2.3.1: Student centric methods, such as experiential learning, participative learning and problem-Solving methodologies are used for enhancing learning experiences

The teaching-learning process is one major objective and the strength of our college. Students are given a right blend of traditional and modern methods to make learning student-centric and a rewarding experience. Experiential learning, participative learning and problem solving methodologies are well adopted to ensure the holistic development of students and facilitate life-long learning and knowledge management. a) Experiential learning 1. Practical courses (laboratory) including virtual labs are made compulsory in the online mode class activities. 2.The inclusion of Internship is developing good practices and innovative methods of learning, The traditional lecture and laboratory activities have evolved into more open ended, Internship-based experiences that help students develop additional skills and contextualize the learning of theories. 3. Each student must do a Project as part of the curriculum where the student can choose a domain of their interest and implement their innovation. The students are motivated to do industry and research-oriented projects. 4.Content beyond the experiments are assigned to the student to fill the gap between curriculum and industry requirements.

b. Participative learning 1. Industrial / field visits / internship at Industry and/or renowned institutions are mandatory.2. Students are involving group discussion and seminar presentation on very course related topics. 3. Students are encouraged and presently made mandatory to take Online Courses offered by premier institutions of the country. 4.Each course handling conducting Quiz, Debate for the sharing of the student technical knowledge. 5.Industry projects and collaborations are undertaken to enrich students with pre-employment training. 6.Periodical Guest lectures on topics relevant to employment skills by personnel from respective organizations / industry.

C) Problem solving methodologies

1.Each course handling faculties are giving Case Study topic –
related their subject for analysis and discussion. 2.Faculties are conducting subjects of highly analytical nature, with the objective to increase problem solving capabilities, analytical thinking and logical ability. 3.Faculties are support to the students to attempt and solve problems individually and independently. 4. For the tutorial session, a class is divided into two groups and faculty members are assigned to each group separately. 5.Giving assignments and quizzes at the end of instruction of each unit. All academic activities are aimed at elevating the students' knowledge, skills and build confidence in them.

INDUSTRIAL TRAINING

- Industrial training, where a student undertakes a period of training at an organization usually during a semester break, is an important part of preparing the student for a professional career.
- Through active involvement in preparation, the student learns about industrial demands, skill sets, and work ethics.
- Every year, students experience industrial training as per the syllabus prescribed by JNTUH and gain knowledge of various departments such as Quality Assurance, Quality Control, Tablets, Capsules, Vaccine Manufacturing, Analytical Research and Development, Clinical Research, Drug Regulatory Affairs, Hospital Pharmacy, etc. For instance, IV-year B. Pharmacy students have visited The Suven Pharmaceuticals Pvt. Ltd., located at Suryapet Ho, Suryapet-508213 (Near Sree Maruthi Vidya Nikethan, Dasai Gudem Industrial Area).

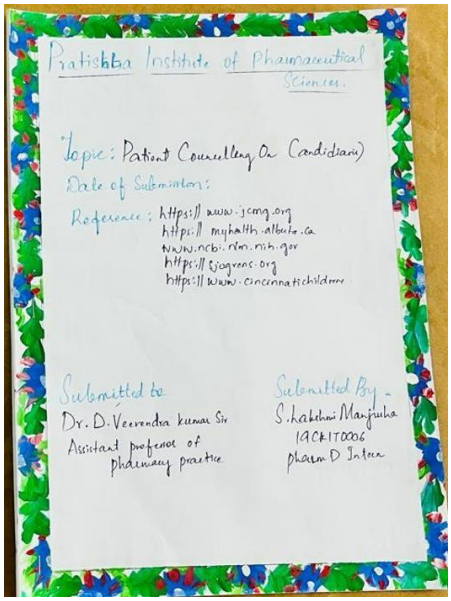
HANDS-ONLEARNING

- B. Pharmacy, Pharm D, and M. Pharm students gain theoretical knowledge by participating in pragmatic learning within various laboratories located at the institute.

- The faculty has designed various experiments according to the syllabus assigned by JNTUH. Students gain practical awareness through live activities and handling instruments such as UV-Visible Spectrophotometry, HPLC, Dissolution, and Gel Electrophoresis, among others.

ASSIGNMENTS

- Assignments are a crucial component of the internal evaluation process, serving as valuable learning instruments.
- Students may be given various types of assignments, including essays, literature reviews, annotated bibliographies, critical reviews, reflective journals, and case studies, depending on the needs and learning situations. These tasks are designed to help students achieve learning objectives related to specific content, concepts, or relationships. Assignments involve independent information seeking and the use of a wide range of information sources. Each semester, students are assigned two topics per subject related to their syllabus and are required to gather relevant information.
- Marks are allotted based on the completion and quality of the assigned tasks.
- Through this process, students enhance their knowledge of the topic, improve their proofreading skills, and develop presentation techniques.



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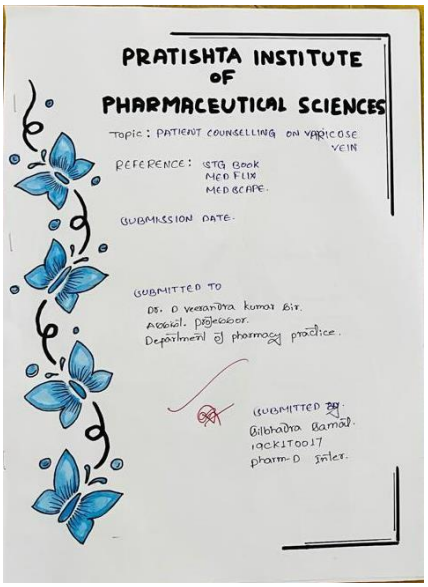

PRATISHTA INSTITUTE
OF
PHARMACEUTICAL SCIENCES

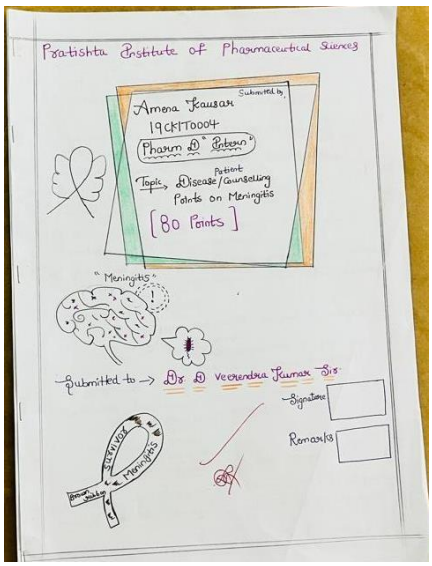
TOPIC : PATIENT COUNSELLING ON VARICOSE VEIN

REFERENCE : STG Book
NED FLIX
MEDSCAPE.

SUBMISSION DATE.

SUBMITTED TO
Dr. D Veerendra kumar Sir.
Assist. Professor.
Department of pharmacy practice.

SUBMITTED BY:
Gilbhatra Kamal.
19CK1T0017
pharm-D Inter.


Pratishta Institute of Pharmaceutical Sciences

Submitted by
Amena Jawsar
19CK1T0004
Pharm D Intern

Topic → Disease / Patient Counselling Points on Meningitis

[80 Points]

"Meningitis"

Submitted to → Dr D Veerendra Jawsar Sir

Signature

Remarks

Meningitis
Bacterial
Viral

PROJECTBASEDLEARNING

Project-based learning is a teaching method where students gain knowledge and skills by working over an extended period to investigate and respond to an authentic, engaging, and complex question, problem, or challenge. This approach not only provides opportunities for students to collaborate and take charge of their own learning but also teaches essential skills such as problem-solving. Additionally, it helps in developing critical thinking and time management skills, which are integral to their future.

Each year, IV B. Pharmacy, II M. Pharmacy, and Pharm D students are assigned a project under the guidance of faculty, to be completed within the academic year. Marks are awarded based on the project results, presentation, and viva-voce. The research and review articles of these projects are published by students in various national and international journals.

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LIST OF PROJECTS OF IV TH YEAR B.PHARM STUDENTS–A.Y.2023-2024

ATotalof11projectsweredoneundertheguidanceoftheirrespectiveguides.

SI.No	Nameof theSuperior	Roll.No	NameoftheStudent	Titleofthe Project
1	K.SandhyaMs.Pharm	20CK1R0003	J.AKHILA	DESIGN AND SYNTHESISOF 1,3,4 OXADIAZOLEDERIVATIV ESACTINGONINFLAMMA TION
		20CK1R0010	A.ASHWINI	
		20CK1R0016	G.DIVYA	
		20CK1R0050	R.SRAVANI	
		20CK1R0077	SOUMYADEEP MAITI	
2	SHAIKRAFIYA,M.Pharm	(20CK1R0001)	PANJALAA KANKSHA	PREPARATION ANDEVALUATION OF HAIRGELS BY USING BUTEAMONOSPERMA FLOWERSEXTRACT
		(20CK1R0031)	RUDRAPRADEEP	
		(20CK1R0049)	MANNEM SRAVANI	
		(17CK1R0075)	CHARALA VENUMADHAV	
		(17CK1R0059)	KAKARJALAPA VANKUMAR	SYNTHESIS AND STUDIEOF BIPHENYLDERIVATIVES AND THEIRANTIMICROBIALA CTIVITIES
3	SHAIKSHAHEEN,M.PHARM.,	(20CK1R0008)	MAMIDIANU	
		(20CKIR0011)	SHAIKASMA	
		(20CK1R0014)	NARIGEBH OOMIKA	
		(20CK1R0043)	MAMIDISHEELA	
		(20CK1R0062)	CHINNAPANGU VISHNU	
4	Y.VENKATESWARLUM.Pharm.	(20CK1R0074)	MDSAIDALAM	"SYNTHESIS AND STUDIEOF BIPHENYLDERIVATIVES AND THEIRANTIMICROBIALA CTIVITIES"
		(20CK1R0066)	AKSHAYHATI	
		(20CK1R0047)	CHINTHASHOBHA	
		(20CK1R0060)	M.VINAYKUMAR	
		(20CK1R0061)	D.VINEETH	

5	BOINAPALLI.RAMBABU M.Pharm(PhD)	20CK1R0023	PATTETIM EGHANA	FORMULATION AND INVITRO EVALUATION OFORALDISINTEGRATINGTABLETSOF DICLOFENAC SODIUMTABLETS
		(20CK1R0033)	K RAJARAJESHWARI	
		(20CK1R0045)	SIRIKONDA SHIREESHA	
		(20CK1R0048)	DUGGESINDHU	
		(20CK1R0051)	SHAIKSULTHAN	
6	BATHINIVIJAYKUMAR M.Pharm	(20CK1R0013)	ATHRAM BHEEMRAO	DESIGN AND INVITROCHARACTERIZATION OFNON-EFFERVESCENTFLOATINGTABLETSOF GLIPIZIDE
		(20CK1R0055)	KVANDANA	
		(20CK1R0055)	DURGAMVASAVI	
7	Dr.CHANDAKAMADHU. M.Pharm,PGDCR..,(PhD)	(20CK1R0030)	BASARAJU PAVANI	INFLUENCE OF CRUDEFIBRE AN LAXATIVEACTIVITYONDRYFRUITS
		(20CK1R0026)	KAVALI NARESHKUMAR	
		(20CK1R0076)	SUBHAMAJHI	
8	DONTHAMALLA.GUNASHEELA M.Pharm(PhD)Scholar	(20CK1R0009)	GUMMAKONDA ANUSHA	FORMULATION OF GELAND IT'S UV PROTECTIONSTUDY OF SOMEMEDICINALFLOWERS
		(20CK1R0032)	PADIRA PRUDVIRAJ	
		(20CK1R0044)	MALOTHSHIREESHA	
		(20CK1R0072)	AMARESHGIRI	
		(19CK1R0003)	PACHIPALA BHAVANI	
9	G.MANASAVEENAM.Pharm	(20CK1R0069)	PRITAMGHOSH	ESTIMATIONOFSPF NUMBER
		(20CK1R0067)	RITWIKDAS	
		(20CK1R0006)	CH.ANAND	
		(20CK1R0071)	TOOBAAYESHA	
10	M.RAJANI.(M. Pharm)	(20CK1R0005)	THOTAAMULYA	PHYTOCHEMICALSCREENING ANDANTIOXIDANT ACTIVITYON METHANOLICEXTRACT OF MANILKARAZAPOTA
		(20CK1R0029)	KONGALANAVYA	
		(20CK1R0042)	KANKALISHARADHA	
		(20CK1R0052)	CH. SURYANARAYANA	
		(20CK1R0068)	BUDDHADEVSHIT	

		(20CK1R0007)	RATLAVATH ANJALI	DEVELOPMENT ANDCHARACTERIZATION OFFLOATNG TABLETS OFMETFORMINHYDROCHLORIDE
		(20CK1R0017)	JONNALAGADDA GOPICHAND	
		(20CKIR0023)	PERUMALLAPALLI MADHURI	
		(20CKIR0036)	MANDADIR USHMITHA	
11	DRYENUMULANETTEKALLUM. PHARM.,Ph.D., Professor	(20CK1R0070)	PUSULURI NAYAKANTIK ALYANBABU	

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LIST OF PROJECTS OF V TH YEAR PHARM D STUDENTS –A.Y.2023-2024

sl no.	Name of theSuperior	Rollno	Name of theStudents	Title
1	Dr.CHANDAKA MADHU M.Pharm,PGV Ph.D(Dept ofpharmacology)	19CK1T0001	KOMARARAPU BHANUSANJANA	EVALUATING VITAMIN-DRUG INTERACTIONS: THECRUCIALROLE OFCLINICALPHARMACIST.
		19CK1T0010	BALKONDASAI SREEVARDHAN	
		19CK1T0014	GAJABIMKAR VAISHNAVI	
		19CK1T0017	SILBHADRA SAMAT	
2	Dr. MD.RASHEEDUDDIN, Pharm.D, ASSISTANT PROFESSOR	18CK1T0005	PEDDAPALLI HAREESH	HYPERTENSIVE PATIENTSAT A PRIMARY CAREHOSPITAL:AN ASSESSMEOF MEDICATIONADHERENCE AND ITS RISKFACTORS
		19CK1T0007	NARAPANGU MOHANASREE	
		19CK1T0013	DONGARIS UMANASREE	
		19CK1T0016	DIPENDUSAHU	
3	Dr.Y.N.KUMAR M.Pharm, Ph.DDirector	19CK1T0003	CHANDANABOINA JYOSHNA	PREVALANCE AND RISKFACTORS OF PREGNANCYINDUCEDHY PERTENSION - A COMPREHENSIVEANALYSISINALOCALPOPULATION
		19CK1T0011	PASULAS ANJEEVANI	
		19CK1T0018	SUBHAJITMANNA	
		19CK1T0020	TIRTHANKAR SANKI	
	Dr.VRAJKUMAR, M.Pharm., Ph.D.,PROFESSORAND PRINCIPAL	19CK1T0004	AMENAKAUSAR	OPTIMIZING THERAPEUTICSTRATEGIES: A PROSPECTIVEANALYSIS OF DRUG PRESCRIBINGPATTERNS IN PATIENTS WITHTYPE2DIABETESMELLITUSAND COMORBIDITIES
		19CK1T0005	NITTAKAVYA	
		19CK1T0019	SUSOVANJANA	
5	Dr. D.VEERENDRA KUMAR Pharm.D,ASSISTANTPROFESSOR	19CK1T0006	SURAPANENI LAKSHMI MANJUSHA	A STUDY ON THEASSESSMENT OF LEVEL OFDEPRESSION,ANXIETYANDSTRESS AMONG PATIENTSWITHDIABETES MELLITUS
		19CK1T0009	PASULAPRASAD	
		19CK1T0012 19CK1T0015	NIMISHAKAVI SPOORTHI BUBAI	

			BHOWMIK	

LIST OF PROJECTS OF II ND YEAR M.PHARM STUDENTS–A.Y.2023-2024

sl no.	Name oftheSu perior	Roll no	Name oftheStu dents	Title	DEPARTMENT
1	Dr V. RAJKUMARM. Pharm. Ph.D.,	(H.T. No.21CK1S1214)	MOZNUR RAHMAN	STABILITYINDICATING METHODDEVELOPMENTAN DVALIDATIONOFFENOFIBRI CACID & PITAVASTATIN BYUSINGRP-HPLCMETHOD	PHARMACEUTICALANAL YSIS
2	Dr V. RAJKUMARM. Pharm.Ph.D.	(H.T. No.21CK1S1209)	BORAS ARITHA	DEVELOPMENTAND VALIDATION OF A RP-HPLCFOR THE SIMULTANEOUSESTIMATION OF QUINAPRILANDHYDROCHLO ROTHIAZIDE INACTIVE	PHARMACEUTICALANAL YSIS
3	Dr V. RAJKUMARM. Pharm. Ph.D.,	(H.T. No.21CK1S1205)	JATANGI MOUNIK A	ANALYTICALMETHOD DEVELOPMENT ANDVALIDATION FORABALOPARATIDE ANDTERIPARATIDEINCOMBI NEDDOSAGE FORMBY RP-HPLCMETHOD	PHARMACEUTICALANAL YSIS
4	Dr V. RAJKUMARM. Pharm. Ph.D.,	(H.T. No.21CKIS12 07)	ANKA MSAHIT HI	METHODDEVELOPMENTAND VALIDATION FOR THESIMULTANEOUSESTIMAT IONOF GATIFLOXACIN ANDAMBROXOL IN PURE FORMAND MARKETED PHARMACEUTICALDOSAGE FORM	PHARMACEUTICALANAL YSIS
5	Dr V. RAJKUMARM. Pharm. Ph.D.,	(H.T. No.21CK1S1215)	MANDA DISOWM YA	RP-HPLCMETHODFOR SIMULTANEOUSESTIMATION OF CIPROFLOXACIN ANDDEXAMETHASONE IN EYEDROPS	PHARMACEUTICALANAL YSIS

6	Dr V. RAJKUMARM. Pharm. Ph.D.,	(H.T. No.21CK1S1211)	GANNOJUTHRIVENI	ANEWRP-HPLCMETHODAND IT'S VALIDATION FOR THEANALYSISOFARTESUNATEANDMEFLOQUINEIN BULKAND PHARMACEUTICALDOSAGEFORMASPERICH GUIDELINES	PHARMACEUTICALANALYSIS
7	G.MANASAVEENA AssistantProfessor	(21CK1S0108)	PANDAVULAMOUNIKA	PHYTOCHEMICAL AND ANTI-HYPERLIPIDEMIC SCREENINGOFMOLLUGOPENTAPHYLLA	PHARMACOLOGY
8	Dr.CHANDAKAMADHU, M.Pharm.,PGDM,Ph.D	20CK1S0101	PoleKalyani	EXPLORINGTHE PHYTOCHEMICALCOMPOSITION ANDGASTROPROTECTIVE EFFECTSOF ETHANOLIC EXTRACTFROM SOLANUM INDICUMLINNLEAVESINALBINORATS:ASTUDYOFANTI-ULCER ACTIVITY	PHARMACOLOGY
9	Dr.CHANDAKAMADHU, M.Pharm.,PGDM,Ph.D	20CKIS0108	Pindiga Uma	STUDY OF ANTIOBESITY ANDANTI-ARTHRITIC ACTIVITY OFLANTANACAMARAEXTRACTINWISTARTALBINORATS	PHARMACOLOGY
10	DrChandrakaMadhu, M.Pharm,PGDM.,Ph.D.,	(H.T.No.21CK1S0101)	N.AMBIKA	INVESTIGATIONINTOTHE ANTIUROLITHIC PROPERTIESOFSYZYGIUMCUMINIEXTRACTUSING AN ETHYLENE GLYCOLINDUCED MODEL IN MALEALBINORAT	PHARMACOLOGY
11	Dr ChandrakaMadhu, M.Pharm, PGDM.,Ph.D.,	(H.T.No.21CK1S0104)	KUNDENAKAVYA	THE INFLUENCE OF CRUDEFIBRE ON LAXATIVE ACTIVITYINBOTHINVITROANDINVIVISTUDIES	PHARMACOLOGY
12	DrChandrakaMadhu, M.Pharm,PGDM.,Ph.D.,	(H.T.No.21CK1S0115)	SANIDULISLAM	STUDYONTHE PHYTOCHEMICALSCREENINGAND IMMUNOMODULATORYACTIVITY OF THE HYDROALCOHOLIC EXTRACTS OFMANGIFERAINDICALEAVESINALBINORATS.	PHARMACOLOGY

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PROJECT WORK – 2023 - 2024

CHRONICRENALFAILURE

Chronic pathology, often known as Chronic renal failure is the end result of Persistentkidney damage and gradual loss of organ function, which results in buildup of dangerous levelof fluid, electrolytes and wastes in body.this can lead to a drop in kidney function (known as theglomerular filtration rate, or GFR), which can be measured using a blood test. CKD can begraded as mild, moderate, or severe, based on the presence of certain markers in the urine. InearlyCKD,thereisstillsomedegreeofrenalfunction,whileinthelatestages,CKDisconsidered to be kidney failure. Chronic kidney disease is on the rise all over the world. One inten people has some form of the disease, which is caused by a number of factors, includingdiabetes,hypertension,obesity,smoking,and high cholesterol.

EPIDEMILOGY: Chronickidneydisease(CKD)isacommonconditionthataffectsmillions ofpeople worldwide.Prevalence:Accordingtothe latestestimatesbytheGlobalBurden of Disease study, the global prevalence of CKD was 9.1% in 2019. This represents anincrease from 7.2% in 1990. Age and gender: The prevalence of CKD increases with age, and ishigher in men than in women. However, the incidence of end-stage renal disease (ESRD) ishigherin women, possibly duetoalongerlifeexpectancy.

- Kidneydiseaseisaconditionthataffectsalotofpeopleintheunitedstates.It'sespeciallycommonina dults,andaffectsaround 15%ofadults (morethan 1in7adults).
- Nearly90%ofpeoplewhohavekidneydiseasedon'tknow theyhaveit.
- Oneinthreeadults intheUnitedStates hasariskforkidneydisease.

ETIOLOGY:

Theetiology(i.e.thecause)ofChronicKidneyDisease(CKD)iscomplexandcanbeinfluencedbymultipl efactors.

Diabetes:DiabetesisaleadingcauseofCKD.Highbloodsugarlevelscandamagethesmallbloodvesselsi nthekidneysovertime, leadingtokidneydamage.

Hypertension: Highbloodpressurecandamagethebloodvessels inthekidneysandaffecttheirabilityto filter wastefrom theblood.

Glomerulonephritis:Thisisaconditioninwhichthetinyfiltersinthekidneys(glomeruli)becomeinflamed and damaged.

Polycystic kidney disease: This is a genetic disorder in which numerous cysts form in thekidneys,leadingtokidney damageandfailureovertime.

Infections:Certaininfections,suchaschronicpyelonephritis,cancauseinflammationandscarrin gin thekidneys,leadingtoCKD.

Obstruction:Blockagesintheurinarytract,suchasfromkidneystones,cancausedamagetothekidneysif nottreatedpromptly.

Medications:Certainmedications,suchasnonsteroidalanti-inflammatorydrugs(NSAIDs)andsomeantibiotics,cancausekidneydamage.

Fatalorganicprocessproblems:

Thiswilloccurifthefoetus'kidneysdonotdeveloptrustedSourcecorrectlywithinthefemaleinternalreproducti veorgan.

Systemiclupuserythematosus:

Thisisassociatedegreeresponseconditionwherebythebody'ssystemattacksthekidneysliketheywerefo reigntissue.

Certainmedications:

Theoveruseofboundmedication,together withNSAIDs,willcausenephropathy

CKDSTAGES:

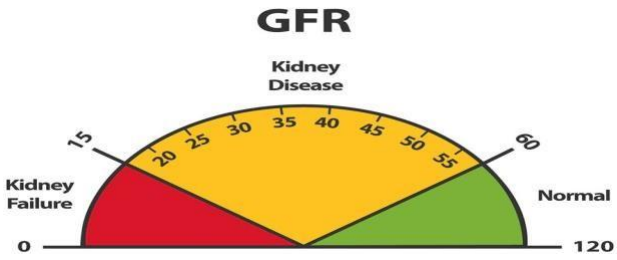

Figure1:Glomerularfiltrationrate

Doctorscan determinehowmuchkidneydamageaperson hasbymeasuringtheirGFR(ascientific

discipline formula that employs a person's age, gender, and their blood serum creatinine level).This could be a good indicator of how well their other organs are working. The diagnostic cluesthat suggest kidney disease include the presence of protein in the urine, high creatinine levels inthe blood, and small kidneys on ultrasound. This reflects the kidneys are slowly losing function.Theincreaseincreatininelevels overtimeis areliableindicator of kidneydisease.

□ **Stage1:**with2orhighGFR(GFR>ninetyml/min)

□ **Stage2:**gentleCKD(GFR=60-89ml/min)

□ **Stage3A:**ModerateCKD(GFR=45-59ml/min)

□ **Stage3B:**ModerateCKD(GFR=30-44ml/min)

□ **Stage4:**SevereCKD(GFR=15-29ml/min)

□ **Stage5:**finalstageCKD(GFR<15ml/min)

CKDSTAGE1KIDNEYFUNCTION(90-100%):

In Stage 1 CKD, the kidneys are working well and the glomerular filtration rate (GFR) is greaterthan90ml/min/1.73m2.However,therearelaboratoryabnormalitieslikeproteinintheurine;

evidence of structural damage to the kidneys on x-ray, ultrasound, MRI, or CT scan; or a familyhistoryofpolycystickidney disease.Patients areusually asymptomatic.

CKDSTAGE2KIDNEYFUNCTION(60-89%):

Stage 2 or mild CKD means that the kidney function is 60 to 89 ml/min/1.7 m2 Frequenturination,especiallyatnight,highbloodpressure,andurineabnormalitiesonurinalysis.However,mostpatientsareasymptomatic.

CKDSTAGE3KIDNEYFUNCTION(30-59%):

In Stage 3 or moderate CKD, the kidney function is 30-59 ml/min/1.73m2. The patient may nothaveanysymptomsyet,ormaystarttoexperiencemildones.Theremaybeurinaryabnormalitiespresentand theserumcreatinineiselevated.

CKDSTAGE4KIDNEYFUNCTION(15-29%):

In Stage 4 CKD, your kidney function is less than 29 ml/min/1.73m2. This means that even ifyou don't have any other symptoms, your kidney might not be working very well. This can causemild,vague, or very seriousproblems.

CKDSTAGE5KIDNEYFUNCTION(<15%):

Stage 5 CKD is a very serious condition with a reduced kidney function. Most patients will needdialysisorakidneytransplantatthisstagecanleadtolife-threatening complications.

ENDSTAGERENALDISEASE

End-stage kidney disease is a stage of kidney disease where the kidneys have stopped workingproperly and it is considered to be an advanced stage. At this point, conservative management(e.g. medications, diet, lifestyle modifications) is not enough to keep the person alive and theywill need to be on dialysis or have a kidney transplant. If the disease progresses to an advancedstage, almostall of yourkidney's functions are lost. Thereareonlytwo treatment optionsavailable at this stage: dialysis (which includes haemodialysis and peritoneal dialysis) or kidneytransplant.

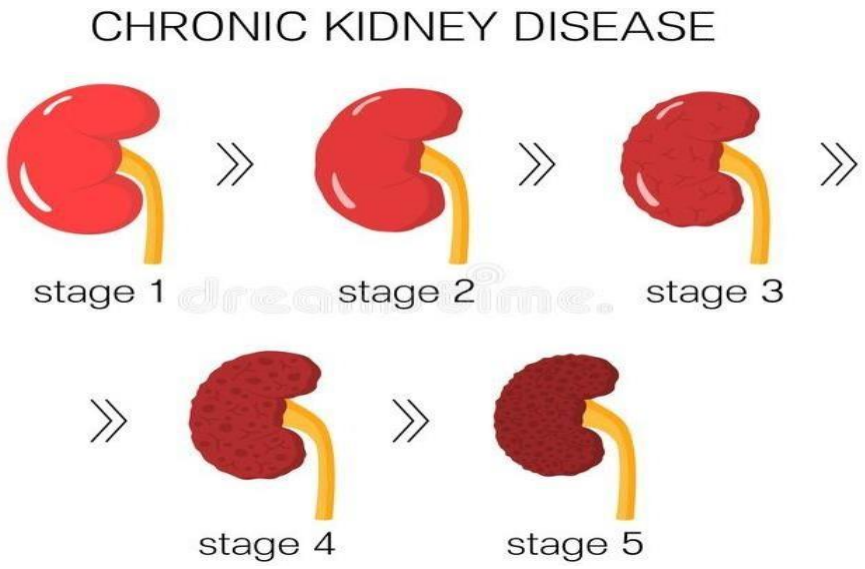

Figure2:stagesofchronickidneydisease

RISKFACTORS:

- Cigarettesmoking
- Highsteroidalcohol
- Diabetes(types1and2)
- Autoimmunedisease
- Obstructivenephropathy,similarlyasbladderobstructioncausedbybenignendocrineabnormality.
- Atherosclerosis
- Cirrhosisandliverfailure
- Narrowingofthearterythathas yourурinaryorgan
- Kidneycancer
- Bladdercancer
- Kidneystones

- Kidneyinfection
- Systemiclupuserythematosus
- Scleroderma
- Vasculitis
- Vesicoureteralreflux,thathappensoncewasteflowsbacktoyoururinaryorgan.

PATHOPHYSIOLOGY:

• While they increase the risk of kidney disease, susceptibility factors do not actually harm thekidneys. Age, low birth weight, racial or ethnic minority status, family history, and reducedkidneymassareriskfactors.

- systemicinflammation,dyslipidaemia,andlowincomeoreducation.
- Drugstherapychangethewaythatinitiationfactorscausekidneydamage.

After the start of a progression factor, the decline in kidney function accelerates. Kidney harm.Diabetes-relatedglycaemia,hypertension,proteinuria,andsmokingareprogression-relatedfactors. The majority of progressive kidney diseases have a final common pathway that leads toirreversible damage to the renal parenchyma and ESRD. Important components of the pathwayincludeglomerularcapillaryhypertension,proteinuria,andnephron massloss.

CKD, or chronic kidney disease, is a condition where the kidneys progressively lose their abilitytofilter wasteand excessfluid fromtheblood.

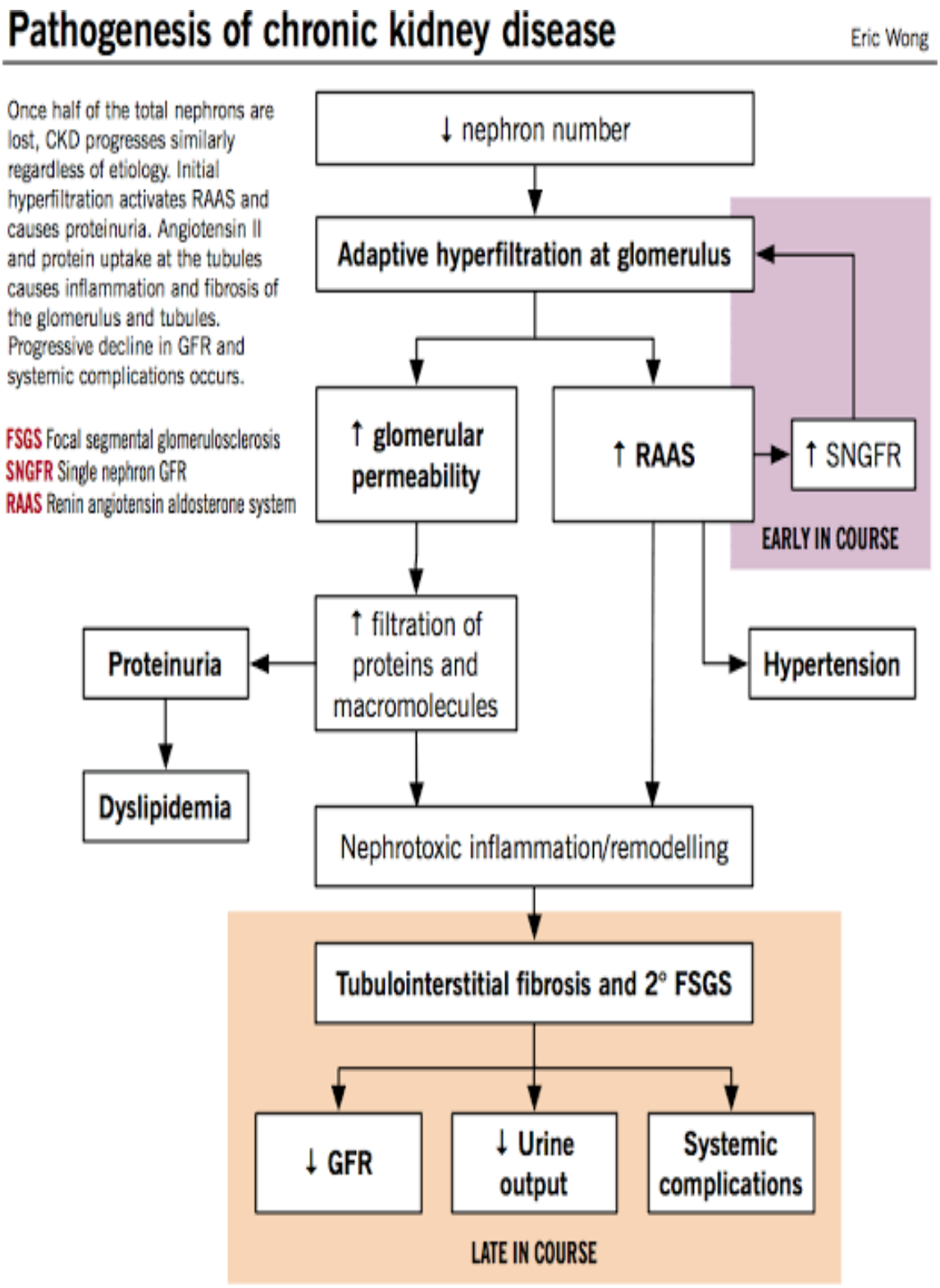

Figure3:pathogenesisofCkD

SIGNSANDSYMPTOMS

Fatigueandweakness: This isoneofthemostcommonsymptoms ofCKD.

Swelling:CKDcancausefluidretentioninthebody,leadingtoswellinginthelegs,ankles,feet,face,and hands.

Shortnessofbreath: Asfluidbuildsupinthelungs,itcanbecomedifficulttobreathe,causingshortness ofbreath.

Urinarychanges: Changesinurination,suchasfrequency,colourandamountmaybeanearlysign of CKD.

Bloodinurine:CKDcancausedamagetothekidneys'bloodvessels,leadingtobloodintheurine.

Nauseaandvomiting: Wastebuildupinthebloodcancausenauseaandvomiting,aswellasaloss of appetite.

Itching:Aswaste buildsupin theblood,it cancauseitching,whichisusually worseatnight.

Musclecramps: Electrolyteimbalances,suchaslowpotassiumandmagnesium,cancausemusclecramps.

Difficultysleeping:CKDcancauseinsomniaandothersleepdisturbances.

DIAGNOSIS

Chronic kidneydisease(CKD)isusuallyasymptomlesscondition,butitcanbediagnosedwith

lab tests. However, other tests are needed to confirm that you have CKD,such as blood pressureandaurinalysis.

Medicalhistoryandphysicalexam:ThePhysicianwillqueryaboutthehealthstatus,includinganyhistor yofkidneydisease,andperformaphysicalexamtolookforsigns ofkidneydamage.

Blood tests: Blood tests are done to measure the level of waste products, such as creatinine andblood urea nitrogen (BUN), in the blood. High levels of these waste products indicate that thekidneys arenotfunctioning properly.

Urine tests: Urine tests are done to check for the presence of protein and other abnormalities,whichcan beasign ofkidney damage.

Imaging tests: Imaging tests such as ultrasound, CT scan or MRI may be performed to look atthesizeandstructureof thekidneys.

Renalultrasound

This non-invasive check provides footage to help your doctor ensure whether or not or notthere'sAssociatein Nursingobstruction.

Othertests:

AdditionaltestsforCKDinclude:

- Akidneydiagnostictest
- Abone densitycheck
- AnabdominalCTscans.

Kidneybiopsy: In some cases, a kidney biopsy may be performed to examine a small pieceofkidneytissueunderamicroscope,to help determinethecauseof thekidneydiseases

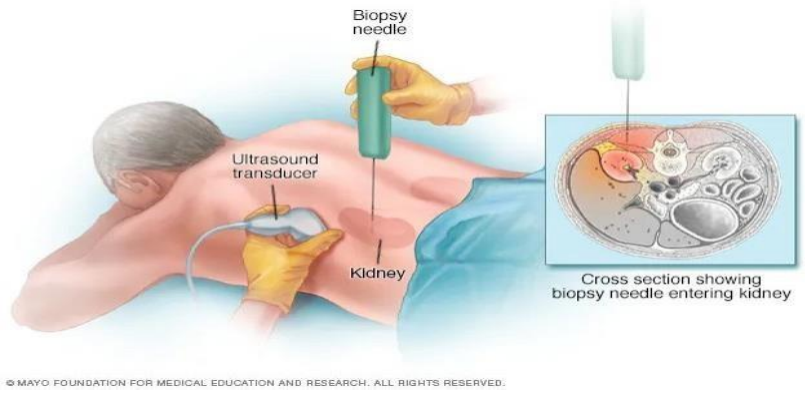

Figure4kidneybiopsy

MANAGEMENT

Bothpharmacologicalandnon-pharmacologicaltreatmentareusedtotreatCKD.Dependingonwhetherdiabetesis presentor not,differentstrategiesshouldbeused.

Pharmacologicaltreatment:

Pharmacologicaltreatment for chronic kidneydisease (CKD) typically involvesthe use ofmedications tomanagecomorbidities andcomplicationsassociatedwith thedisease.

Bothnon-loopdiuretics(e.g.,thiazides)andloopdiuretics(e.g.,furosemide)areeffectiveinallstagesof CKDas adjunctantihypertensive therapy.

- Furosemidecanbe usedsafelyformanagementoffluidoverloadinallstagesofCKD,includingwhenGFRis severelyreducedto< 30 mL/min/1.73m2.

1. Bloodpressuremedications:ACEinhibitorsandARBscanhelptolowerbloodpressureinpeoplewith CKD.IfyourGFRfallsbelow 25%afterstarting thesemedications

2. Diuretics:Diureticshelpsinmanagefluidbuild-upinCKDpatients,particularlythosewithedemaor heartfailure.

3. Erythropoietin-stimulatingagents:ThesemedicationsmaybeusedtotreatanemiainCKDpatientsby stimulating red blood cellproduction.

4. Phosphatebinders:PhosphatebindersmaybeusedtolowerbloodphosphatelevelsinCKDpatients,as highphosphatelevelscancontributeto bonedisease.

5. VitaminDsupplements:VitaminDsupplementsmaybe usedtomanagebonediseaseinCKDpatientsby promoting calcium absorption.

6. Ironsupplements:IronsupplementsmaybeusedtotreatanemiainCKD patientsbyprovidingthenecessary building blocksforredblood cellproduction.

Non-pharmacological: theprogressionofCKDinpeoplebyeatingalow-proteindiet(0.6to0.75g/kg/day) patients with or withoutdiabetes,though thebenefitisminimal.

LIFESTYLEMODIFICATIONS

Changesyoumaketoyourlifestylemayhelpslow theprogressionofchronicnephrosis (CKD).

Stopsmoking

NutritionForeGFR≥30mL/min/1.73m28Pa

rameters:

Protein:0.75-1.0g/kg/day(norestrictionnecessary)

Salt:Thelimitforsodiumis2.3gramsperday.Thatmeansyoucan'thavemorethan2.3gramsofsodiumeach day.Avoid adding saltduringcooking .

Phosphate: No restriction

necessary**Fluid:** Drink water to

satisfy

thirstIncreasedfluidintakeisnotnecessa

ry

Carbonatedbeverages: Avoidance ispreferable

• Limitalcoholintake.

• Followahealthyeatingplanandreduce theamount ofsalt

• Followupandtreatregularlyasdirectedbyyournephrologist.

COMPLICATIONS:

CKDprogressestofailure,complicationscaninclude:

Anaemia: If yourkidneys don't make enougherythropoietin,this canlower yourblood cellcount and cause anemia. This can lead to problems like not getting enough oxygen to your vitalorgans and tissues.

Fluidretention: When the kidneys can't filter out too much salt from your body, it causes fluidto

build up (swelling). This can make your hands and feet swell, and it can also make your lifemoredifficult.

Gout:Arthritisisaconditionthatcanbecausedbyabuild-upofuricacidinthejoints.Thisis

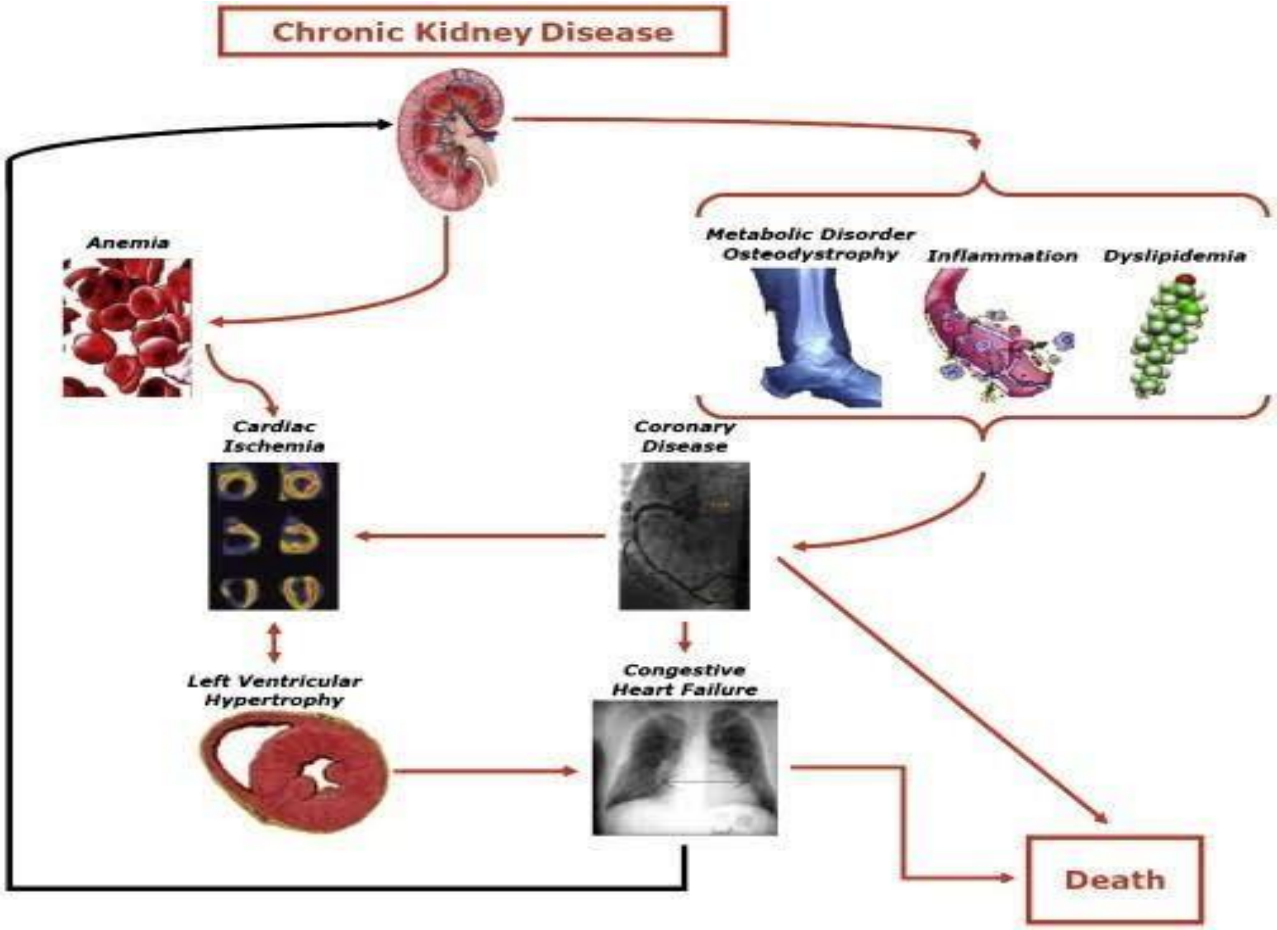

Figure5:complicationsofchronickidneydisease

becauseuricacidisfilteredthroughthekidneysandislinkedtoarthritis.

Hyperkalaemia:thatisoncebloodmetallicelementlevelsrise,presumablyleadingtoheartinjury.

Metabolicpathology,thatisonceacidbuildsupwithinthebody

Osteomalacia:bonescanbecomeweakandbreak.

Pericarditis:thatisoncethesac-likemembraneroundtheheartbecomes inflamed

Secondarythyrotoxicosis:that is once fat-soluble vitamin, calcium, and phosphorus levelssquaremeasureoutofbalance.

END-STAGERENALDISEASE

End-stage kidney disease is a stage of kidney disease where the kidneys have stopped workingproperly and it is considered to be an advanced stage. At this point, conservative management(e.g. medications, diet, lifestyle modifications) is not enough to keep the person alive and theywill need to be on dialysis or have a kidney transplant. If the disease progresses to an advancedstage,almostallofyourkidney'sfunctionsarelost.Dialysis(whichincludeshaemodialysisand

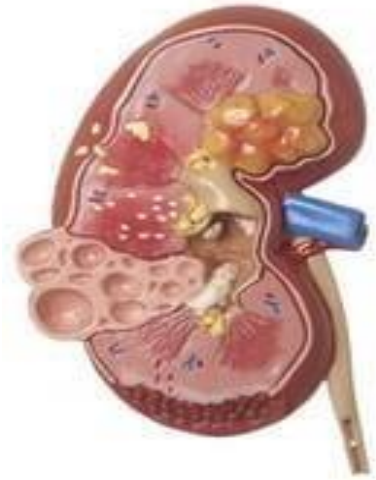

Figure6:Endstagekidney

peritonealdialysis)orkidneytransplantaretreatmentoptions.

Palliative care: For people who are not eligible for dialysis or transplant, or choose not toreceive these treatments, palliative care can be provided to help manage symptoms and improvequalityof life.

DIALYSIS

Dialysis is a way to remove waste products and excess water from your body that accumulate inkidneyfailure.

Dialysis also helps to keep the water level in the body correct and to correct electrolyte and acid-base balance disturbances. However, dialysis cannot replace all the functions of a normal kidney,suchasmaking erythropoietin.

Dialysis is a process in which different substances are separated from your body by using anexternal machine. In dialysis, diffusible substances like medicine and metabolites are separatedfromyourbody.Dialysisincludestwodifferentprocedures:peritonealdialysisandhaemodialysis.

HEMODIALYSIS

In haemodialysis, the blood is passed through a special filter or artificial kidney to remove wasteproducts and excessfluids.

Hemodialysis is a type of treatment that is very safe, effective and comfortable This process isassisted by a dialysis machine. dialysis machine uses a dialyzer to remove waste and water fromthe blood. This is done by pumping the blood through flexible tubes. In some cases, a specialtreatment called heparin infusion or continuous saline flushing is done to prevent clots fromforming.

. You can do hemodialysis at home four to seven times per week,you will need to do at-hometreatments for fewer hours each session, you may choose to do hemodialysis at night while yousleep.

BEFOREHEMODIALYSIS

Before hemodialysis, you may have a minor surgical procedure to make it easier to getblood. To make the most of your hemodialysis treatment, stay as close to your ideal weight aspossible. your ideal weight is the weight you maintain when you don't have any extra fluid inyour body. If you stick to a healthy diet and take care of your sodium levels during hemodialysistreatments, you should be able to reach your ideal weight at the end of every treatment. Whenyour hemodialysis treatments are working and you stay close to your ideal weight, your bloodpressureshould beundercontrol.

ARTERIOVENOUSFISTULA(AVFISTULA): AnAVfistulaisamedicalprocedure that connects an artery and vein in your arm. This makes it easier for doctors to giveyoudialysistreatments.AVgraftsare alsooften usedinAVfistulas.

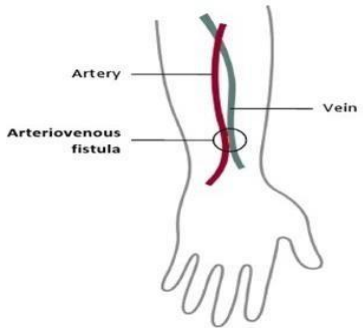

Figure7:Arteriovenousfistula

ARTERIOVENOUS GRAFT (AV GRAFT): These grafts are soft and hollow, and they helpthe connected artery and vein to grow larger. This makes it easier for your body to get blood and oxygen,anditalso helpstheflowofblood in andoutof yourbodyquickly.

Figure8:Arteriovenousgraft

If dialysis needs to happen quickly, your provider may use a catheter (thin tube) to access avein in your neck, chest, or leg, The dialysis machine is a special filter that helps to remove extrafluids and waste products from the blood. This helps to make the blood more purified andhealthier.Thedialysate(specialsolution)ispreparedbythemachine,andithelpstomakethe

blood even more purified. The dialysis machine is about 20 inches long and 5 inches wide. It hasa clear plastic cylinder that holds thousands of tube-like hollow fibres. Each tube is made ofsynthetic semi-permeable material**.** These hollow fibres are connected at the top and bottom ofthe cylinder, andtheyform the"blood compartment."Blood entersthe blood compartment atoneend and exitsattheother endafter beingpurified**.**

- Themachinecleans thebloodandthensends itbacktothebody.
- Eachhemodialysissessionlastsaboutfourhours andisdone3timesaweek.

PurificationOfBloodinDialyzer

In hemodialysis, blood is taken from a patient through a vein and passed through a dialysismachine. The dialysis solution flows around the machine's hollow fibers, called dialysate Inhemodialysis,bloodistakenfromapatientthroughaveinandpassedthroughadialysismachine.

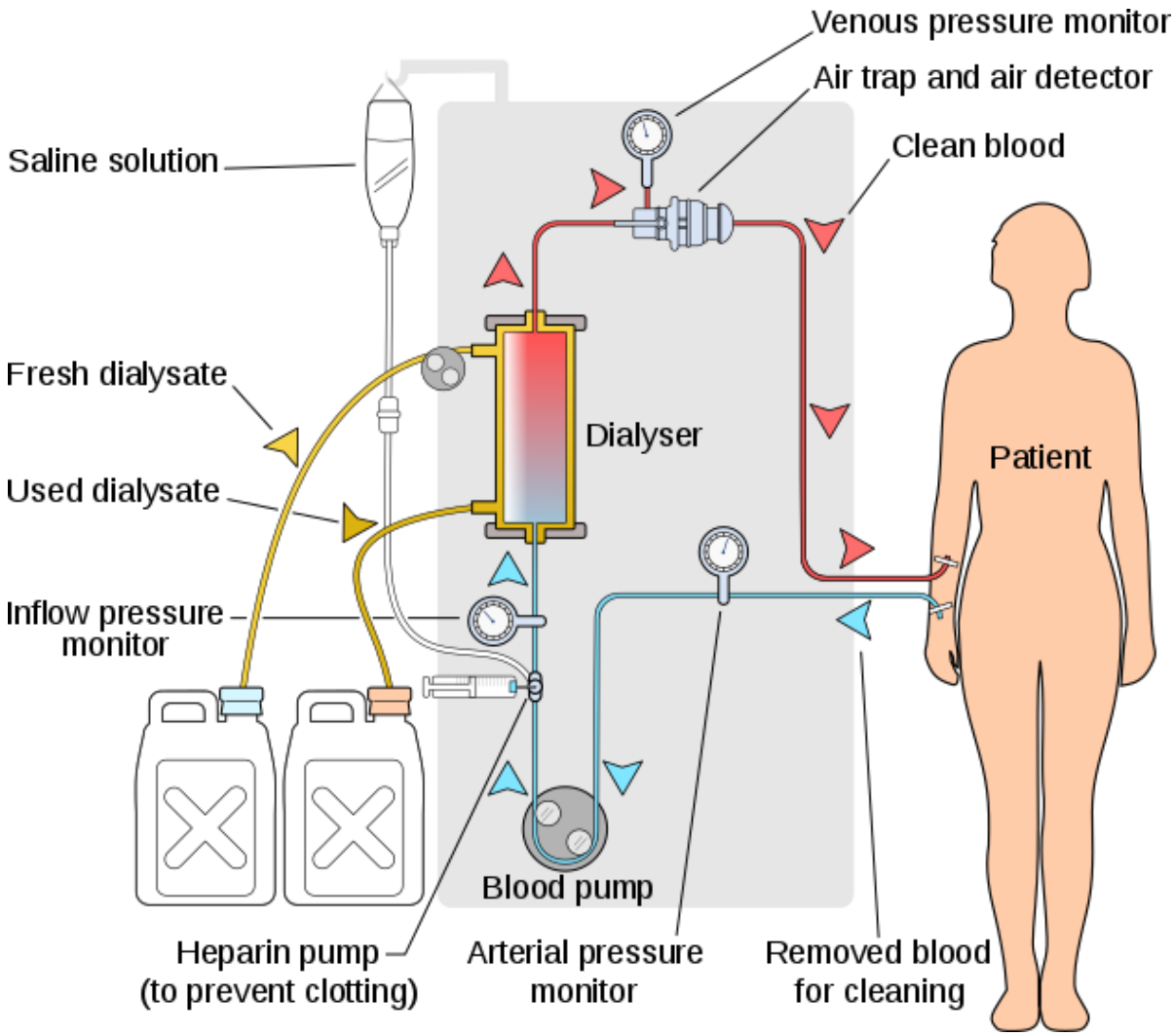

Figure9:PurificationofbloodinDialyzer

Every minute, 300 ml of blood and 600 ml of dialysis solution flow in opposite directionsthrough the hollow fibers that separate the blood and dialysate compartments in a dialyzer. Thesemi-permeable membrane of the hollow fibers allows waste products and excess fluid to beremoved from the blood, while the dialysis solution with toxins and fluid from the blood flowsout.Fourhoursoftreatmentwithhemodialysisresultsinasignificantreductionofbloodureaandserumcreatininelevels, theremovalofexcess fluids,andcorrectionofelectrolytelevels.

COMMONPROBLEMSDURINGHEMODIALYSIS:

Some common problems during hemodialysis include low blood pressure(hypotension), nausea, vomiting, muscle cramps, weakness, and headache. These problems maybe avoided by taking appropriate measures before the dialysis session, such as checking thepatient'sbloodpressureand bloodvolume status.Weightgainbetween sessions shouldbemonitored,andserumelectrolytesandhaemoglobin levels should becheckedaswell.

PERITONEALDIALYSIS

Peritoneal dialysis is a type of dialysis that is used to treat people with kidney failure. It is verypopular and effective, and it is the most common way that dialysis is done at home. In order tocontrol weight gain between dialysis treatments, it is important for patients to keep their fluidsandsaltintakerestricted.

Peritoneal dialysis is a type of dialysis that is not normally used to detoxify. It is only about 10-25% as effective as haemodialysis, and it is only a little more effective than forced diuresis. It isalso time consuming, requiring 24 hours for successful completion as opposed to the 2-4 hourcycles of haemodialysis and haemoperfusion. The only advantage to peritoneal dialysis is that itdoes notrequireanticoagulation.

The peritoneum is a layer of tissue that lines the inside of the abdominal cavity. This membranehelps to keep waste products and toxins in the blood away from the body. Peritoneal dialysis is aprocess of purifying blood throughthemembrane.

PROCEDURE

Peritoneal dialysis works on the same principle as hemodialysis, which allows the diffusion oftoxins from the mesenteric capillaries across the peritoneal membrane into the dialysate dwellingin the peritoneal cavity. A stylet catheter is placed at the bedside or the surgical insertion of aTenckhoffcatheterisperformed,anddialysatefluidisinstilled.1to2Litersoffluidisexchanged each hour.

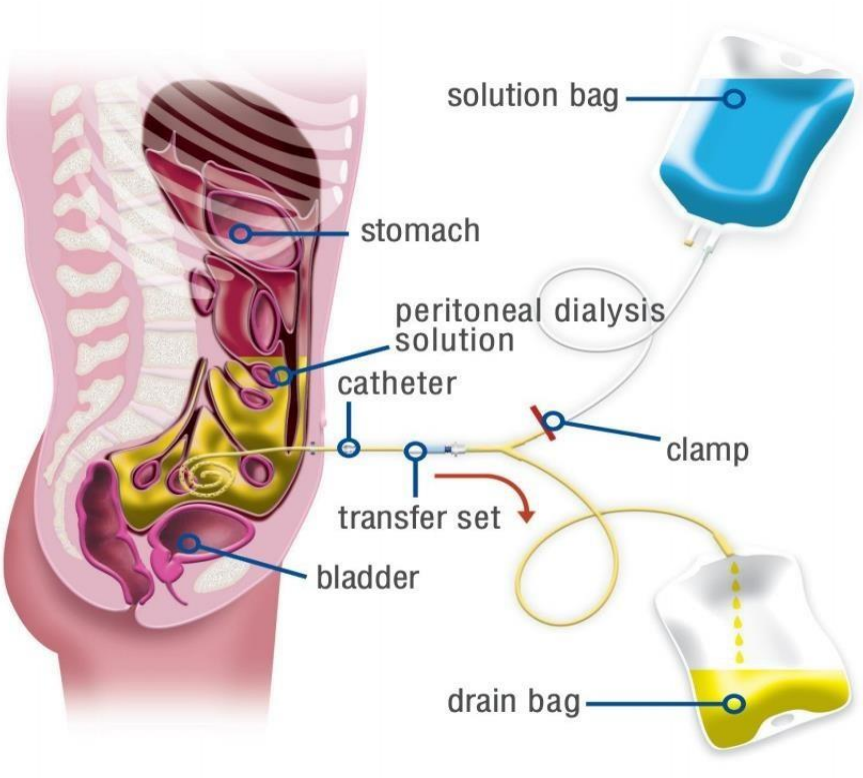

Figure10:peritonealdialysisprocedure

TYPESOFPERITONEALDIALYSIS:

1. IntermittentPeritonealDialysis(IPD)
2. ContinuousAmbulatoryPeritonealDialysis(CAPD)
3. ContinuousCyclingPeritonealDialysis(CCPD)

INTERMITTENTPERITONEALDIALYSIS:

IPD is a type of dialysis where a special catheter is inserted into the patient's abdomen. Thiscatheter has multiple holes which allow the dialysate (solution that absorbs waste products andexcessfluids)to beinfusedinto theabdominalcavityorperitonealspace.

The dialysate slowly absorbs the patient's waste products and excess fluids, and the process isrepeated several times a day. IPD usually lasts for 24 to 36 hours, and it is usually repeated atshortintervalsof 1 to 3 days.

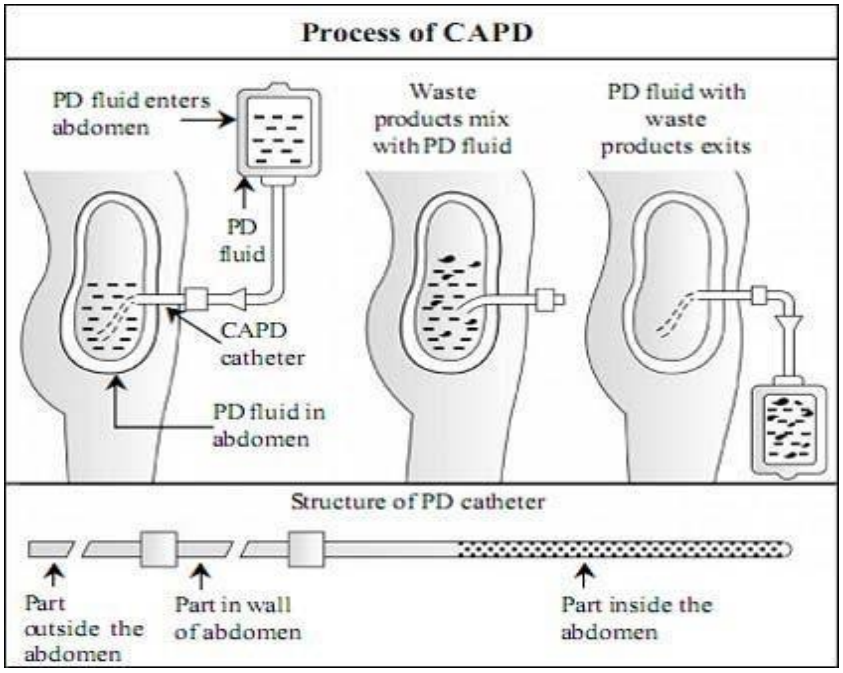

Figure11:processofcontinuousAmbulatoryperitoneal dialysis

CONTINUOUSAMBULATORYPERITONEALDIALYSIS:

CAPD means C – nonstop The process is continued(treatment without stopping for 24 hours aday,7daysaweek).A–itinerantThecasecanwalkaroundandperformroutineconditioning.P – Peritoneal The peritoneal membrane in the tummy works as a sludge. D – Dialysis Thesystem of sanctification of blood. nonstop itinerant Peritoneal Dialysis(CAPD) is a form ofdialysis which can be carried out by a person at home without the use of a machine. As CAPDprovidesconvenienceandindependenceit'sapopulardialysis modalityinnumerous countries.

PROCESS OF CAPD: CAPD catheter The endless access for peritoneal dialysis(CAPDcatheter) is a soft thin flexible silicon rubber tube with multitudinous side holes. It's surgicallyfitted into the case's tummy through the abdominal wall, about an inch below and to the side ofthenexusor belly button.

The CAPD catheter isfittedabout 10 to 14 daysbefore CAPDthresholds. The PD catheter isthe"lifeline "ofCAPDcases,just astheAVfistulaisto acaseon hemodialysis**.**

RENALTRANSPLANTATION:

For those with end-stage renal disease, renal transplantationhas been found to be avery effective treatment. Clinical results are now excellent, with 98% and 90–95%, respectively,patient and graft survival rates after one year. The majority of transplant recipients never need togo back to receiving dialysis. Although many patients with end-stage renal disease are frail andelderlyand/orhaveanumberofco-existingmedicalconditionsthatpreventthemfromundergoing surgery, kidney transplantation is the treatment of choice for patients with end-stagerenaldiseasewho arefitto receivea transplant.

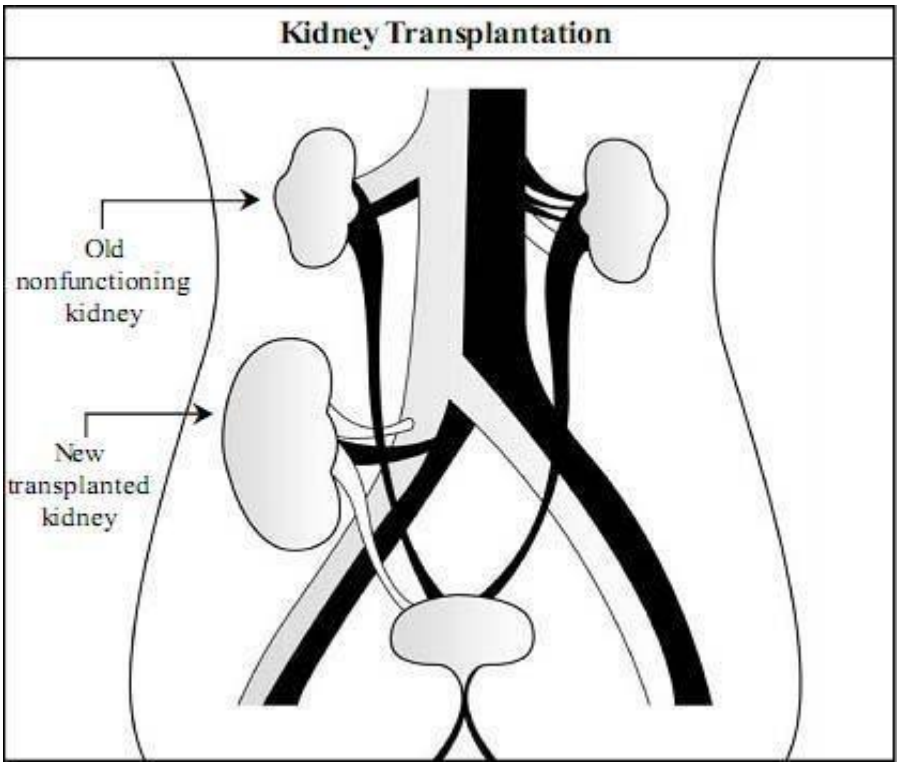

Figure12:Renaltransplantation

Whenthesourceofthekidneyisalivingdonor,thetransplantedkidneyusuallybeginsfunctioning immediately. However, when the source of the kidney is a deceased donor, thetransplanted kidney may not start working right away. In a live kidney donor transplant surgery,boththerecipientandthedonorareoperatedonatthesametime.Thesurgerylastsaboutthree

to five hours and is performed under general anesthesia. The kidney is usually removed from thedonor either by open surgery or by laparoscopy. After removal, the kidney is washed with aspecialcoldsolutionandplacedintotherightlower(pelvic)partoftheabdomenoftherecipient.

After a deceased donor kidney is used, the transplanted kidney may take a few days or weeks tostart working. The recipient with a delayed transplant may need dialysis until kidney functionbecomesadequate.

WHYDOWENEEDPRESCRIPTIONPATTERN?

Prescription patterns tell us a lot about the kind of drugs people use, how often they use them,andhowwelltheyfollowregional,stateornationalguidelinesabouthowtotreattheirconditions.

Thegoalofprescriptionpatternsistoensurethatpatientsreceivethemosteffectivetreatmentfor their condition, while minimizing the risk of adverse effects or drug interactions. Properprescription patterns can also help to reduce the incidence of medication errors, improve patientoutcomes, and optimizetheuseofhealthcare resources.

A recent study has found that prescribing quality is an important dimension that needs to beconstantly evaluated. This means that doctors need to be careful when prescribing drugs, sincethis can leadto problems such as increased side effects, drug interactions, and the developmentofdrug resistance.

A lot of research has been conducted to study the way doctors prescribe medications across thecountry Prescribing is one of the main causes of irrational drug use. Poorprescribing habitsresultinineffectiveandunsafetreatments,aggravationorprolongationofdisease,patientsufferin g and harm, and higher costs. The frequency of irrational prescriptions cannot be reducedwithoutacriticalrootcauseanalysis

A prescription pattern is essentially a set of guidelines or recommendations for the appropriateuse of medications based on various factors such as the patient's medical history, symptoms, age,weight,and other relevantfactors.

Having a standardized prescription pattern can help doctors and other healthcare professionalsmakemoreinformeddecisionsabouttheappropriatetreatmentstoprescribefortheirpatie nts.It

can also help prevent overuse, underuse, or misuse of medications, which can have negativeconsequenceson patients'health.

In addition, prescription patterns can help ensure consistency in the prescribing practices ofhealthcare professionals, which can improve patient outcomes and reduce healthcare costs. Byusing a standardized approachto prescribingmedications, healthcare professionals can alsoidentifyanypotentialdruginteractions orcontraindicationsthatcouldaffectpatientsafety.

Overall, prescription patterns are an important tool for healthcare professionals to ensure thatpatientsreceivethebestpossiblecareandtreatmentfortheirmedicalconditions.

PRESCRIPTIONINDICATIONS:

a. The average number of medicines specified per hassle was calculated to measure the degreeof polypharmacy. It was calculated by dividing the total number of different medicine productsspecified by the number of hassles surveyed. Combinations of medicines specified for one healthproblemwerecounted asone.

B. Chance of medicines specified by general name was calculated to measure the tendency ofdefining by general name. It was calculated by dividing the number of medicines specified bygeneralnamebythetotalnumberofmedicines specified, multipliedby 100.

C. Chance of hassles in which an antibiotic specifiedwas calculatedto measure the overall useof generally overused forms of medicine remedy. It was calculated by dividing the number ofpatient hassles in which an antibiotic was specified by the total number of hassles surveyed,multipliedby 100.

D. Chance of hassles with an injection specified was calculated to measure the overall positionuseofgenerallyoverusedforms ofmedicineremedy.Itwascalculatedbydividingthenumberofpatient hassles in which an injection was specified by the total number of hassles surveyed,multipliedby 100.

1) **Chandel Ritesh Kumar et at., (2016)** Chronic kidney disease is a global health threat,especially for developing countries, due to its increasing incidence, poor progression andhigh treatment costs. Treatment includes dialysis and kidney transplantation. Appropriatedrug selection for patients with chronic kidney disease (CKD) is important to avoidadversedrugreactionsandensureoptimaltreatmentoutcomes.Prescribingdrugsrationall y is a difficult task in CKD patients. Therefore, the present study was planned toknowtheprescriptionpatternofdrugsinchronickidneydiseaseonmaintenancehemodialysisi nJaipur,Rajasthan.ThestudywasconductedintheDepartmentofPharmacologyincollaboratio nwiththe DepartmentofNephrology,S.M.S.MedicalCollege & Hospital, Jaipur (Rajasthan) from April 2017 to March 2018. The socio-demographic profile and details of the medication administered were recorded in a pre-designedandpre-testedform.Theresultswereexpressedaspercentagesandparts.Pearson's correlation coefficient ® was calculated to show the correlation between druginteraction and drug per prescription. In the present study, of 160 chronic kidney patients,most (75.63%) were men with a mean age of 39.5-13.29 years and 24.37% were womenwithameanageof40.41-13.53years.Comorbiditiesincludedanemia(98.13%),hypertension(95.65%),infections(22.5 %),anddiabetesmellitus(6.85%).Averagenumberof drugsper prescription were7.841.40

2) **Sourav Chakraborty saugataghosh et al., (2016)** To study the prescribing pattern ofdrugs for patients with chronic kidney disease (CKD) on maintenance hemodialysis. Thisprospective observational study was conducted in a teaching hospital hemodialysis unitwith CKD patients on maintenance hemodialysis.Patients' clinical profile, drug usepattern, and medication-related problem data were collected in a structured case reportform, and the data were analyzed descriptively. Data from 100 patients recruited over 6months were analyzed. The mean age was 51 (42-57) years; 57% were male, mean[standard deviation (SD)] urea level was 160.11 (70.32) mg/dL, mean (SD) creatininelevel was 8.73 (5.29) mg/dL. A large number (46%) suffered from diabetic nephropathy.The most common comorbidities were anemia (89%), followed by hypertension (85%).Themean(IQR)numberofdrugsperprescriptionwas 10(9-13),withthemajoritybeing

cardiovascular drugs (23.41%), followed by gastrointestinal drugs (15.76%) and vitamins(12.29%). The median (IQR) number of potential drug-drug interactions per prescriptionwas2(2-
3).Theincidenceofadversedrugreactions(ADRs)was46%,withhyponatraemia being the most common (32%), followed by hypoglycaemia (16%) andhypokalemia (10%). Adherence waslow in the majority (64%) of patients. There is ahigh incidence ofpolypharmacy along with significantmedication-relatedproblems,such as B. High drug-drug interactions/prescribing, high incidence of ADRs and lowadherence.tpopulation

3) **Narayana Murthy et al., (2017)** CKD (Chronic Kidney Disease) is a general term forheterogeneous diseases affecting kidney structure and function. It is defined as eitherrenal damage ora decreasedglomerular filtration rate of less than 60mL/min/1.73m2for 3 months or more. The purpose of the present work is to examine the pattern of druguse in chronic kidney disease patients undergoing hemodialysis at the Department
ofNephrology,RajarajeshwariMedicalCollegeandHospital,Bangalore.Thestudyincluded 52 patients, including 41 men, 11 women, with a mean age of 47.6 years. In ourstudy,manypatientshadhypertension(HTN)88.46%(46),withcalciumchannelblockers (CCB) 08.48% (38) being the most commonly prescribed antihypertensive drug.Approximately 1/3 of the patients with diabetes mellitus (DM) 36.53% (19) most of thesepatients were treated with oral antidiabetics (OHA) and less than half of the patients weretreatedwithinsulin01.56%(07).Otherdrugssuchasphosphatebinders(calciumcarbonate andacetate) weremostcommonlyprescribedby 11.16%(50),aspirin by08.70% (39) and statins by 10.04% (45) pt. A total of 448 drugs were prescribed. In 52points,ie about8.61drugs/prescription,showingpolypharmacy.Patientsundergoinghemodialysiswith CKD.
4) **Purna Atray et al., (2021)** The primary intent of the study is to analyze the prescribingpattern and to identify the various drug interactions (DDIs) associated with therapy inpatients with chronic kidney disease (CKD). A total of 214 patients with chronic kidneydisease and transplantation were eventually enrolled after strict adherence to selectioncriteriainthisobservationalstudyconductedovera6-monthperiodinthenephrology

department of a multispecialty hospital. Relevant data was extracted from prescriptions.The calculated mean age was 51.51 16.07 (mean standard deviation) years with malepredominance (69.15%). Hypertension (33.17%) and diabetes (26.63%) are the mostcommoncomorbidities.Theaveragenumberofdrugsprescribedperprescriptionwas 7.83. Based on the first anatomical level of ATC classification, drugs from hematopoieticagentswereahighlyrecommendedclassofdrugs(20.15%),followedbyagentsco ntributing to the cardiovascular system (19.08%), and drugs from the digestivetractand metabolism (17.94%). . This study demonstrates the variability of drug use in CKDpatients.

5) **Ashraf Tadvi etal.,(2018)** Chronic kidney disease (CKD) is a global public healthproblem associated with various complications. CKD patients undergoing hemodialysishave associated comorbidities, and rationally prescribing drugs in these patients is adifficult task. Evaluation of drug prescribing patterns in CKD patients on maintenancehemodialysis. A hospital-basedcross-sectional observational studywas conductedatKing Khalid General Hospital, Al Majmaah, over a period of one year. The records of thepatients in the specified period were viewed and data on prescriptions were analyzed. Atotalof41patientprescriptionswereanalyzed.Themostcommonconcomitantcomorbidity was hypertension in 82.9% of patients, followed by anemia in 73.1% ofpatients and secondary hyperparathyroidism in 63.4% of patients. 85.4% of the patientshad more than one comorbidity. The total number of drugs prescribed was 504 and theaverage number of prescriptions per patient was 12.3. The percentage of drugs prescribedusing generic names was 71.4 and 65.3% of the drugs prescribed were from the WHOEssential Medicines List. The total number of fixed dose combinations used was only1.2%.ThestudyprofileddrugsprescribedforCKDpatientsonmaintenancehemodialysisin asecondarycarehospitalinSaudiArabia.Inthisstudy,alargenumberof drugs were used per prescription, increasing the possibility of drug interactions andadverseevents.

6) **FatheaAbobkerGolegetal.,**(**2014**)End-stagekidneydisease(ESKD)isnowaworldwide pandemic. A systematic review was conducted by searching the PubMed,EMBASE and Google Scholar databases to identify all relevant articles published inEnglish from 2003 to 2012, End Stage, Terminal, Chronic, Renal, Kidney, Risk Factors,Arab,NorthAfricaandLibya.In2003,thereportedincidenceofESKDandtheprevalence of dialysis-treated ESKD in Libya were equal at 200 per million population(PMP). In 2007, the prevalence of dialysis-treated ESKD was 350 PMP, but the trueincidence of ESKD was not available. The latest published WHO data from 2012 showedthat the incidence of dialysis-treated ESKD had increased to 282 PPM and the prevalenceof dialysis-treated ESKD had reached 624 PMP. The main causes of ESKD were diabetickidney disease (26.5%), chronic glomerulonephritis (21.1%), hypertensive nephropathy(14.6%)andcongenital/hereditarydisorders(12.3%).Thetotalnumberofdialysis centers was 40 with 61 nephrologists. The nephrologist/internist to patient ratio was 1:40andthenursetopatientratiowas1:3.7.Between2004and2007,only135life-threatening kidney transplantswere performed. ESKD is a major public health problemin Libya, with diabetic kidney disease and chronic glomerulonephritis being the maincauses. The most common comorbidities were hypertension, obesity and the metabolicsyndrome.

7) **Purna Atray et al,.(2021(**The primary intent of the study is to analyze the prescribingpattern and to identify the various drug interactions (DDIs) associated with therapy inpatients with chronic kidney disease (CKD). A total of 214 patients with chronic kidneydisease and transplantation were eventually enrolled after strict adherence to selectioncriteria in this observational study conducted over a 6-month period in the nephrologydepartment of a multispecialty hospital. Relevant data was extracted from prescriptions.The calculated mean age was 51.51 16.07 (mean standard deviation) years with malepredominance (69.15%). Hypertension (33.17%) and diabetes (26.63%) are the mostcommoncomorbidities.Theaveragenumberofdrugsprescribedperprescriptionwas 7.83. Based on the first anatomical level of ATC classification, drugs from hematopoieticagentswereahighlyrecommendedclassofdrugs(20.15%),followedbyagents

contributing to the cardiovascular system (19.08%), and drugs from the digestivetractand metabolism (17.94%). . This study demonstrates the variability of drug use in CKDpatients.

8) **Avez ALI et al., (2021)** The current study was conducted to review and evaluate thepattern of medication use in patients with chronic kidney disease (CKD). A 12-monthprospective observational study involving 384 CKD patients was conducted at ShadanTeaching and General Hospital, Peerrancheru (Hyderabad) The inclusion and exclusioncriteria. Of the 384 patients, 249 (65%) were male and 135 (35%) were female with amean age of 58.28 (SD: 13.12). A total of 384 prescriptions with a total of 3634 drugswere examined, of which drugs affecting the cardiovascular system were prescribed mostfrequently (36.37%). The average number of drugs per prescription was found to be 9.08when considering the total number of prescriptions. The percentage of drugs prescribedunder generic names was 15.57%. The percentage of encounters with antibiotics was25%, while the percentage of encounters with injections was 86%. The percentage ofdrugs prescribed from the Essential Drug List orFormulary was 26.36%. Assessingpatterns of medication use in CKD patients against the WHO core indicators helps tounderpin current hospital guidelines for optimal use of medication. The introduction of aclinicalpharmacisttogetherwithamultidisciplinaryteamprovidespatientswithintensivecare and helpsimprovetheclinicaloutcome…

9) **Paik J.M.a,b,c,d et al., (2017)** The medication burden of patients with end-stage renaldisease (ESRD) onhemodialysis,a patient population witha highcomorbidityburdenand complex care requirements, is among the highest of any of the chronic diseases. Thegoal of this study was to describe the medication burden and prescribing patterns in acontemporary cohort of patients with ESRD on hemodialysis in the USA. We used theUnited States Renal DataSystem databasefrom January 1, 2013,andDecember 31,2017,toquantifythemedicationburdenofpatientswithESRDonhemodialysisaged ≥18years.Wecalculatedtheaveragenumberofprescriptionmedicationsperpatientduringeach

respectiveyear(January–December),numberofmedicationswithinclasses,

including potentially harmful medications, and trends in the number of medications andclasses over the 5-year study period. Results: We included a total of 163,228 to 176,133patients from 2013 to 2017. The overall medication burden decreased slightly, from ameanof7.4(SD3.8)medicationsin2013to6.8(SD3.6)medicationsin2017.Prescribing of potentially harmful medications decreased over time (74.0% with at leastone harmful medication class in 2013–68.5% in 2017). In particular, the prescribing ofnon-benzodiazepine hypnotics, benzodiazepines, and opioids decreased from 2013to2017(12.2%–6.3%,23.4%–19.3%,and60.0%–53.4%,respectively).Thistrendwasconsistent across subgroups of age, sex, race, and low-income subsidystatus.Patientswith ESRD on hemodialysis continued to have a high overall medication burden, with aslight reduction over time accompanied by a decrease in prescribing of several classes ofharmfulmedications.Continuedemphasisonassessmentofappropriatenessofhighmedication burden in patients with ESRD is needed to avoid exposure to potentiallyharmfulor futilemedicationsinthispatientpopulation.

10) **Rowa Al-Ramahi etal.,(2012)**To determine the medication prescribing pattern inhospitalized patients with chronic kidney disease (CKD) in a Malaysian hospital, weprospectively studied a cohort of 600 patients in two phases with 300 patients in eachphase. The first phase ran from early February to late May 2007 and the second phasefrom early March to late June 2008. Patients with CKD who had an estimated creatinineclearance of 50 mL/min and were older than 18 years were included. A data collectionform was used to collect data from the patient's medical records and chart review. Allsystemicdrugsprescribedduringthehospitalstaywereincluded.Patientswereprescribed 5795 drugs. In the first phase, patients were prescribed 2,814 prescriptionscontaining176differentdrugs.Inthesecondphase,2981outof158drugswerepres cribed.Themeannumberofdrugsinthefirstandsecondphaseswas9.383.63and 9.94 3.78, respectively (P-value = 0.066). The five most commonly used drugs werecalcium carbonate, folic acid/vitamin Bcomplex,metoprolol,lovastatin,and ferroussulfate.Themost commonlyused drugclasses were mineral supplements, vitamins,antianemics,antibacterials,andbeta-blockers.Thisstudyprovidesanoverviewof

prescribingpracticeinacohortofhospitalizedCKDpatientsandidentifiespotentialareasfor improvementin prescribing

11) **JanetMaryOommenetal.,(2012)**Patternofchronickidneydiseasepatientsundergoing hemodialysis at both hospitals. The study was conducted in a tertiary carehospital and a private hospital over a period of nine months. Patients with chronic kidneydisease who were on maintenance hemodialysis for at least one month were included.Information such as sociodemographic and clinical characteristics, previous medications,comorbidities and current medications were noted on self-created patient forms. Meanstandard deviation and percentages and relevant statistical tests such as the Chisquare testwere used. The majority of patients were middle socioeconomic class in private hospitalsand lower middle class in tertiary hospitals. Most were unemployed (50.60%, 36%),married(90.36%,88%)andhadhighschooldiplomas (62.65%,45.33%).Approximately 78(93.97%)patientshadtertiaryhealthinsuranceand39(52%)hadprivate/healthinsurance. Hypertension has been found to be the leading cause in tertiary and privatehospitals. Calcium channel blockers (77.10%,53.30%) were commonly prescribed inbothhospitals.Erythropoietin(69.80%),calciumacetate(21.70%)andantidiabetics(insulin 10.84%) in tertiary hospitals, while newer and more expensive drugs such asdarbepoetin,ironsupplementsandlanthanumcarbonatewereprescribedinprivatehospitals.

12) **Anina Anil et al., (2021)** The study was conducted prospectively by using a sample sizeof 135 patients with the aim of assessing the prescription pattern of drugs used in chronickidney disease patients undergoing haemodialysis in nephrology department for a studyperiodof6months.Theobtainedparameterswereanalysedandtheresultsconcludedthat the most prescribed drug in the study population was antihypertensives (16%) whichwasfollowedbymultivitamins(13%),haematinics(11%),diuretics(7.4%),erythropoiet in stimulating agents (7.2%) and phosphate binders (6.7%). The study hashelped to provide an overall estimate of the drugs being prescribed among the CKDpatientsintheconcernedtertiarycarehospital.Incorporatingastandardassessmentand

treatment may reduce the complications and adverse reactions seen in these patients andwould help doctors, medical professionals and family members to better understand thephysical and psychological problems of patients with CKD on haemodilaysis. This wouldinturnimprovetheirqualityoflifeandreducethemortalityriskinthispopulation.

13) **Fahad M et al., (2018)** This study was performed to analyze various demographic datasuch as age, gender, nationality, status of the patients, and the causes of end-stage renaldisease (ESRD) of 349 patients who were undergoing hemodialysis (HD) during theperiod from January 2013 to December 2015 at the Dialysis Center of King KhalidHospital in Tabuk City. One hundred and fifty-two patients (43.6%) were on HD in 2015.Age of the patients ranged from 9 to 93 years and the mean age was 51.3 ± 17.6 years.Majority of the patients, i.e., 140 (40.1%) were in the age group of 40–59 years, followedby the age group of 60–79 years by 27.8% (97 patients). Saudis constituted 84.2% (294)and non-Saudis accounted 15.8% (55) of the patients over the years studied. There were198males(56.7%)and151females(43.3%).Thedeathratein2014was6.2%,whereasit increased in 2015 to 10.5%. The high escape rate (10.3%) of patients was in 2014.Diabetic nephropathy was the most common cause of ESRD, accounting for 30.4% of allcases, followed by unknown etiologies accounting for 25.2%. Nearly 22.6% of all ESRDcases had hypertension. Primary glomerular disease was seen in 8.9% and obstructiveuropathy in 3.7%. Other causes constituted 7.4% of the cases. The data of ERSD patientsin Tabuk City are comparable with that of other regions of the Kingdom of Saudi Arabia.We conclude that analysis studies of HD centers help to understand the problems and theneeds of the patients, find the solutions, and create a connection between the consumersandhealth-careproviders.

14) **SridharSrimathetal.,(2017)**Patients on hemodialysis are highly dependent withseveral comorbid conditions who often have unsatisfactory rehabilitation, poor prognosisand suffer additional burdens including invasive interventions and time commitment.Patientssufferfromfurtherlossesinprofessional,social,sexualandpsychological contexts,inadditiontophysiologicalandemotionalshocksfeltatthetimeofdiagnosis

and during the course of treatment. Hence a study is conducted to assess the drug usepatterns and QoL (SF-36) in HD patients (n=105). Hypertension (100%) was found to bethe most common comorbid condition followed by anemia (85.71%), DM (60%), CAD(33.33%),hyperlipidemia(26.67%)andhypothyroidism(14.8%).Amongdruguse patternsantihypertensives(100%),anticoagulants(100%)andeyrthropoietin(100%)weremostcommonlyprescribed.Thepresentstudyrevealedthatthestudysampleundergoing hemodialysis had lower health related QOL scores for all the 8 domains forthe first assessment compared to the second assessment. But there was no significantdifference between the two assessments. After the follow up, in both males and females,all the domain scores were found to be significantly improved. In males, after follow up,bodily pain was more improved followed by vitality, general health, role physical, socialfunctioning, role emotional and mental health. In females, after follow up, bodily painwas more improved followed by general health, vitality, social functioning, mental healthandphysicalfunctioning.

15) **S. Rakshana and Preetha Selva et al., (2018)** Chronic kidney disease patients need totake careful care when taking drugs, in order to prevent further renal damage. This studylooked at the prescription patterns of drugs used by chronic kidney disease patients. Outof the 448 patients studied, 237 were male and 211 were female. 45.98% of the people inthe study were between the ages of 46 and 60. The total number of drugs prescribed was3132. Of these, 533 were vitamins, 470 were anti-ulcer drugs, 417 were diuretics, 309wereantibiotics,260wereantiemetics,228wereantihypertensives,211wereantihistamines, 211 were antiplatelet drugs, and 202 were antidiabetics. 2518 (80.39%) ofthe drugs were taken by oral route and 493 (15.75%) were taken by injection. AccordingtoWHOdrugprescribingindicators,anaverageof7.2drugswereprescribedperencounter.Thisstudyshowsthecurrentprescribingpracticeofnephrologistsforhospitalized patients with chronic kidney disease. Due to polypharmacy, it is inevitablethat clinicianswill prescribe generic drugsfrom the National list of Essential Medicinestorationalizedrug therapy.

16) **Abdul Nafih1, et al., (2017)** Background Patients treated with hemodialysis and renaltransplant require complex therapy regimens that manage comorbid conditions such asdiabetes, hypertension, and so on; as a result, they may develop drug-related issues.Inappropriatemedicationusageraisestheriskofdrugrelatedproblems,whichcanmanifest as excessively extended hospital stays, higher expenses, and overuse of medicalservices. Prescribing pattern among the patientstreated with hemodialysis and renaltransplantation are not well characterized previously. Objectives The objective of thestudy is to investigate drug prescription trends in hemodialysis patients and to study theprescribingpatternsofmedicationsinkidneytransplantationpatients.Materialsandmethods Theprospectiveobservationalstudywasconductedoveraperiodof8months,

i.e. from October 2021 to June 2022 in end stage CKD patients treating with maintenancehemodialysisand renal transplant. Different classesof drugs prescribed and percentageof drugs per prescription was estimated in this study. Data were analyzed descriptively.Results 105 patients recruited have been analyzed of which 76 (72.38%) were male and29 (27.6%) were female. Polypharmacy (use of ≥5 medications) was observed in 91.5%in hemodialysis patients and 100% in renal transplant patients.The most prescribed drugsin hemodialysis patients were Cardiovascular Drugs 72 (100%), and in renal transplantpatients, immunosuppressant were highly prescribed 33 (100%). Conclusion This studyconcludes that the cardiovascular agents and immunosuppressant were the most commondrugsprescribedamongthehemodialysisandrenaltransplantpatientsrespectively.polypharmacy among overall patients were observed and it may initiate drug relatedproblems.

Hemodialysisisatreatmentforpatientssufferingwithend-stagerenaldisease(ESRD)Hemodialysispatientsrequireseveralmedicationstomanagetheirco-morbiditiesandcomplications of ESRD. Medication safety and efficacy in these patients depend on prescriptionpatterns and medication adherence. Prescription pattern studies in haemodialysis can provideusefulinsightsintothepharmacotherapyofthesepatientsandhelpidentifygapsandopportunities to improvemedicationsafety andefficacy.

The need for the study of prescription pattern trends in hemodialysis patients is evident for thefollowingreasons:

Hemodialysis patients have a burden of co-morbidities, and medication therapy is essential forthe management of these comorbidities. However, medication-related problems, such as druginteractions,adversedrugreactions,andmedicationnon-adherence,arecommoninthesepatientsandmay contributetoincreasedmorbidityand mortality.

Hemodialysis patients often require multiple medications to manage their comorbidities. Thecomplexity of medication therapy in these patients can lead to medication errors and suboptimaltreatmentoutcomes.

There is a lack of prescribing guidelines specific to hemodialysis patients. Prescribing guidelinesforthegeneralpopulationmaynotbeappropriateforthesepatients,astheyhavealteredpharmacokineticsandpharmacodynamics due toESRDandhemodialysis.

There is a knowledge gap in the prescribing patterns and medication safety in hemodialysispatients. Prescription pattern studies in these patients can help identify gaps in knowledge andinform thedevelopmentofguidelinesandeducationalinterventionstoimprovemedicationsafetyand efficacy.

Hemodialysis is a costly treatment, and medication-related problems can increase the economicburdenonpatientsandthehealthcaresystem.Prescriptionpatternstudiescanidentifyopportunitiestoimprovethecost-effectivenessofmedicationtherapyinhemodialysispatients.

AIM:

Todeterminetheprescriptionpatterntrendsinhemodialysispatients.

OBJECTIVE:

- Tocollectthedatafromthedialysiswardandnephrologydepartmentof VijayaKrishnamulti-specialty hospital.
- Tocategorizetheprescriptionsbasedongenderandage.
- Tostudytheprescriptionpatterninthetreatmentofhaemodialysis withcomorbidconditions.
- Tolistoutthefrequentlyprescribeddrugs andthedrugclasses.

STUDYDESIGN:

This is a prospective observational study conducted for 6 months at Vijaya Krishna multi-specialtyhospital,Suryapet.patientswhometintheinclusioncriteriaaretakenintoconsideration.

COLLECTION OFDATA:

Usingsuitablydesignedcollectiondata,thefollowingdetailsarecollected.

- Patientdemographics.
- Laboratoryinvestigationreports.
- Patienttreatmentcharts.
- Diagnosis.
- Durationoffrequencyofhemodialysis.

INCLUSIONCRITERIA

- Patientswhoarereceivinghemodialysistreatment
- Patientswhoareat30years old
- Patientswhohavebeenonhemodialysis treatmentforaminimumof3months
- Patientswhohaveprovidedinformedconsenttoparticipateinthestudy

EXCLUSIONCRITERIA:

- Patientswhohavereceivedkidneytransplant
- Patientswhoarepregnantorlactating
- Patientswithahistoryofallergyoradversereactionstothemedicationbeingstudied
- Patientswithahistoryofsubstanceabuseordependence

METHODSANDCOLLECTIONOFDATA:

- Dataiscollectedthrough.:
- Patientinterviewtodeterminetheirchiefcomplaints,historyofpresentillness,pastmedicalhistory, and dietintake.
- Medicalrecords.
- Patientprescription.

DURATION OFTHESTUDY:

Thestudyhas beenconductedforaperiodof6months.

PLACEOFTHESTUDY:

ThestudywascarriedoutinVijayaKrishnamulti-specialtyhospitalofthenephrologydepartmentin Suryapet.

Table1representsATotalof60prescriptionsthatwerecollectedrandomlyfromthepatientsandwereanalyzedforaprescriptionpatterninHaemodialysispatients.Among60studysubjects, 85 % are males, and 25% are females this study reveals that the majority of cases aremales.

Table1:Distributionbasedongender

GENDER	NO.OFPATIENT'S	%OFCASES
Male	45	85%
Female	15	25%
Total	**60**	**100%**

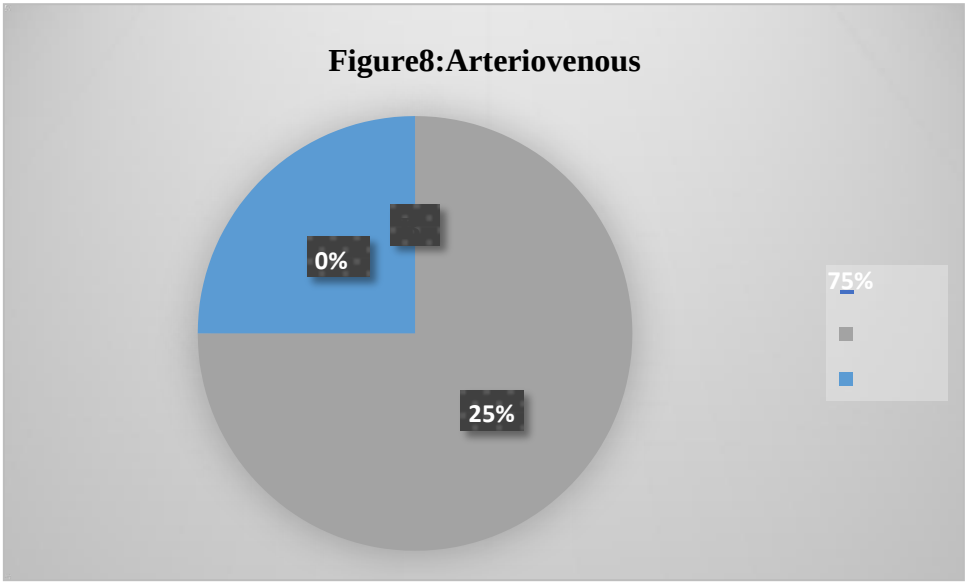

Figure1:DistributionBasedonGender

Table 2 represents the age and gender-wise distribution of patients involved in the study. Duringthe study, the maximum number of patients were found in the age group 30-40 years,16.6%arefrom40-50years,26.7%arefrom50-60years,30%arefrom60-70years,and18.4%arefrom 70-80years.

Table2:Distribution based onagegroup

AGE(YEARS)	NO.OF PATIENTS MALE(%)	NO.OFPATIENTS FEMALE(%)	(%)NO.OFCASES
30-40	4(8.8%)	1(6.7%)	8.3%
40-50	7(15.5%)	3(20%)	16.6%
50-60	14(31.1%)	2(13.3%)	26.7%
60-70	12 (26.6%)	6(40%)	30%
70-above	8(18%)	3(20%)	18.4%
Total	**45(100%)**	**15(100%)**	**100%**

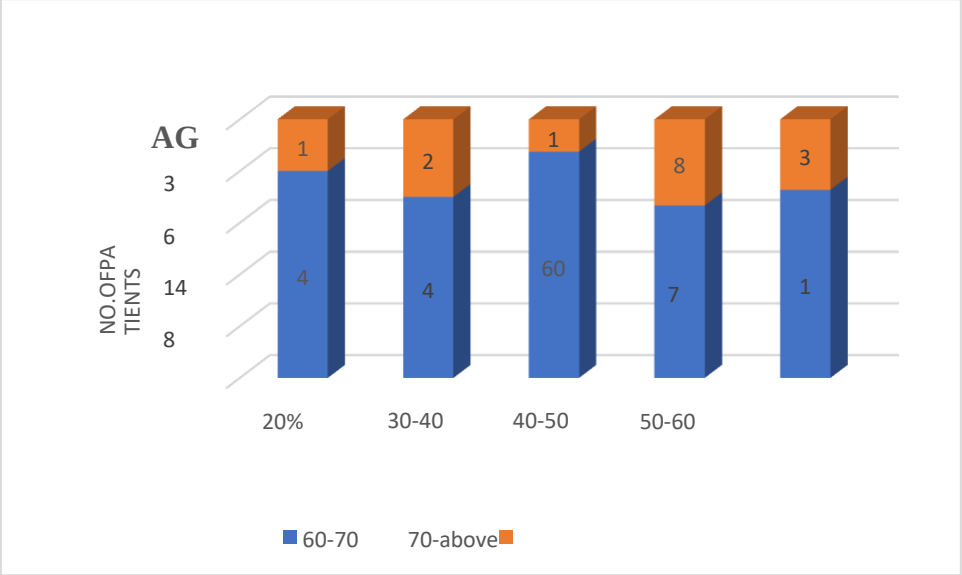

Figure2:DistributionBasedon agegroup

Table3RepresentBMIinthestudy.Amongthe60patients,totalNormalweight25(41.6%)wereoverweight22(36.7%)wereObeseweight9(15%) wereunderweight4(6.7%).

Table3:Distribution basedonBMI(bodymassindex)

WEIGHT	NO.OFPATIENTS	NO.OFCASES(%)
Underweight	4	6.7%
Normal	25	41.6%
Overweight	22	36.7%
Obese	9	15%
Total	**60**	**100%**

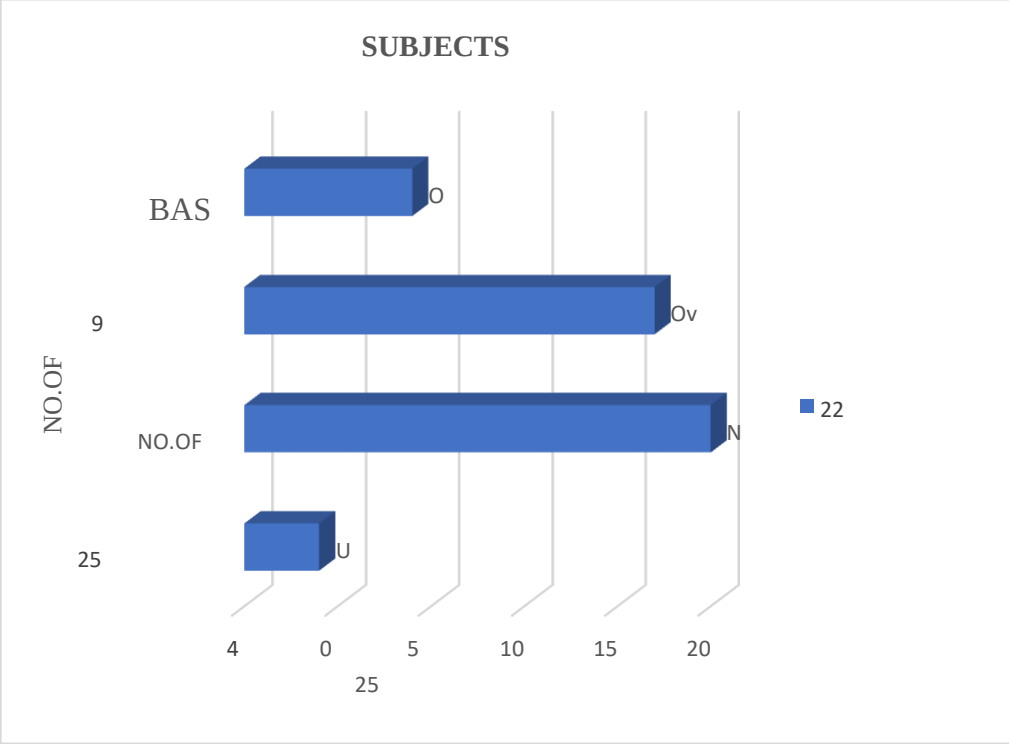

Figure3:DistributionBasedonbodymassindex

Table4representstheDominociliaryAmong60subjects 63.4%arefromaruralarea,and36.6 %arefromurbanareas thisstudyrevealsthatthemajorityofcasesarefromurbanareas.

Table4:Distributionbasedondomiciliary

DOMICILIARY	NO.OFPATIENTS(%)	NO.OFCASES%
Rural	38	63.4 %
Urban	22	36.6%
Total	**6**	**100%**

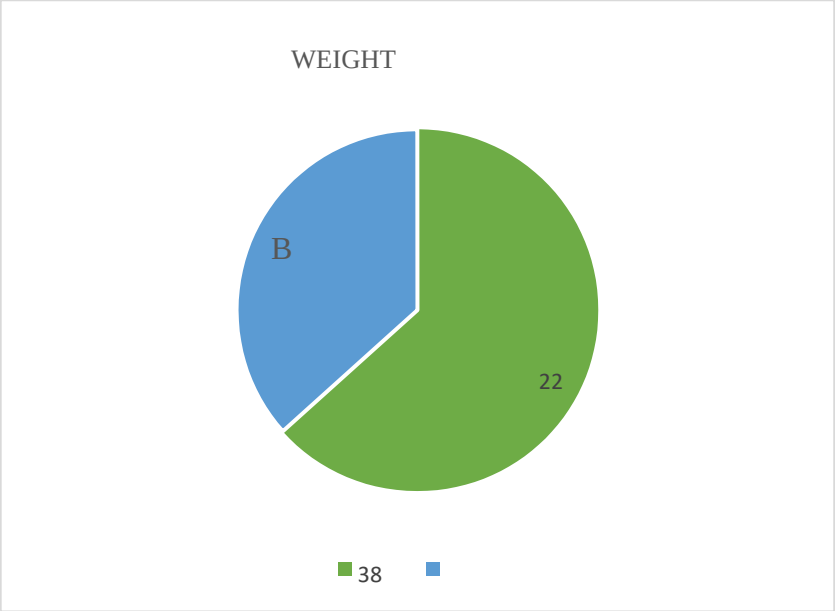

Figure4:DistributionBasedondomiciliary

Table5representsthealcoholandnon-alcoholicandgender-wisedistributionofpatientsinvolved in this study. Among 60 subjects 75% are alcoholic and 15 % are non-alcoholic, thisstudyreveals thatthemajorityofalcoholicpatientsareundergoinghemodialysis.

Table5:Distributionbasedonsocialstatus(alcoholic)

TYPE	NO.OFPATIENTS(%)	%OFCASES
Alcoholic	45	75 %
Non-alcoholic	15	15%
Total	**60**	**100%**

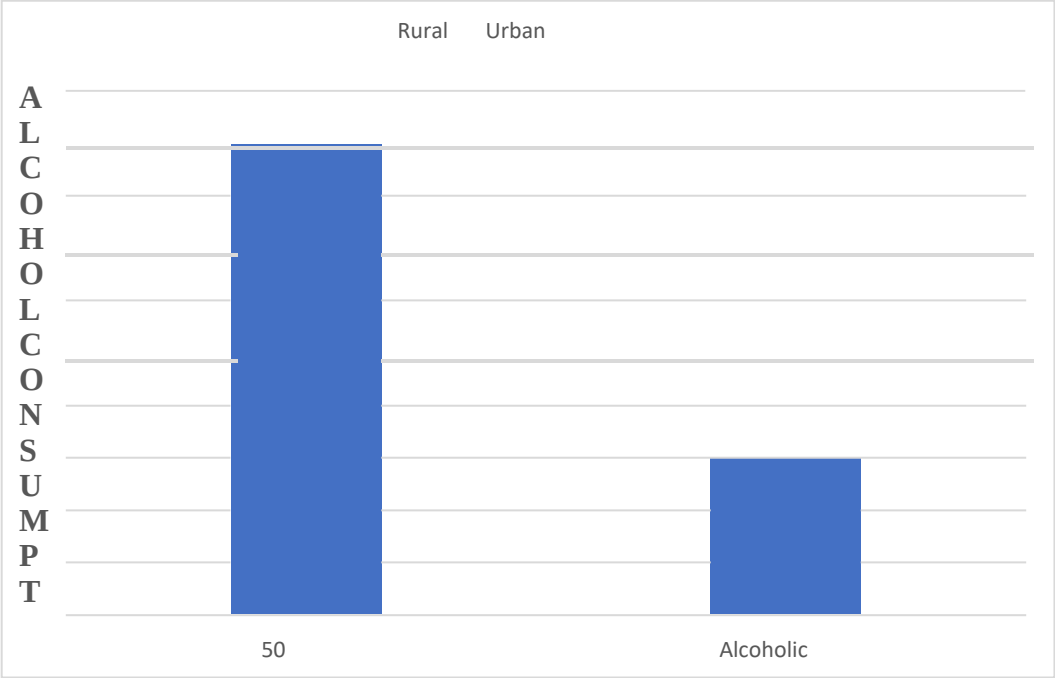

Figure5:DistributionBasedonsocial status(Alcohol)

Table 6 represents the smoker and non-smoker and gender-wise distribution of patients involvedin this study. Among 60 subjects 75% are alcoholic and 15 % are non- smoker, this study revealsthatthemajority of alcoholicpatientsareundergoinghemodialysis.

Table6:Distributionbasedonsocialstatus(smokers)

TYPE	NO.OFPATIENTS	%OFCASES
Smoker	48	80%
Nonsmoker	12	20%
Total	**60**	**100%**

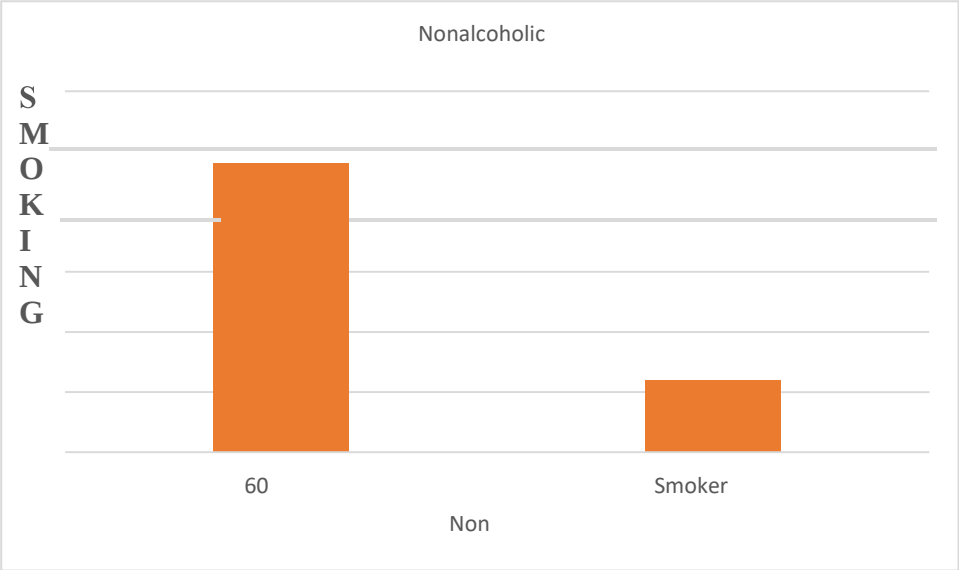

Figure6:DistributionBasedonsocialstatus(smoker)

Table7Representsthedurationofhaemodialysis,among60subjects,Thereareabout30%ofpatients haveundergonehemodialysis inthepastyear.58.4%wereundergoinghaemodialysisfor1-5 years,and about11.6% hadundergonehaemodialysisfor 5-10years.

Table7:Distributionbasedonthedurationofhaemodialysis

DURATION	NO.OFPATIENTS	%OFCASES
1year	18	30%
1-5years	35	58.4%
5-10years	7	11.6%
Total	**60**	**100%**

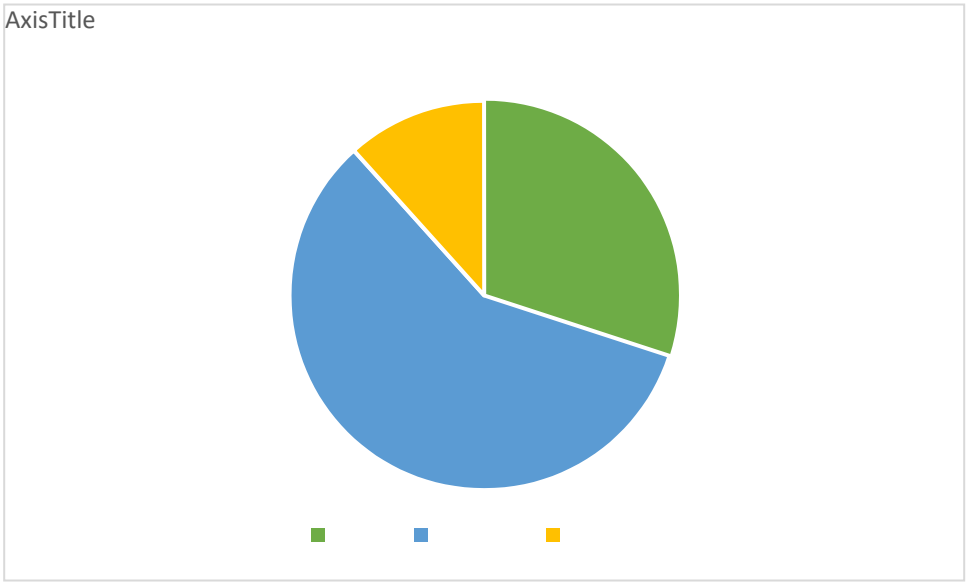

Figure7:Distributionbasedonthedurationofhemodialysis

Table8representsthefrequencyofHaemodialysis,Among60subjects41.7%havebeenundergoing hemodialysis 3 times a week, followed by (58.3%) of the patients undergoinghemodialysis2 timesaweek.

Table8:Distributionbasedonthefrequencyofhaemodialysis sessionsperweek.

FREQUENCY	NO.OFPATIENTS	%OFCASES
Weeklytwice	25	41.7%
Weeklythrice	35	58.3%
Total	**60**	**100%**

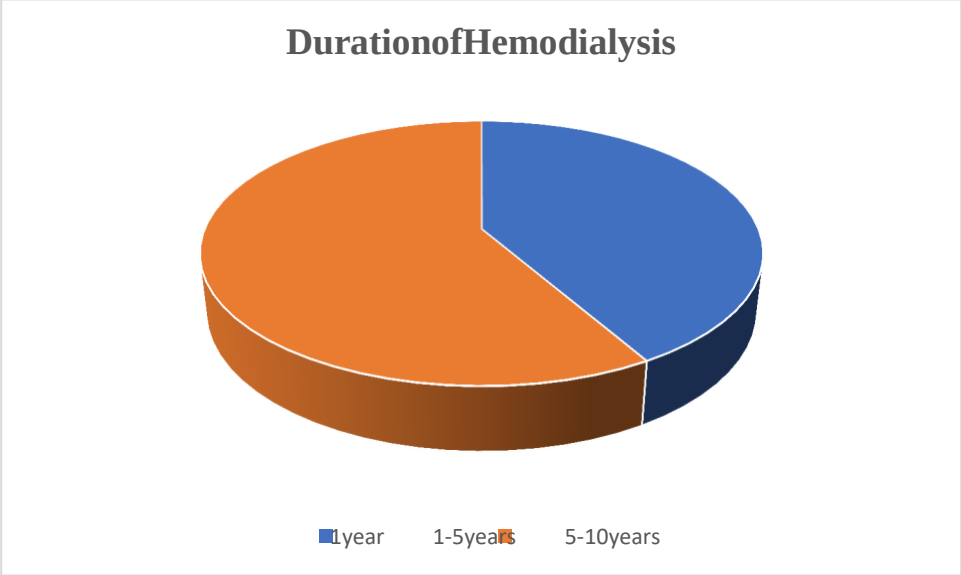

Figure8:DistributionBasedonthefrequencyofhemodialysis

Table 9 represents that Among 60 subjects almost all the patients enrolled in this study have atleast more than one comorbid condition.18.4 withhypertension,13.3% with DM, HTN+DM33.3%isthemostcommoncomorbidconditions16.7%arewithCVD,3.4%DM+hypothyroidism,8.2% withanemia,and6.7% withGITThatweobserved.

Table9:Distributionbasedonco-morbidities

CO-MORBIDITIES	NO.OF (MALE)%	NO.OF (FEMALE)%	TOTAL%OF CASES
Hypertension	8(17.7%)	3(20%)	18.4%
Diabetesmellitus	7(15.6%)	1(6.7%)	13.3%
HTN+DM	16(35.5%)	4(26.7%)	33.3%
Cardiovascular disease	9(20%)	1(6.7%)	16.7%
DM+hypothyroidism	1(2.3%)	2(13.3%)	5%
GIT	2(4.5%)	1(6.6%)	5%
Anaemia	2(4.5%)	3(20%)	8.4%
Total	**45(100%)**	**15(100%)**	**100%**

Figure9:DistributionBasedonco-morbidities

Table 10 Represents The drug classes involved in this study. Among 60 prescriptions, a total of272 drugs were found in 8 different class. Among them that most commonly prescribed drugswere found to be Antihypertensive 95(35.0%) followed by Antidiabetic 45(16.5%) followed byMultivitamins55(20.3%)followedbyAntiplatelets20(7.3%)followedbyhematinic28(10.3%)followedbyprotonpumpinhibitors15(5.6%),followedbystatins10(3.6%)followedby Anti-thyroid drugs4(1.4%).

Table10:Distributionbasedontheclassification ofdrugs

DRUGCLASS	No.OFDRUGS	%OFDRUGS
Antihypertensives	95	35.0%
Antidiabetic	45	16.5%
Multivitamins	55	20.3%
Antiplatelets	20	7.3%
Hematinics	28	10.3%
Protonpumpinhibitors	15	5.6%
Statins	10	3.6%
Antithyroid	4	1.4%
Total	**272**	**100%**

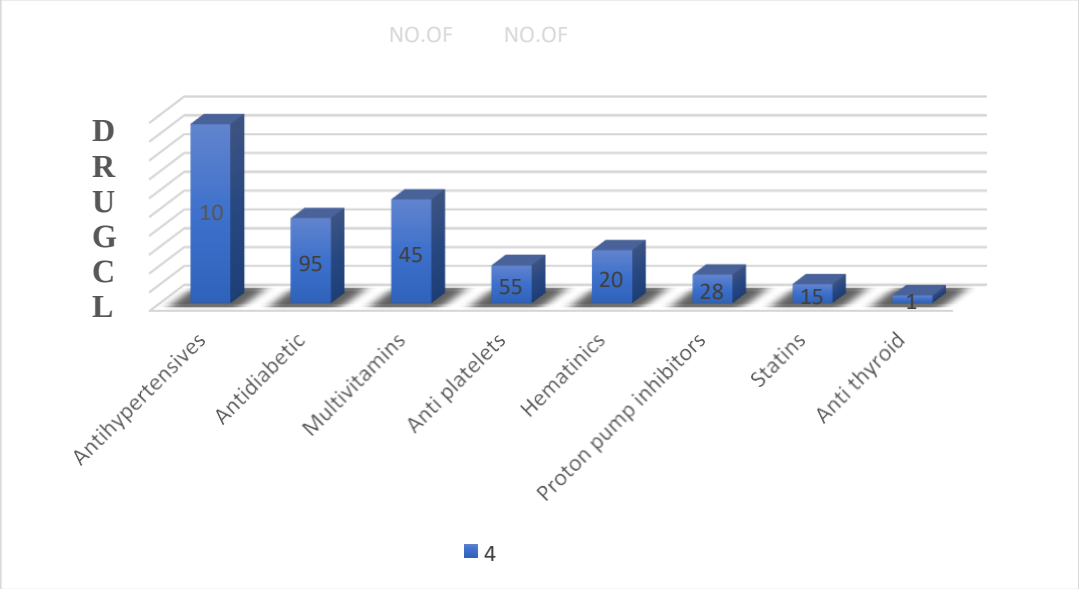

Figure10:DistributionBasedondrugclassifications

Table 11 represent the list of class that comes under Antihypertensives 75 drugs were prescribedin60prescriptions,outofwhichcalciumchannelblockers32(33.6%)alongwithBeta-blockers,20(21.0%) with Angiotensin 2 receptors 18(19.0) and calcium-channel blockers +Beta-blocker's19(20.1%).TheclassofCalciumChannelBlockerswasfoundtobethemostfrequentlyprescribed drug amongAntihypertensives.

Table11:Distributionbasedonantihypertensivedrugs

CLASSOFDRUGS	NOOFDRUGS	%OFDRUGS
Calcium-channelblockers	32	33.6%
Betablockers	20	21.0%
Angiotensin2receptors	18	19.0%
Calcium-channel blockers+betablockers	19	20.1%
Diuretics	6	6.3%
Total	**95**	**100%**

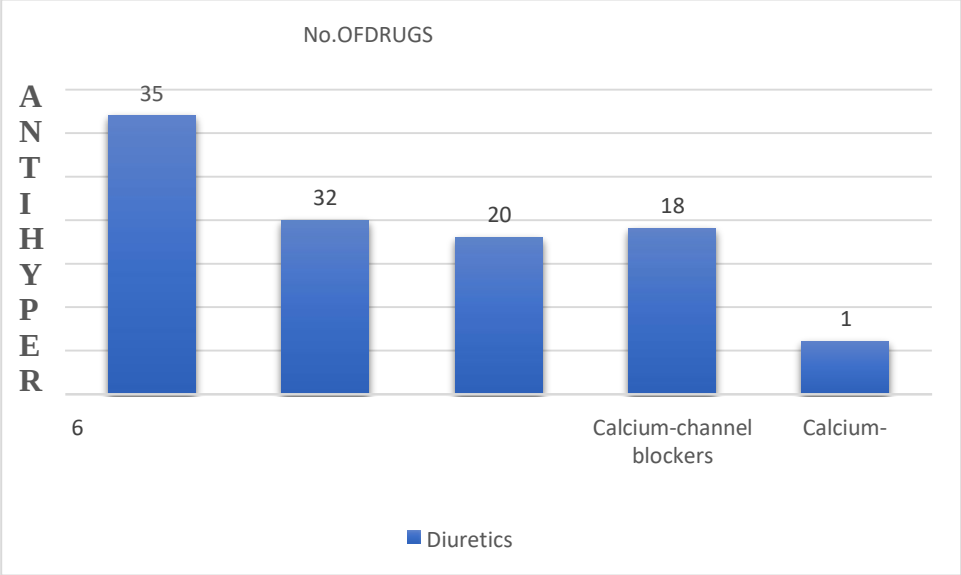

Figure11:Distributionbasedonantihypertensives

Table12Figure20Representsthelistofclass thatcomes undertheDiabeticdrugs45Diabeticdrugs were prescribed in 60 prescriptions, of which Biguanides + sulfonylureas 36(80%) wereprescribed Human insulin 9 (20%). The Drug biguanides + sulfonylurea was found to be themorefrequently used drugsin Human Insulin.

Table12:Distributionbasedonanti-diabeticdrugs

CLASSOFDRUG	NO.OFDRUGS	%OFDRUGS
Biguanide+ Sulfonylurea	36	80%
Humaninsulin	9	20%
TOTAL	**45**	**100%**

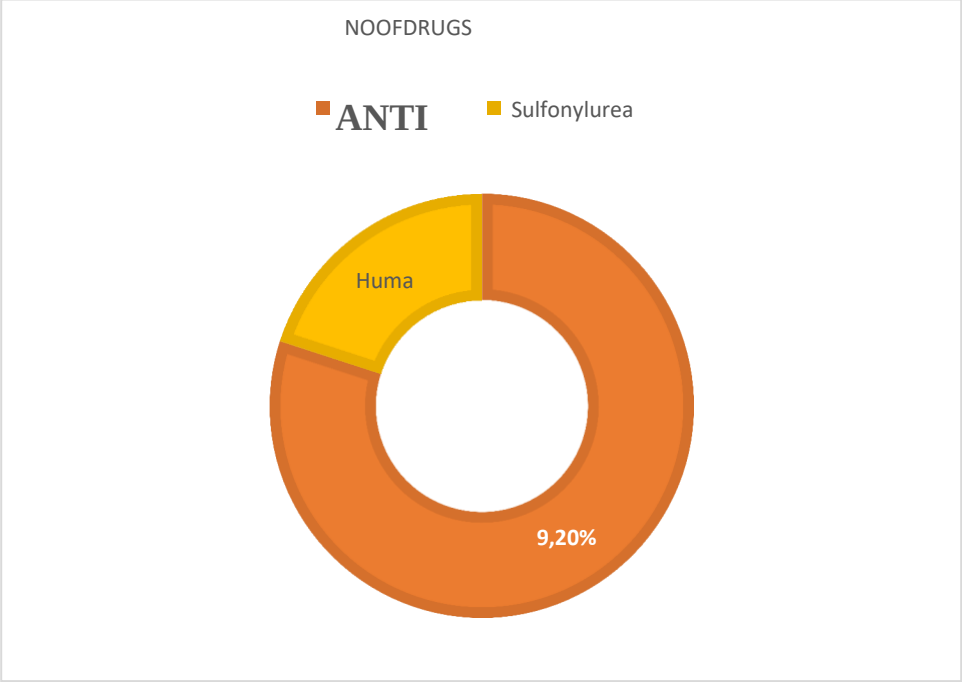

Figure12:DistributionBasedonAnti-Diabetics

Table 13 represents the list of drugs that belongs to the class of Anti-platelets.

20anti-platelets drugs were dispensed in 60 prescriptions, out of which 10(50%) werepresscribedwith Aspirin,10(50%)with Clopidogrel.

Table13:Distributionbasedonanti-plateletdrugs

CLASSOFDRUG	NO.OFDRUGS	%OFDRUGS
Aspirin	10	50%
Clopidrogrel	10	50%
TOTAL	**20**	**100%**

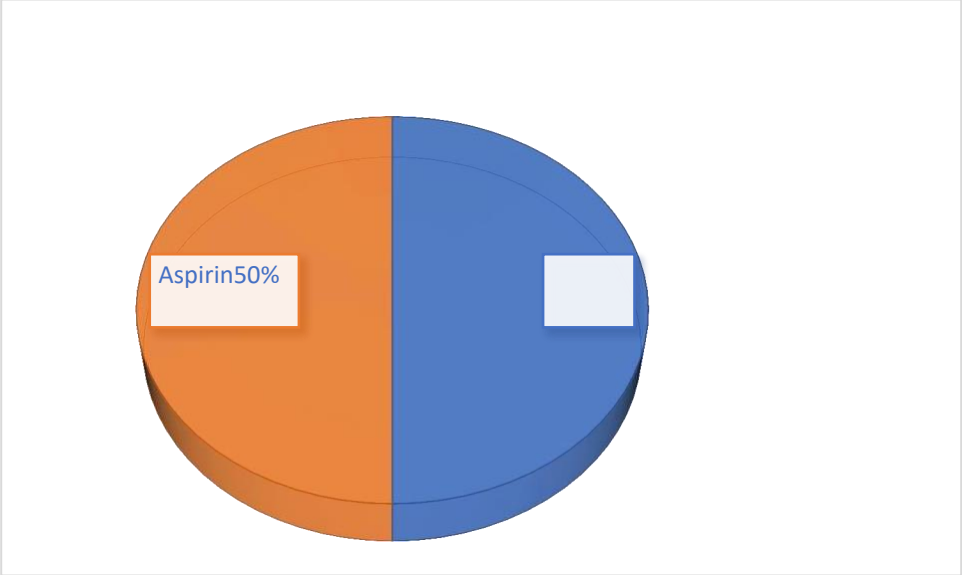

Figure13:DistributionBasedonAntiplatelets

Table14representsthelistofdrugsthatwereunderthecategoryofHaematinics.Among60patients 18 (64.3%) were prescribed folic acid followed by 6(21.4%) given parental ironfollowed 4(14.3%) dispensed with oral iron. The drug folic acid was found to be the mostcommonlyprescribed drug among haematinics.

Table14:Distributionbasedonhaematinics

CLASSOFDRUG	NO.OFDRUGS	%OFDRUGS
Folicacid	18	64.3 %
Parentaliron	6	21.4%
Oraliron	4	14.3%
TOTAL	**28**	**100%**

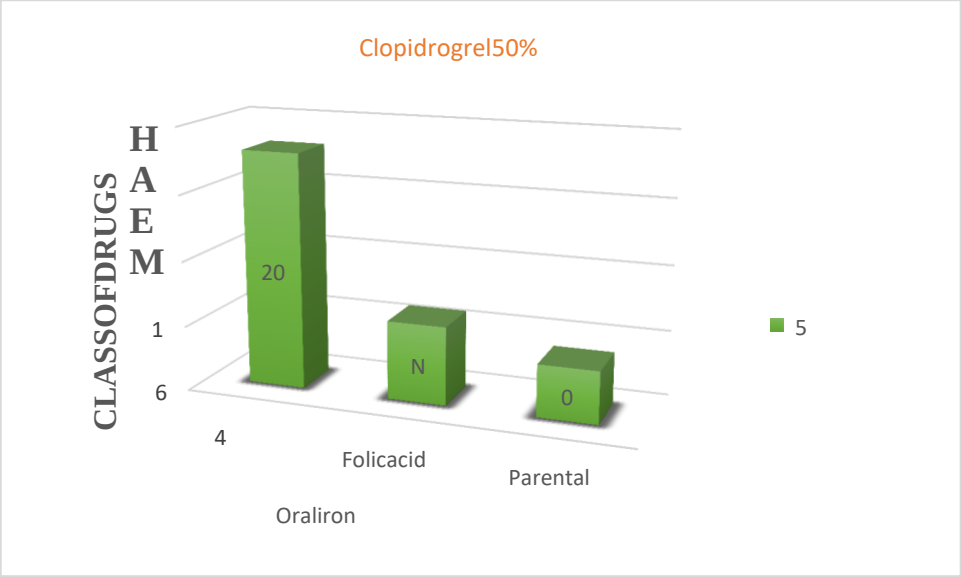

Figure14:DistributionBasedonHaematinics

Table 15 represents the list of drugs that belongs to the class of multivitamins. Among 60patients 25(45.4%) were dispensed with Neurobionforte followed17 (30.9%) were dispensedwithrevitfefollowed13(23.7%)weregivenwithNephropowder.thedrugNeurobionforte wasfoundto bethemostcommonly prescribed drugamong Multivitamins.

Table15:Distributionbasedonmultivitamins

CLASSOFDRUGS	NO.OFDRUGS	%OFDRUGS
Neurobionforte	25	45.4%
Revitfe	17	30.9%
Nephropowder	13	23.7%
TOTAL	**55**	**100%**

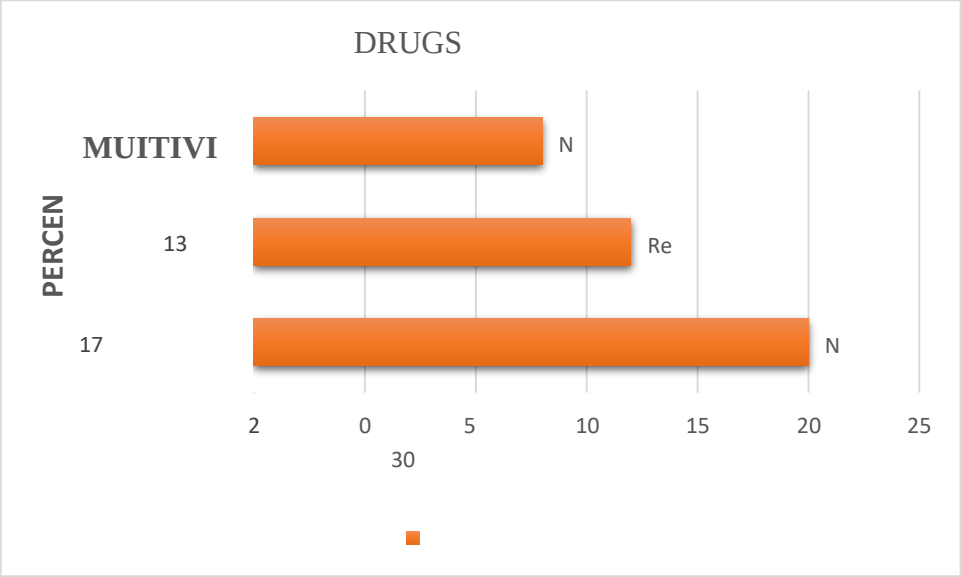

Figure15:DistributionBasedonMultivitamins

Table 16 represents the list of drugs that come under the class Statins. Among 60 patients,10(100%)wereprescribedAtorvastatin.ThedrugAtorvastatinwasfoundtoBethemostcommonlyprescribed drug among statins.

Table16:Distributionbasedonstatins

CLASSOFDRUG	NO.OFDRUGS	%OFDRUGS
Atorvastatin	10	100%
Others	0	0 %
TOTAL	**10**	**100%**

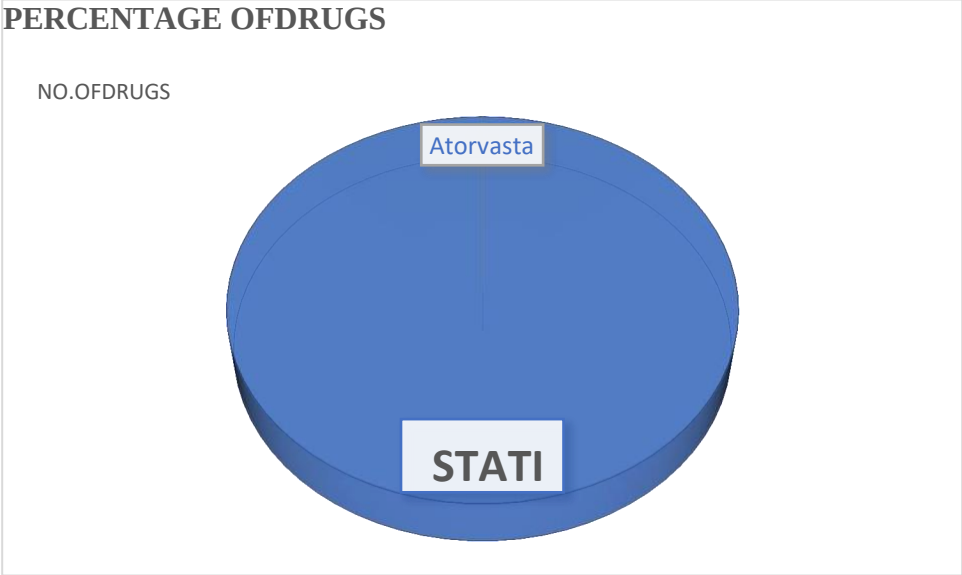

Figure16:DistributionBasedon statins

Table 17 represents the list of drugs that comes under the class proton-pump inhibitors.15Proton-pumpInhibitordrugswereprescribedin60prescriptions,outofwhich9(60%)wereprescribedwith pantoprazole, and6(40%)wereprescribedwithOmeprazole.

Table17:Distributionbasedonprotonpumpinhibitors

CLASSOFDRUG	NO.OFDRUGS	%OFDRUG
Pantoprazole	9	60%
Omeprazole	6	40%
Others	0	0%
TOTAL	**15**	**100%**

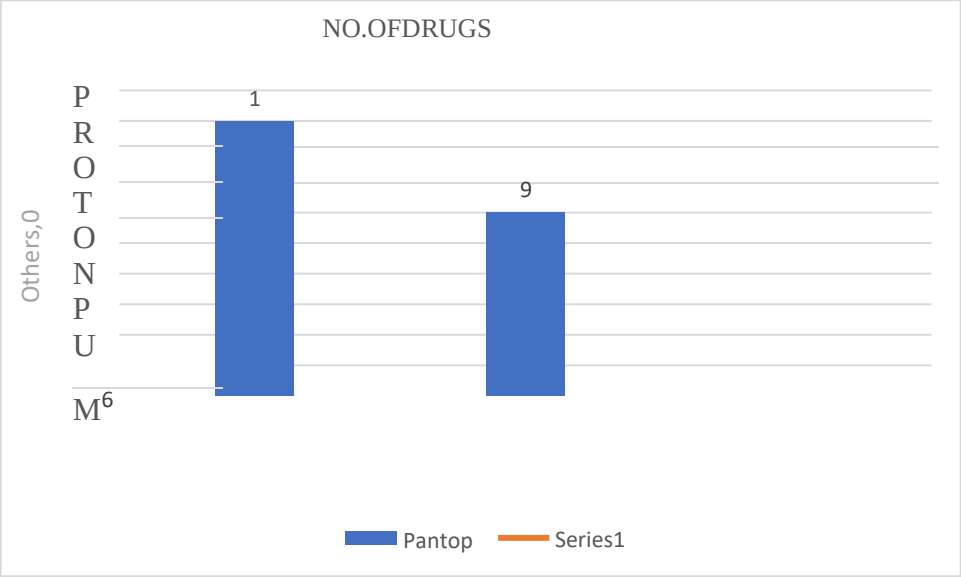

Figure17:DistributionBasedonprotonpumpinhibitors

Table 18 represents the list of drugs that comes under the class anti thyroid drugs. Among 60Patients, 4(100%) were prescribed levothyroxine. The drug levothyroxine was found to Be themostcommonly prescribed drugamong anti-thyroids.

Table18:Distributionbasedonantithyroiddrugs

CLASSOFDRUG	**NO.OFDRUGS**	**%OFDRUG**
Levothyroxine	4	100%
TOTAL	**4**	**100%**

CONCLUSION

In this study, we found that the males aged 60 -70 years and the females aged 45 -55 years weremore exposed towards haemodialysis. Hypertension and Diabetic mellitus were observed as themajorco-morbidconditionswhichisanmajorrisk factorforhemodialysis.

This study identified and concluded that the most commonly prescribed medications in this studyare calcium channel blockers followed by Beta blockers, Anti-Diabetic drugs, Antiplatelets,multivitamins, statins and heamatinics. Patients in the dialysis unit are exposed to multiple drugsat a time, as the patients were associated with multiple medical conditions thereby, a high risk ofadverse drug outcomes can be reported by the Hemodialysis patients. The clinical pharmacist isresponsible to create awareness about rational use of medications. The study mainly assessed thestandard treatment pattern which further helps in reducing the resultant complications among thehaemodialysed subjects. Patient Education can also be an important factor in order to achievepersonalizedtherapeuticgoalofindividualpatient,whichcanimprovetheir qualityoflife.

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26. KodaKimblebook
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29. Stage 1 of chronic kidney disease CKD: Causes, symptoms and treatment(kidneyfund.org)\
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PATIENT

PROFORMADATACOLLEC

TIONFORM

Patientdemographicsdetails

Name: Gender:

IP/OP: Unit:

Age: Weight:

BMI:

- Underweight:
- Normalweight:
- Obeseweight:
- Overweight:

Domiciliarystatus:

Rural: Urban:

Occupation:

Socialstatus: Smoker/Non-smoker: Alcoholic/Non-Alcoholic:

Durationofhaemodialysis:

FrequencyofHaemodialysis: weekly2times Weekly3times

Co-morbidities:

No. of drugs

prescribed:Listofdrugsp

rescribed:

S.NO	Drugs	Indication	Dose	ROA	Frequency
1					
2					

3					

4					
5					
6					
7					
8					
9					
10					

TITLE

FORMULATION AND EVALUATION OF ORAL DISINTEGRATING TABLETS OFTORSEMIDE

ABSTRACT

Swallowing difficulties are common across the age spectrum, but are more prevalent among theelderly and young children. Self-destructing pills that can only be opened by speaking their owncode would solve the problem of swallowing altogether, allowing for a jolt to get things moving.ThegoalofthisinquirywastoformulateandplanaSuperdisintegrant-enabled,orallydisintegratingtablet(ODT)containingTorsemide.TheSuperdisintegrantscroscarmellosesodium, crospovidone, and sodium starch glycolate were used in the preparation of the orallydisintegratingtabletsbyasynchronizedburden.Hardness,friability,thickness,andquietsubstance consistency were measured of the assembled tablets. In 23 seconds, the majority of thesuperdisintegrant disintegrated, which appears to be 98.82% silent conveyance at this time orless, as per the conceivable outcomes of modern packaging. When used in the form of an ODT,thesuperdisintegrant croscarmellosesodiumprovides rapid disintegration.

Key Words: Torsemide, Croscarmellose Sodium, Crospovidone, Sodium starch glycolate andOralDisintegrating Tablets.

INTRODUCTION

TheODTs'assessmentstructure,whichhasseenrecentmechanicalkindsofimprovement,satisfiesthefundamentalofunderstandingrequirementswithoutinterruptingitsampleness.Patients who have difficulty swallowing conventional tablets or holders will find that ODTsprovide their basic needs. 2 The fact that you don't have to dilute them with water or chew themup beforehand is just another perk of ODTs. Some ODTs, sometimes referred to as clear verbalbreaking down pills, are designed to isolate within minutes. Other ODTs contain a handful ofbosses that can increase the speed of crippling inside the verbal opening (Superdisintegrant), andthese are commonly known as verbal stalling tablets, the disintegration of which can take up to asecond.3Patientswithgettingthroughqueasiness,whoaretraveling,orwhohavefollowingto

no agree to water are similarly astounding contenders for ODTs1, who have for the most partbeen the objective of these unused verbal dissolving/deteriorating appraisal structures. Comparedto traditional appraisal methods, the primary benefit of ODT choosing is that it incorporates thebest features of both liquid and regular tablet designs. It's easier to take than a pill, thanks to theliquid form's simplified swallowing aid. Oral disintegrating tablets (ODTs) offer the potentialadvantage of essentially more cautious dosing than the primary alternative, verbal liquids. "Asolid evaluation structure containing strong substances or dynamic settling that separate rapidlygenerally inside so to speak seconds when set upon a tongue," as described by the US Food andDrugAdministration (FDA).

Thisevaluationframeworkfirmlyestablishesthepotentialaugmentationofdryandliquidcoordinate.Af ewnoteworthyODTdevelopmentspermithigh-volumemedicinestacking;they'retasty;theyprovideanexcellentmouthfeeling;andtheyflushoutsuperf luousenhancement within the mouth following spoken interaction. The potential of ODT to improvethe bioavailability of poorly dissolvable medications by reversing their toxic profile and hepaticmaintenancemedicineshasbeeninvestigated.Fastisolatingpills,quickdissolvingtablets,exped ientdissolvingtablets,poroustablets,andrapimeltsareallnamesforthesamething:tabletsthatdissolveq uicklyandcompletelyinthemouth.TheUnitedStatesPharmacopeia(USP) recognized these dosageforms asODTsdespite the fact that they containa massivenumber of over words. Recently, the term "orodispersible tablet" has been standardized by theEuropean Pharmacopeia to refer to tablets that disintegrate instantly and within three minutes ofbeing placedin themouth.4

According to the FDA, ODT is "A solid evaluation structure containing supportive substance orlively settling which falls to pieces rapidly for the main piece inside perhaps seconds when putuponthetongue."Byandlarge,ODTisolationtimesmightrangefromsecondstominutes.Orallyisolat ed pills havefiveadvantages:6,7,8

Bioavailability of medications is increased when they travel from the mouth and throat throughtheesophagus and into thestomach in theform ofspit.

Increased bioavailability with fewer side effects and improved clinical efficacy managementcanbeachieved with pregastric support.

• Comfortablecommunicationwiththosewhorefusetotakeapill,suchastheyoung,theold,thementally ill, theinjured, and the recalcitrant.

- •Agreementofmembershipinadefinitegroupafterbeingseparated fromliquids.
- •Theevaluationstructuremaybeswalloweddry,makingitanadvantageforpatientswhoaretraveling and may not haveaccess to clean watervery away.
- •TheunusualmouthfeelofODTsishelpfulinretrainingtheprefrontalcortextoviewthesolution as "appealing reality," especially inyoung patients.
- Advantagesofliquidmedicationscanbe communicatedinthesamewayassolids.
- •Rapiddecompositionofmedicationandsupport,potentiallyallowingforanimmediatecommencementofaction

IMPORTANTCRITERIAFOREXCIPIENTSUSEDINTHEFORMULATIONOFODTs:[9,10]

• Itneedstheoptiontogointoisolationimmediately.

• TheODTsshouldbeunaffectedbytheirindividualcharacteristics.

Itmusthavenoconnectiontotheword"quiet"oranyotherexcipients.

• Itmustnotcompromisetheitem'slogicalandpalatablequalities.

• Whendecidingoncreatinga(orasnaresmixture),it'simportanttothinkaboutthething'sdurabilityand reliability down to the smallest detail.

• Theexcipients usedwill havemolding propertieswithin arangeof30-350C.

• Polyethyleneglycol,cocamargarine,andhydrogenatedvegetableoilsarejustafewexamplesofpolymericmixtures thatinduceFOR inthe folios. Assembling theODTS: 11, 12,13, 14

Theinarguableheadwaygainedin understandinghowtocoordinate ODTsiscomprisedof:

Theseinclude:outlining,freezedrying/lyophilization,sublimation,showerdrying,massrelease,anddirect weight.

Dryingout,orlyoplilization:

Subliming water from an object and then freezing it is a crucial step in ODT preparation. Freeze-drieditemsisolatefasterthanotheropensolidsbecauseofthepreparationmethod.Theproximityofdazzling indistinctimprovementtobuildingprofessionalsandoccasionallytotrustworthy other than via freezedrying prepare may account for the accelerated deteriorationstandard for the subtle components. Relative water insolubility, small particle size, and excellentliquid quality in suspensions are the optimum pharmacological characteristics for this cycle.Considering the solidify point unhappiness and the improvement of cleaned solid on setting,which seem to crumble on sublimation, are the fundamental challenges associated to water-dissolvablemedications.Inadditiontocoveringupunpleasantflavorsandpreventingthebreakdownofprogress,theincreasingavailabilityofcryoprotectantslikemannitolandcrystalforming materials has increased crystallinity. By using a freeze-drying technique, stablecompounds can be controlled at room temperature, which should facilitate the preparation ofdangerously high-temperature scenarios. The participation is limited by factors other than thebasic cost of alteration and supervision. In many of the most recent assessments, structures havebeen damaged in multiple ways, including the absence of limit necessary for a normal level ofdiscomfort.

Molding:

To outline a compound, one can either immerse, dissolve, or scramble the medication with thedissolvable, and then irrelevance the saturated mix into tablets (weight forming with lower strainthan standard tablet weight), or disperse the dissolvable from a calm methodology or suspensionat encompassing weight (no vacuum lyophilization). The tablets specified by weight frameworkaredehydrated.Theformedtabletsachieveanamazinglypenetrablegameplan,whichtransforms the crippling and crumbling velocity of the object because the weight obligationrelated is lower than ordinary tablets. However, precise screening of the powder mixture isessentialforincreasingtherateofitsbreakdown.Sinceitsmechanicalqualityprovidespracticallydisintegrationandbreakingamidsthandling,itiscommonlyemployedwithdissolvabledecorations (saccharides)thatcausemouthto feeland crippling oftablets.

SprayingtoDry:

Because the managing dissolvable is lost in the course of the sprinkle drying association, theresulting powders are unusually delicate and fine. Allen and Wang used theshower dryinghandle to neatly stack ODT. Manitol was used as the construction virtuoso, sodium starchglycolate as the superdisintegrant, citrus extract and sodium bicarbonate were used to revive theseparating and disintegrating processes, and hydrolyzed and non-hydrolyzed gelatin was used asthesupporting association.

Ageneralcleaning:

The development includes cooling the flaming blend with a mixture of polyethylene glycol andmethanolthat dissolves inwater,and the subsequentarrivaloffragilemassvia extruder orneedle to request an office from the thing into indeed locations using warming sharp edge tooutline tablets.18

Granulationinparts:

PEG6-Sterate, a hydrophilic waxy coating, was used by Abdelbary et al. to create ODT. Thewaxysurfaceofsuperpolystatemaymeltbetween33and370degreesCelsius,anditshydrophilic to lipophilic congruity may be 9. It's absurd that it travels as a folio and increasestablets' actual resistance, but it does have an effect on tablets' weakening since it separates in themouth, solubilizes quickly, and leaves no room for a twist of fate. The value of ODT wasestablished for super polystate by a tranquil granulation approach in which the granules wereencased in a fluid of some kind. Paracetamol was used as the demonstration medication, andmannitol and crosscarmellose sodium were used as excipients that dissolve in water and as aweakeningagent, respectively.

Phasetransistionprocess:

The disintegration of ODT was studied by Kuno et al., who used erythritol (m.p.1220C), xylitol(m.p.93-950C), trehalose (970C), and mannitol (1660C) to examine the Organize transistion ofsugar alcohols. A powder containing two sugar alcohols with highand low dissolving centerswas compressed at a temperature between their consolidating networks, yielding tablets thatcould be easily transported. The tablets aren't of sufficient hardness, in terms of moo similarity,beforewarminginvolvement.Warmingcyclessoftenedthetabletsbecauseanincreaseincove
r

particle size, or the holding surface area within the tablets, was authorized by the Organizetransitionto asugar alcohol with alower consolidation point.

Effective sublimation of ODT relies on the proximity of particularly penetrable improvementinside the tablet format. Standard tablets typically contain water-dissolvable embellishments, buttheyquicklydeterioratedueto excessiveporosityandalackofcare.Sublimationfromanencased tablet can be used to treat the porosity of volatile compounds like camphor. Sublimingsurface shed from packed tablets created using a combination of mannitol and camphor was usedby Koizumi et al. to create ODT. After pills were made available, camphor was sublimated in avacuumat 800 degrees Celsius for30 minutes.

TECHNOLOGIESTHATCANBETRUSTED15,16,17

TheZydisuprising:

You can use Zydis without water, and it takes less than three seconds to isolate on your tongue,makingitapotentiallyusefulsetofdriedareasofstrengthforlinguisticbuilding.Themedicineis actually encased in a structure that dissolves in water and then, after being exposed to air,solidifies and breaks apart. In order to facilitate rapid disintegration and huge genuine backboneto endure managing with, the structure integrates water-soluble saccharides and polymer (gelatin,dextran, alginates). During the transmission phase, water is used to transport porous particles forrapid isolation. The problem of sedimentation in dispersed fix is dealt with by using a variety ofgums. Glycine is used to stimulate the reduction of the zydis unit during the cycle and long-termstorage. Since the zydis appraisal structure is so little, each unit is packaged in a peelable upsetpack that allows for easy removal without damaging the contents. A potential drug replacementforZyprexawouldideallybewater-insoluble,extremelystable,andhaveasmallparticlesize(50microns or less). Drugs that can betaken in water

EnhancingOrasolv:

CIMA's fastest dissolution decision ever. Coordinate burden at cow weight drive prepares tabletsto accommodate linguistic separation and debilitating time. Orasolv movement is a form ofmildly fizzy tablet that dissolves quickly in the mouth. Thanks to the development of bubblyscientists,the medicines cannow be tastedandadministeredthroughspittle.Thesilencecausesa

deafening numbness in the mouth. Orasolv's moo-like mechanicalness is where it falls short mostcritically. The provided tablets are easily broken, so extra care must be taken when packagingthem.

Progresswith Durasolv:

This is not a guaranteedupgrade by the CIMA lab; it only makes Odt'stimeline second best.Thisadvancementresultsinquiet,fillers,oil,andtabletsstructuredintheusualformats.Durasolv'sfinercomponentshavebettermechanicalqualitythantheirforerunners'fortheexpress reason that they are compacted to a greater degree. The demand for Durasolv is so highthat the standard upset pack of vials will eventually be completely full. It's a great innovation foranythingthat needs elaborate firework displays.

Astonishingdevelopmentinthetab:

Yamanouchi has given his approval. Wow means "without water" in Wowese. Wow tabs arecompressed tablets with granules manufactured from saccharides of moo and height moldabilitythat dissolve intra buccally. It is used to ask for a tablet with a rapid dissolving rate and anappropriate level of hardness. The ability to mold the material is the key to crushing it. Moo'sformseemstohavereducedcompressibilityfortablettingandaquickrotrate,whichisconsistent with its moldability. However, this configuration is swapped out in the case of asignificantincrease inmoldability. In this, hotdecorations are combinedwithsaccharides thatcan be easily shaped into moo and then compressed into a tablet. Due to its inherent toughness,the wow tab definition is not surprising to weather forecasters. The tab system is brilliant,becauseit makes sensefor bothstandard holdersand the angrymob.

Developmentsincotton:

Fuisz obtains it. Cotton cake innovation calls for an alluring going instrument to create floss liketransparent improvement. This sugar, which has the consistency of glass, can be combined withthe prescribed prescription to make a tablet. An effect has an abnormally high dissecting height.Whenplaced on the tongue, it spreadsout and separates quickly.

Oraquicktechnology:

K V Fix Affiliation, a backer of the oraquick ODT definition, guarantees that its flavor maskingprogression, i.e., microsphere improvement (Micromask), offers superior mouth feel to tasteconcealing alternatives. In addition to allowing for faster, more innovative sensible production,the taste-masking tool doesn't require the use of any solvents. A tablet with reliable mechanicalquality and no off-putting flavor mask is the result of careful weighing. Fast rot is confirmed inseconds with exceptional flavor masking using Oraquick. KV repair has items, with various sortsof medications including analgesics, hack and cold, psychotics, and underground dreadful tinycreatureinfective, buttheadvancement employingoraquick improvementhas nothing.

DevelopmentofNanocrystals:

Soul the Prussian Head generally agrees with this. In addition to lyophilization, the nanocrystalmovementalsoincludesthecolloidaldispersionofmedicinematerialandwater-solubledecorations filled into problem pockets. For both safe and potentially harmful medications, thismethodeliminatestheneedforgroupcollaborationthroughoutstepslikevisualization,granulation, mixing, and tabletting. This pattern holds true at low dosages of medication sincesocialgatherings areinconsequential.

A feedstock containing a sugar transporter can be mistreated with streak warm management,leading to a development known as shearform advancement: in sight of arranging of floss. In thiscycle, sugar is continually exposed to diffusive control and a temperature incline, which elevatesthe temperature of the mass to create an internal, stream state, allowing some of it to move withyielding of mass. The spinning head that tosses the floss is the source of the gushy mass. Theresulting floss is a bit foggy, so it's chopped and recrystallized using planned processes tostandardizeitsstreamqualitiesandmakeitsuitableformixing.Itisthencombinedwithadditional tablet excipients and a functional settling to form a tablet. The supplementary blend iscompressedintoatablet.Fluffcanbeusedtoincorporatetheflamingsettlingandotherexcipients prior to finishing the recrystallization process. When combined with got or uncoatedmicrospheres,the shear structurefloss is usedtomakeEZnibbling orstreakgroup tablets.

Breakthroughinthepharmaceuticalindustry:SPIPharmahaslicensedthiscutting-edgeinnovation.ODTispromotedbyoccupyingthecoprocessedexcipients,anditisolatesin30–40

seconds.Inthisdevelopment,thedrug,flavoring,andoilareallblendeddryandthencompressed into tablets by weight. The tablets purchased are of sufficient quality to fill allpacketsand holders.

This forward momentum in Frosta is authorized by Akina. It arranges the potential of smallerplastic granules and co-processing at moderate strain to areas of high value for high-porositymaterials.Producedfrom: 1. anon-aggressiveandplastic outersurface

BoosterforWaterInterruptions andSafe

The weak plastic surface is combined with water entrance enhancer and then pulverized withlock, and the association is formed. The pills were tested and found to have a bafflingly highhardnessandarapid isolation time rangingfrom15 to 30 seconds.

GroupsThatCoordinateODTs18,19

Regular doctors are in the greatest position to keep up with the latest developments and educatetheir patients about what's in store as a result of taking the basic package. The vast majority ofODT recipients have only a superficial understanding of the cutting-edge assessment framework.The onset of pill isolation in the mouth would be unnoticed by patients. They might hope for amore immediatebeginningtoevents.A lackof confusionor perplexitycanbe avoidedwithsome explanation from a reserved expert. As is the case with all forms of evaluation, certaingroups of patients will benefit more than others from these developments. Patients who arealways on unsettling minimal creature cholinergic remedies may not be the greatest candidatesforthesetreatments. Thereis no need for water anyway.

EVALUATIONOFODTs[20,21,22,23]

Evaluation cutoff points of tablets mentioned within the Pharmacopeias should be taken intoaccount,andavariety ofunexpected testsaresurveyed here.

Because of the specific cycles and decorations used within the saving, hardness is a fundamentalcharacteristic that ODT is aiming for. To facilitate early isolation within the mouth, the ODT'shardness restriction is typically kept at a lower range. Standard hardness testers can be used tomeasurethe tablet's hardness.

Friability: AformulatormayfinditdifficulttokeepanODT'spercentfriabilitywithinallowable ranges, given that any approach to the social occasion of an ODT runs the danger ofincreasing the values for percent friability. Therefore, it is crucial that this tipping point wasidentifiedand that the outcomes are acceptable (between 0.1%and 0.9%).

Timetowetandwater-handlingcapability:

The contact point is linked to the wetting season of the assessment structure. The ODT's wettingseason is a further key breaking point that must be taken into account in order to gain insight intoitsbrittle qualities.A shorter wettingtimesuggeststhe pill canbeisolated morequickly.

The major procedure29 can be used to conduct a survey of the wet season of the tablets. Apetridish holds five sheets of 10cm wide indirect tissue paper. Petridish includes a water-solublecollection procedure that only takes ten milliliters. The tablet is placedon the outer layer oftissue paper with care. Wetting time is the amount of time it takes for water to penetrate thetablet'soutermost layer.

The tablet's size just before being placed within the petridish is a significant factor in the waterdigestion allocation survey (Wb). Take the tablet out of the petridish when it has been wetted(Wa).Thereis nofixed formula fordetermining R, theamount of water consumed.

100*(Wa- Wb) /Wb= R

Assessmentsofsponge-likeabsorbency:

Evaluations of ODT moisture uptake should be written to guide the choice of criteria. Ten pillsfrom each location were stored in a desiccator with calcium chloride at 370 degrees Fahrenheitfor 24 hours. The tablets were then measured and put on display at room temperature until theyreached a relative persistence of 75%. The dessicator achieved the necessary humidity by using athree-day soak in a solution of dusted sodium chloride. To evaluate the moisture uptake fromother excipients, one tablet was preserved as a control (without super disintegrants). The rate ofweightgain in tablets was measured and recorded.

Disablingtest:thefirstminuteprovidesthebestopportunityforisolatingODTs,andtheseparationdurationthatstabilitycanendurerangesfrom5to30seconds.However,the

evaluation of astonishingly low weakening durations is not achieved by the typical procedure forperformingdisintegrationtestsonsuchestimatingstructures.ThedeathknellforODTtestingisasaliv ary replication ofmouth separation.

When ODT doesn't employ taste masking, it's difficult to tell how the ODT's deteriorationmethodsdifferfromtheconventionaltablet'sdevelopmentstrategy.AccordingtotheUSP monograph, it is possible for drugs to have a crumbling state. Evaluation of ODT should use thesamemediaasevaluationoftheirnormalpillsupplements,suchas0.1NHcl,pH4.5,andpH 6.8 compositions. In most cases, 50 revolutions per minute (rpm) is used when dissolving theprimer of ODT tablets, and this has been confirmed by experience with a USP 2 paddle device.Under the circumstances specified in the USP monograph, the separation of ODTs is, as may beexpected, quite rapid. As a result, a relative profile could be energised by using lower paddlerates. Massive tablets exceeding or equaling one gram in weight and containing appropriatelythick particles may cause a vessel's inclination that is otherwise resistant to greater paddle speedsto change. Due to these two factors, a mixing speed of 25-75 rpm is deemed appropriate. Whilethe USP 1 (canister) device may have certain useful applications for ODT, it is rarely used due tothesuperiorexpresscertifiablequalitiesoftablets.Itispossiblethattabletfragmentsordisintegratingta bletmassescouldentertheholderattheshaft,wherethereisnexttonoappropriatemixing. Thiswould lead tounpredictable rot profileresults.

LITERATUREREVIEWONTOPIC

ChandrashekharPatiletal.,(2023) Amulti-homecreatedadversaryofdiabeticimpulsedissolving tablet segregated with a monetarily open metformin tablet was the motivation for thisunendingexamination.Curcumalonga,Cinnamomumzeylanicum,Zingiberofficinale,andTrigon ella foenumgraecumare justfew of the naturalmedicines withanti-diabetic qualitiesfound in the multi-homemade foe of diabetic tablet. Curcuma longa, Cinnamomum zeylanicum,Zingiber officinale, and Trigonella foenumgraecum are all included in this plant-based blend. Toachieve this specificity, MCC is used as a diluent and sodium saccharin is used as a gaininground master within the tablet definition. Superdisintegrants like crospovidone, sodium starchglycolate(SSG),andacombinationofthetwowereusedtoaidintheformationofatablet's

disintegration rate and strength. Evaluations of the tablets' composition, hardness, friability,wetting time, in-vitro diffusing time, and in-vitro consistent delivery were conducted. The poly-typical opponent of the diabetic tablet was evaluated at each cutoff, and all of the endpoints wereconsidered to be very good. The polyherbal anti-diabetic pill was carefully monitored to ensure itmettherequiredstandardsforthickness,hardness,weightvariation,friability,andin-vitroconsistentconveyance.24

Dr. A. Abdul Hasan Sathali et al., (2022) Creative hypertension may be a foreseen infection ofhypertension.Ifnottreatedproperly,itcanleadtostrokes,myocardialinfarctions,cardiovascularcollapse,andchronicrenaldisappointment.Effortshavebeenundertakentoexpeditetheonsetofaction,medicinalresponse,quietcertification,andbasicpassageoftorsemide, a drug used in the treatment of hypertension. Coordinate weight method was used toformulatefast-dissolvingtablets(FDTs)oftoremidewithvaryingconcentrationsofsuper-disintegrants. Fourier transform infrared spectroscopy (FT-IR), differential scanning calorimetry(DSC), and other techniques were used to evaluate the setup tablets before and after they wereused. Calorimetry, Micromeritics, Hardness, Weight, Friability, Time to Separate, Time to Wet,Water Retention, and In-Vitro Decomposition are all taken into account. The FTIR analysessupported the view that the excipients and medication are well-balanced. All definitions, asassessed by micromeritics, had an appealing to unbelievable stream limit. Tablet hardness andfriability gave the impression that the layout plans had remarkable mechanical quality. Super-disintegrant Crospovidone was used to make batch F27, but it failed miserably in terms of tabletisolating,wetting time, waterdigestion degree, andin-vitro dissolution.25

NeveT.D.etal.,(2022) Torsemide(Peak),acirclediuretic,isacourseIVprescriptionwithinthe Biopharmaceutical Coordinate System (BCS), and the purpose of the energy survey was toimprove its water solubility and disintegration qualities via a solid scrambling technique. Thehydrophilic transporter polyvinylpyrrolidone K-90 (PVP-K30) was used to create dissolvablescattering and scouring procedures that were then used to build solid Pinnacle scatterings atgrouped levels. Assessments for tranquil substance, surrender rate, dissolvability, and Fouriertransform infrared spectroscopy (FT-IR) were used to determine the passed solid scatterings.Torsemide tablets with and without a currency opening were tested for their crumbling qualities.Itseemsliketherewasafour-overlayimprovementindissolvabilityascomparedtotheparent

calmafterthesolidscatteringswereformed,andthiseffectwasmostpronouncedforamedicine:transporter ratio of 1:2. One possible barrier to disintegrationidentified byFT-IRanalysis was the absence of made transactions between the drug and the transporter. Solidscrambling tablets appeared to have a stunning breaking down profile in reflected stomach fluidpH 1.2 at 37°C 0.5 than the trade Highest point tablets, in terms of both ruthless separation time(9.01 min) and crumbling capability in 30 min (43.62%). Since both Top solid scatterings andtrade tablets are fast vehicles, Weibull and Krosmeyer models were used to select the medicationreleasecentrality.Thefindingsofthisstudysuggestthatsoliddiffusingtechniquescanbeusedtoimprove Pinnacle debilitating's solubility andspeedin water.26

Meer R. Zafar et al., (2020) ADHF, or persistently compensated heart failure, is also known asvolume over-inconvenience. Those with ADHF are more likely to prioritize office confirmationsfor volume over inconvenience. Overuse inconvenience can be attributed to factors such as drugresistance,extraordinarysaltdemand,comorbidities,andspoilingadvancement.Althoughdiuretics have been the cornerstone of treatment for cardiovascular collapse (HF) during the pastfew decades, the fieldhas made significant strides in that time. Even though diuretics canstimulate the renin-angiotensin-aldosterone system (RAAS) and cause potentially harmful sideeffectsasdiureticresistance,neurohormonalunderwriting,andkidneyfailure,theyarenevertheless necessary. In recent years, there has been a surge of curiosity about cutting-edgeframeworks for balancing volume over annoyance in ADHF. Treatment of volume overload inpatients with ADHF is recommended by both the American College of Cardiology Foundation(ACCF) and the American Heart Association (AHA) guidelines. Therefore, ultrafiltration (UF) isa promising new alternative to dialysis for the management of volume overload in patients withADHF.Thisreview article isanexample of publiclyavailableclinicaldata onthe use ofdiuretics and UF in patients with ADHF, and it highlights the difficulties associated with bothapproaches27.

P Abhinandana et al., (2019) Torsemide (Pinnacle), a member of the pyridine sulfonyl ureagroup of diuretics, and spironolactone (SPI), a potassium-saving diuretic, are used combined totreat congestive heart failure. A diuretic is a medication that increases urination frequency andurgency. For the concomitant evaluation of Torsemide and Spironolactone, as required by the ByandlargeLeadinggrouponHarmonizationregulations(Q2B),anundeniable,right,right,and

sensitive maintained adjust arrange otherworldly execution liquid chromatographic procedurewasbrought.Using10mMpotassiumdihydrogenorthophosphateandacetonitrileasaccommodating organize inside the level of 20:80 v/v, and confirming perceivability at 235nm,thepiecewasdoneonanAgilent1220LCstructurewithEZChromeAliteprogrammingequipped with an Agilent C18 district (4.6250mm, 5m) and UV identifier. RSD 2% was regardedacceptable when the number of orticle plates was >2000. The outcomes were well-coordinatedbetween 10 and 22 micrograms milliliter-1 for Apex and 100 and 220 micrograms milliliter-1 forSPI. In reality, the method was put to use in order to correct the coordinates. The decision madewasvalidated by thestatistics as beingtimely, appropriate, andconsiderate.28

Jaydeep Singh Baghel et al., (2019) Researching the use of mixed dissolvability made sure tosort out and develop a fast dissolving solid scrambling is a distinctive feature of the ongoingassessment study. Physiologically plausible water dissolvable additional chemicals (solubilizers)were combined with the poorly dissolvable medicine torsemide (display prescription) in an efforttospeedupitsdissolutionanddiffusion.MethodologiesandSurfaces:Toimprovethedissolvability ofthedrugtorsemide,whichispoorlysolubleinwater,acombinationofsolubilizerswasused.Thiscombinationincludedsodiumcaprylate,sodiumcitrate,sodiumacidic disastrous affirmation, and beta cyclodextrin as mixed dissolvable structures. Solubility,infrared, ultraviolet, and differential scanning calorimetry all contributed to a complete picture oftorsemide. Long-term room-temperature and low-temperature quality assessments of torsemidescrambledinsolidformwerecarriedout.Everythingwascompletelyaccurateandmicrobiologicallystablewhencombined.Inconclusion,thetorsemide'sinadequatewaterdissolvabilityhasbeenaddressedbyemployingthemixeddissolvabilityconceptinenergizingfixstacking.29

LITERATUREREVIEW0NDRUG

V. K. Chopra et al., (2023) Heart attacks are linked to more frequent hospitalizations, slowerrates of growth in years lived, and a greater likelihood of betting on average performance. Whenothermethodsofdecongestionforcardiovascularfailurehavefailed,torsemideisoneofthelast

resort recalledcircle diuretics inIndia.Allofthis torsemide use, fromdose totitration, isfounded on pragmatic considerations. Due to the lack of robust confirmation thinking aroundwhichtreatmentoptionscanbe producedforpeople withcardiovascular breakdown,circlediuretic treatment is limited to a select few instances. A leading group of expert cardiologists andnephrologists from India collaborated to create this comprehensive evaluation record for theusage of torsemide in patients with cardiovascular breakdown, regardless of renal shortfall. Thiscomprehensive analysis of torsemide will anticipate an excellent correlation with circle diuretictherapyin conventional patients withcardiovascular breakdown.30

AhmedKamal Siddiqietal.,(2023) Torsemidemaybemorebeneficialthanfurosemide,although only about 10% of patients with cardiovascular breakdown (HF) are actually taking it.Previous studies comparing furosemide and torsemide in HF patients have yielded seeminglycontradictory findings, particularly with regards to hospitalizations and mortality. To far, therehave been many studies comparing the effects of furosemide and torsemide on mortality andhospitalization rates for heart failure patients; our goal was to compile thesestudies into acomprehensive meta-analysis. We conducted a comprehensive search of PubMed/Medline, theCochrane Library, and Scopus from inception to June 2023 for studies comparing furosemidewith torsemide in adults (>18 years old) with irreversible or foreseeable HF. All-cause mortalitydata was extracted, combined with HF-related and general hospitalization data, and then deleted.Takingintoaccounttheself-definingeffectsshow,boondocksplotsweredeveloped.Ourstudyof an 8-month follow-up at a single facility included data from 17 separate studies (n = 11,996patients). Furosemide and torsemide groups in HF patients showed no difference in all-causemortality in our pooled analysis (OR = 0.98, 95% CI: 0.75-1.29, P = 0.89). However, comparedwith furosemide alone, torsemide was associated with a significantly lower incidence of bothHF-related and all-cause hospitalizations (OR = 0.73, 95% CI: 0.54-0.99, P = 0.04). When usedalone or in combination with furosemide, torasemide significantly lowers hospitalizations for HFand other causes, without improving death. In patients with HF who are not reaching a state ofadequate control, wesupport switching with furosemideto torsemide.31

SujanaReddyetal.,(2022) Thebewitching,riskyputofftypeIVextraflimsinessmucocutaneous skin provides known as toxic epidermal necrolysis (TEN) and its close cousin,Stevens-Johnsonsyndrome(SJS),canoccasionallybefilledbymedication.Sulfonamide

antimicrobialsandincontestableanticonvulsantsarethetwomosteminentlyunacceptablecouples. Using hematoxylin and eosin recolor skin biopsies, we describe the case of a 41-year-oldDullfemalewhofirstpresentedwithSJSandthendevelopedTEN.Herskinwassplittingand deteriorating on almost 80% of her body's surface area. Torsemide was used to treat hermassive, diffuse anasarca caused by alcoholic cirrhosis, and it was discovered that this led toTEN. A team of specialists from fields as diverse as dermatology, gynecology, rheumatology,nephrology, and psychiatry worked together during her month-long stay to diagnose and treat herrelativecalm.Intravenoussteroid,cyclosporine,plasmaexchange,andintravenousimmunoglobulinwereamongtheseveralmedicalinterventionsthatwereexchanged.Considering that over 30% of TEN takers pass, and this devotee was suffering from cirrhosis initslaststages,herassumptionwasparticularlyimpoverished.EvenifherTENgraduallyimprovedovertime,thehushwasfraughtwithdifficulty.Thisinstanceemphasizesthesignificanceofrememberingtobecarefulwithsulfonamidemedicationswhentreatingindividualswho haveahistory of extreme sensitivityto sulfamedicines.32

Melcy Mary Philip et al., (2019) The tablet form of Dytor contains a fixed-dose combination ofthe diuretics torsemide and spironolactone for the treatment of edema. It's possible that TEN is alegitimate, potentially life-threatening skin condition. A case report of a 47-year-old womantaking Dytor In addition (5/50 mg)therapy once daily for generalized edema is presented here.Thepatientpresentedwithdermatologyshort-termdivisionchiefcomplaintsofvariousdisintegrations,includingverbaldistress,lipconnectionwithscaling,rednessandusingsensation inside the two eyes, and various clear for the most part erythematous rashes all over thebody for the previous two days.According to her evaluation and lab results, she had abnormallyhigh levels of SGOT (140 IU/L), SGPT (228 IU/L), Snow covered mountain (162 IU/L), andblood urea (47 mg/dl). Dytor was abandoned because its development would have resulted inhazardousepidermalnecrolysis.Dexamethasoneimplant,IgGimplant,Cefotaximemix,Cloxacillin e case, Cetirizine pill, Hydroxypropyl methylcellulose eye drop, and genuine mouthpaint were added to the pharmaceutical suspension. A crisis workplace survived the stillness for25 days. There was a distinct advance of silence. According to the WHO-UMC causality scale,thiscasefalls within theplausiblerange.33

Poornima Singh et al., (2019) A significant amount of effort should be put into techniquedevelopment and streamlining to make an RP-HPLC procedure more practical, as this will alsoimprove the overall performance of the system. An advanced methodology shouldn't be awkwardto adopt. The goal of any plan of action should be to speedily complete preclinical diagram,determining show, and trade testing. Torsemide was confirmed in demonstration work using theRP-HPLCtechnique.TakingintoaccounttheR.S.D.(percent),linearity(relationshipcoefficient), and precision (character) as much as possible. Every step of the process was crystalclearandexactlywhatwassupposedtohappen.Themanufacturedframeworkseffectivelyshattered the tablet definition. Maximum effort yielded outcomes that complied with ICH andUSP standards. Central applications of the ICH methodology for supporting drug appraisal areincludedin thescopeof this audit.34

3. AIMANDOBJECTIVE

Aim:

ThespotofthecontinuoussurveyistoOrganizeTorsemideverbalisolatingtabletsbyutilizingsuperdisintegrants.

OBJECTIVE

Verbal affiliation is the chief outstanding course isolated with other appraisal structures since ofsimplicityofingestion,tormentavoidance,adaptabilityandovercompletelysettledconsistenceat any rate one essential deterrent of solid estimation structure is the annoyance in swallowing(dysphasia)or gnawing in patientsparticularly pediatric and geriatricpatients.

The quiet worth and consistence arefundamental in coordinate of the watchful medicationimprovementsystem;onesuchmedicineimprovementstructureisverbalisolatingtablets(ODTs)which has acquiredassertion and inescapability insidethe high leveltimes.

The astounding variable for the business result of verbal disintegrating tablets is, in view of itsfundamentalimpactonsortingoutconsistenceofallageget-togethers.Theseassessmentsstructures are coordinated so they weaken or isolate in patients fast upon contact with spit, insidethespaceof secondswithoutoffer assistanceof waterprovokingspeedier startofadvancement.

Theessentialobjectiveofthisthinkaboutistoredesignthedissolvabilityof Torsemideutilizingsuperdisintegrants.

4. PLANOF WORK

1. Composingstudy

2. Assuranceofmedication

3. Keenmethod development

a.Changeturn(Standard chart)

4. ArrangingofverbalweakeningtabletsTorsemide.

5. Depictionofmicrometricproperties.

• Spotofrest

• Massthickness

• Tappedthickness

• Carr'srecord

• Hausner'scertificate

6. Depictionof tabletforthegoing withlimits

• Weightassortment

• Thickness

• Hardness

• Friability

• Deterioratingtime

• Contentconsistency

7. Invitrodisintegratingcontemplates

8. Drug-Excipientcomposedendeavors

• FT-IR

DRUGPROFILE:[34-35]

Drug: Torsemide

Synonym **:**1-isopropyl-3-((4-m-toluidino-3-

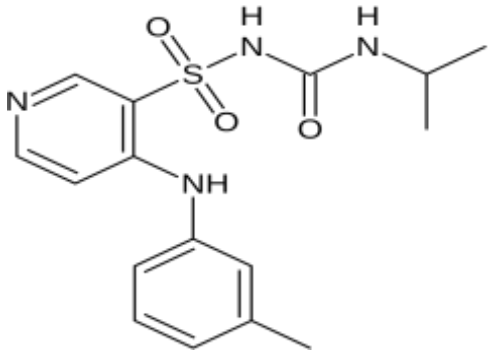
pyridyl)sulfonyl)urea,Demadex,luprac, torasemida.

Drugrequest:antihypertensiveeducatedauthorities,diuretics,

Sodiumpotassiumchloride symporterinhibitors

Brandname(singlemedication):diuver,examide,luprac.

Structure:



Compound name/portrayal/iupac name: n-[(isopropylamino)carbonyl]-4-[(3-

Methylphenyl)amino]pyridine-3-sulfonamide

Atomic condition

:C16H20N4O3S**Atomic weight :**

348.421

gm/mole.**PHYSICOCHEMICALPROP**

ERTIES

Description(physicalstate)seriousareasofstrengthfor:.Dis

solvability:waterdissolvability

Segmentplanand part:imbuement (10mg/ml),tablet (5mg,10 mg,20mg, 100mg).

Consolidatingpoint:164-

164°c**Pka(strongest acidic) :**

5.92**Pka(strongesturgent):**4.2

Log p:2.3

PHARMACOKINETICPROPERTIES

Bioavailability:80-90%

Half-life:3.5hrs

Ingestion:humangastrointestinalsupport

Volumeof stream :12 to15 l

Protein restricting :> almost 100%

%**Metabolism :** hepatic

(80%)**Metabolites:**m1,m2,m3,m4,m5metabolit

es.

Discharge :torsemide is cleared from the course by both hepatic osmosis (around 80% of rigidspace) and delivery into the pee (by and large 20% of complete an open door in patients withnormalrenalcapacity).

Contradicting impacts/side effects:wooziness, cerebral pain, burden, deficiency, spewing,hyperglycemia, past crazy pee, hyperuricemia, hypokalemia, unnecessary thirst, hypovolemia,shortcoming,esophagealchannel, and dyspepsia

PHARMACODYNAMICSPROPERTIES

Part of activity :torasemide blocks the na+/k+/2cl- - transporter framework (through impedanceof the chloride restricting site) in the lumen of the thick climbing part of the circle of henle,accomplishingadiminishinginreabsorptionof sodiumandchloride.Thisoutcomesinan

improvement in the speed of transport of changed liquid and electrolytes to the distal protests ofhydrogenandpotassiumparticlesurge,whileplasmavolumefixingincreasesaldosteronecreation. The drawn outdevelopment and highaldosterone levels advancesodium reabsorptionatthedistaltubules,andbydevelopingthevehicleofsodiumtothedistalrenaltubule,torase mide in a roundabout way expands potassium discharge through the sodium-potassiumtrade system. Torasemide's assets in different pieces of the nephron have not been shown. Assuch torasemide develops the urinary arrival of sodium, chloride, and water, yet it doesn't allaround change glomerular filtration rate, renal plasma stream, or horrendous base agreement.Torasemide's belongings as an antihypertensive are an immediate consequence of its diureticworks out. By diminishing extracellular and plasma liquid volume, beat is diminished for a brieftimeframe outline, and cardiovascularresult besides reduces.

Accommodatingadequacy/signs:forthetreatmentofedemarelatedwithcongestivecardiovascular breakdown, renal sickness, or hepatic illness. Additionally for the treatment ofhypertensionalone orinmix inwith otherantihypertensive prepared experts.

Contraindications:torsemide tabletiscontraindicated inpatientswithknown preposteroussensitivityto torsemideor to sulfonylureas.

Torsemidetabletiscontraindicatedinpatientswhoareanuric.

Composedendeavors

Drug composed endeavors :amikacin close by torsemide, this can develop the impacts ofamikacin.This can makehurt the kidneys orhearing difficulty.

Gentamicin close by torsemide, this can create the impacts of gentamicin. This can make hurt thekidneys orhearing difficulty.

Levomethadyl acidic destructive deduction close by torsemide can manufacture the bet of aconflictingheart musicality

Liquorcorrespondences:torsemideandethanolmighthaveaddedsubstanceimpactsinchopping down your pulse. You could encounter migraine, tipsiness, dazedness, swooning, andbesideschanges in heartbeat or heartbeat

6. EXCIPIENTS PROFILE

CROSS CARMELLOSE SODIUM

Nonproprietary Name:

BP: Croscarmellose Sodium, JP: Croscarmellose Sodium, PhEur: Croscarmellose Sodium USP-NF: Croscarmellose Sodium

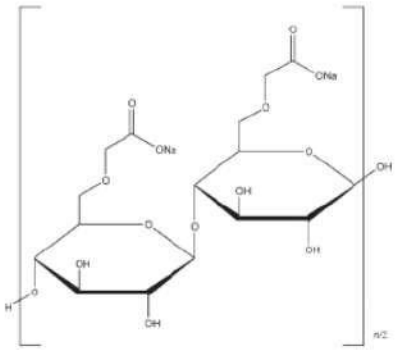
Synonyms:

Ac-Di-Sol; carmellosum natricum conexum; crosslinked carboxymethylcellulose sodium; Explocel; modified cellulose gum; Nymcel ZSX; Pharmacel XL; Primellose; Solutab; Vivasol.

Chemical Name and CAS Registry Number:

Cellulose, carboxymethyl ether, sodium salt, crosslinked [74811-65-7]

Structural Formula:



Functional Category: Tablet and capsule disintegrant.

Applications in Pharmaceutical Formulation or Technology:

Croscarmellose sodium is used in oral pharmaceutical formulations as a disintegrant for capsules, tablets and granules. In tablet formulations, croscarmellose sodium may be used in both direct-compression and wet-granulation processes. When used in wet granulations, the croscarmellose sodium should be added in both the wet and dry stages of the process (intra and extra-granularly) so that the wicking and swelling ability of the disintegrant is best utilized. Croscarmellose sodium at concentrations up to 5% w/w may be used as a tablet disintegrant, although normally 2% w/w is used in tablets prepared by direct compression and 3% w/w in tablets prepared by a wet-granulation process.

Use Concentration (%)

Disintegrant in capsules 10–25

Disintegrant in tablets 0.5–5

7. METHODOLOGY

Buffer preparation:

Preparation of 0.2 M Potassium dihydrogen orthophosphate solution: Accurately weighed 27.128 gm of monobasic potassium dihydrogen orthophosphate was dissolved in 1000 ml of distilled water and mixed.

Preparation of 0.2 M sodium hydroxide solution: Accurately weighed 8 gm of sodium hydroxide pellets were dissolved in 1000 mL of distilled water and mixed.

Preparation of pH 6.8 phosphate buffer: Accurately measured 250 mL of v0.2 M potassium dihydrogen orthophosphate and 112.5 mL of 0.2 M NaOH was taken into the 1000 mL volumetric flask. Volume was made up to 1000 mL with distilled water.

Analytical method development for Torsemide:

a) Determination of absorption maxima

A spectrum of the working standards was obtained by scanning from 200-400 nm against the reagent blank to fix absorption maxima. The λmax was found to be 285 nm. Hence all further investigations were carried out at the same wavelength.

b) Construction of standard graph

100 mg of Torsemide was dissolved in 100 mL of pH 6.8 phosphate buffer to give a concentration in 1mg/mL (1000µg/mL) 1 ml was taken and diluted to 100 ml with pH 6.8 phosphate buffer to give a concentration of 0.01 mg/ml (10µg/ml). From this stock solution aliquots of 1.0 ml, 2.0ml, 3.0 ml, 4.0 ml, 5 ml, were pipette out in 10 ml volumetric flask and volume was made up to the mark with pH 6.8 phosphate buffer to produce concentration of 10, 20, 30, 40 and 50µg/ml respectively. The absorbance of each concentration was measured at respective (λmax) i.e., 285 nm.

Formulation development:

Drug and different concentrations of super disintegrants (Sodium starch glycolate, Cross caramellose Sodium, Cross povidone) and required ingredients were accurately weighed and

passed through a 40-mesh screen to get uniform size particles and mixed in a glass motor for 15 min.

- The obtained blend was lubricated with magnesium stearate and glidant (Talc) was added and mixing was continued for further 5 min.
- The resultant mixture was directly compressed into tablets by using punch of rotary tablet compression machine. Compression force was kept constant for all formulations.

Table 7.1: Formulation table showing various compositions

INGREDIANTS	FORMULATIONS								
	F1	F2	F3	F4	F5	F6	F7	F8	F9
Torsemide	5	5	5	5	5	5	5	5	5
Croscarmellose Sodium	10	20	30	-	-	-	-	-	-
Crospovidone	-	-	-	10	20	30	-	-	-
Sodium starch glycolate	-	-	-	-	-	-	10	20	30
Talc	5	5	5	5	5	5	5	5	5
Mg.Stearate	5	5	5	5	5	5	5	5	5
Mannitol	10	10	10	10	10	10	10	10	10
Lactose	65	55	45	65	55	45	65	55	45
Total weight	100	100	100	100	100	100	100	100	100

Evaluation of tablets:

Pre compression parameters:

Measurement of Micromeritic properties of powders

1. Angle of repose : The angle of repose of API powder is determined by the funnel method. The accurately weighed powder blend is taken in the funnel. The height of the funnel is adjusted in a way that the tip of the funnel just touched the apex of the powder blend. The powder blend is allowed to flow through the funnel freely on o the surface . The diameter of the powder cone is measured and angle of repose is calculated using the following equation.

$\tan \Theta = h/r$ .....(1)

Where , h and r are the height and radius of the powder cone.

Table 7.2 : Flow Properties and Corresponding Angle Of Repose

Flow Property	Angle of Repose (^{0})
Excellent	25-30
Good	31-35
Fair- aid not needed	36-40
Passable-may hang up	41-45
Poor-must agitate, Vibrate	46-55
Very Poor	56-65
Very, very Poor	>66

2. Bulk density

The powder sample under test is screened through sieve No.18 and the sample equivalent to 25 gm is weighed and filled in 100 ml graduated cylinder and the powder is leveled and the unsetled volume, V_0 is noted. The bulk density is calculated in g/cm^3 by the formula.

Bulk density = M/V_0 ..... (2)

V_0 = apparent unstirred volume

M= Powder mass

3. Tapped density

The powder sample under test is screened through sieve No. 18 and the weight of the sample equivalent to 25 gm filled in 100ml graduated cylinder. The mechanical tapping of cylinder is carried out using tapped density tester at a nominal rate for 500 times initially and the tapped volume V_0 is noted. Tappings are proceeded further for an additional tapping 750 times and tapped volume, V_b is noted. The difference between two tapping volume is < 2%, V_b is considered as a tapped volume V_f. The tapped density is calculated in g/cm^3 by the formula.

Tapped density = M/V_f ..... (3)

M = weight of sample powder taken

V_f = Tapped volume

4. **Compressibility index**

The compressibility index of the powder blend is determined by Carr's index to know the flow character of a powder. This formula for Carr's index is as below:

Carr's Index (%) = [(TD-BD)/TD] x100 ..... (4)

5. Hausner's ratio

The Hausner's ratio is a number that is correlated to the flowability of a powder or granular material. The ratio of tapped density to bulk density of the powders is called the Hausner's ratio. It is calculated by the following equation.

$H = Pt / \rho B$ .....(5)

where ρT= tapped density, ρB = bulk density

Table 7.3 : Scale of Flowability

Compressibility index (%)	Flow character	Hausner Ratio
≤ 10	Excellent	1.00-1.11
11-15	Good	1.12-1.18
16-20	Fair	1.19-1.25
21-25	Passable	1.26-1.34
26-31	Poor	1.35-1.45
32-37	Very Poor	1.46-1.59
> 38	Very, very Poor	> 1.60

Post compression parameters:

a) Thickness

The thickness of the tablets was determined by using Digital micrometer. 10 individual tablets from each batch were used and the results averaged.

b) Weight variation

Twenty tablets were randomly selected from each batch and individually weighed. The average weight and standard deviation 3 batches were calculated. It passes the test for weight variation test if not more than 2 of the individual tablet weights deviate from the average weight by more than the allowed percentage deviation and none deviate by more than twice the % shown. It was calculated on an electronic weighing balance.

c) Friability

The friability values of the tablets were determined using a Roche-friabilator. Accurately weighed six tablets were placed in The Roche friabilator and rotated at 25 RPM for 4 min. Percentage friability was calculated using the following equation.

Friability = ([w_0-w]/w_0) x 100

Where w_0 = weight of tablet at time zero before revolution.

w = weight of the tablet after 100 revolutions

d) Drug content

The content of drug carried out by 5 randomly selected tablets of each formulation. The 5 tablets were grinded to get powder; this powder was dissolved in pH 6.8 phosphate buffer by sonication for 30 min and filtered through filter paper. The drug content was analyzed spectrophotometrically at 285 nm using UV spectrophotometer. Each measurement was carried out in triplicate and the average drug content was calculated.

e) Disintegration test Six tablets were taken randomly from each batch and placed in USP disintegration apparatus baskets. Apparatus was run for 10 min. and the basket was lift from the fluid, observe whether all of the tablets have disintegrated.

f) Dissolution test of Torsemide : Drug release from Torsemide tablets was determined by using dissolution test USP 24 type II (paddle). The parameters used for performing the dissolution were pH 6.8 medium as the dissolution medium of quantity 900 ml. The whole study is being carried out at room temperature of 37˚ C and at a speed of 75 RPM.

5 ml aliquots of dissolution media were withdrawn each time intervals (5, 10, 15, 20, 30, min) and appropriate dilution by UV spectrophotometer. The concentration was calculated using standard calibration curve.

Drug-Excipients compatibility studies: Drug excipients compatibility studies were carried out by mixing the drug with various excipients in different proportions (in 1; 1 ratio were to have maximum likelihood interaction between them) was placed in a vial, and closed with rubber stopper and sealed properly. Fourier Transform Infrared Spectroscopy (FTIR) studies were performed on drug, optimized formulation using Bruker FTIR. The samples were analyzed between wave numbers 4000 cm^{-1} and 550 cm^{-1}.

8. RESULTS AND DISCUSSION:

Preparation of calibration curve of Torsemide:

The regression coefficient was found to be 0.999 which indicates a linearity with an equation of y=0.018 x-0.000. Hence Beer-Lmbert's law was obeyed.

Table 8.1 : Calibration curve data of Torsemide in pH 6.8 phosphate buffer

Concentration (µg/mL)	Absorbance
0	0
10	0.188
20	0.363
30	0.547
40	0.734
50	0.923

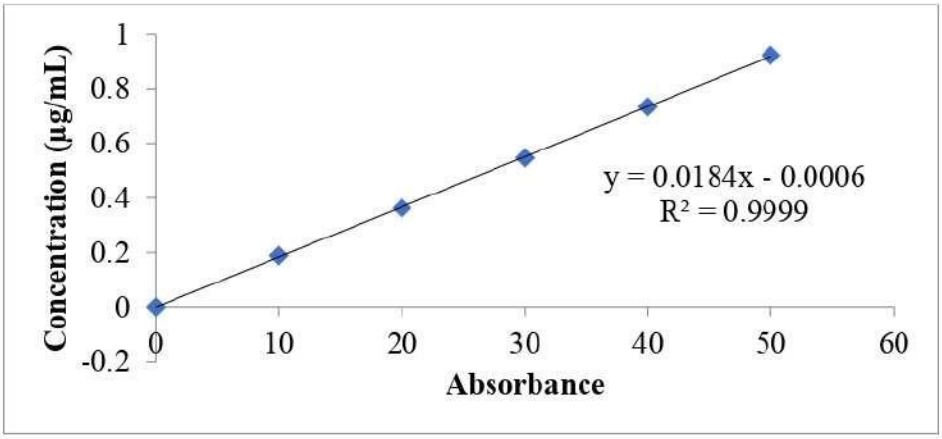


FIG 8.1: Calibration curve data of Torsemide in pH 6.8 phosphate buffer

EVALUATION OF PRE-COMPRESION PARAMETERS OF POWDER BLEND

Table 8.2: Evaluation of pre-compression parameters of powder blend

Formulation code	Angle of repose	Bulk density(gm/mL)	Tapped density (gm/mL)	Carr's index(%)	Hausner's ratio
F1	23.14 ±0.3	0.51 ±0.01	0.51 ±0.01	5.16 ±2.0	1.01 ±0.02
F2	23.47 ±0.4	0.55 ±0.01	0.54 ±0.02	6.48 ±2.0	1.04 ±0.03
F3	23.73 ±0.5	0.59 ±0.02	0.67 ±0.03	9.74 ±2.0	1.17 ±0.03
F4	23.27 ±0.4	0.53 ±0.03	0.52 ±0.04	8.22 ±2.2	1.02 ±0.03
F5	22.56 ±0.2	0.45 ±0.02	0.55 ±0.01	12.54 ±4.9	0.65 ±0.23
F6	23.84 ±0.4	0.57 ±0.01	0.58 ±0.01	14.86±2.2	1.18±0.03
F7	23.31±0.3	0.44 ±0.02	0.53±0.03	14.33±2.0	1.13±0.23
F8	22.63±0.4	0.46 ±0.03	0.56±0.02	13.62±2.0	1.16±0.02
F9	22.94±0.2	0.58 ±0.01	0.69±0.01	11.89±2.2	1.19±0.02

- For each formulation blend of drug and excipients were prepared and evaluated for various pre compression parameters described earlier in methodology chapter.
- The bulk density of all formulations was found in the range of 0.44 ±0.02 - 0.59 ±0.02 and tapped density was in the range of 0.51 ±0.01 - 0.69±0.01
- The Carr's index and Hausner's ratio was calculated from tapped density and bulk density.

EVALUATIONS OF POST COMPRESSION PARAMETERS OF TORSEMIDE ODTs

Table 8.3: Evaluation of post compression parameters of Torsemide Fast dissolving tablets

Formulation codes	Average weight(mg)	Hardness (kg/cm^2	Friability (%loss)	Thickness (mm)	Drug content (%)	*In vitro* disintegration Time(sec)
F1	97.25	2.21	0.41	1.61	99.16	32
F2	98.68	2.44	0.34	1.64	97.41	25
F3	99.41	2.37	0.57	1.77	96.70	23
F4	100.02	2.22	0.32	1.52	99.25	42
F5	96.69	2.35	0.45	1.65	97.58	36
F6	97.47	2.48	0.58	1.88	98.85	30
F7	99.59	2.33	0.43	1.63	99.36	68
F8	98.23	2.46	0.46	1.76	98.61	53
F9	99.72	2.39	0.59	1.89	98.92	41

Weight variation and Thickness: All the formulations were evaluated for uniformity of weight using electronic weighing balance and the results are shown above. The average tablet weights of all the formulations were noted down.

Hardness and friability: All the ODT formulations were evaluated for their hardness using Monsanto hardness tester and the results are shown above. The average hardness for all formulations was found to be between (2.21- 2.48) kg/cm^2 which was found to be acceptable. Friability was determined to evaluate the ability of the tablets to with stand the abrasion during packing, handling and transporting. All the ODT formulations were evaluated for their percentage friability using Roche friabilator and the results are shown above. The average percentage friability for all the formulations was between 0.32 - 0.59 which was found to be within the limit.

Drug content: All formulations were evaluated for drug content according to the procedure described in methodology section and the results were shown above. The assay values for all formulations were found to be in the range of (96.70 - 99.36). According to IP standards the tablets must contain not less than 95% and not more than 105% of the stated amount of the drug. Thus, all the ODT formulation complies with the standards given in IP.

***In vitro* disintegration time:** *In vitro* disintegration studies showed from 23-68 sec.

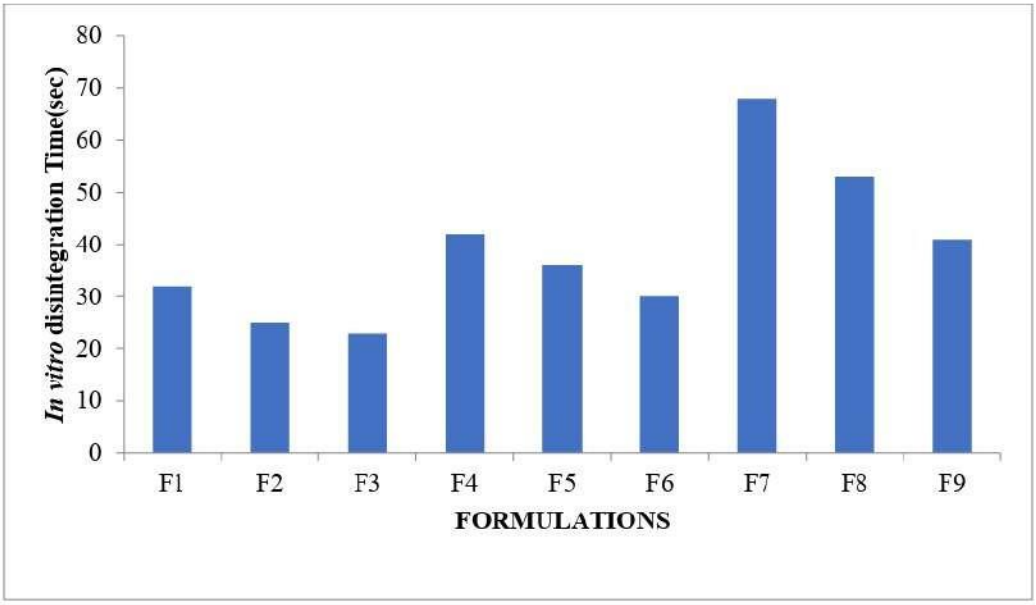


Figure 8.2: *In vitro* disintegration time

IN VITRO DRUG RELEASE SYUDIES OF TORSEMIDE

Table 8.4: *In vitro* Dissolution data of Torsemide

Time (mins)	F1	F2	F3	F4	F5	F6	F7	F8	F9
0	0	0	0	0	0	0	0	0	0
5	13.25	11.08	28.18	21.32	28.47	33.55	27.19	39.95	29.47
10	26.88	34.62	45.38	44.34	45.92	36.71	34.62	46.35	46.76
15	39.49	47.71	52.67	67.04	52.75	49.68	51.37	54.09	49.52
20	52.22	62.35	79.85	78.91	62.29	52.18	68.88	61.76	56.68
30	75.19	75.48	86.57	85.31	89.17	75.32	75.49	68.19	77.32
45	88.37	98.82	93.22	92.78	96.36	98.48	82.67	85.22	83.61

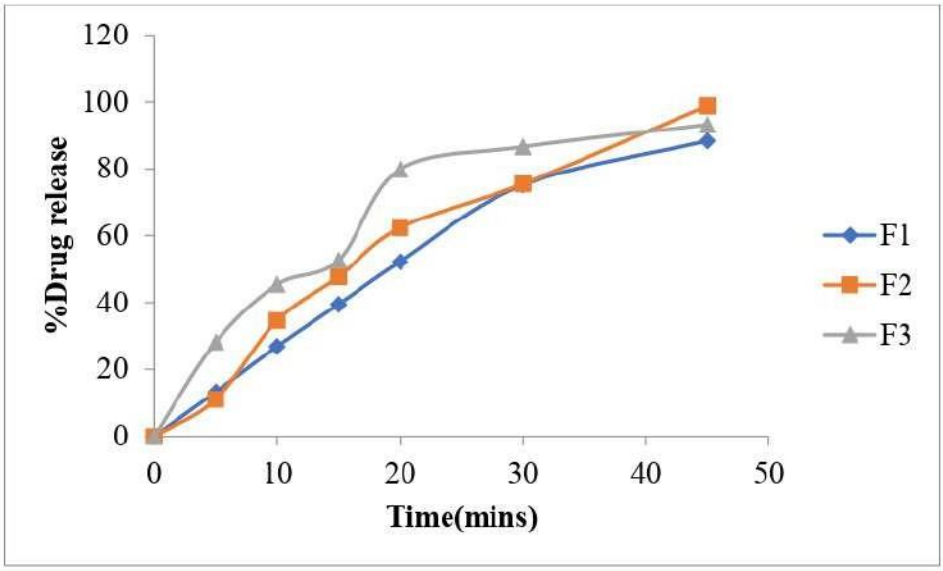


Fig 8.3: Dissolution profile of formulations F1, F2, F3

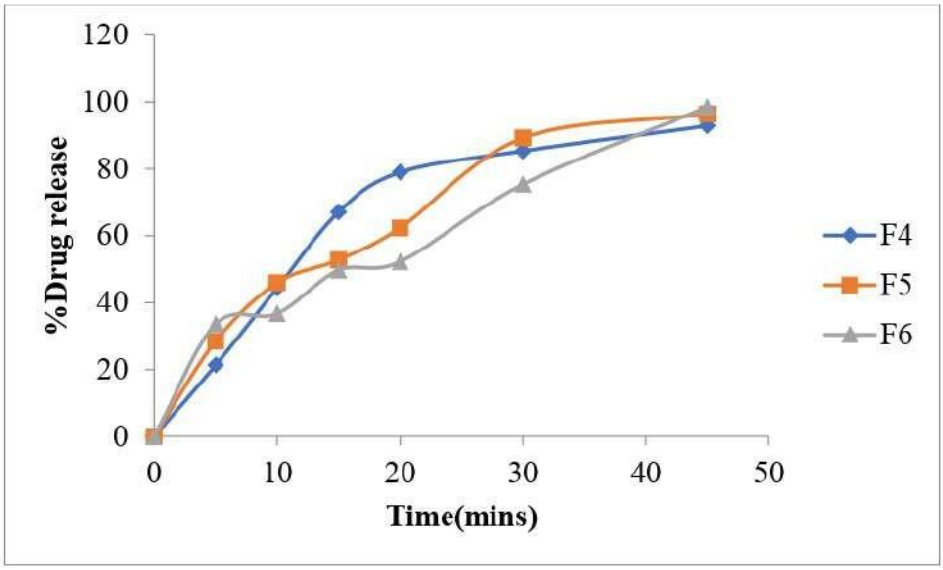


Fig 8.4: Dissolution profile of formulations F4, F5, F6

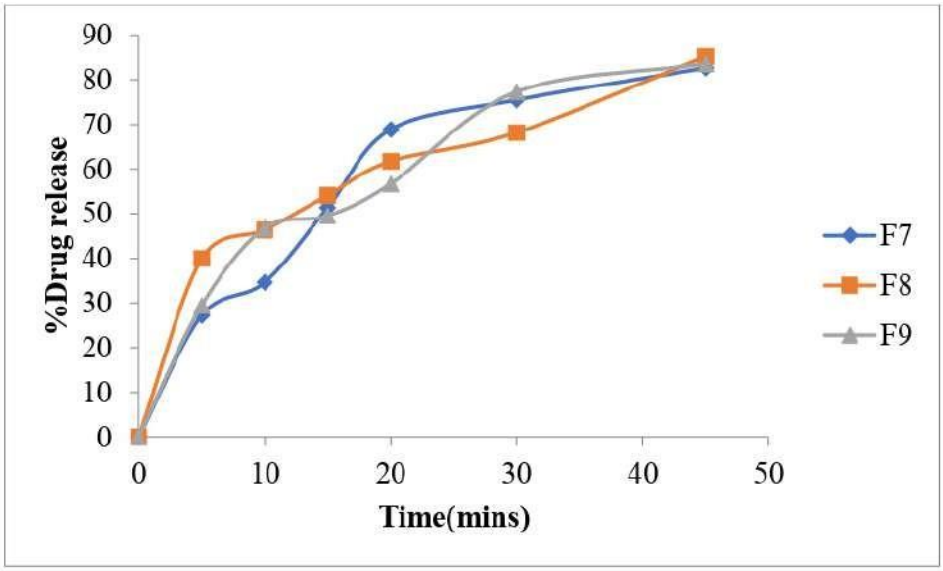


Fig 8.5: Dissolution profile of formulations F7, F8, F9

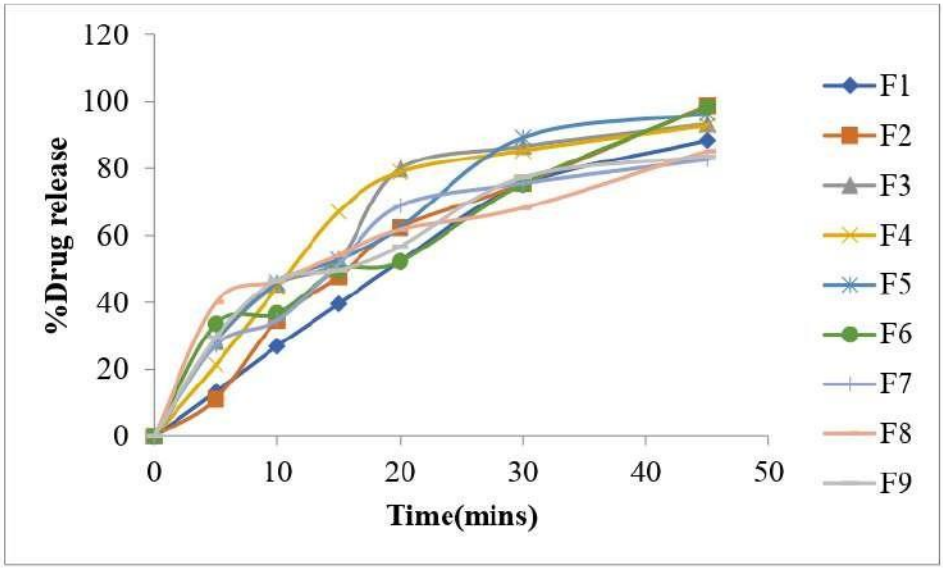


Fig 8.6: Dissolution profile of all formulations F1-F9

From the Table it was evident that the formulations prepared with Croscarmellose Sodium powder were showed good drug release i.e., 98.82 % (F2 Formulation) in higher concentration of blend i.e. 20 mg. Formulations prepared with Crospovidone showed good drug release i.e., 98.48 % (F6 Formulation) in 30 mg concentration when increase in the concentration of Crospovidone drug release unable to retarded. Formulations prepared with Sodium starch glycolate showed maximum drug release i.e., 85.22 % (F8 Formulation) at 45 min in 20 mg of blend.

Among all formulations F2 formulation considered as optimised formulation which showed maximum drug release at 45 min. i.e. 98.82 %. Croscarmellose Sodium was showed good release when compared to Sodium starch glycolate.

Finally concluded that F2 formulation (Contains Croscarmellose Sodium) was optimised better formulation.

FTIR RESULTS:

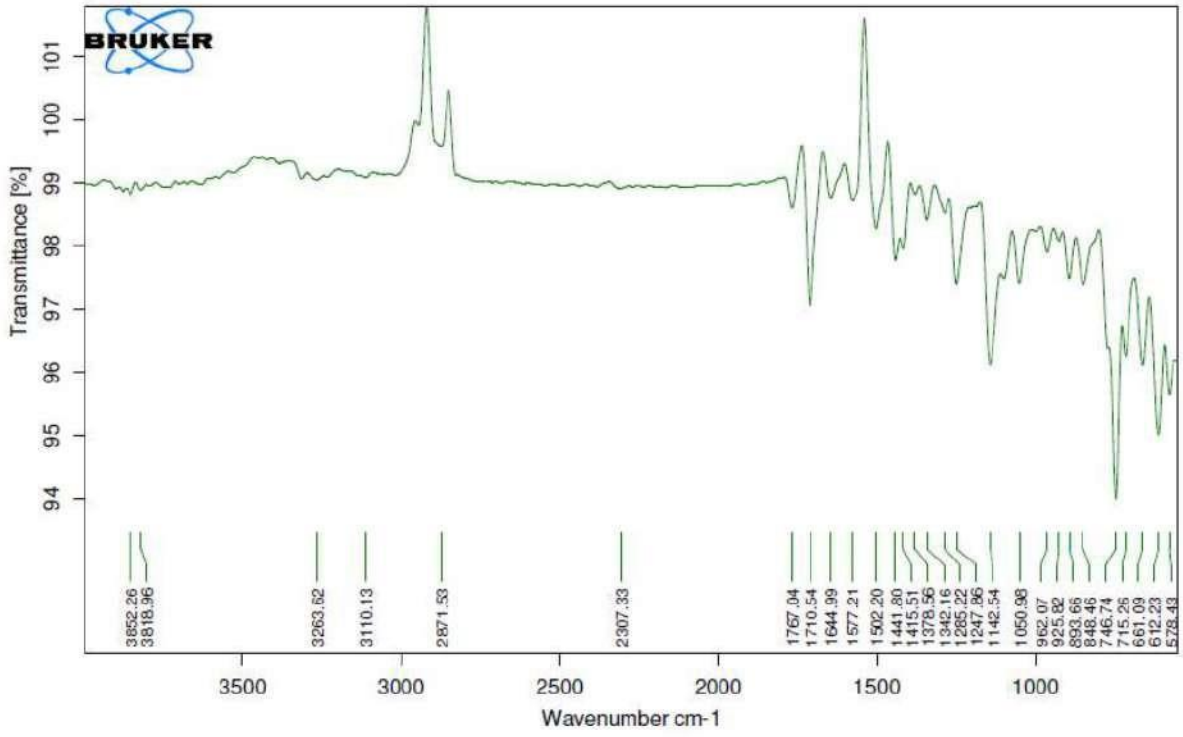


Fig 8.7: FTIR of Torsemide Pure Drug

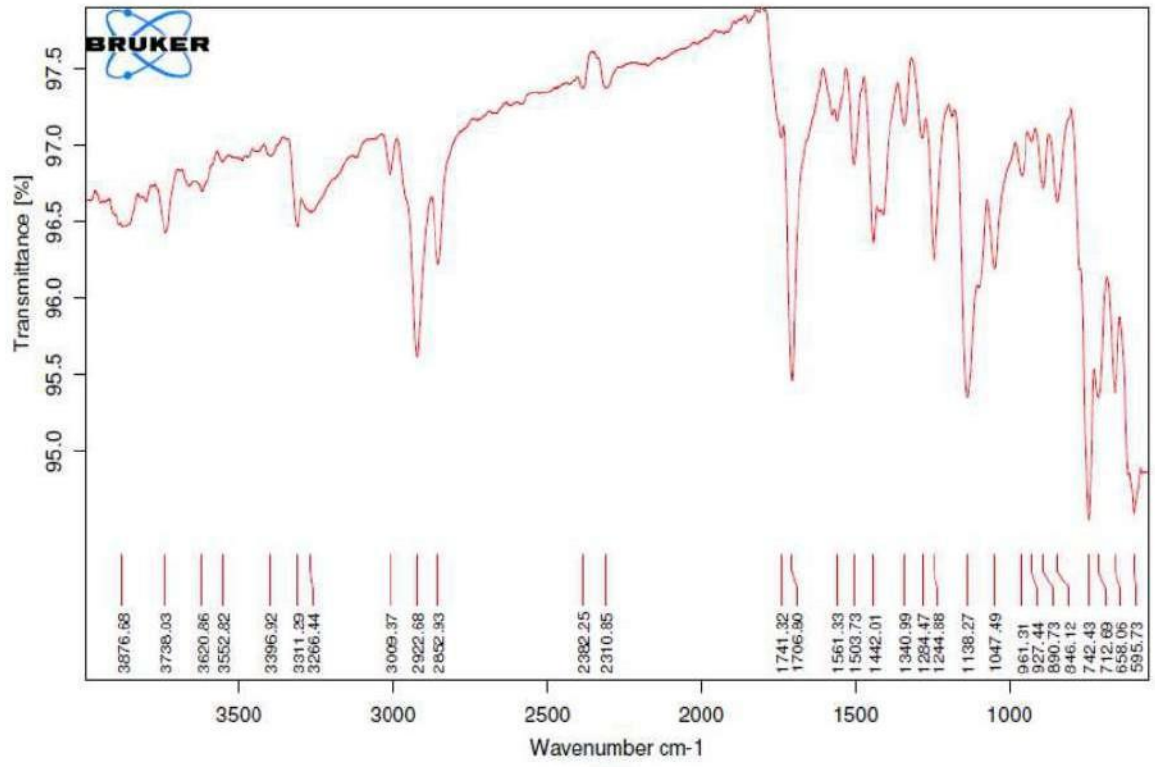


Fig 8.8: FTIR of Torsemide optimized formulation

Torsemide was mixed with proportions of excipients showed no colour change providing no drug-Excipient interactions

9. CONCLUSION

The Oral disintegrating tablets of Torsemide were formulated by using super disintegrants like Sodium Starch Glycolate, Cross Caramellose Sodium and Crospovidone. FTIR study reveals that there is no drug-excipients interaction between Torsemide and excipients. The prepared tablets were shown good post compression parameters and they passed all the quality control evaluation parameters as per I.P limits. The use of Superdisintegrant Croscarmellose Sodium at the concentration of 20 mg given better release of drug when compared to other superdisintegrants. The Optimised Formulation (F2) was showed Highest Drug Release (98.82%) in 45 minutes. The proposed ideal and reproducible characteristics of disintegration time and drug release profile.

By employing commonly available pharmaceutical Sodium starchglycolate, Cross Caramellose Sodium and Crospovidone and Lactose a fast disintegrating tablet of Torsemide can be developed which can be commercialized. The developed formulation of Torsemide ODT showed good efficacy, rapid onset of action, better patient compliance.

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