiatric/any other illness 3) cognitive impairment 4) age more than 70yrs 5) any iatrogenic events 6) use of physical restraints 7) malnutrition8) more than 3medications added 9) hypertension 10) COPD 11)alcohol abuse 12) smoking history 13) past history of delirium 14) preoperative use of Benzodiazepines 15) preoperative use of narcotic analgesics 16)epidural use.[3]The above 16 established risk factors had a strong correlation for development of delirium was individually studied using logistic regression for their strength to predispose to delirium. Out of 5 risk factors with good positive correlation 3 factors- use of physical restraints; use of more than 3 medication and epidural use were strong predictors of delirium independently.

DISCUSSION

Profile of Delirium cases : The present study is a prospective cross sectional study which used DRS-R-98 A similar study was carried out by Meagher et al [14]. Half of the 100 patients in that study were men and mean age of the group was 70.1 yrs (SD= 11.5). In our study out of 149 patients mean age was 44.04 (SD=19.296) which was considerably younger but statistically

TABLE- 2

REFERRAL PATTERNS IN TOTAL AND DELIRIUM POSITIVE CASES

		Frequency (N)	Percent (%)	Delirium Positive N (%)	Delirium Negative N(%)
a)	Only request for examination	24	16.1	8 (22.2)	16(14.1)
b)	request for expert opinion with clinical notes	64	43.0	16(44.4)	48(42.5)
c)	request with active intervention with a probable diagnosis & comments on patient's behavior and necessary investigations	61	40.9	12(33.3)	49(43.4)
Total		**149**	**100.0**	**36**	**113**

insignificant (p> 0.05). Grover et al [8] performed a retrospective study of 3092 cases of delirium, out of which males constituted 64.1% (n=1982) of all referred cases. According to authors there was over representation of the males in this study. In the same study highest referrals were from age group of 16-45 years(58.37%) followed by patients in age group of 40-60 years(21.41%) . Kishi et al [16] had mean age of 71.4(11.7=SD) in delirium positive group, male gender 19(73.1%),education in years mean 12.3(SD= 2.6), married 20(76.9%), employed 8(30.8%). In our study 30(83%)delirium subjects were married and 12(33.3%) were employed. This was statistically insignificant.

Validation of Delirium rating scale : The Cronbach alpha coefficient to measure the internal consistency of the individual items of DRS-R-98 was measured in first 42 subjects which came out to be 0.87 which is highly significant.The cutoff scores for DRS-R-98 [11] were determined by using receiver operator characteristic (ROC) analysis to determine acceptable levels of sensitivity and specificity when comparing with non delirious subjects.This yielded cut off scores for DRS-R-98 as severity score being 9.5 (sensitivity as 0.89 and specificity as 0.86) and total score is 12.5 (sensitivity as 0.92 and specificity as 0.85). Cut off scores of 15.25 and 17.75 were chosen as 2 best options resulting in same sensitivity (92%) but the higher cut off had a higher specificity (95%).[11] The best cut off score for DRS-R-98 severity scale was 15.25 in this study resulting in 92% sensitivity and 93% specificity. Similarly the Dutch version [15] of DRS-R-98 has yielded different cut off scores for total and severity scores with different sensitivity and specificity.

Prevalence : Out of 149 cases of suspected delirium referred from various specialties of tertiary care hospital 36 (24.2%) were identified delirium positive by a clinical psychiatrist using DSM-IV-TR.This prevalence was closer to that reported by western research [3,4] of 10-30% in medically ill in patients and much more than reported by Indian studies.[5-8] This could be due to flawed metho-dology, lack of collectively accepted definition of prevalence and no use of standardized rating scales.

Referral Rates : Among referred cases in delirium positive cases in our study the medicine indoor (58.3%) and surgery indoor (19.4%) patients constituted the major sources of delirium.In another study [17] the majority in referred delirium group constituted of Medicine (74.49%), Surgery (14.29%) and neurology (11.22%). This preponderance of physicians over surgeons in referring the delirium cases was probably due to increased awareness on the part of physicians regarding the delirium, they encounter delirium more, and they are more prompt in sending a referral to the psychiatrist. This finding was similar to that reported in another study.[9]

Major psychiatric reasons for referrals in our sample were altered behavior, altered sensorium, incoherent talks and drug addiction. Casuative factors in present study were comparable to other Indian studies.[8, 16]

Out of total of 24(16%) only 8(22.2%) rated positive for delirium constituted group a) mere request for referral. The authors looked at the referral patterns in delirium positive 36 cases and found that in (b)&(c)category 16(44.4%) +12(33.3%) = 28(77.7%) quickly diagnosed the delirium or had strong suspicion for positive indication. The terms used for the patients were acute psychosis, ICU psychosis, deliberate self harm, depression etc. In these subgroup physicians outnumbered surgeons.Querques maintains that delirium is caused by diverse medical and surgical conditions and their treatment.[9] The author has offered many names of medico surgical condition and medication which predispose to delirium (risk factors). Risk factors for delirium identified in present study were use of physical restraints; use of more than 3 medication and epidural use independentally.

In present study average mean age was younger than other studies. Prevalence is much closer to western studies than Indian studies. The

DRS-R-98 was validated in local population and yielded cut off score for total and severity score items which was different from another study. The physicians suspected and referred delirium much more and earlier than surgeons. The referral pattern (source) and reason of referral and medico-surgical diagnosis were similar to other studies.

Limitation of the study is cross-sectional design which did not look at the sub types of delirium which may have affected the diagnosis and total prevalence of delirium.

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