Original Research Article

A Cross Sectional Survey on Patient Responsibility towards Rational Use of Medicine in Chronic Illnesses

Padmaja Shetty K[1], Anusha S J[2], Pratibha Nadig D[3]

[1]Assistant Professor, Department of Pharmacology, Dr.Chandramma Dayananda Sagar Institute of Medical Education and Research, Dayanand Sagar University, Ramanagara District, Devarakaggalahalli, Harohalli, Karnataka
[2]Assistant Professor, Department of Pharmacology, Dr.Chandramma Dayananda Sagar Institute of Medical Education and Research, Dayanand Sagar University, Karnataka
[3]Professor and HOD, Department of Pharmacology, Dr.Chandramma Dayananda Sagar Institute of Medical Education and Research, Dayanand Sagar University, Karnataka.

Abstract

Background: Responsible, rational usage of medication in chronic disease determines the optimal response to treatment, prevention of complications, active surveillance of adverse drug reactions and improvement in quality of life.

Objective: The aim of this cross sectional survey was to determine the responsibility of patients towards safe medication usage for successful management of chronic diseases.

Methodology: This prevalidated questionnaire based cross sectional survey was conducted between August 2021 – January 2022 on 400 subjects diagnosed with chronic disease/s. Chi square test was performed for association between several variables affecting patient responsibility towards medication usage and adherence. Association between demographic variables and medication adherence was assessed using multivariate logistic regression.

Result: The sociodemography showed that out of 400 participants in this survey, 52.5% females, 50.5% >65years, 73.5% were graduates and 78.8% suffering from chronic disease/s for more than 2 years. The most common chronic disease/s noted were diabetes mellitus -35.8%, hypertension- 60.8%, arthritis-15.3%, asthma-14%.

Patients' responsibility towards medication usage showed that 94%- discussed with the doctor before going to pharmacy. 94.8% enquired dose, 48.3%- name of the medicine, 83.5%- how to take medicine, 64.0% -duration , 78%- time and 88.8%- frequency of medication.

Medication adherence questionnaire showed that 25%- stopped taking medication due to various reasons, 21.3% forgot to take medication and 21.5% felt hassled sticking to routine medication usage. Medication safety behaviour showed that 27.8% read package insert, 76% read tablet name before consuming, 52.3% - follow up.

Multivariate logistic regression showed that employed, males were more likely to adhere (OR:0.54; 95% C.I: 0.307-0.951). Chi square test showed a significant (p<0.05) increase in non adherence with pill burden and significantly (p<0.05) less responsible behaviour towards medication is associated with increasing duration of illness and non adherence.

Conclusion: There was a suboptimal association between patient responsibility towards medication usage which affected adherence and safety behaviour. This study was also an effort in

creating awareness but further sensitization among general population is necessary for effective management of chronic diseases.

Keywords: Survey, Rational, Chronic Diseases, Questionnaire, Adverse Event

Introduction

Chronic diseases are defined broadly as conditions that last for one year or more, requiring continuous medical care and also affecting quality of life [1]. The most common chronic diseases reported are diabetes mellitus, hypertension, myocardial infarction, arthritis, asthma, chronic obstructive pulmonary disease, cancer, menstrual irregularities and neuropsychiatric disorders [2].

It is observed that 46.6% of chronic diseases contributed to national DALYs, with a significant 55% seen in urban areas [3]. Deaths due to noncommunicable diseases (NCDs) is estimated in 41 million people each year, which is equivalent to 71% of all deaths globally [4,5].

It is observed that approximately 50% of population fails to take medications for chronic diseases due to various reasons. Identification of non adherence and failure of treatment is challenging, pointing towards responsibility of key stakeholders such as doctors, nurses, pharmacists, pharmaceutical companies, regulatory bodies and consumers/ patients [6,7].

Patient's responsibility in medication usage forms the most important link for either success or failure of medication management in chronic diseases. The most common reasons of nonadherence are due to lack of patient involvement in the disease management process, a lack of information on the disease and its treatment, dosage information or motivation to continue it [8]. This study aimed to determine the patient's responsibility towards medication usage and its association with adherence, safety practices and sociodemographic variables.

Materials and Methods

Patient's responsibility towards medication usage practices were assessed by a set of 24 questions which were initially validated by a pilot study.

The questionnaire was divided into 3 parts:

1. Part 1 included demographic details: Patients' age, gender, education status, occupation.

2. Part 2 included details on patients' illness: type and duration of chronic illness, pill burden.

3. Part 3 included the self directed questions on patients' responsibility towards medication usage, adherence and safety practices.

This cross sectional, observational questionnaire based study included 400 participants aged > 18years diagnosed with chronic diseases of more than 6 months duration. Data was collected between August 2021 – January 2022 after obtaining institutional ethics committee approval (ECR/1628/Inst/KA/2021). Google forms and hard copy of questions were used to collect the data.

The inclusion criteria were as follows : 1) >18 years of age with chronic diseases 2) Both gender 3) Those suffering from chronic disease on specific medication (>6 months duration) 4) Willing to participate in the study. The exclusion criteria were as follows : 1) Study participants with medical background (medical graduates, nurses, medical researchers) 2) Those on herbal supplements, multivitamins and other nutritional supplements .

Descriptive statistics like demographic data and categorical variables obtained were analysed using latest SPSS 27 software. Chi square test was performed to see the significant (p<0.005) association between patient responsibility towards medication usage with adherence, safety practices, pill burden and duration of illness. The effect of sociodemographic factors on medication adherence and drug safety practices by the patient was determined by using multivariate logistic regression analysis. Adjusted odds ratios (ORs) from multivariable models, with their 95% confidence intervals (CI) and P-values were reported.

Results

Sociodemographic characteristics

Out of 400 participants in this survey, 210 (52.5%) were females, 202(50.5%) were >65years, 294 (73.5%) were graduates, 176(44%) were housewives and 293 (73.3%) had income >41430.(Bar Graph 1)

Pattern of distribution of chronic diseases

314 (78.5%) have been suffering from chronic diseases for more than 2 years. The most common chronic illnesses observed are diabetes mellitus -143(35.8 %), hypertension-243 (60.8%), arthritis-61(15.3%), asthma-14 (3.5)% and thyroid disorder-33(8.3%). (Bar Graph 2)

Pattern of patient responsibility towards rational medical use

The study showed that 104 (26.0%) participants read the prescription first, 376 (94%) discussed with the doctor before going to pharmacy, 98 (24.5%) directly went to the pharmacy. Further, the study showed that 385 (96.3%)- take medicine regularly as prescribed by physician and of this 193(48.3%) enquired about the name of the medicine, 379 (94.8%) :dose, 334 (83.5%): how to take medicine, 355 (88.8%) : frequency of intake, 78(19.5%) :

time of intake, 256(64.0%) : how many days /months of medicine intake.

Questionnaire on responsibility towards safety practices showed that 27.8% read patient package insert/ internet for product information, 61.5% shared the drug allergy related information with their doctor, 61.5% enquired as to why doctor added, stopped or changed the medication, 76% read the tablet name every time before consuming the medicines, 80.3% check for expiry date on the label and 52.3% ask doctor about follow up. Further in this study, 95.8% reported that this survey changed their perspective on their responsibility towards adhering to treatment regime and rational use of medicine.

Pattern of Medication Adherence

While questioning about medication adherence: 25% reported they have stopped taking medications because they feel worse taking it, 21.3% sometimes forget to bring along the medicines while travelling, 16% feel like their health is under control and stop taking medicines and 21.5% feel hassled about sticking to the treatment plan.

Pattern and frequency of adverse event reporting

In this study, 113 (28.25%) of study participants reported adverse events to their medications, of which most commonly reported were heart burn: 24 (6%), giddiness: 15 (3.75%), hypoglycaemia: 14 (3.5%), and nausea: 4 (1%).

Questions on drug safety behaviour has shown that 177(44.3%) of patient reported adverse events to their doctor and as a result 25% of them reported to have stopped medications.

Association between variables, patient responsibility towards medication usage and medication adherence

The study showed that significantly less adherence was observed among patients suffering from chronic diseases due to

increasing number of medications and due to long duration of illness. (Table 1 & 2)

Chi square test shows a significant (p<0.05, 96.5%) association between medication safety behaviour and medication adherence showing that patients who reported adverse events to their doctors did not stop taking medication in response to this event.

Correlation between sociodemographic data with medication adherence and drug safety behaviour

Multivariate logistic regression was performed to determine the factors associating adherence to medication usage. The males were more likely to adhere to medication usage compared to females (OR: 0.54; 95% C.I:

0.307-0.951) and the odds of employed adhered to medication usage is higher compared to unemployed. (Table 3).

Multivariate logistic regression was performed to determine the factors associated with drug safety practices. The outcome /response variable was binary i.e., practicing drug safety behaviour(yes (1)) and not practicing drug safety behaviour (no (0)). Of all the demographic variables education level had a significant association with drug safety practices. Those with graduation (OR: 3.5; 95% C.I: 1.23-25.3) and post graduation /higher education (OR: 1.8; 95% C.I: 1.24-9.8) were more likely to practice drug safety behaviour compared to primary and high school education.
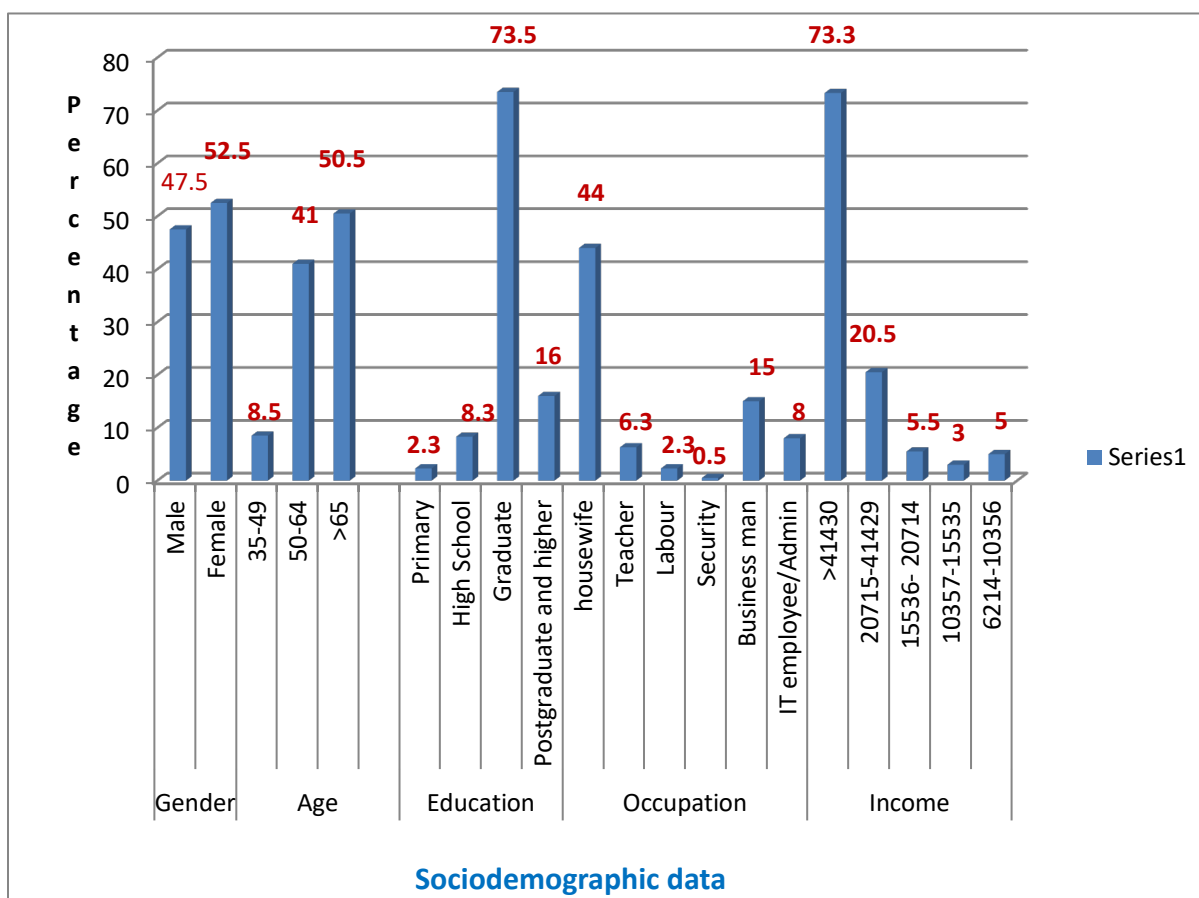

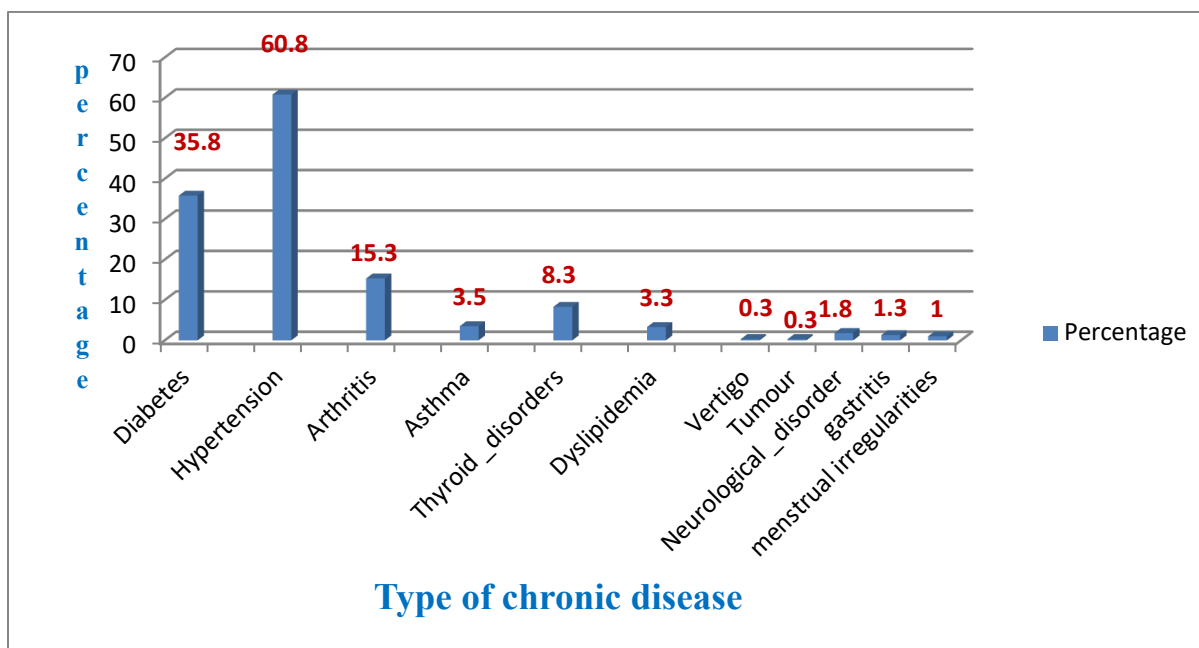**Figure 1: Frequency (%) of socio demographic details**

Figure 2: Frequency(%) of chronic diseases

Table 1: Association between variables, patient responsibility towards medication usage and medication adherence

Adherence Questions A/NA R/NR		No. of medications taken			P value
		1 tab	2-3 tabs	>3 tabs	
Have you stopped taking medications because you feel worse when you took it?	A	25.9%	20.9%	30.3%	0.312
	NA	74.1%	79.1%	69.7%	
When you travel or leave home , do you sometimes forget to bring along your medicines?	A	21.4%	21.8%	21.3%	0.995
	NA	78.6%	78.2%	78.7%	
When you feel like your health is under control, do you sometimes stop taking medicines?	A	14.9%	15.5%	19.1%	0.659
	NA	85.1%	84.5%	80.9%	
Do you feel hassled about sticking to your prescribed treatment plan?	A	19.9%	20.0%	28.1%	0.259
	NA	80.1%	80.0%	71.9%	
Have you stopped taking any medication due to its side effects without talking to your doctor?	A	14.4%	30.0%	43.8%	0.01*
	NA	85.6%	70.0%	56.2%	
What is the first thing you do after receiving a prescription? Read it?	A/R	22.4%	24.5%	36.0%	
	NA/NR	77.6%	75.5%	64.0%	0.048*
What is the first thing you do after receiving a prescription? Discuss with your doctor before going to pharmacy?	A/R	24.4%	16.7%	35.2%	
	NA/NR	75.6%	83.3%	64.8%	0.011*
If yes, did you report adverse events to your doctor?	A/R	72.1%	52.7%	22.5%	0.001*
	NA/NR	27.9%	47.3%	77.5%	

A- Adherent   R-Responsible
NA- Non adherent   NR-Not responsible
*- P value significant

Table 2: Association between patient 's responsibility towards medication usage and duration of illness

Patient safety behaviour/patient's responsibility towards medication usage R/NR		Duration of illness			P value
		less than 6months	6months-2yrs	greater than 2yrs	
What is the first thing you do after receiving a prescription? Go to the pharmacy?	R	89.1%	86.8%	71.9%	0.009*
	NR	10.9%	13.2%	28.1%	
Which of the following information you will ask your doctor? How to take medicine?	R	65.2%	89.5%	86.0%	0.001*
	NR	34.8%	10.5%	14.0%	
You may not be tolerating all the medicines or may have developed allergies to some medicine. Do you give this information to your doctor before getting the prescription?	R	76.6%	39.5%	33.0%	0.001*
	NR	23.4%	60.5%	67.0%	
Do you ask your doctor to as why did he add, stop or change the medication?	R	70.2%	34.2%	34.3%	0.001*
	NR	29.8%	65.8%	65.7%	
Do you read the tablet name every time before consuming the medicines?	R	59.6%	15.8%	19.4%	0.001*
	NR	40.4%	84.2%	80.6%	
Do you check for expiry date on the label?	R	42.6%	10.5%	16.8%	0.001*
	NR	57.4%	89.5%	83.2%	
Do you ask your doctor about the need for follow up with queries such as when to come for follow up, any test reports to bring for the follow up?	R	27.7%	44.7%	52.7%	0.05*
	NR	72.3%	55.3%	47.3%	

R- Responsible   NR-Not responsible
*P value Significant

Table 3: Multivariate logistic regression indicating association between various demographic factors associated with adherence

Variables	OR	SE	95% C.I)	P value
Gender				
Female	Reference[a]			
Male	0.540	0.288	0.307-0.95	<0.05*
Age				
>60	Reference[a]			
<60	1.435	0.302	0.70-2.51	.232

Education				
Primary	Reference[a]			
High School	0.483	0.86	0.08-2.6	0.402
Graduates and higher	0.64	0.52	0.23-1.80	0.408
Post Graduates and higher	0.60	0.31	0.32-1.10	0.10
Occupation				
Unemployed	Reference[a]			
Employed	0.77	0.29	0.43-0.81	<0.05*
Income				
>41430 higher income	Reference[a]			
<41430 lower income	1.30	0.26	0.77-2.2	0.324

Discussion

Medication usage practices are challenging , time consuming and complex especially n chronic diseases. Awareness about the disease, duration, medications, patient-doctor-pharmacist communication, financial implications, follow up and adverse events reporting are the critical elements of management protocol of chronic diseases. Medication adherence generally decreases as the duration of medicine intake increases [9,10].

Irrational use of medicine can interfere with adherence to treatment, treatment failure and development of complications. Operational success is very crucial for management of chronic diseases. After diagnosis and prescription of medication, equal importance should also be given to sustainence of long term therapy for chronic diseases [11,12].

Patient self-report, claims data, pharmacy refill, and electronic measures, are the most commonly used methods of adherence measurements utilised in research, practice and clinical studies. No subjective or objective evaluation methods are robust enough to assess the patients' responsibilties towards medication adherence, medication usage and safety practices while on chronic medications [13,14].

Our study shows that ~50.5% of population were >65years of age and ~52.55 of population were females . This is similar to a study by Marengoni A et al which shows that increasing age, female gender, and lower education status were independently associated with a > 50% increased risk for multiple morbidities [15].

Chronic diseases are often the determinants of increasing morbidity, premature deaths and decreased quality of life among elderly patients. 78.8% were suffering chronic diseases > 2years with diabetes mellitus, hypertension, arthritis and asthma to be the most common diseases suggesting the increasing incidences of non communicable diseases among elderly patients as shown in study by Jana et al [16].

Pill burden in this study has shown that 50% are on single medication, 27.2% on 2 medications and 22.3% on >3 medications. This is similar to study by Zidan et al, Yi Wen Tan wherein 29%, 14.5% respectively were on more than 5 medications at a time for their chronic diseases. Though polypharmacy is unavoidable in chronic diseases, ironically it is also associated with increasing risk of morbidity, mortality, hospital admissions, anxiety and adherence issues among patients. Hence, polypharmacy has to be considered for prescribing and deprescribing of drugs [17,18].

It was observed from questionnaires on patient related factors that 69.41% of study participants have optimal knowledge and responsibility towards medication usage similar to a study by Okuyan *et al* [19,20] which includes regular interaction with doctor about dose, how to take medicine, frequency of medication and adverse events reporting practices.

Further in this study, a greater proportion of study participant showed good medication safety practices such as reading the package insert, tablet name every time before consuming medication/s, expiry date on medication, discussing with their doctor on why they added, stopped, or changed the medication, need to follow up, and >90% of participants felt that the study enhanced the awareness towards the medication usage for their disease. This positive responsible behaviour of patients towards medication usage can be attributed to their education status and urban life which facilitates easy access and availability of medications.

According to WHO, ~50% of patients with chronic diseases reported adherence to medication [21]. Out of the myriad of factors causing failure of therapy, the most important ones are patients' factors (age, gender, knowledge, behaviour and belief) patient prescriber communication, multiple medications and pathology of the disease itself [6,22].

A study by Nita *et al* has shown 87.2% moderate adherence among patients on treatment for chronic diseases. Similarly our study also has shown that ~79% patients had good adherence to medication by not stopping medication intake on feeling worse, while travelling, when they feel their health is under control and they did not feel hassled about sticking to their routine medication intake [6,23]. 21.3% of patients forget to take medications which is lower compared to a study done by Jimmy *et al* [24].

The study showed a significant increase in non adherence with pill burden which is similar to study by Napolitano *et al* where, patient's adherent to medication took a significantly lower number of pills per day [25].

Increasing duration of illness affected the patient's responsible behaviour towards medication usage and was associated with less adherence to medication. <50% adherence to treatment of chronic diseases was observed in developing countries which can compromise the effectiveness of management strategies [26].

The study also has shown that males were more likely to adhere to medication when compared to females. Further employed adhered to medications more than unemployed also implying the importance of financial stability. Other demographic data such as age and education status did not show any association with adherence to medication. This is similar to study by Cody Arbuckle *et al* which showed high adherence rate to medication related to male, age, income, education and white race/ethnicity [27].

Active and responsible involvement of patients is of paramount importance in decision making, communication and maintenance of treatment in chronic diseases. Self-management strategies should be formed for successful management of chronic illnesses [28].

Chronic disease self management programmes (CDSMP)developed by Stanford University Team has been used for efficient self management of chronic diseases . This helps to change the patients' perspective and enhances rate of health literacy involving chronic diseases [29,30].

Limitations of the study

Majority of the study population were urban with good education status (above high school) and employed or retired suggesting that they had good knowledge about their

disease and the medications used. Our study lacked data from rural population and from different sectors.

Conclusion

Reducing morbidity and mortality, improving quality of life and preventing the development of complications are essential factors that drive elderly patients to take medications for long term. Our study has shown that there is a necessity to create awareness and encourage the prospect of educating and sensitizing patients' to be responsible in management strategies which facilitates rational long term usage of medication in chronic diseases.

References

1. About chronic diseases [Internet]. Cdc.gov. 2022 [cited 2022 Aug 22]. Available from: https://www.cdc.gov/chronicdisease/about/index.htm
2. General health status [Internet]. Healthypeople.gov. [cited 2022 Aug 22]. Available from: https://www.healthypeople.gov/2020/about/foundation-health-measures/General-Health-Status
3. The lancet.com. [cited 2022 Aug 22]. Available from: https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(19)30451-6/fulltext)
4. Noncommunicable diseases [Internet]. Who.int. [cited 2022 Aug 22]. Available from: https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases
5. Non-communicable diseases [Internet]. Gov.in. [cited 2022 Aug 24]. Available from: https://www.nhp.gov.in/healthlyliving/ncd 2019.
6. Brown MT, Bussell JK. Medication adherence: WHO cares? Mayo Clin Proc. 2011;86(4):304–14.
7. Jankowska-Polańska B, Uchmanowicz I, Dudek K, Mazur G. Relationship between patients' knowledge and medication adherence among patients with hypertension. Patient Prefer Adherence. 2016;10:2437–47.
8. Sav A, King MA, Whitty JA, Kendall E, McMillan SS, Kelly F, et al. Burden of treatment for chronic illness: a concept analysis and review of the literature. Health Expect. 2015;18(3):312–24.
9. Blenkinsopp A, Bond C, Raynor DK. Medication reviews: Medication reviews. Br J Clin Pharmacol. 2012;74(4):573–80.
10. Reynolds R, Dennis S, Hasan I, Slewa J, Chen W, Tian D, et al. A systematic review of chronic disease management interventions in primary care. BMC Fam Pract. 2018;19(1):11.
11. Lehmann A, Aslani P, Ahmed R, Celio J, Gauchet A, Bedouch P, et al. Assessing medication adherence: options to consider. Int J Clin Pharm. 2014;36(1):55–69.
12. Basu S, Garg S, Sharma N, Singh MM. Improving the assessment of medication adherence: Challenges and considerations with a focus on low-resource settings. Tzu Chi Med J. 2019;31(2):73–80.
13. Grymonpre RE, Didur CD, Montgomery PR, Sitar DS. Pill count, self-report, and pharmacy claims data to measure medication adherence in the elderly. Ann Pharmacother. 1998;32(7–8):749–54.
14. Evans CD, Eurich DT, Lamb DA, Taylor JG, Jorgenson DJ, Semchuk WM, et al. Retrospective observational assessment of statin adherence among subjects patronizing different types of community pharmacies in Canada. J Manag Care Pharm. 2009;15(6):476–84.
15. Marengoni A, Winblad B, Karp A, Fratiglioni L. Prevalence of chronic diseases and multimorbidity among the elderly population in Sweden. Am J Public Health. 2008;98(7):1198–200.
16. Jana A, Chattopadhyay A. Prevalence and potential determinants of chronic disease

among elderly in India: Rural-urban perspectives. PLoS One. 2022;17(3):e0264937.

17. Zidan A, Awaisu A, El-Hajj MS, Al-Abdulla SA, Figueroa DCR, Kheir N. Medication-related burden among patients with chronic disease conditions: Perspectives of patients attending non-communicable disease clinics in a primary healthcare setting in Qatar. Pharmacy (Basel). 2018;6(3).

18. Tan YW, Suppiah S, Bautista MAC, Malhotra R. Polypharmacy among community-dwelling elderly in Singapore: Prevalence, risk factors and association with medication non-adherence. Proc Singap Health. 2019;28(4):224–31.

19. B. Okuyan, M. Sancar, and F. V. Izzettin, Assessment of medication knowledge and adherence among patients under oral chronic medication treatment in community pharmacy settings, Pharmacoepidemiology and Drug Safety. 2013; 22(2):209–214.

20. Mekonnen GB, Gelayee DA. Low medication knowledge and adherence to oral chronic medications among patients attending community pharmacies: A cross-sectional study in a low-income country. Biomed Res Int. 2020:4392058.

21. You can't manage what you can't measure: Medication adherence in chronic disease management. Milliman.com. 2021.

22. Gast A, Mathes T. Medication adherence influencing factors-an (updated) overview of systematic reviews. Syst Rev. 2019; 8(1): 112.

23. Nita Y, Saputra FM, Damayanti S, Pratiwi PI, Zukhairah R, Sulistyarini A, *et al*. Medication adherence in the elderly with chronic diseases using the Adherence to Refill and Medication Scale (ARMS). In: Unity in Diversity and the Standardisation of Clinical Pharmacy Services. 1st Edition. Boca Raton, FL: CRC Press; 2017;175–8.

24. Jimmy B, Jose J. Patient medication adherence: measures in daily practice. Oman Med J. 2011;26(3):155–9.

25. Napolitano F, Napolitano P, Angelillo IF, Collaborative Working Group. Medication adherence among patients with chronic conditions in Italy. Eur J Public Health. 2016;26(1):48–52.

26. Failure to take prescribed medicine for chronic diseases is a massive, world-wide problem. Indian J Med Sci. 2003; 57(9):427.

27. Arbuckle C, Tomaszewski D, Aronson BD, Brown L, Schommer J, Morisky D, *et al*. Evaluating factors impacting medication adherence among rural, urban, and suburban populations: Medication adherence in rural, urban, and suburban. J Rural Health. 2018;34(4):339–46.

28. Kang E, Kim S, Rhee YE, Lee J, Yun YH. Self-management strategies and comorbidities in chronic disease patients: associations with quality of life and depression. Psychol Health Med. 2021; 26(8): 1031–43.

29. Self-managing chronic disease [Internet]. Stanford BeWell. 2012 [cited 2022 Aug 24]. Available from: https://bewell.stanford.edu/self-managing-chronic-disease/

30. Chronic disease self-management program description [Internet]. Cdc.gov. 2019 [cited 2022 Aug 24]. Available from: https://www.cdc.gov/arthritis/interventions/programs/cdsmp.htm