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Acquisition and Utilization Pattern of Medication for Common Non-Communicable Diseases Among Rural Community



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ABSTRACT

Background: NCDs are estimated to account for 71% of the 57 million global deaths and are epidemic in rural India and lead to chronic expenditure on health and worsen poverty. As there is a lack of a system to collect data creates difficulty to put on efforts at measuring the problem, guiding interventions, and monitoring them effectively, study focusing on affordability and utilization of medicines among rural household people with common NCDs. **Objectives:** To understand drug acquisition and utilization pattern, compliance, and quality of care for NCD in a rural community. **Methods:** A cross-sectional survey was done among 100 people of Vajamangala village who are suffering from NCDs of age 20-90 years through an interview by using questionnaires for acquisition and utilization of medicines, socio-demographics tool, and household inventory tool. Data were analyzed by using SPSS software. **Results:** In this study, the majority of participants (57%) belong to an elderly group of age (51-70yrs) suffering from DM (Men, 59.6%) and HTN (Women, 54.7%). 2/3rd(66.03%) of participants are illiterates. Participants identify medicines ($p=0.05$) by type of package (58.5% in women, 51.1% in men), colour (in women 18.9%) and name (in men 25.5%). About 3/4th(75%) of the participants acquire medicines in the nearest community pharmacy on monthly basis, 69.8% of women are dependent on their household members whereas 59.6% of men are self-affordable ($p=0.004$). Non-compliance is observed high in women than men and major reasons are lack of stock and time constraints ($p=0.03$) in both gender. **Conclusion:** Guiding the patient about the drug acquisition and utilization in a community can be carried out in a community pharmacy, clinic, or specific centers to maximize the therapeutic effect, minimize adverse reactions and enhance the patient knowledge. These activities should be well coordinated to build better health care systems in India.

INTRODUCTION:

Non-Communicable diseases (NCD) are chronic diseases of long duration, and generally slow progression and are the result of a combination of genetic, physiological, environmental, and behavioral factors.

NCDs are estimated to account for 71% of the 57 million global deaths. NCDs are epidemic in rural India and lead to higher and prolonging expenditure on health and thereby worsening poverty. In India, NCDs are estimated to account for 63% of all deaths. Among the NCD's CVD accounts for 27%, Cancer 9%, 11% Chronic RD, 3% DM, 13% all others. The probability of dying from an NCD was greater for males than females. 1 in 4 Indian risks dying from an NCD in early 70's^[2].

Rural setup:-

Vajamangalais a village located in Mysuru, a distance of 15kms with a total population of 4853 people accounting for 1054 households. The total literacy rate is 61.02% among that male and female literacy rate consists of 66.36% and 55.55% respectively.

Work profile: Out of 4853 populations 1,685 were engaged in work activities. 86.35% of workers describe their main work as employment of earning more than 6 months while 13.65% were involved in Marginal activity providing a livelihood for less than 6 months. 1685 workers engaged in main work, 360 were cultivators while 50 were agriculture laborers.

The majority of households are usually owned by the residents with a basic type of infrastructure consisting of either Puccahouse; Semi pucca or kaccha house. All the houses are co-resided with their family members, the villagers usually obtain their money by counting on the co-residing family members or allowances/pensions provided by the government schemes such as pension for people above 60 years and widow pension, physically challenged people for living expenditures.

The ease and access to medicines in LMICs entirely depend on the socio-economic status of the individual. The villagers avail medicines through government schemes that are either paid or free. Individuals can afford medicines bought near local pharmacy stores or nearby residency are dispensed under the supervision of pharmacists. Provisional stores or retail stores still sell medicines for general conditions such as headaches, body pain, etc which is

unethical. Other benefits for the villagers include a subsidiary option or regular payment option for certain medications. Jan Aushadhi scheme is well established in the village. Medical practitioners distributing medicines through assistants is still in practice. The health provisions available in the Village are as follows: -According to census data 2011,

Medical Amenities	Distance from village
CHC	5-10kms
PHC	Less than 5kms
Maternity & Child welfare centre	5-10kms
P.K.T.B clinic	5-10kms
Hospital allopathic	5-10kms
Hospital alternative medicine (HO)	5-10kms
Dispensary	5-10kms
Veterinary hospital	Less than 5kms
Mobile health clinic	More than 10kms
FWC	Less than 5kms

METHODOLOGY

This study is a cross-sectional survey done for the rural people of Vajamangala village who are suffering from NCD. The study was carried out by two Pharm D students (5th year) and they were chosen as data collectors. All the patients satisfying the inclusion criteria were included in the study number of sampling techniques was followed. Sample size was 100.

MATERIALS AND METHODS:

- **Study design:** The study is a prospective observational study
- **Duration of study:** The study was conducted from Dec 2019 till May 2020.
- **Site of study:** Vajamangala, Mysuru (rural)
- **Source of data and materials:**
 - 1) Socio-economic data
 - 2) Patient health records

3) Medications used by the patients.

• **Materials:**

1) Socio demographics tools, Household inventory

2) Self prepared questionnaires for acquisition and utilization of medicines

Study criteria:

Inclusion criteria:

- Patient of age more than 20yrs and irrespective of gender
- Patients receive Generic, branded drugs, and other over-the-counter medicines.
- Patient suffering from common Noncommunicable disease.

Exclusion criteria:

- Patient suffering from communicable disease alone
- Patient of age less than 20yrs
- The patient whose data is incomplete and not responding.

➤ The participants were sensitized regarding the objectives of the study, confidentiality to information participant's right & informed consent. The purpose of the study & procedure involved in the study were explained to participants before administration of the questionnaire & participants were also assured regarding the confidentiality of the information.

➤ The questionnaires were categorized into 3 sections; First section considered data regarding the socio-demographic characteristics, behavioral characters such as smoking and consumption of alcohol, medications used for NCDs, assessing comorbidity with the help of a tool named Socio-demographic risk questionnaire; the Second section includes Household Questionnaire to assess the standard of living of the individuals such as income, work profile, literacy profile, etc.; the third section comprises of Drug acquisition & utilization questionnaire which includes questions related to medication adherence and acquisition of medications for NCDs.

Field Work:-

➤ The research team visits households with NCD conditions. In the household either one or more than one family member may be suffering from NCD. The interview lasts up to 25 min for each individual. The most common NCDs during the study were DM and HTN. The majority of the people included in the study for NCDs were suffering at least from one or more co-morbid conditions such as eye problems, deafness, arthritis, etc. The risk factors were also assessed with the help of the questionnaires. The work profile of the village suggested that most of the people are laborers working outside the village. Visits encountered with either participant only or informants or both as well. Many of the participants showcased their medications and some provided prescription and treatment charts due to lack of stock. A mini session of counseling about the drugs and diseases, hygiene management were also done after the interview and the medications used by participants were documented. The villagers were cooperative and friendly.

Analysis:-

Data of three questionnaires tools were collected and entered in EPIDATA v3.1 software. The data is compiled into Microsoft Excel. Results were analyzed in both descriptive and analytical methods of statistics. Chi-square tests were done for the proportions and a t-test is done for the results having mean and standard deviations by using SPSS software. The graphs were obtained for results showing less and borderline significant values.

RESULTS

Descriptive analysis:

(a) - Age and Gender

In this study, 100 participants meeting eligibility criteria were included. Among them, 47 are men and 53 are women, including various age groups between 20-90 years.

Table 1:-- Average age among both the gender

Age (yrs.)	Men (n=47)	Women (n=53)	p value
Mean (SD)	58.7 [12.11]	54.88 [12.05]	0.12**
p values:-	**p – t-test		

Table 2:-- Categories of age included in the study

AGE (yrs.)	MEN n (%)	WOMEN n(%)	TOTAL n(%)	p value
<50	10[21.3%]	23[43.4%]	33[33.0%]	0.037*
51-70	33[70.2%]	24[45.3%]	57[57.0%]	
71-90	04[8.5%]	06[11.3%]	10[10.0%]	
Total	47[47.0%]	53[53.0%]	N=100[100%]	
p values:-	*p- Chi square test			

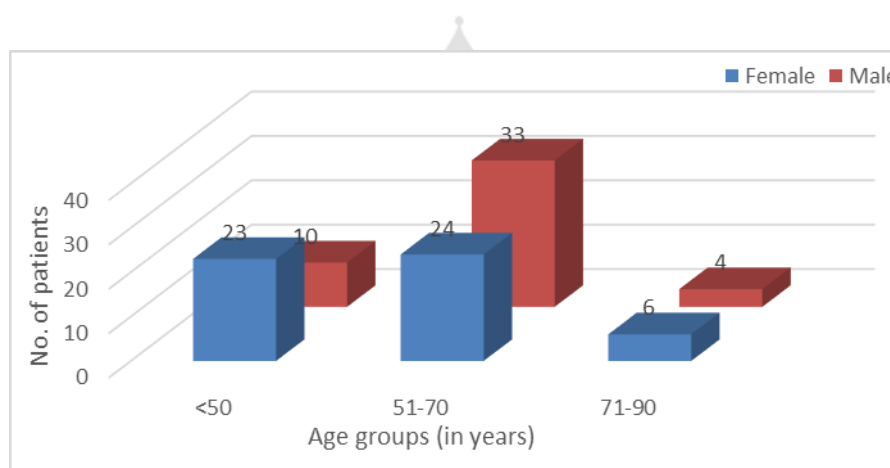


Figure 1: Categories of age included in the study.

➤ From the above table, 33% belong to the age ≤ 50 , 57% belong to the age ranging 51-70yrs and 10% belong to 71- 90 years of age. 3/4th of the men population is seen between the 51-70 yrs of age. Women were seen in almost the same proportions in both the age category of less than 50 and higher.

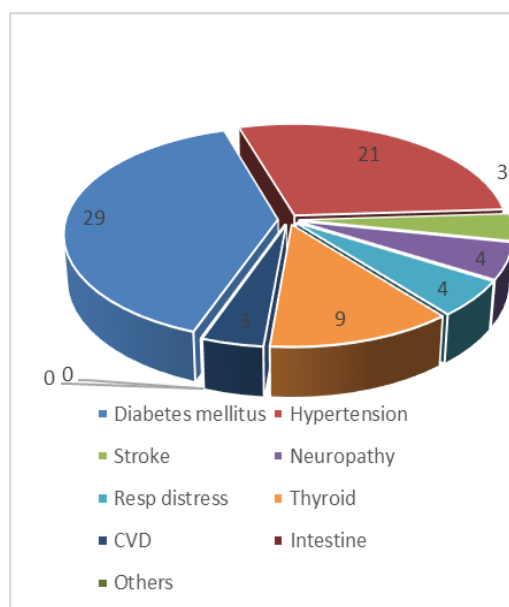
(b):- NCDs

DM and HTN were no significant differences in both genders. RD was seen significantly higher in women than men. Comorbidities risk associated with DM and HTN such as CVD

were higher in women than men. According to our study results, women were more susceptible to NCDs than men.

Table 3- Different types of NCDs with respect to gender

NCD TYPE	MEN n (%)	WOMEN n (%)	p VALUE
Diabetes Mellitus	28[59.6%]	22[41.5%]	0.07*
Hypertension	21[44.7%]	29[54.7%]	0.32*
Stroke	03[6.4%]	02[3.8%]	0.55*
Neurological disorders	04[8.5%]	04[7.5%]	0.86*
Respiratory Disorders	04[8.5%]	07[13.2%]	0.45*
Thyroid disorders	0[0.0%]	03[5.7%]	0.10*
Cardiovascular disorders	03[6.4%]	05[9.4%]	0.58*
Intestine disorders	0[0.0%]	02[3.8%]	0.18*
Others	0[0.0%]	01[1.9%]	0.34*
p values :- *p – Chi-square test **p – t-test			



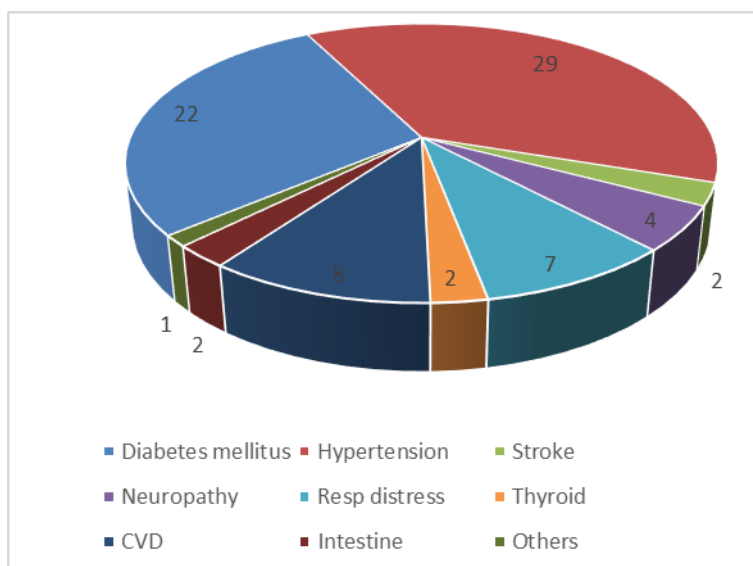


Figure 2a: Different types NCDs in men **Figure 2b:** Different types of NCDs in women

(c) Marital status, Education, SLI:-

Table 4:--Socio demographic characteristics 1

Socio-demographics	Men n(%) (n=47)	Women n(%) (n=53)	p value
Marital status			
• Married	30 [63.8%]	35[66.0%]	0.94*
• Single/ widow	10 [21.3 %]	12[22.6%]	
• Unmarried	03 [6.4%]	02[3.8%]	
• Divorced	04 [8.5%]	04 [7.5%]	
Education			
• Illiterate	30 [63.8%]	35 [66.03%]	0.49*
• Primary	03 [6.4%]	06 [11.32%]	
• Secondary	04 [8.5%]	05 [9.43%]	
• Graduate	0 [0.00%]	03 [5.66%]	
• Not completed primary	5[10.6%]	4[7.5%]	
• Not disclosed	2[4.3%]	3[5.7%]	
Standard of Living Index (score)	33.72[6.078]	32.96 [7.311]	0.56**
p values:- *p – Chi-square test		**p – t-test	

The majority of the study sample was found to be married and exhibiting equal proportions. Comparatively 2/3rd of the sample proportions were illiterate in both gender and About 11.32% of females had completed primary, 8.5% of men had completed secondary. Despite the educational status, all study sample has an average of 33 scores as a standard living index which is exposing as a middle-class community.

(d):- family type and work profile.

➤ Rural area consists of both nuclear and joint family. According to data, there are 61.70% and 47.2% of the nuclear type of family among men and women respectively. The joint type of family was 38.3% and 52.83% among men and women respectively.

Table 5:-- Socio demographic characteristics 2

Socio-demographics	Men n(%) (n=47)	Women n(%) (n=53)	p-value
Family type			
• Nuclear	29 [61.70%]	25 [47.2%]	0.15*
• Joint	18 [38.3%]	28 [52.83%]	
Job category			
• Paid full-time work	16 [34.04%]	2 [3.8%]	0.01*
• Paid part-time work	09 [19.14%]	2 [3.8%]	
• Housewife/husband	1 [2.1%]	30 [56.6%]	
• Retired	21 [44.68%]	19 [35.8%]	
p values :- *p –	Chi-square test	**p – t-test	

➤ In men, the work profile of paid work was either full-time 34.04% or part-time of 19.14%, as in women majority were homemakers (56.6%). The majority of the people are dependent on the household members for the living who are categorized as retired in which are 44.68% and 35.8% among men and women respectively. Socio behavioral characteristics such as smoking, alcohol & consumption of tobacco did not play a significant role in this study.

women, about 72.3% and 66% respectively were affording their medicines for a month as the incidence rate of diabetes and hypertension is high. OOP is observed in 1/2th of the proportions in both genders. The majority of participants (74.5% of men and 83% of women) usually buy their medications in the nearest community pharmacy by paying the price fixed for each medicine, discounts may be applicable. Government schemes such as JanAushadhi are well established.

Table 6.2:-- Acquisition pattern 2

Characteristics	Men n(%) n=47	Women n (%) n=53	p value
The participant usually takes all medicines as recommended?			0.55*
• Yes	44[93.6%]	51[96.2%]	
• No	3[6.4%]	2[3.8%]	
How often does the participant undergo regular follow-up?			
• Less often	15[31.9%]	15[28.3%]	
• Regularly	26[55.3%]	28[52.8%]	0.70*
• Do not follow up	6[12.8%]	10[18.9%]	
p values:- *p – Chi-square test		**p – t-test	

Participants were usually adherent to the medications recommended by a healthcare professional and undergo regular follow up usually around 15 days especially in the case of DM and HTN. Women were significantly less in undergoing follow-up than men.

(f): Utilization pattern among the study sample

Identification of medicines:--

The majority of the study population can identify medicines on their own and may need help from household members in certain situations. Identification of medicines is seen high in women by type of package compare to men. 1/4th of men can read the name on the medicines and 1/3rd of women are identified by the shape of medicines.

Table 7 – utilization pattern of medications

Table 7.1:- Identification of medicines

Characteristics	Men n(%) n=47	Women n(%) n=53	p value
Can you identify medicines?			
• Yes	40[85.1%]	50[94.3%]	0.13*
• No	7[14.9%]	3[5.7%]	
Identified by Whom?			
• Self	42[89.4%]	53[100.0%]	0.20*
• Daughter	1[2.1%]	0[0.0%]	
• Wife/husband	2[4.3%]	0[0.0%]	
• Son	1[2.1%]	0[0.0%]	
• Friend	1[2.1%]	0[0.0%]	
How do you identify your medicines?			
• Colour of the medicine	5[10.6%]	10[18.9%]	0.05*
• Name of medicine	12[25.5%]	4[7.5%]	
• Type of package	24[51.1%]	31[58.5%]	
• Shape of medicine	1[2.1%]	6[11.3%]	
• Mark on medicine	2[4.3%]	1[1.9%]	
• Others	3[6.4%]	1[1.9%]	
p values:- *p –Chi-square test		**p – t-test	

Non -compliance:-

Among the study participants, Women were found to be less adherent compare to men in case of skipping a dose. The major reason among both the gender was lack of stock and time constraints. Alternative for non-compliance is higher in women than men. 27.7% of men ignore the dose which is higher than women. The pattern of remembering to take medicines is significantly high in women than men by watching meal time.

Table 7.2:- Non- compliance

Characteristics	Men n(%) n=47	Women n (%) n=53	p value
Will you forget to take medicine at the right time?			
• Yes	21[44.7%]	31[58.5%]	
• No	26[55.3%]	22[41.5%]	0.17*
Reason for Skipping dose if any?			
• Not interested	3[6.4%]	6[11.3%]	
• Substance abuse	5[10.6%]	0[0.0%]	
• Lack of stock	19[40.4%]	19[35.8%]	0.03*
• Feeling better	1[2.1%]	8[15.1%]	
• Fasting	0[0.0%]	2[3.8%]	
• Time constraints	18[38.3%]	18[34.0%]	
• Others	1[2.1%]	0[0.0%]	
Alternative you do if you miss a dose?			
• I will take it when remembered	17[36.2%]	22[41.5%]	
• I will wait for the next dose	15[31.9%]	18[34.0%]	
• Twice the next dose	00[0%]	1[1.9%]	0.04*
• I will ignore	13[27.7%]	4[7.5%]	
• Others	2[4.3%]	8[15.1%]	
How will you remember to take medicines at right time?			
• By watching time regularly	5[10.6%]	3[5.7%]	
• Remembered by Family members	2[4.3%]	3[5.7%]	0.74*
• Watching meal time	35[74.5%]	43[81.1%]	
• Others	5[10.6%]	4[7.5%]	

Whether you stop your medication if you feel your health condition is better?			
• Yes	8[17.0%]	17[32.1%]	0.08*
• No	39[83.0%]	36[67.9%]	
Who insisted you stop medication?			
• Physician	1[12.5%]	5[29.4%]	0.356*
• Self- decision	7[87.5%]	12[70.6%]	
p values :-	*p –	Chi-square test	**p – t-test

Analytical statistics:-

➤ From table 4, we observed that the Majority of the men fall under the category of elderly i.e., 51-70yrs of age who are either retired (44.68%) or have a work profile of paid full time (34.04%). Most of the men are self-dependent and earn money, buy medicines themselves. The job category provided a p-value of 0.001 which is significant and obtained by the Chi-square test. The significance implicates that nearly 56.6% of women are a homemaker and (retired 35.8%) dependent on the household members to avail medicines and also for the living.

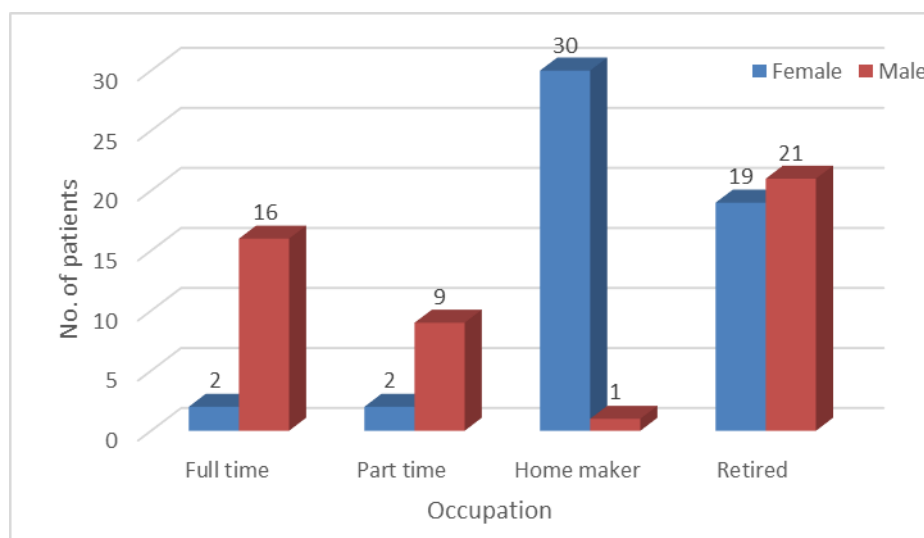


Figure 3: job category concerning gender

➤ From table 4, we can interpret that the acquisition pattern of medicines depends on the individual economic status such as job category. The majority of participants buy their medicines themselves in men 59.6%, among women nearly 70% are dependent on household members such as son, wife, etc. due to their position as a homemaker. The p-value obtained by stratification of results was 0.004 by chi-square test. The graph is as shown below.

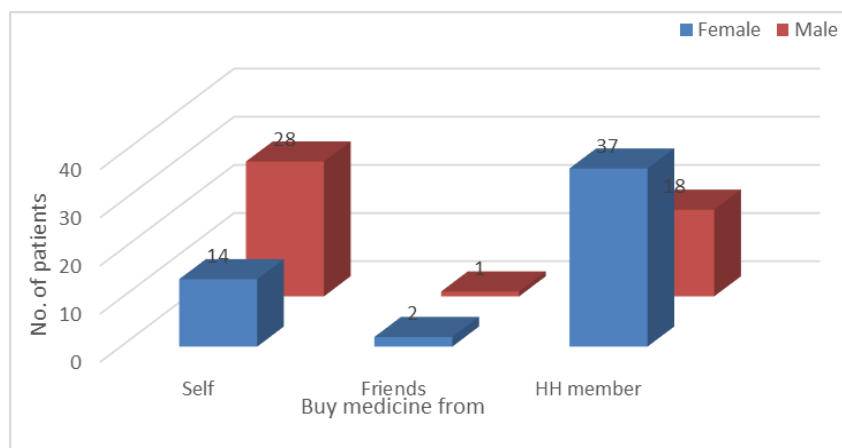


Figure 4: Purchase of medicines

➤ From table 5, we observed that data collected about the utilization of drugs among 100 participants shows us there is a high rate of illiteracy but also the people about 85.1% of men and 94.3% of women can identify medicines on their own. Identification is done through different ways such as majority by type of package (51.1% of men, 58.5% of women), the colour of medicine (10.6% of men, 18.9% of women), and name of the medicine (25.5% of men, 7.5% of women), shape and mark of the medicines. The rest of the participants are dependent on their daughter, wife husband, son, and friends. the p-value obtained is 0.05.

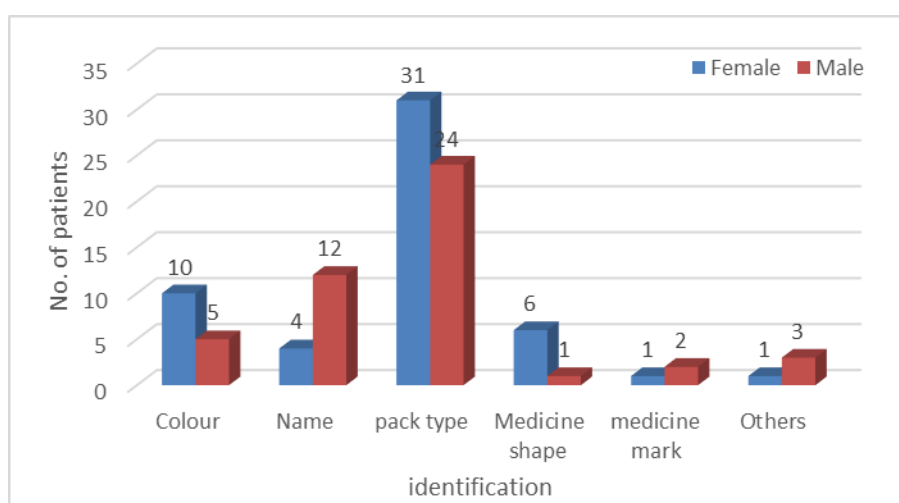


Figure 5: Different methods of identification of medicines

➤ The reason for non-compliance is almost same in both the gender. The participants were found to be less adherent to their medication to take at the right time as table 6 shows 44.47% and 58.5% among men and women forget due to lack of stock in the home was one of the major reasons given by 40.4% of men,35.8% of women and time constraints are the other major reason among 38.3% of men and 34% of women respectively. The p-value obtained is 0.03. Alternatively, when they skip the dose most of the participants about 36.2% of men,41.5% of women will take when they remember irrespective of the frequency, and also 31.9% of men and 34% of women will wait until the next dose.1.9% of women will twice the next dose due to their health consciousness. 74.5% of men and 81.1% of women remember to take the medicine by watching the mealtime, while others recall by their family members in respect to watching time regularly. The p-value obtained from the results is 0.04.

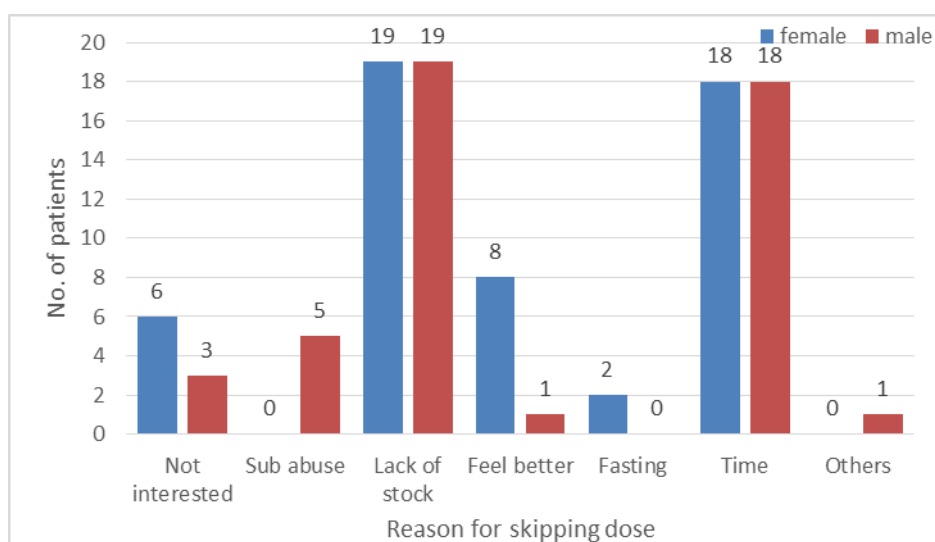


Figure 6: Reasons for skipping the dose

➤ As per the data, about 17% of men and 32.1% of women stop their medications when they are feeling better. Among them, 87.5% of men and 70.6% of women will stop their medication without consulting anyone (self- decision). Only about 12.5% of men and 29.4% of women consult their physician before the cessation of prescribed medications. This shows that the participants were more concerned about their health condition as 83.6% of men and 67.9% of women did not stop their medications even when they feel better.

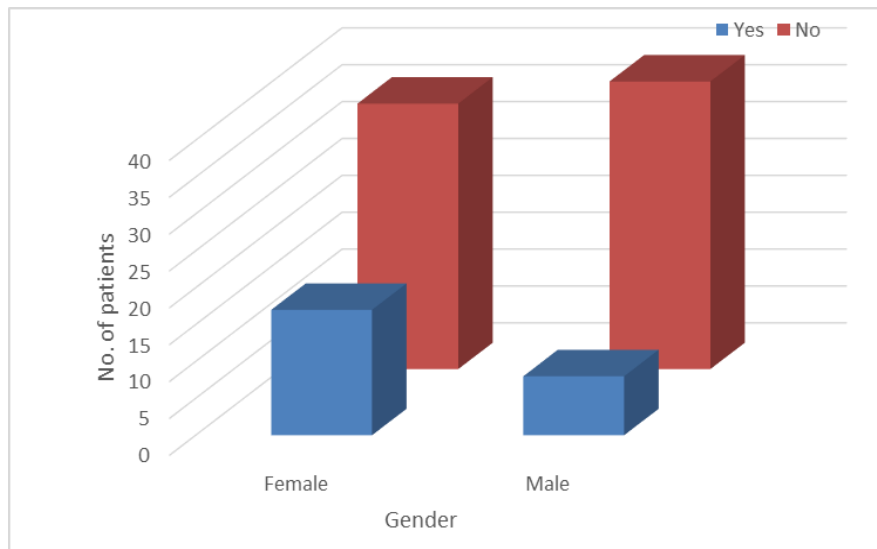


Figure 7:- stop medications

DISCUSSIONS

Key Findings:--

- Among 100 participants, 57% of them belongs to age from 51-70 yrs.
- Diabetes and hypertension were the most common type of NCD found in the study sample. No significant differences in both the gender.
- No differences in proportions of married and widowed in men and women.
- The education profile of both gender majorly includes illiterates.
- Men had a work profile of paid full-time work and retired, while most of the women were homemakers and retired.
- Socioeconomic status directly reflects upon the acquisition and utilization of medicines for NCDs.
- Women were less adhering to their medications compare to men.
- Lack of knowledge regarding the rational use of PPIs, hygiene management, handling of medications in menstrual period and fasting period in Women. Among men lack of awareness about substance abuse such as alcohol and tobacco before or after taking medicines.

- Lack of access to health amenities such as primary health care centers is seen in both the gender.
- Discontinuing of medicines in the middle of regimen is seen markedly high in women compared to men. Women tend to seek less advice from health care professionals before discontinuing.
- Avail of medicines is majorly seen in community pharmacy nearby in both the gender.

Compare and Contrast:-

This study found that 44.7% of men and 58.5% of women were exhibiting non-compliance to medications. A contrast finding similar to this study was reported in Puducherry, South India with an overall 32.7% of non-compliance. In both studies, women were found to be less adhering to medications [3].

The acquisition of drugs and health service utilization in our study showed significant results of wider vision compared to the previous study carried out in Tumkur. Only 4.3% of men and 3.8% of women use health amenities such as PHC to purchase medicines and treat them among the total sample and the rest of them used other health sectors such as private hospitals to treat and purchase medicines from community pharmacies.

STRENGTH AND LIMITATIONS

Strengths of the study,

- A first study among Indian rural men and women for NCDs.
- All the questionnaires were validated and translated to Kannada.
- All the interviews were done at the patient's residence.
- All the participants have consented.
- No missing data

Limitations of the study:-

- Small sample size from one big village (Vajamangala)

- Nonrandomized sample
- No qualitative data

Recommendations:-

Insights: Participants are unaware of adverse effects of high doses of drug taken on an empty stomach before fasting and also while consumption of alcohol, majority exhibited an addiction character of taking medicines on a daily routine basis even though they have a choice of skipping meals or food but not medicines due to lack of awareness & knowledge, females are more prone to above observations compare to male. People who are above 55yrs of age exhibited irrational use of proton pump inhibitors daily. In our study, acquisition of OTC drugs and used as per requirements were analyzed and analgesic named SUMO tablet and Paracetamol is availed commonly among the community. Many of the participants reported avoiding Metformin during the menstrual cycle due to the experience of some adverse drug reactions like intestine problems.

CONCLUSION

This study reported that Diabetes mellitus and Hypertension were the predominant type of NCDs observed in both the gender. Non-compliance is seen higher in women than men. Out-of-pocket expenditure for the purchase of medicines is high and has no significant differences among men and women. Despite the existence of government amenities such as Jan Aushadhi, the majority of the participants avail medicines in community pharmacies every month among men and in women by family members. Guiding the patient about the drug acquisition and utilization in a community can be carried out in a community pharmacy, clinic, or specific center to maximize the therapeutic effect, minimize adverse reactions and enhance the patient knowledge. These activities should be well coordinated to build better health care systems in India.

Financial support and sponsorship: Nil.

Conflicts of interest: There are no conflicts of interest.

Future directions:-

- Maintaining a mandatory follow-up record of basic health parameters such as blood pressure and blood glucose level every 15 days.
- More emphasis on the utilization of government sectors for treatment should be done.
- Provide strategies to identify medications for the right conditions such as placing the pills in a colored jar, not consuming the last tablet of the sheets to identify by type of package, color, and shape of medicines.
- Educational awareness about hygiene and use of medications during the menstrual period to women by spreading leaflets in local language and also establishing information center in nearby local pharmacies or hospitals.
- Establishing services for the acquisition of medicines by recognizing a pharmacist nearby the village. This initiative can also be done by a pharmacy volunteer.
- Participants who are dependent on the family members for their living are empowered with different types of pensions such as elderly, physically handicapped, widow, etc.
- Due to lack of knowledge about the safe use of medicines, an awareness camp should be conducted.
- The literacy rate should be improved in the villages.

LIST OF ABBREVIATIONS

CHC- Community Health Centre

DM- Diabetes Mellitus

FWC- Family Welfare Centre

HTN- Hypertension

NCDs- Non – communicable diseases

OOP- Out Of Pocket expenditure

PHC- Primary Health Centre

SLI- Standard of Living Index

SPSS- Statistical package of social sciences

WHO- World Health Organization

CVD:- Cardiovascular disorder

RD:- Respiratory disorders

LMICs :- Low and Middle income countries

REFERENCES

- 1) Non communicable diseases country profile 2018 ISBN: 978 92 4 1514620https://www.who.int/nmh/publications/ncd-profiles-2018/en/
- 2) Non-communicable Diseases Progress Monitor, 2017 ISBN 978-92-4-151302-9. https://www.who.int/nmh/publications/ncd-progress-monitor-2017/en/
- 3) Moving to Universal Coverage? Trends in the Burden of Out-Of-Pocket Payments for Health Care across Social Groups in India, 1999–2000 to 2011–12 .Anup Karan SakthivelSelvaraj , Ajay Mahal. PLoS One. 2014;9:e105162.
- 4) Improving access to medicines for non-communicable diseases in rural India: a mixed methods study protocol using quasi-experimental design. Prashanth et al. BMC Health Services Research (2016) 16:421 DOI 10.1186/s12913-016-1680-3.
- 5) Prevalence of medication adherence and its associated factors among patients with noncommunicable disease in rural Puducherry, South India – A facility-based cross-sectional study. K Yuvaraket al J Family Med Prim Care. 2019 Feb; 8(2): 701–705. doi: 10.4103/jfmpc.jfmpc_350_18
- 6) Ghosh S. Trends and Differentials in Health Care Utilization Pattern in India. J Health Manag. 2014;16:337–63.
- 7) Kotwani A, Ewen M, Dey D, Iyer S, Lakshmi PK, Patel A, Raman K, Singhal GL, Thawani V, Tripathi S, Laing R. Prices & availability of common medicines at six sites in India using a standard methodology. Indian J Med Res. 2007;125:645–54.
- 8) Boutayeb A & Boutayeb S (2005) The burden of non communicable diseases in developing countries. International Journal for Equity in Health 4, 2.
- 9) Can the rural poor in India afford to treat non-communicable diseases. Erika Binnendijk, Ruth Koren and David M. Dror doi:10.1111/j.1365-3156.2012.03070.x volume 17 no 11 pp 1376–1385 november 2012.
- 10) D. Abegunde, C. Mathers, T. Adam, M. Ortegón, K. Strong. 2007. “The burden and costs of chronic diseases in low-income and middle-income countries” The Lancet 370(December 8):1929-38.
- 11) Non-communicable disease syndemics: poverty, depression, and diabetes among low-income populations. Emily Mendenhall et al .Lancet . 2017 March 04; 389(10072): 951–963. doi:10.1016/S0140-6736(17)30402-6.
- 12) Non-communicable diseases in low- and middle-income countries: context, determinants and health policy J. J. Miranda et al doi:10.1111/j.1365-3156.2008.02116.x
- 13) Medication Adherence among Rural, Low-Income Hypertensive Adults: A Randomized Trial of a Multimedia Community-Based Intervention, Michelle Y. Martin, PhD, Young-il Kim, PhD, Polly Kratt, PhD, First Published July 1, 2011. https://doi.org/10.4278/ajhp.090123-QUAN-26
- 14) India's escalating burden of non-communicable diseases, Perianayagam Arokiasamy Published: October 03, 2018. DOI: https://doi.org/10.1016/S2214-109X(18)30448-0.

- 15) Inequity in access to inpatient healthcare services for non-communicable diseases in India and the role of out-of-pocket payments. KathiresanJeyashree. et al., Year : 2017 | Volume : 30 | Issue : 5 | Page : 249-254.
- 16) A pilot study to evaluate home-based screening for the common non-communicable diseases by a dedicated cadre of community health workers in a rural setting in India. ParthaBasu. et. al., Published: 03 January 2019, BMC Public Health volume 19, Article number: 14 (2019) .
- 17) World Health Organization. Global Health Observatory (GHO) data. NCD mortality and morbidity. Geneva: WHO; Available from: http://www.who.int/gho/ncd/mortality_morbidity/en/. Accessed on 16 June 2018.
- 18) Das J, Mohpal A. Socioeconomic Status And Quality Of Care In Rural India: New Evidence From Provider And Household Surveys. Health Aff (Millwood). 2016;35(10):1764–73. <https://doi.org/10.1377/hlthaff.2016.0558>
- 19) Sreerama G, Matavalum S, Chandresekharan P, Thunga V. Difficulties in accessing and availing of public health care systems among rural population in Chittoor District, Andhra Pradesh. International Journal of Medicine and Public Health. 2015;5(4):265–9. <https://doi.org/10.4103/2230-8598.165085>
- 20) The burden of non-communicable diseases in India. Hamilton: The Cameron Institute; 2010. Non-communicable diseases (NCDs)—India's next major health challenge (English). NCDs policy brief: India. Washington, D.C.: World Bank Group; 2011.
- 21) Available at <http://documents.worldbank.org/curated/en/281961505994118415/Non-communicable-diseases-NCDs-Indias-next-major-health-challenge> (accessed on 10 Jun 2017). †
- 22) WHO, Indrayan A. Forecasting vascular disease and associated mortality in India. Burden of Disease in India. National Commission on Macroeconomics and Health. Ministry of Health and Family Welfare, Government of India, New Delhi 2015. Year : 2017 | Volume : 30 | Issue : 5 | Page : 249-254.
- 23) Population Census 2011. Available from: <https://www.census2011.co.in/data/subdistrict/686-gogunda-udaipur-rajasthan.html>. Accessed on 14 November 2018.
- 24) Joshi R, Alim M, Kengne AP, Jan S, Maulik PK, Peiris D, et al. Task shifting for non-communicable disease management in low and middle income countries—a systematic review. PLoS One. 2014;9(8):e103754. <https://doi.org/10.1371/journal.pone.0103754>.
- 25) World Health Organization. WHO guideline on health policy and system support to optimize community health worker programmes. Geneva: WHO; 2018.
- 26) Global status report on non communicable diseases 2014 <https://www.who.int/nmh/publications/ncd-status-report-2014/en/>
- 27) Out of pocket expenditure on chronic health conditions <https://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-12-990>