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### RESEARCH ARTICLE

#### IDENTIFYING POLYPHARMACY THROUGH PATIENT CONSULTATION W GERIATRICS AT TERTIARY CARE HOSPITAL

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#### Manuscript Info

##### Manuscript History

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#### Abstract

**Background:-**The rapidly growing numbers and proportion of elderly meant that more people will be entering a period of life where the risk of developing certain chronic and debilitating diseases is significantly higher. People over the age 6 years are more likely to be on medication than younger people

**Objective:-**To determine the common drugs involved in Polypharmacy and resolve potentially inappropriate medications in geriatrics.

**Materials & Methods:-**A prospective observation and non invasive study was carried out in the departments of general medicine, orthopedics, general surgery at tertiary care hospital for duration of 6 months

**Result:-**A total of 105 cases of Polypharmacy were recorded from a total population of 10,000 Patients, among which males 71 cases (35%), females 34 cases (15%), maximum Patients belong to age group of 60-70 age i.e 56 cases, 71-80 age were 20 cases, more than 80 age was 19 cases. Most of the cases collected from general medicines i.e 56 cases, general surgery i.e 18 cases, orthopedics

**Conclusion:-** Polypharmacy and inappropriate drug use is prevalent among the elderly. In our study, Polypharmacy is involved more in cardiovascular diseases and surgery. Inappropriate drugs like aspirin, nifedipine, spironolactone, diclofenac are significant. So, while prescribing drugs to elderly Beer's criteria and STOPP/START criteria should be considered as a standard guideline.

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#### Introduction:-

The rapidly growing numbers and proportion of elderly mean that more people will be entering a period of life where the risk of developing certain chronic and debilitating disease is significantly higher. People over the age of 60 years are more likely to be on medication than younger people. They are often taking several drugs at once to treat concomitant disease processes.

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According to the WHO Polypharmacy is defined as “the administration of many drugs at the same time or the administration of an excessive number of drugs”. Generally use of 5 or more drugs is considered as Polypharmacy.

There may be many consequences associated with the Polypharmacy. Patients are at increased risk of receiving an inappropriate medication and having an adverse drug reaction, which may impact patients adherence to his/her medication regimen. It has also been associated with the increased risk of morbidity or mortality.

The unnecessary drug therapy problems frequently tend to be overlooked in Polypharmacy prescribing. Drug therapy is considered unnecessary for the patient if there is no longer valid medical indication of a particular drug. Unnecessary drug therapy can arise from several common causes, including the following:

No medical indication, prescribing medication that is contraindicated in patients, prescribing unfavourable choice of medicine, dose or duration.

Polypharmacy is known to increase the risk of adverse drug reaction (ADR), drug-drug and drug-disease interaction it has been claimed that 13% risk of adverse drug interactions, rising to 38% when taking four drugs and 82% if seven or more drugs are given simultaneously.

Polypharmacy creates complex medication regimen that make non-adherence a common problem in elderly, with prevalence rates averaging 50%.

Polypharmacy also makes compliance with medications more challenging. Non-compliance with prescribed medications can result in sub-optimal therapeutic effectiveness and can have major clinical consequences. If the existence of non-compliance is not recognised, the physician may increase the dose of the initial medication or add a second agent, increasing both the risk and the cost of treatment.

The universally accepted screening tools for identifying the potentially inappropriate medications include Beers Criteria, START/STOPP Criteria.

For more than 20 years, the Beers Criteria for Potentially Inappropriate Medication Use in Older Adults has been the leading source of information about the safety of prescribing drugs for older people. To help prevent medication side effects and other drug-related problems in older adults, the American Geriatrics Society (AGS) has updated and expanded this important resource.

START/STOPP Criteria provide explicit, evidence based rules of avoidance of commonly encountered instances of potentially inappropriate prescribing and potential prescribing omissions, improve medication appropriateness and prevent adverse drug events.

### **Objectives:-**

1. To identify the common drugs involved in Polypharmacy.
2. To rule out the disease in which Polypharmacy is involved.
3. To identify and resolve potentially inappropriate medications in geriatrics.
4. To find out the consequences of Polypharmacy like side effects, adverse drug reactions, drug-drug interactions.

### **Methodology:-**

1. Study site: In-patient and Out-patient departments of general medicine, orthopaedics, general surgery, in Aware Global hospital.
2. Study design: A Prospective Observational study.
3. Study duration: 6 months.

### **Inclusion criteria:-**

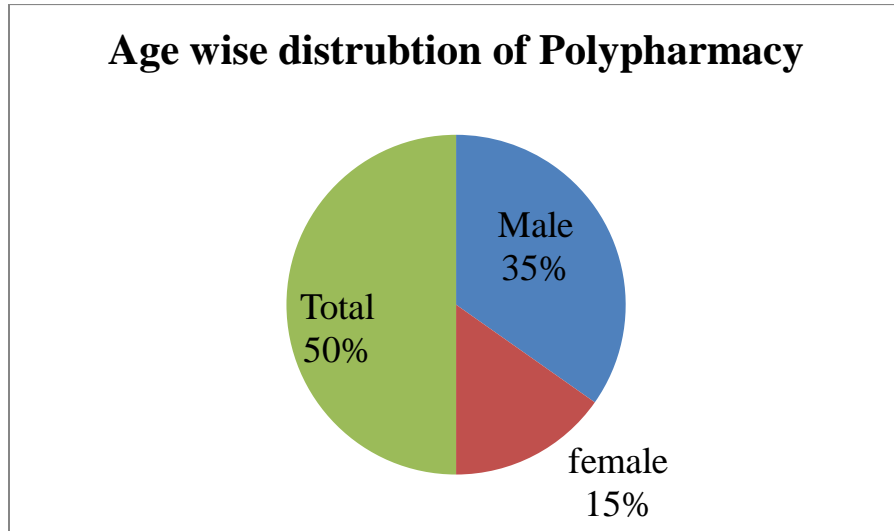
1. Patient of either sex as inpatients and outpatients attending departments of General medicine, Orthopaedics, General surgery.
2. Patients more than 60 years of age.

**Exclusion Criteria:-**

1. Tuberculosis patients, HIV patients, Psychiatric patients.
2. Patients with severe organ failure.
3. Cases from emergency departments.

**Results:-**

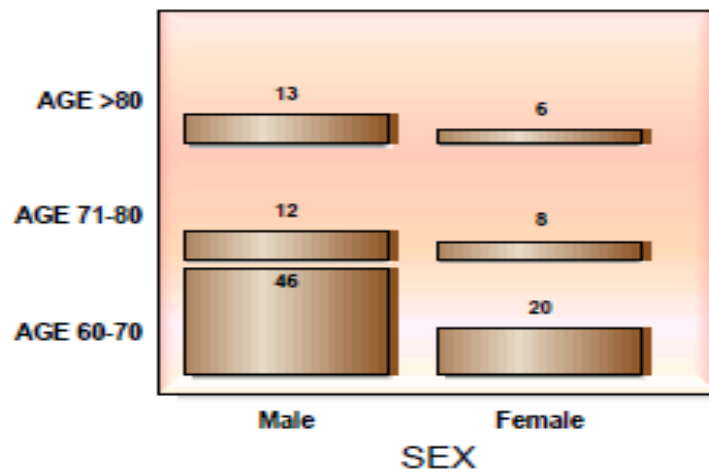
A total of 105 cases have been collected in the departments like General Medicine, General Surgery, Orthopaedics, Gastroenterology.

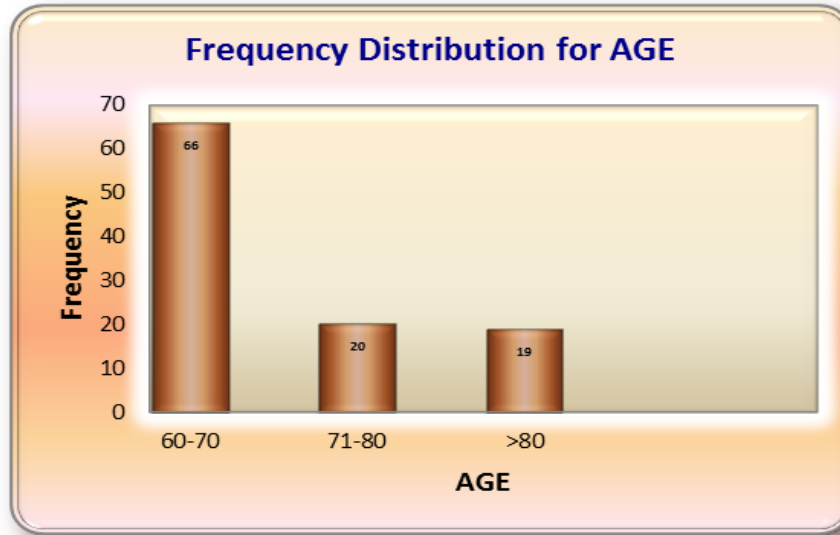


AGE:-

Source of variations	df	Sum of squares	Mean Squares	F Ratio	Probability	$\pi^2$	$np^2$	$o^2$
BetweenGroups	1	0.15624	0.15624	0.238	0.62689	0.002	0.002	-0.007
Within Groups	103	67.69138	0.66720					
Total	104	67.84762	0.65238					

**Frequency Distribution**

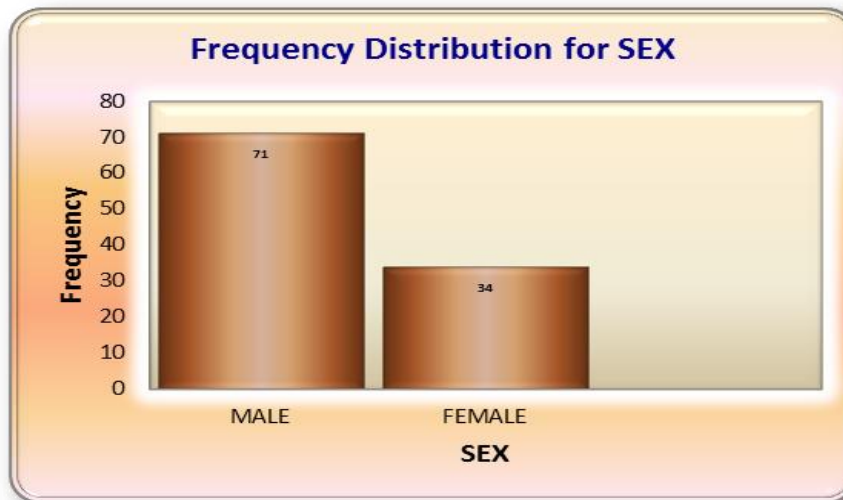




Gender wise distribution of Polypharmacy:

**Gender:-**

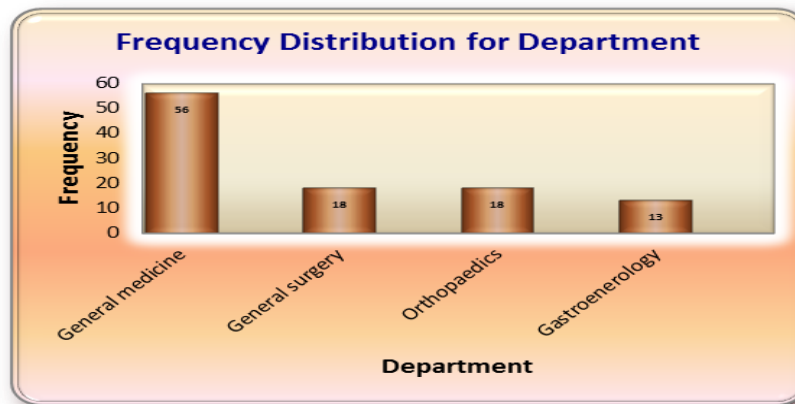
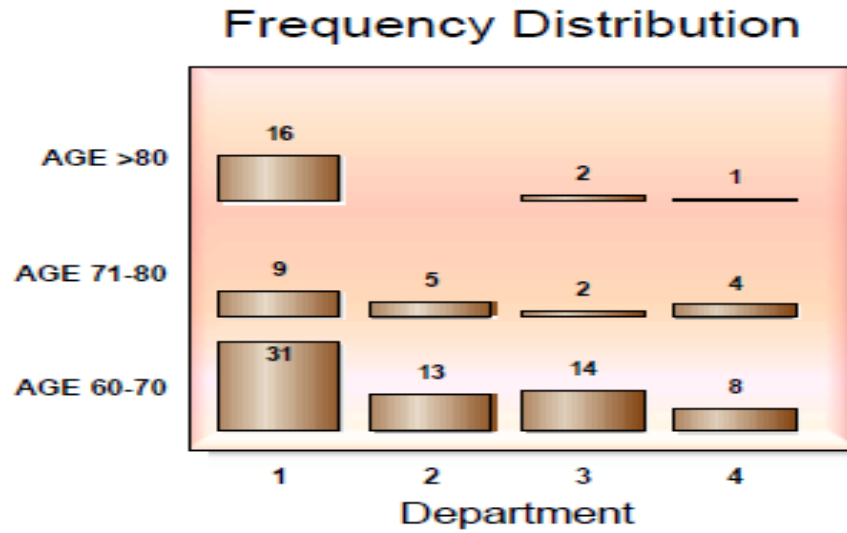
Source of variation	df	Sum of squares	Mean Squares	F Ratio	Probability
Between Samples	2.000	0.146	0.073	0.326	0.723
Within Samples	102.000	22.846	0.224		



Department wise distribution of Polypharmacy:

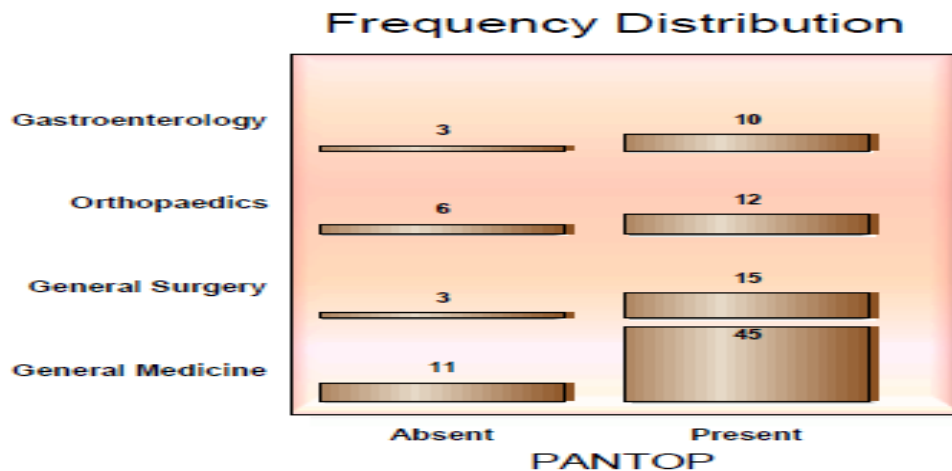
**Department:-**

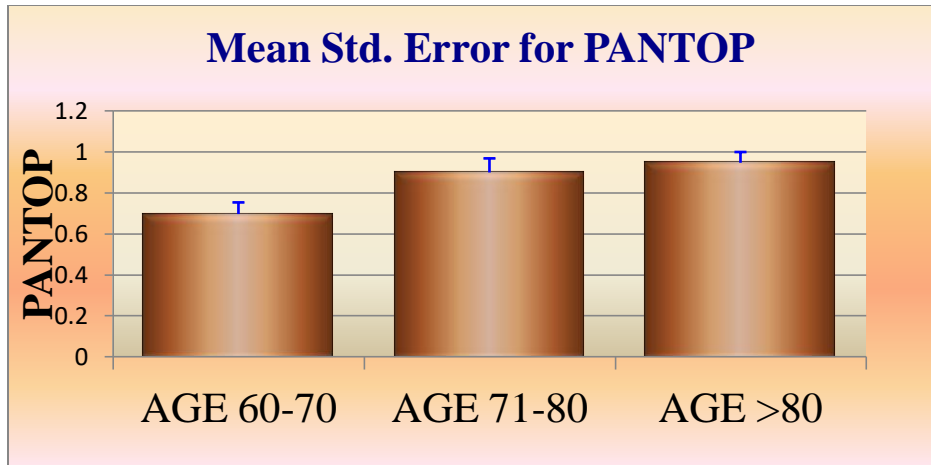
Source of variation	df	Sum of squares	Mean Squares	F Ratio	Probability
Between Samples	2.000	6.273	3.136	2.703	0.072
Within Samples	102.000	118.356	1.160		



**Pantop:-**

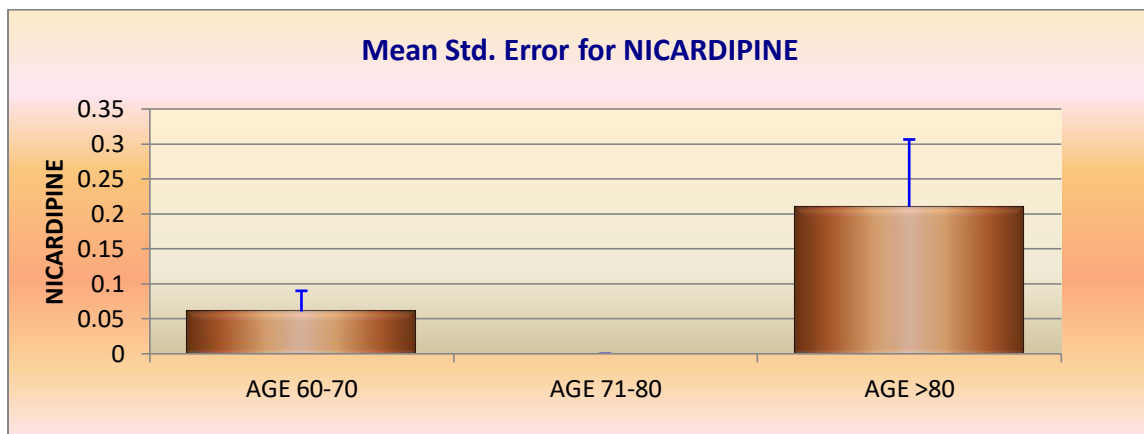
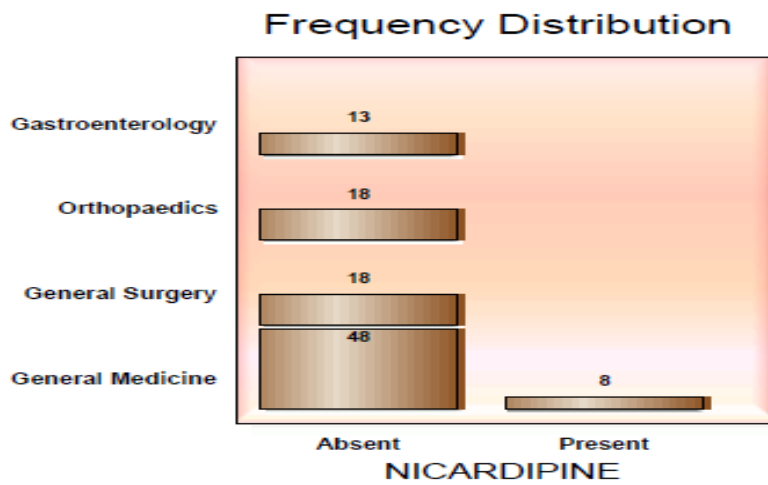
Source of variation	df	Sum of squares	Mean Squares	F Ratio	Probability
Between Samples	2.000	1.275	0.638	3.897	0.023
Within Samples	102.000	16.687	0.164		





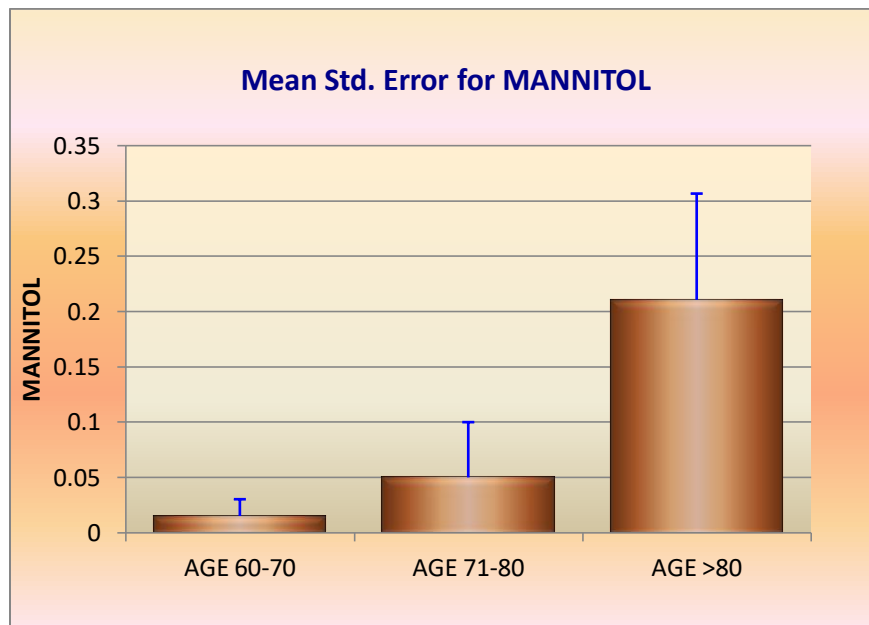
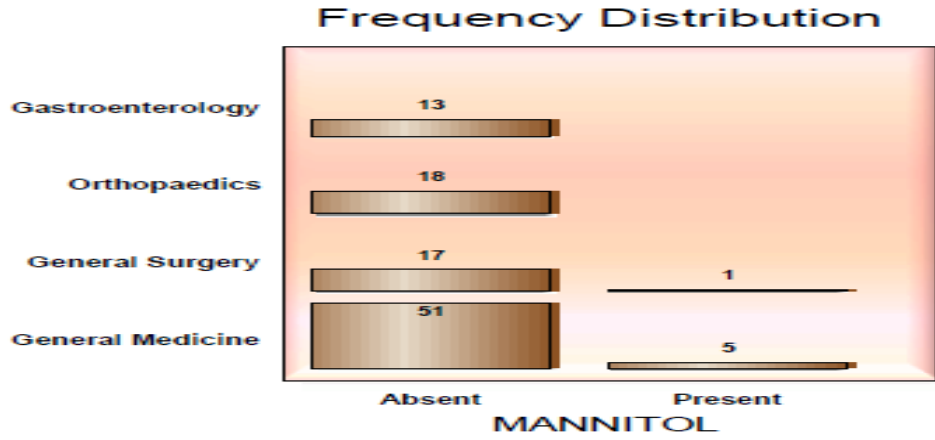
**Nicardipine:-**

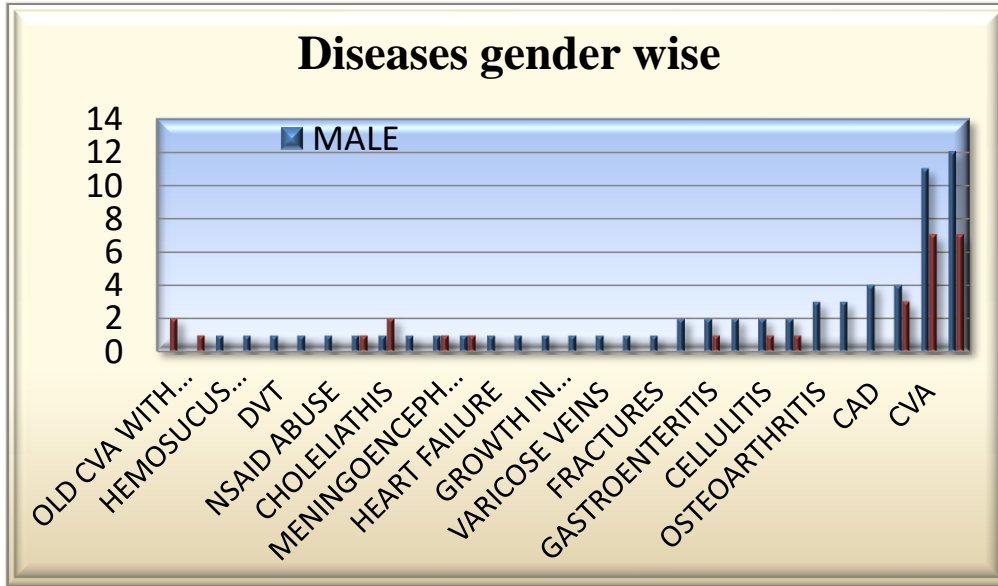
Source of variation	df	Sum of squares	Mean Squares	F Ratio	Probability
Between Samples	2.000	0.475	0.238	3.503	0.034
Within Samples	102.000	6.915	0.068		



**Mannitol:-**

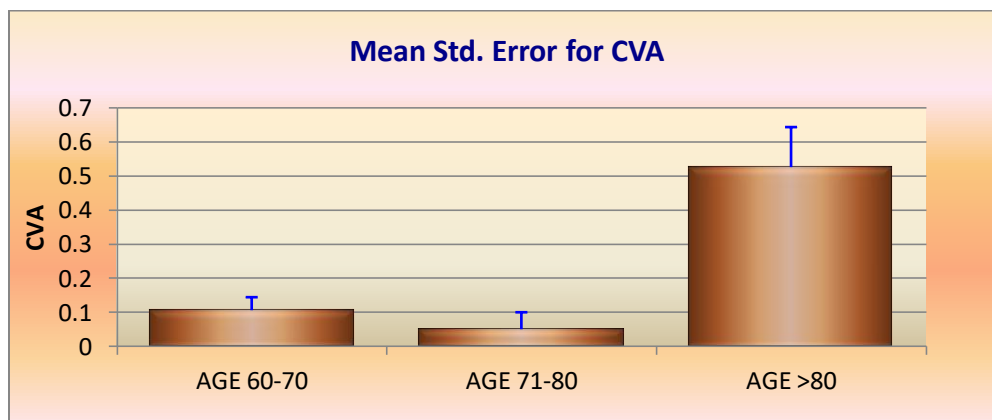
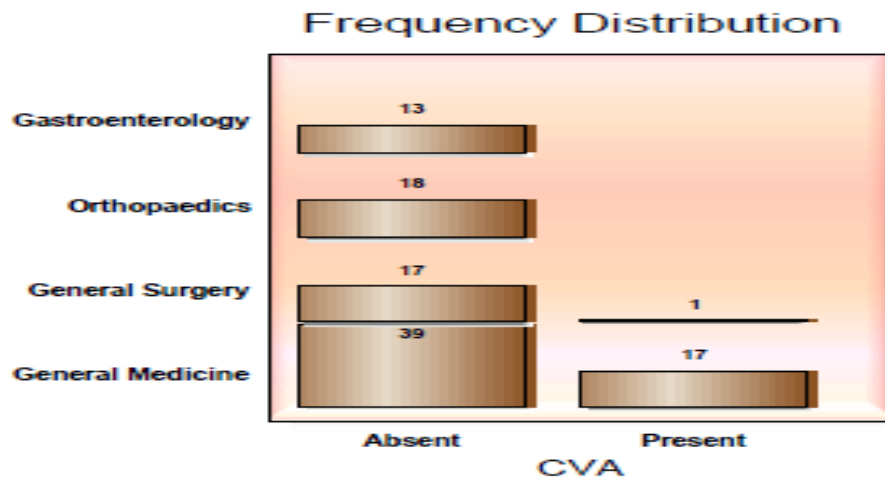
Source of variation	df	Sum of squares	Mean Squares	F Ratio	Probability
Between Samples	2.000	0.564	0.282	5.652	0.005
Within Samples	102.000	5.093	0.050		





CVA:-

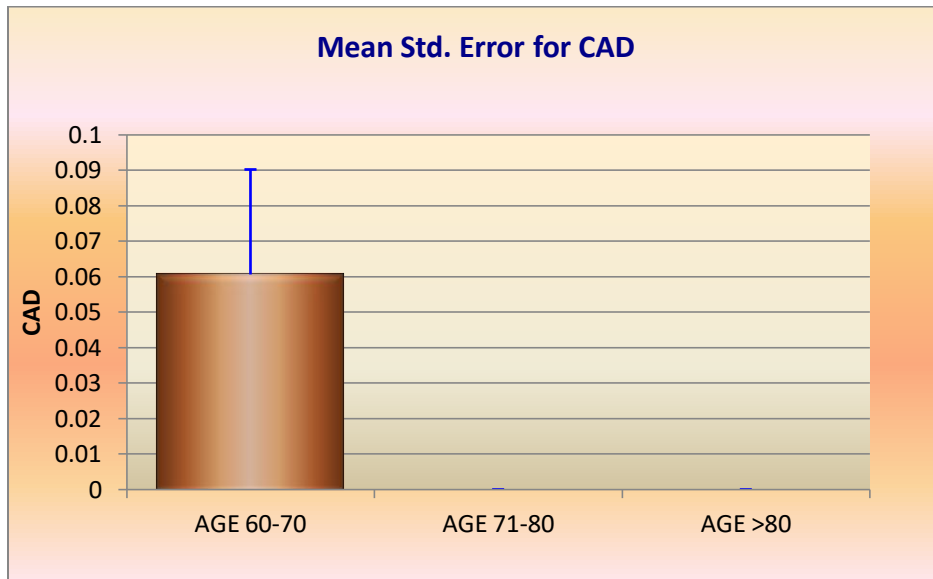
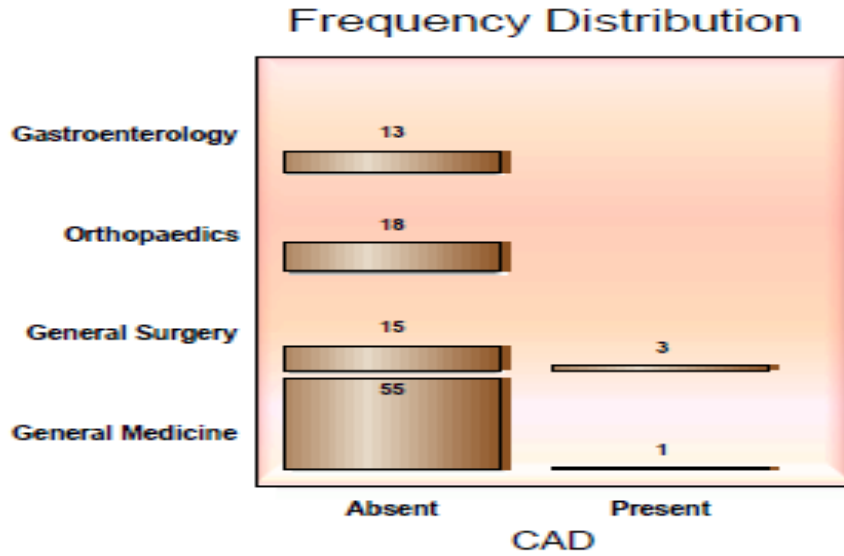
Source of variation	df	Sum of squares	Mean Squares	F Ratio	Probability
Between Samples	3.000	2.13056	0.71019	5.611	0.005
Within Samples	101.000	12.78373	0.12657		





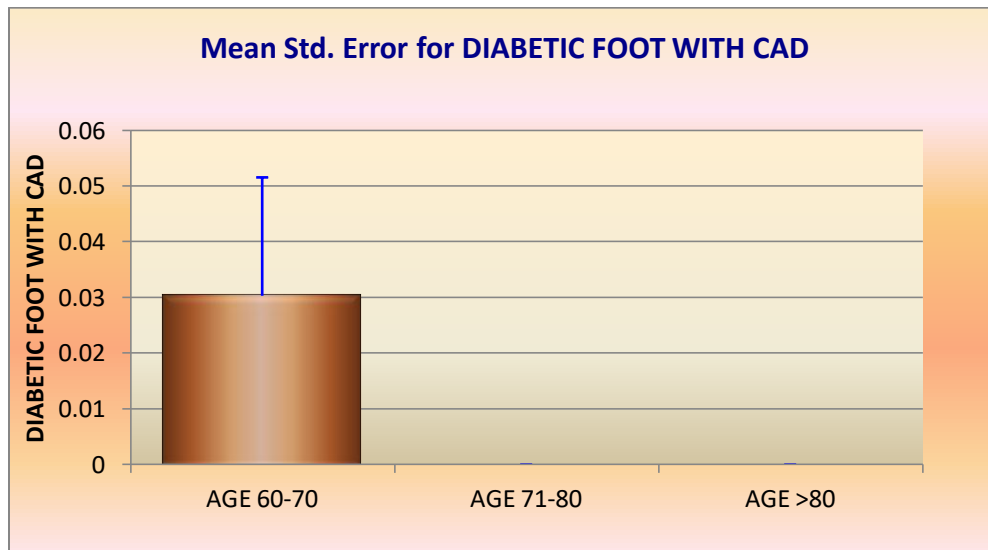
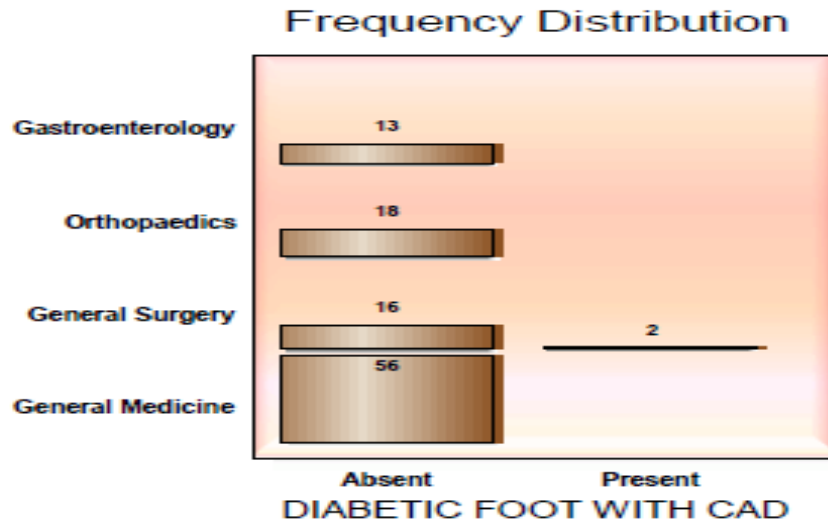
**CAD:-**

Source of variation	df	Sum of squares	Mean Squares	F Ratio	Probability
Between Samples	3.000	0.36548	0.12183	3.534	0.01749
Within Samples	101.000	3.48214	0.03448		



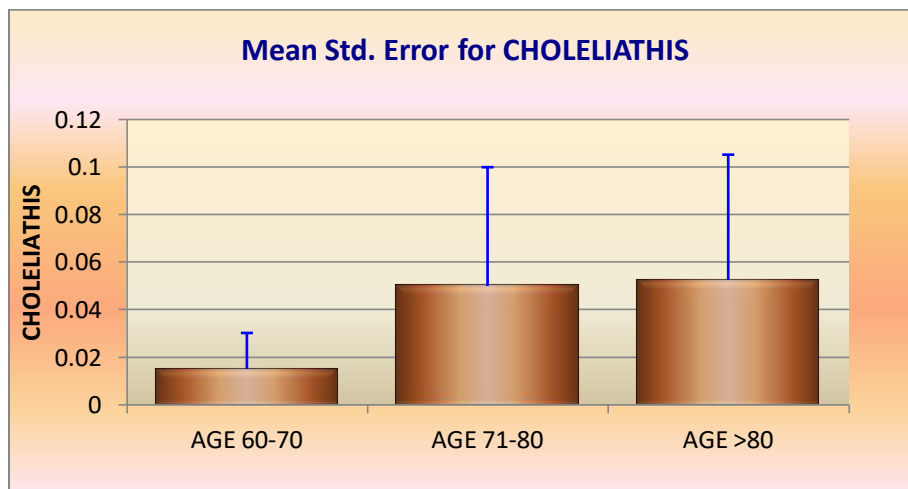
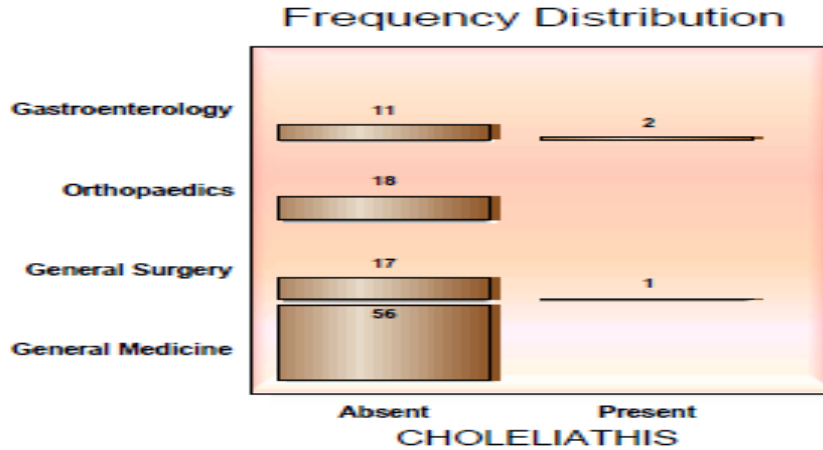
**Diabetic Foot With Cad:-**

Source of variation	df	Sum of squares	Mean Squares	F Ratio	Probability
Between Samples	3	0.18413	0.06138	3.487	0.01855
Within Samples	101	1.77778	0.01760		



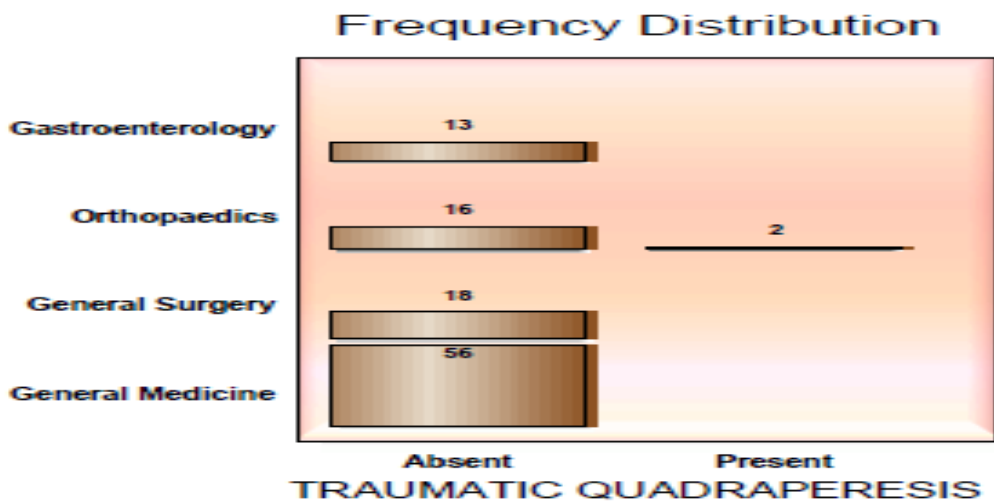
**Cholelithis:-**

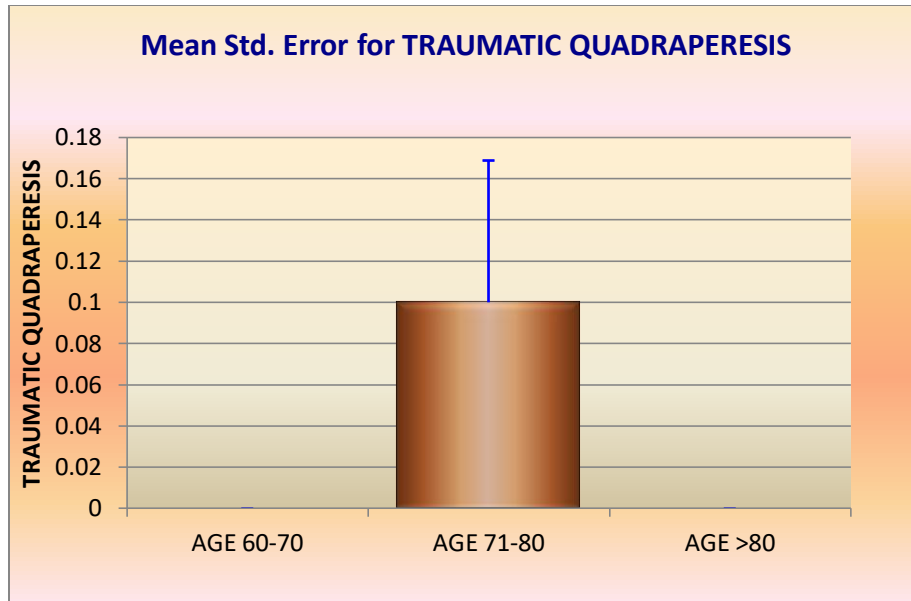
Source of variation	df	Sum of squares	Mean Squares	F Ratio	Probability
Between Samples	3	0.27753	0.09251	3.544	0.01728
Within Samples	101	2.63675	0.02611		



**Traumatic Quadraperesis:-**

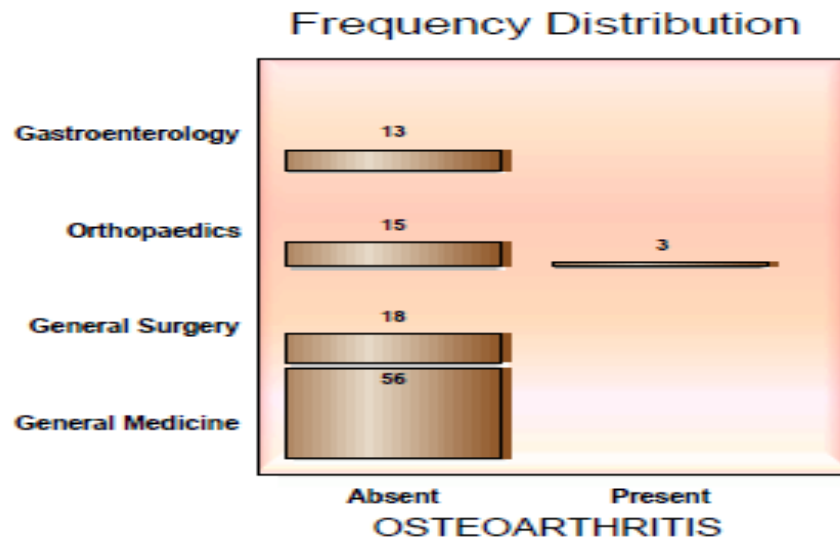
Source of variation	df	Sum of squares	Mean Squares	F Ratio	Probability
Between Samples	3	0.18413	0.06138	3.487	0.01855
Within Samples	101	1.77778	0.01760		

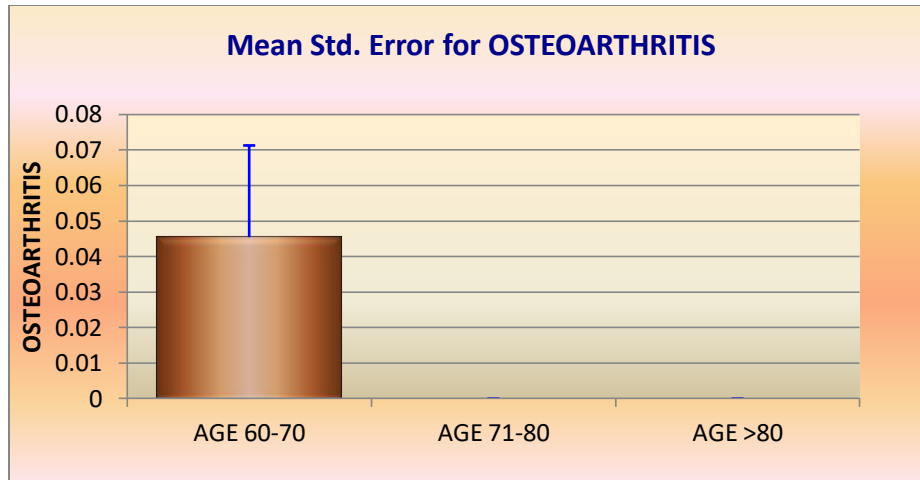




**Osteoarthritis:-**

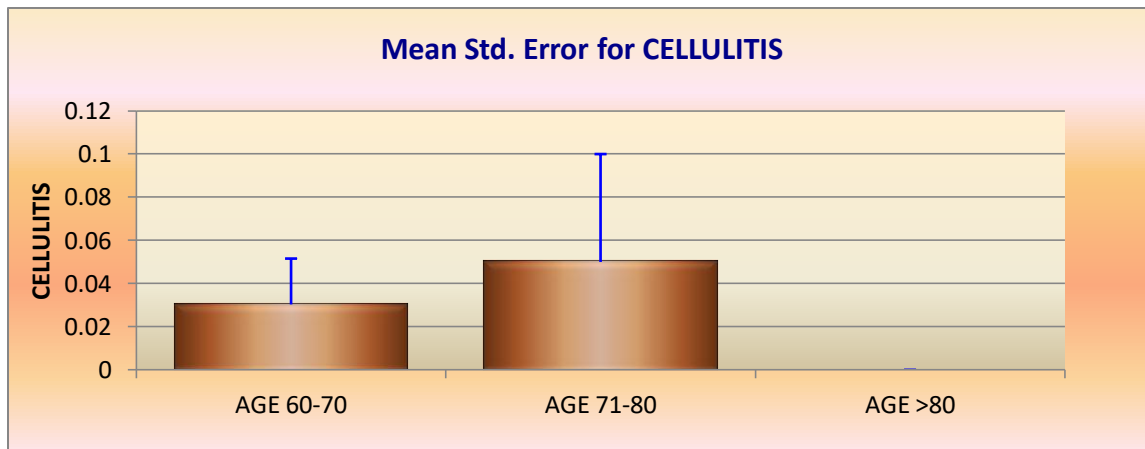
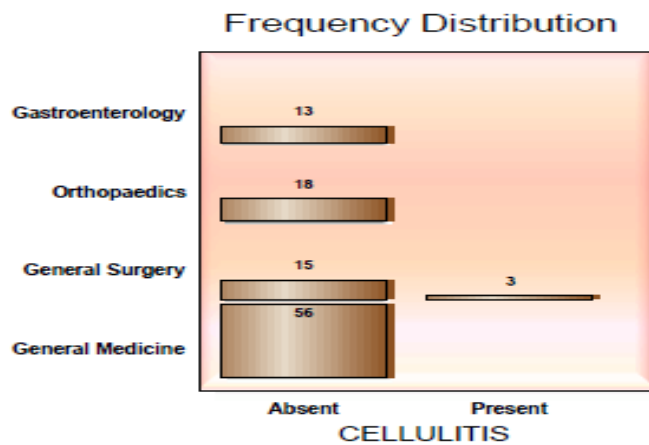
Source of variation	df	Sum of squares	Mean Squares	F Ratio	Probability
Between Samples	3	0.41429	0.13810	5.579	0.00139
Within Samples	101	2.50000	0.02475		





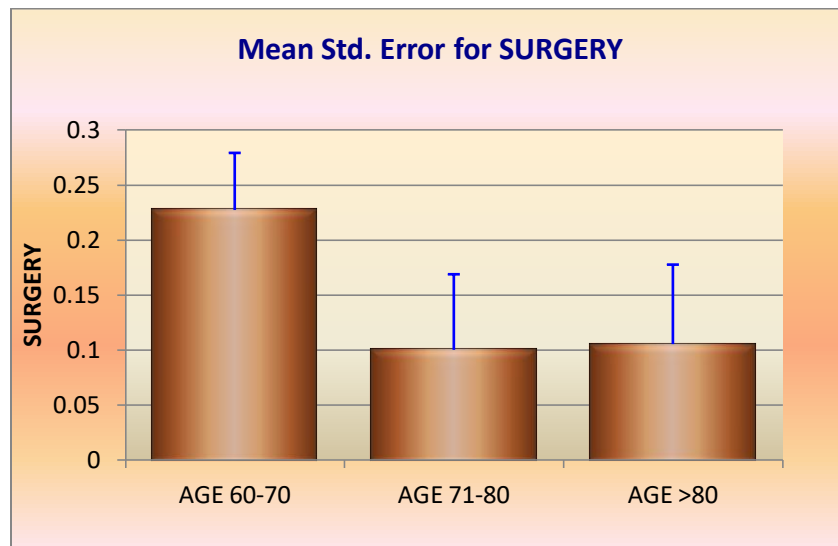
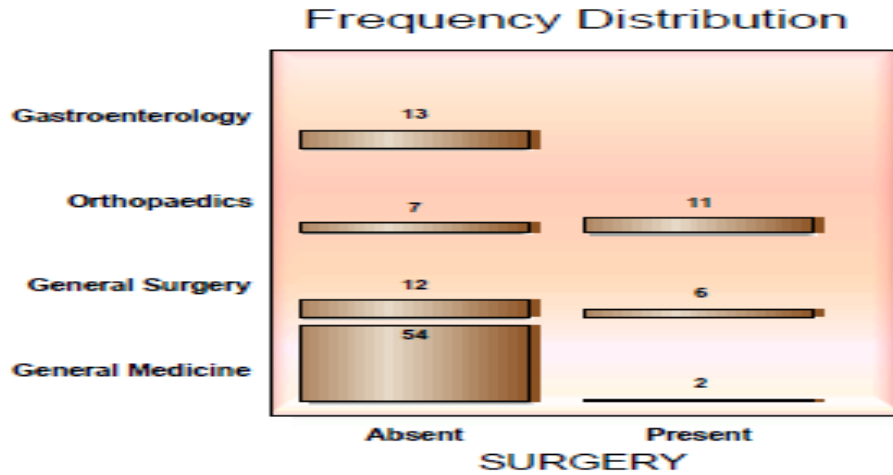
**Cellulitis:-**

Source of variation	df	Sum of squares	Mean Squares	F Ratio	Probability
Between Samples	3	0.41429	0.13810	5.579	0.00139
Within Samples	101	2.50000	0.02475		



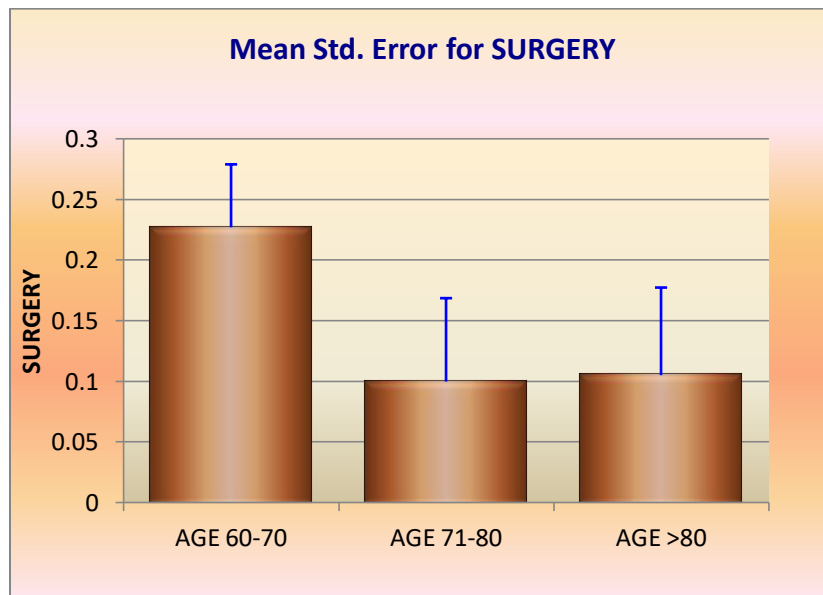
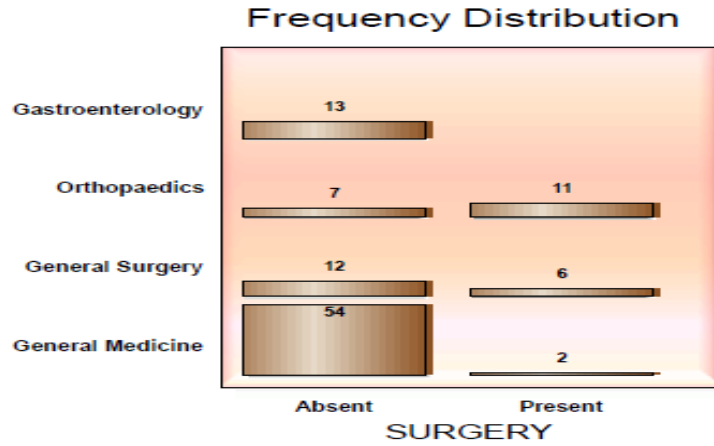
**Surgery:-**

Source of variation	df	Sum of squares	Mean Squares	F Ratio	Probability
Between Samples	3	5.35556	1.78519	17.666	0.00000
Within Samples	101	10.20635	0.10105		



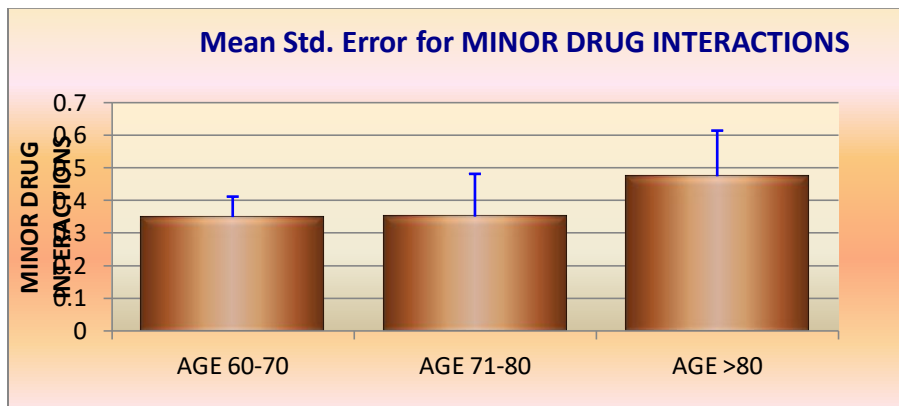
**Peritonitis:-**

Source of variation	df	Sum of squares	Mean Squares	F Ratio	Probability
Between Samples	3	0.27753	0.09251	3.544	0.01728
Within Samples	101	2.63675	0.02611		



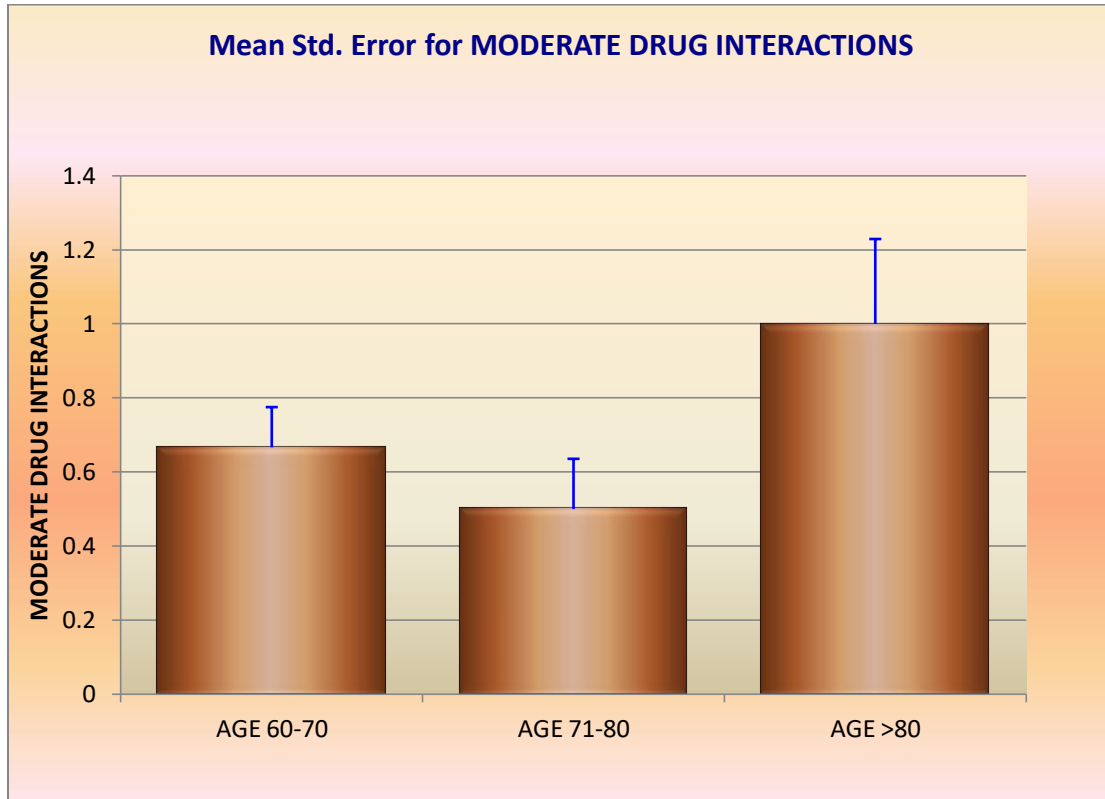
**Minor Drug Interactions:-**

Source of variation	df	Sum of squares	Mean Squares	F Ratio	Probability
Between Samples	2	0.243	0.121	0.409	0.666
Within Samples	102	30.272	0.297		



**Moderate Drug Interactions**

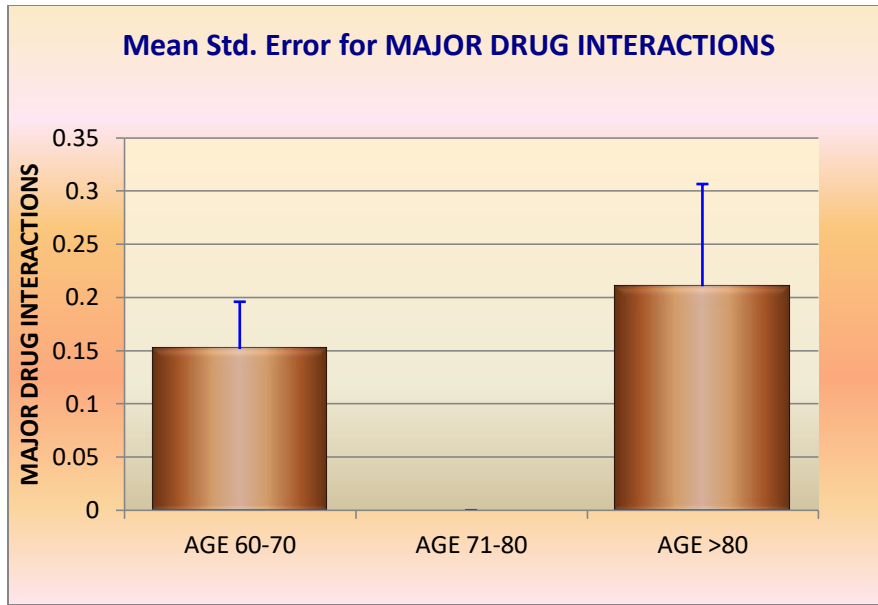
Source of variation	df	Sum of squares	Mean Squares	F Ratio	Probability
Between Samples	2	2.581	1.290	1.740	0.181
Within Samples	102	0.742	0.000	0.000	



**Moderate Drug Interactions:-**

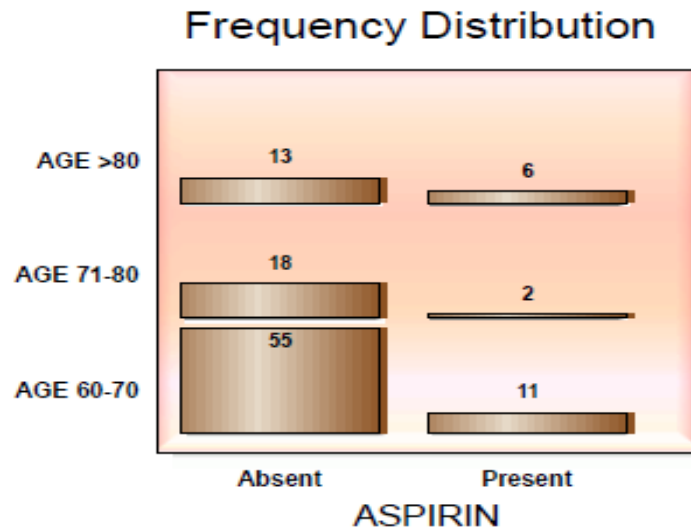
Source of variation	df	Sum of squares	Mean Squares	F Ratio	Probability
Between Samples	2	0.491	0.245	2.149	0.122
Within Samples	102	11.643	0.114		

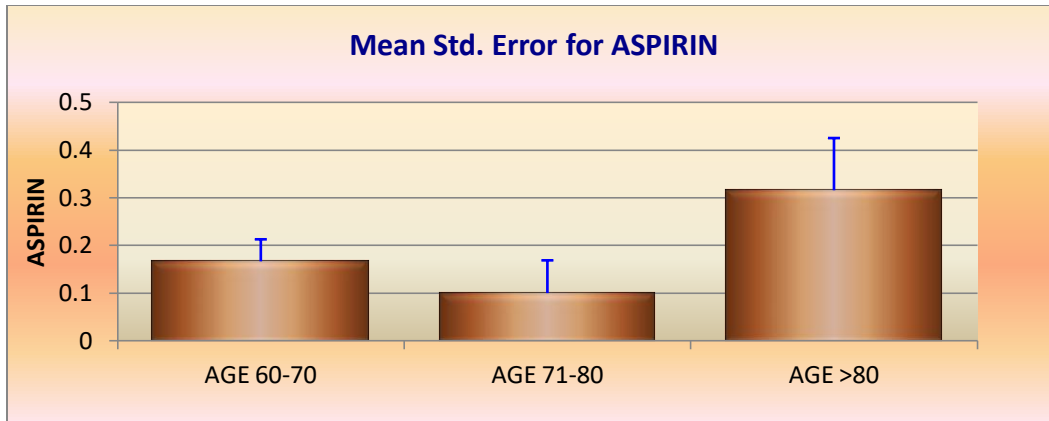




**Aspirin:-**

Source of variation	df	Sum of squares	Mean Squares	F Ratio	Probability
Between Samples	3	2.40317	0.80106	6.149	0.00070
Within Samples	101	13.15873	0.13028		

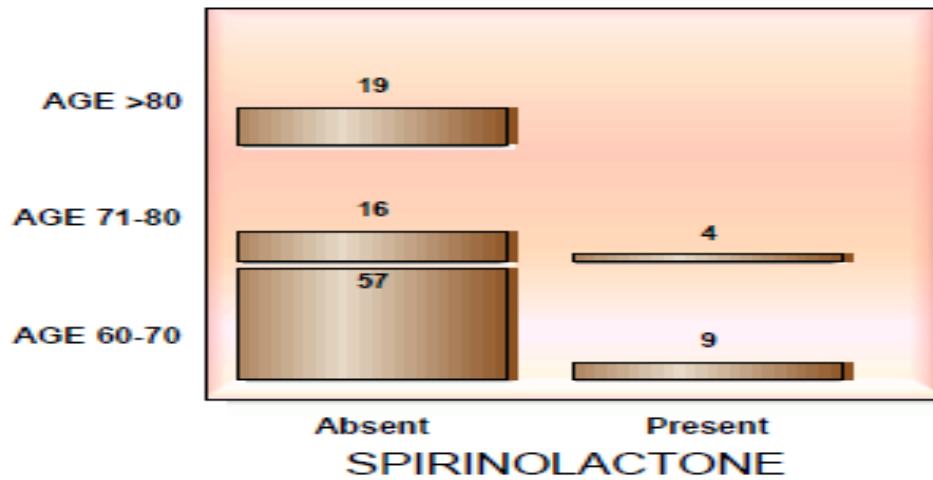


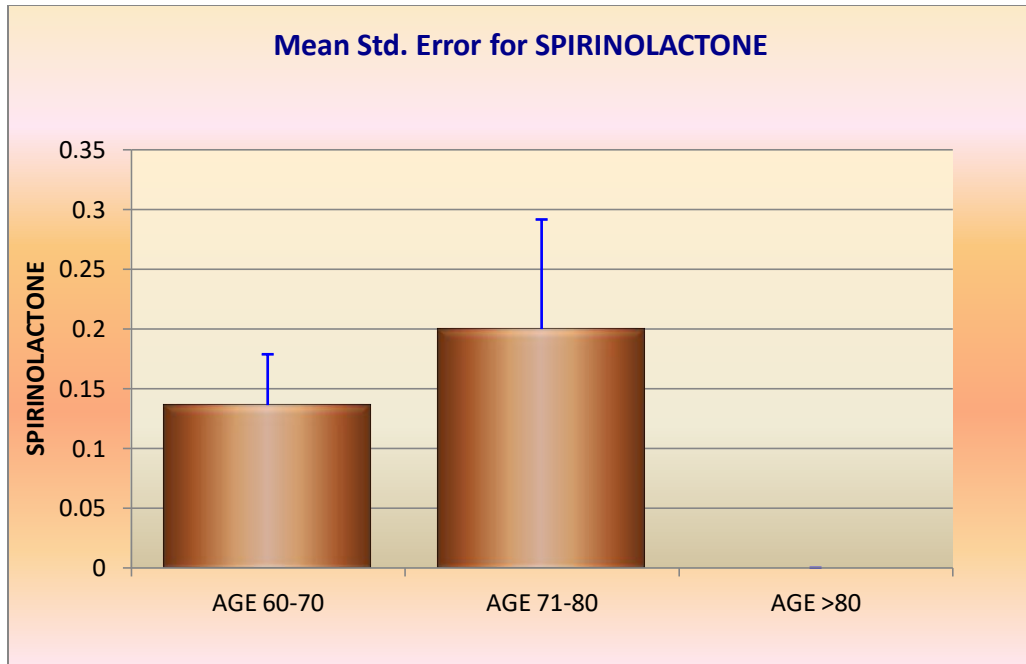


**SPIRINOLACTONE**

Source of variation	df	Sum of squares	Mean Squares	F Ratio	Probability
Between Samples	3	1.19649	0.39883	3.952	0.01038
Within Samples	101	10.19399	0.10093		

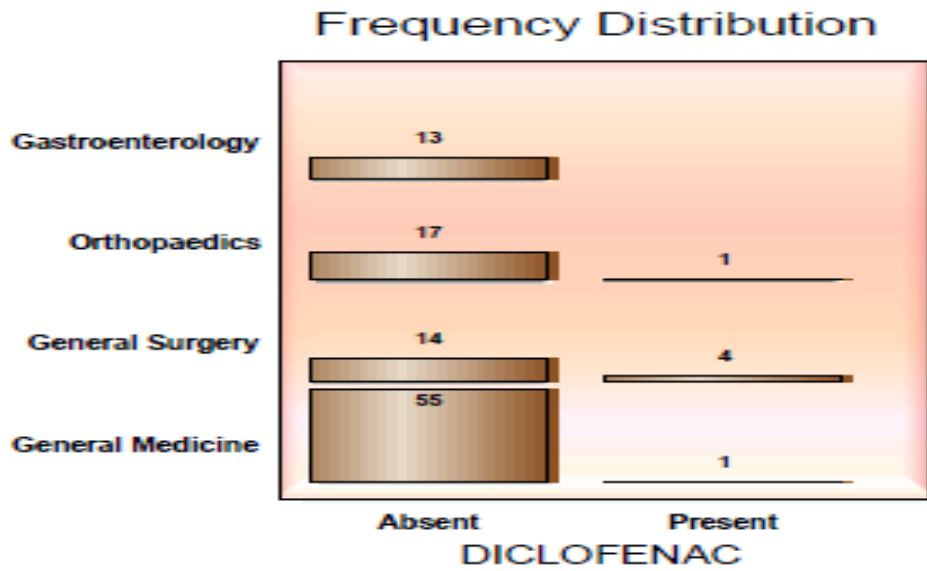
**Frequency Distribution**

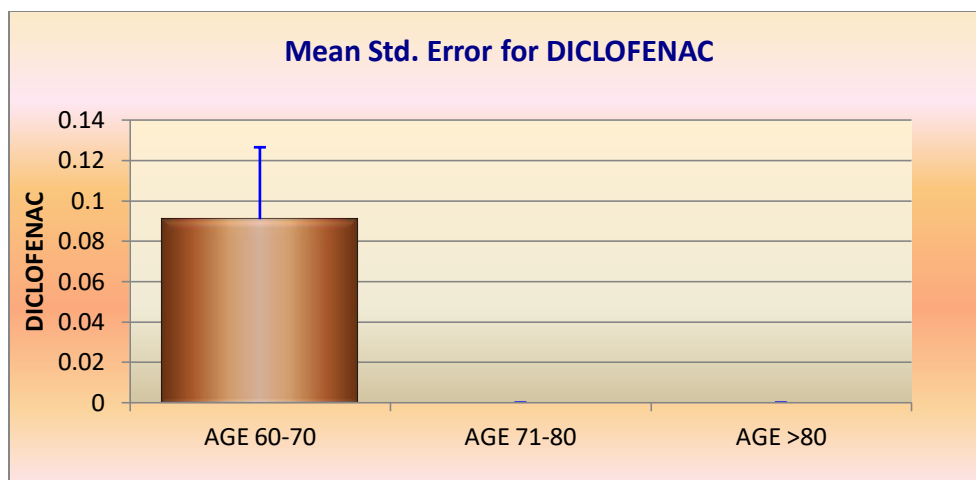




**Diclofenac:-**

Source of variation	df	Sum of squares	Mean Squares	F Ratio	Probability
Between Samples	3	0.61944	0.20648	4.140	0.00821
Within Samples	101	5.03770	0.04988		





### Discussion:-

- 105 geriatric group were included to assess the use of polypharmacy in tertiary care hospital and was analysed by ANOVA and by using Windostat Version 9.2 from Windostat services.
- Among 105 cases it was observed that 38% were female and 62% were male.
- There was no significance difference in the departments included in the work such as General Medicine, General Surgery, Orthopaedics, Gastroenterology.
- Negar Golchinh et.al., conducted a study and concluded that there was no significant difference (age-0.16 and gender-0.32) between age and gender and in our study we observed age(P-value-0.072, gender-0.723).
- Pantop (P-value- 0.028), Nicardipine (P-value-0.03) were inappropriate as per Beer's criteria and were significant in our study, which was similar to the study conducted by Md. Mamum Al-Amin et.al., RJ Lithe, M.Lankar et.al.
- Mannitol was appropriate as per Beer's criteria included in our study (P-value-0.005) which was correlated to the study conducted by Chitra et.al.,
- It was observed that inappropriate drugs as per our study are Aspirin(P-value-0.0007), Spironolactone(P-value-0.010), Diclofenac(P-value-0.008), which was parallel to study conducted by Chitra et.al.,
- Cardiovascular disease (P-value-0.01749) has shown significant difference in our study which was similar to study conducted by Md.Mamum Al-Amin et.al.,
- Cerebrovascular accident (P-value- 0.0134) has shown significance in our study which was related to the study conducted by Kaite Gallacher, et.al.,
- Surgery(P-Value 0.008) was found significant in our study which was correlated to the study conducted by Harstedt M,
- Osteoarthritis (P-value0.001) has shown significant difference in our study which is parallel to the study conducted by John L Wallace
- Diseases like Diabetic foot with CAD(P-value-0.018), Cholelithiasis(P-value-0.017), Cellulitis(P-value-0.001), Peritonitis(P-value-0.017), Traumatic quadriplegia(P-value-0.017) has shown significant difference.
- Consequences of polypharmacy like drug interactions has no significant difference (Minor-0.06, Moderate-0.181, Major-0.122) which was similar to the study conducted by Akram Ahmad, et.al.,
- ADR's also have shown no significance difference of about 0.001 which was similar study conducted by James Wooten et.al.,

### Conclusion:-

Polypharmacy and inappropriate drug use is prevalent among the elderly. In our study, Polypharmacy is involved more in cardiovascular diseases and surgery. Inappropriate drugs like aspirin, nifedipine, spironolactone, diclofenac are significant. So, while prescribing drugs to elderly Beer's criteria and STOPP/START criteria should be considered as a standard guideline.

To improve the medication adherence and to promote rationale therapy in geriatrics we recommend:-

1. Regular medication review.
2. Identify the drug interactions, common side effects.
3. Discourage the patients regarding the use of self-medication, over the counter medication and herbal medications or supplements.
4. Ensure that the dose, frequency, and route are appropriate.
5. Educate the patient and care giver regarding the safe medication use.
6. There is evidence that may Older adults receive medicaions that could potentially cause more harm than good.
7. Finding the right balance between too few and too many drugs will help to ensure increased longevity, improved overall health and enhanced functioning and quality of life for the aging population.
8. Many patients take their medications incorrectly and a large number receive prescriptions from more than one physician.
9. The physiologic changes that occur with aging, biotransformation and excretion (pharmacokinetics).
10. The use of medicines in a disease condition is necessary, but unnecessary load of drug to patient will Increase the safety Problems
11. Polypharmacy can be avoided by sharing treatment goals and plans. To improve drug safety in this high risk population.

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