Research Article

Evaluation of Medication Adherence in Patients with Chronic Illness

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ABSTRACT

Aim: The study's objectives were to (1) assess the extent to which patients with chronic disease take their prescribed medicines, (2) develop strategies for increasing patient adherence, and (3) determine whether or not increased pharmaceutical usage is associated with decreased adherence. **Methodology:** 196 individuals with chronic illnesses were monitored in an interventional trial. Each person's demographic information was recorded, and their medication adherence was scored using the Morisky Medication Adherence Scale (MMAS). The participants received the necessary verbal advice to improve drug adherence. After two months of participation, a new assessment of medication adherence was conducted. **Results:** There were 196 total participants, with men making up the majority (119) and women making up the minority (77). The most common chronic diseases were diabetes mellitus (80.1%), hypertension (43.3%), asthma (7.6%), COPD (7.6%), hypothyroidism (3.5%), chronic renal disease (3.5%), and rheumatic heart disease (3.5%). (4.5 percent). Medication adherence is examined in connection to the quantity of medications taken, and it is shown that the two are unrelated. In the beginning, only 33.6% of patients were determined to have strong adherence to their medications; towards the end, that number had increased to 45.4%. **Conclusion:** Increased medication adherence was a notable consequence of pharmacist assistance in the form of patient counselling. Medication reminder cards and mobile applications have been shown to be effective strategies for increasing medication adherence, and should be included in future research examining this topic.

INTRODUCTION:

Adherence to prescribed medicine is measured by how closely a patient's actual prescription use patterns match the recommendations made by the prescribing physician. Long-term medication is often used in the treatment of chronic conditions. Although these drugs are helpful in fighting illness, most people do not take them as recommended, thus they do not provide the full benefit to which they are capable (Brown MT et al.,2011). Adherence failure is a significant issue that has consequences for both the patient and the healthcare system. In extreme cases, hospitalization or death may result from the patient's failure to adhere to the prescribed medication schedule.

Illnesses that continue more than a year and either make everyday life difficult or need regular medical treatment are considered chronic. Asthma, cardiovascular disease, high blood pressure, and diabetes mellitus are just a few examples of chronic conditions that need ongoing medical care. When it comes to treating chronic conditions, medication is an extremely important component. It is common knowledge that patients who do not take their prescribed medications as directed pose a number of health risks; however, addressing the issue of nonadherence in patients who suffer from chronic conditions has historically been challenging due to the complexity and uniqueness of the issue. Patients are more likely to take their medicines as directed when they are provided with additional information on the prescriptions that they are currently filling (Oung AB et al.,2017). When patients do not take their medications as prescribed, they put a strain on the healthcare system and increase their risk of needing emergency treatment, hospitalization, and less-than-ideal clinical results (Lemay J et al.,2018). Once-daily drug schedules tend to have higher adherence rates among patients with chronic conditions compared to more regularly scheduled regimens (Coleman CI et al.,2012). Medication adherence may be improved in the elderly with chronic disease by providing counselling on medication use. Several elements interact to affect adherence. One may categorize these elements along five dimensions: societal and economic, therapeutic, pathological, individual, and healthcare system. Intentional non-adherence may be influenced by variables such as financial constraints, whereas non-intentional (forgetting) non-adherence might be influenced by causes such as forgetfulness owing to mental illness (Gast A et al.,2019). Patients who suffer from depression are less likely to report and show excellent adherence to diabetes treatment, which has been recognized as a critical factor impacting DM drug adherence and found that only 42 percent of depressed patients reported good

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adherence, whereas 67 percent of patients who did not suffer from depression reported good adherence (Rwegerera GM, et al.,2014). Because of the increase in drug use, research into and development of methods to enhance medication adherence are becoming more important (Oung AB et al.,2017). Polypharmacy is becoming more frequent as more drugs are produced to address chronic disease, and it is one of the main causes for non-adherence in chronic illness (Pednekar PP et al., 2019). Adherence may be measured in a variety of ways, including by seeing patients while they take their prescription, by having them count their pills, by using computerized pill dispensers, and by analysing results like serum drug concentration levels. Several researchers (Pednekar PP et al.,2019) came to this conclusion. The Morisky Medication Adherence Scale (MMAS) consists of 8 questions, 7 of which need a yes/no answer and 1 that may be answered on a 5-point Likert scale. The original Morisky scale was developed by the following factors; Importantly, it has far stronger psychometric properties: sensitivity and specificity are 93 percent and 53 percent, respectively. The additional four questions aim to identify and treat events or situations connected to adherence behaviour. Tan XI et al. (2014). Self-report measures of medication adherence are notorious for their high degree of subjectivity, particularly with regard to the phrasing of questions, the duration of remembrance periods, and the sorts of response items. Self-reports have a high specificity but a weak sensitivity; as a result, when compared to other assessment approaches, they often overestimate adherence behaviour (Stirratt MJ et al.,2015). Both of the Morisky Medication Adherence Scales are the most popular self-reported medication adherence measures, and due to their remarkable validity and reliability in patients with arterial hypertension and other chronic illnesses, they are recommended for use as screening tools in clinical settings (Uchmanowicz B et al.,2019).

Review of Literature:

Poor adherence" (compliance) is common with antihypertensive medications in elderly patients, according to a study by Shrestha S. et al., 2019 titled "Impact of Pharmacist Counselling on Medication Adherence among Elderly Patients on Antihypertensive Therapy at a Tertiary Care Hospital of Nepal." The results of the research showed that individuals with hypertension benefited greatly from medication advice. Once encouraged and counselled, patients showed considerable improvements across the board on the Morisky Green Levine scale measuring adherence. Medication adherence was enhanced for elderly hypertension patients by counselling guided by pharmacists.

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Anmar Al-Taie and colleagues conducted a single-center, prospective, randomised, controlled study in 2020 titled "Impact of clinical pharmacy recommendations and patient counselling programme among patients with diabetes and cancer in outpatient oncology setting." The study included participants who had recently been diagnosed with cancer and diabetes. Patients were separated into two groups: one group received standard oncology care, while the other group received standard oncology care in addition to clinical pharmacy care. This included intensive patient education in both oral and written form, pharmacotherapy optimization, and regular recommendations for diabetic self-care activities, with a follow-up period of three months. When compared to the usual care group, individuals with diabetes and cancer who were receiving chemotherapy had improvements in patient-related outcomes when clinical pharmacy intervention and counselling was provided.

Researchers R Shima et al. 2021 used theme analysis on transcribed material from their qualitative research "A qualitative study of hypertensive care behaviour in primary health care settings in Malaysia." According to the findings, health care providers should continue communicating with hypertension patients to increase the likelihood that patients would comply to their treatment plans.

Objectives:

1. The goal is to raise the rate at which patients take their prescribed medications.

2. The purpose of this study is to evaluate patients' adherence.

3. The goal is to determine whether or not a patient's drug use directly impacts their likelihood of taking their prescribed medications as directed.

4. The goal is to pinpoint the causes of patients' inability to take their prescribed medications as directed.

MATERIALS AND METHODS:

Study Design: The interventional trial lasted for six months and took place at a hospital with 1,000 beds and many medical specialties. The Human Ethics Committee of the Medical University of Vienna accepted the research (MVJMC&RH/IEC-22/2022).

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Study Population: Patients at the study location who were diagnosed with a chronic condition were included in the study population.

Sample Size: 196 patients.

Study Criteria:

Inclusion Criteria:

- Male or female patients with a chronic condition who are at least 18 years old and not yet 75 years old.

- Patients who have had their illness for a year or more.

- Patients who are not currently hospitalized may also benefit from this.

Exclusion Criteria:

- Patients whose ages fall outside of the study's inclusion and exclusion criteria—18 and >75 years—will not be included.

- Individuals who have recently received a diagnosis are not eligible.

- Patients having a history of mental illness are not accepted.

- Patients who refuse to provide their informed permission.

Study Procedure:

1. We used inclusion and exclusion criteria to identify 196 people to take part in an interventional trial. Patients were interviewed about their medical histories and the medications they had been taking.

2. Morisky's medication adherence measure was used to assess how well patients took their medications (MMAS).

3. Patients are counselled orally about the significance of regular medication use in reducing the risk of serious consequences and subsequent hospitalisation among those with a chronic disease.

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4. During the two-month follow-up period, MMAS was reanalyzed for each patient.

Assessment of Adherence:

Patients' adherence is measured by how they respond to a series of questions. One point is awarded for correct answers and none for incorrect ones. After that, we added all the points and put them in the following buckets:

1. High adherence = 8

2. Medium adherence =6-8

3. Low adherence = less than 6

RESULTS

Descriptive Summary of Demographics:

Table 1: Descriptive Summary of the Demographics

| SI. NO	PARAMETERS	RANGE	NO. OF PATIENTS
1	Age	20-29	4
		30-39	12
		40-49	51
		50-59	47
		60-69	58
		70-75	24
2	Gender	Male	119
		Female	77
3	Smoker		27 (13.7%)
4	Alcoholic		23 (11.7%)
5	Both		9 (4.5%)
6	Not Both		155 (79.8%)

Table 1 provides a comprehensive description of the research participants' ages, sex identities, and social backgrounds.

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Comorbidities Observed in Patients:

Eighty one percent of the population, or 157 subjects, were found to have diabetes mellitus; 43 percent of the population was found to have hypertension; seven point six percent of the population, or 15 participants, had asthma or chronic obstructive pulmonary disease; and three point five percent of the population had chronic kidney disease.

Number of drugs used by the patients:

Participants' medication use ranged from 1 to 8 treatments, reflecting their varying comorbidities and previous medical conditions. 44.8% of the sample used just one drug, 33.2% used two, 14.2% used three, 3.5% used four, 2.5% used five, 0.5% used six or more, and 0.5% used eight or more substances. Figure 1 shows a graphical representation of the individuals' drug usage.
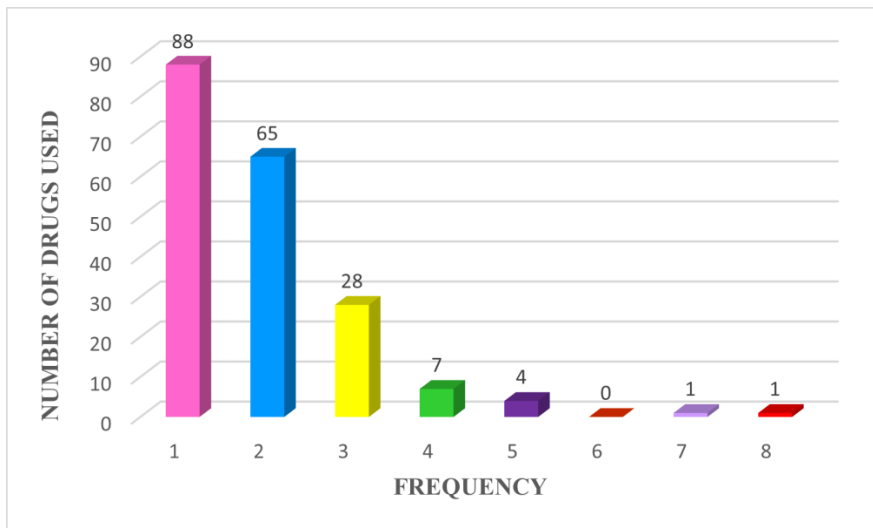
Fig 1: Percentage of Number Of Drugs Used Among The Study Participants

**Initial evaluation of medication adherence:**

Patients' ability to take their medications as prescribed was measured using the Morisky Medication Adherence Scale. Ratings might be between zero and eight. Participants with scores in the 2–5 range were classified as low adherent (40.3%), those with scores in the 6–7 range were classified as medium adherent (51%), and participants with a score of 8 were classified as high adherent (66%) (33.6 percent). Figure 2 provides a visual representation of the score distribution throughout the study population.

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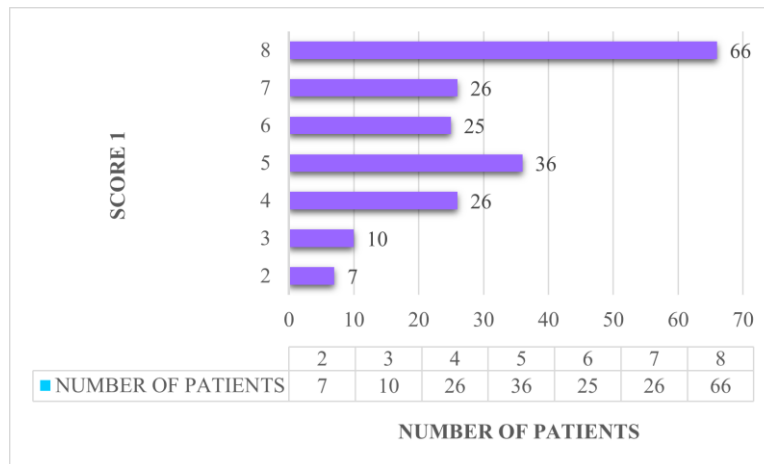
Fig 2: Score 1 Among The Study Participant

Follow up evaluation of medication adherence:

A total of 89 people were rated as "high" adherent, while 83 were rated as "medium" (42.3%), and 24 were rated as "low" (12.2%). (45.4 percent). Figure 3 shows a graphical representation of the participants' score distributions following counselling.
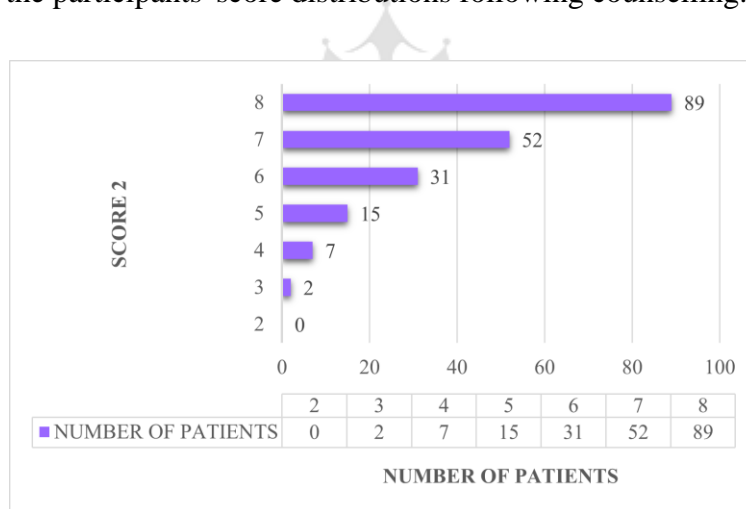

Fig 3: Score 2 among Study Participants

Level of medication adherence among patients:

Using the Morisky medication adherence scale, we scored a total of 196 respondents and divided them into four groups based on their levels of medication adherence. The study indicated that on the day of enrolment, 40.3% of patients had poor adherence, 26.3% had medium adherence, and 33.6% had excellent adherence. A total of about 45.5% of participants were determined to have strong adherence, 42.3% to have medium adherence,

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and 12.2% to have poor adherence at the last follow up. Figure 4 shows a visual representation of the research population's adherence levels to their prescribed medications.
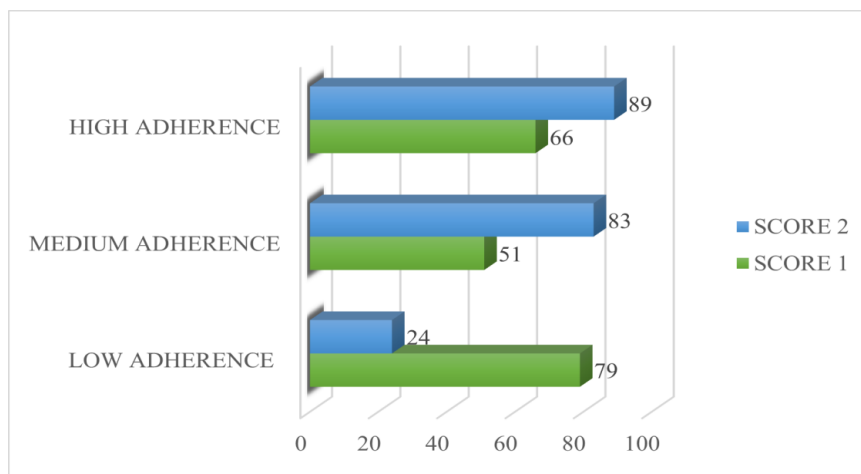
Fig 4: Level of Medication Adherence in The Study Population

Effect of Patient Counselling On Medication Adherence:

The Morisky medication adherence scale was used to quantify the rate of compliance. All of the information we gathered from the interviews was entered into an Excel spreadsheet and then organised into several categories for further statistical processing. The Morisky medication adherence measure was used to conduct statistical analyses of medication compliance among the research population. As an added measure, SAS 9.2 is used to analyse the results. Wilcoxon rank sums test was used for statistical analysis of the data collected.
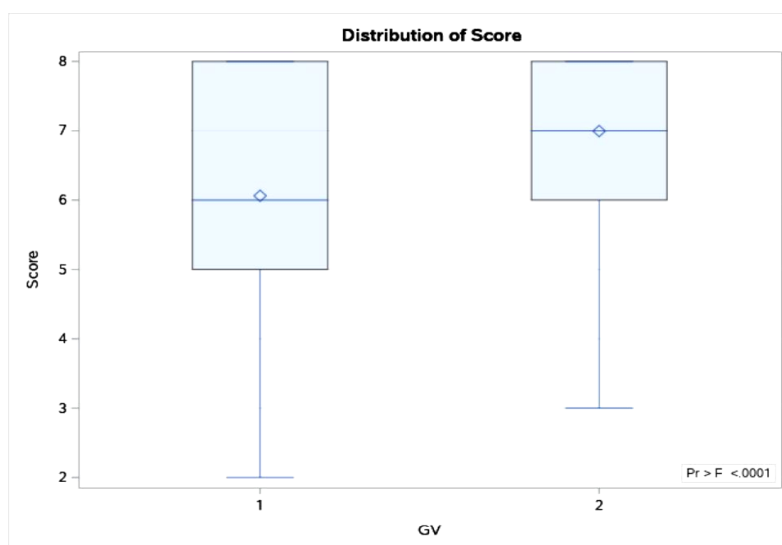
Fig 5: Distribution of Score

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The original Morisky score values of the 196 research participants varied from 2 to 8, with the vast majority of people having scores between 5 and 8. It was determined that 6 is the median for a score of 1. Morisky scores ranged from 3 to 8 throughout the 2-month follow-up, with the majority of patients falling in the 6- to 8-point range. Two-score median was determined to be 7. In comparison to the first evaluation, the median rises significantly over the follow-up. After therapy, there was a noticeable rise in score, from a median of 6.06 on the first scale to a median of 6.99 on the second, which is very close to 7. Figure 5 shows a visual representation of the score distribution. Table 2 shows the difference in medication adherence before and after the intervention.

Table 2: Comparison of Medication Adherence before and after intervention

Wilcoxon scores (Rank sums) for variable score classified by variable GV					
GV	N	Sum of scores	Expected under HO	Std Dev Under HO	Mean Score
1	196	33145.50	38514.0	1078.52155	169.109694
2	196	43882.50	38514.0	1078.52155	223.890306
Average scores were used for ties.					

Wilcoxon Two-Sample Test							
Statistic (S)	Z	Pr<Z	Pr>lZl	T Approximation		Exact	
				Pr <Z	Pr >lZl	Pr <=S	Pr >=lZl
33145.50	-4.9772	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
Z includes a continuity correction of 0.5.							

Relation between number of medication used and adherence level:

Medication adherence and patient medication usage were analysed both before and after intervention in an effort to establish a causal link between the two.

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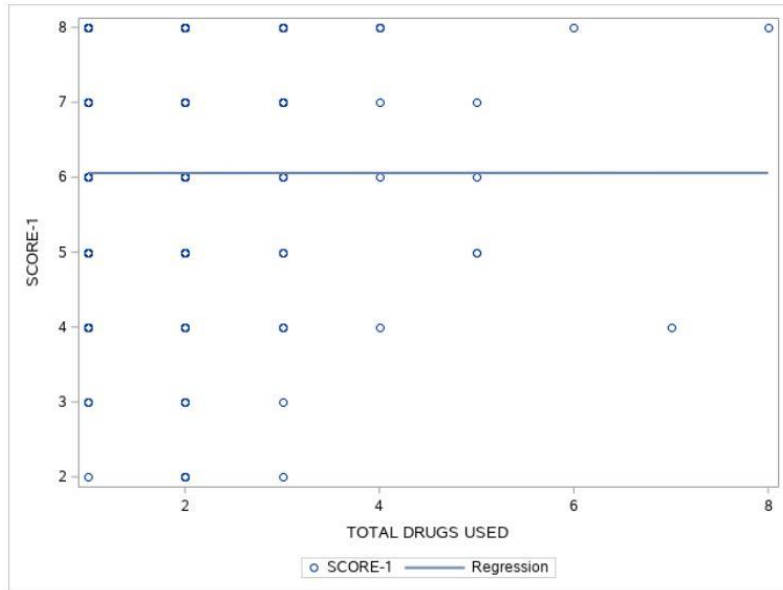
Fig 6: Relation between score 1 and number of medication
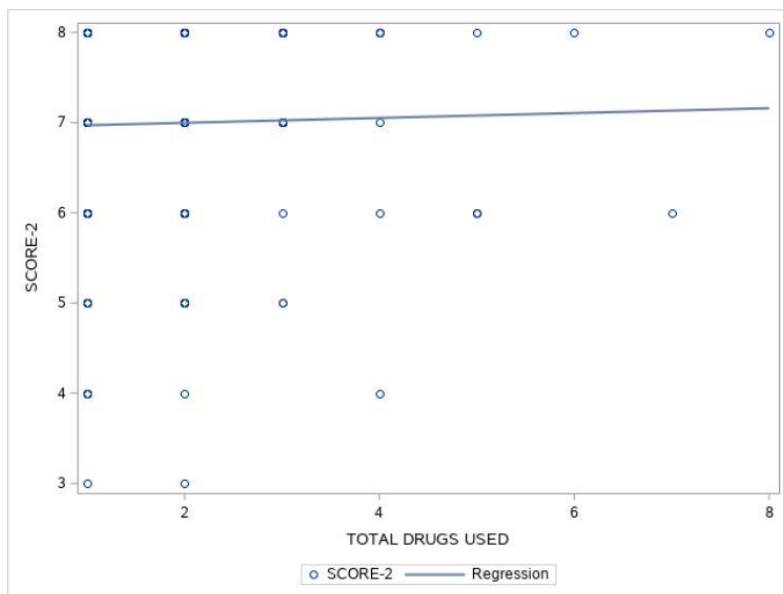
Fig 7: Relation between score 2 and number of drugs used

No statistically significant correlation was seen between drug load and severity. We found that the quantity of medications being taken had no effect on the degree of adherence. Figure 6 is a graphical depiction of the correlation between score 1 and the quantity of drugs. Figure 7 depicts the correlation between drug usage and score 2.

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DISCUSSION

Medication adherence was investigated in this interventional trial to determine the efficacy of verbal counselling. The Morisky medication adherence scale was used to measure the degree to which patients took their prescribed medications. The median score of all participants at the start of the trial was 6, whereas the median score after the intervention was 7. As a consequence, the findings point to a need for a significant rise in medication compliance. Health literacy and, by extension, medication adherence, among people with chronic diseases like hypertension may be enhanced by verbal educational interventions, as reported by Ampofo AG, et al. (Ampofo AG et al.,2020). Medication literacy and adherence may be improved with regular verbal educational interventions that increase patients' interest and participation (Ampofo AG et al.,2020) Many studies have demonstrated that verbal therapy is the most effective technique for increasing drug compliance (Ampofo AG et al.,2020, Vinluan CM et al.,2015, Shrestha S et al.,2019). Each participant will get individualised speech counselling tailored to their specific medical needs and medication regimen. The degree of medication adherence also increased significantly after counselling, as compared to the first evaluation, which is consistent with the findings of the following papers and with our own research (Ampofo AG et al.,2020, Vinluan CM et al.,2015, Shrestha S et al.,2019, Al-Taie A et al.,2020, Gautam S et al.,2021).

Patients require time to overcome their hesitation to ask questions and come around to accepting the advice, as suggested by Razatul Shima et al (Shima R et al.,2014). If there were any questions about this choice, they were answered. The patients benefited greatly from this since they learned more about their medical condition and the drugs they were taking.

Analysis of the correlation between drug load and adherence found no significant association. Authors: Satish S. Satish et al., 2021 Findings show that patients with a single condition were more likely to adhere to their medication regimen than those with multiple comorbidities and polypharmacy, leading the researchers to conclude that the use of additional medications was associated with a lower rate of medication adherence. In contrast to the findings of this research, we discovered that patients who used more medications were more likely to stick to their prescribed course of treatment at the final assessment of medication adherence.

An increase in medication adherence is a noteworthy result of pharmacist assistance in the form of verbal advice. As a result, chronic problems were easier to manage. Initial analysis

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indicated that 33.6% of individuals had strong adherence, whereas almost 45.5% of participants had good adherence throughout the end follow up. The majority of patients who did not take their medications as prescribed cited problems with their memory, the cost, and the complexity of the regimen as the reasons why they did not.

LIMITATIONS

While the research accomplished all its goals, it is not without its flaws.

• The respondents' financial strain was a key barrier that prevented them from adhering to the therapeutic regimen even after the intervention of verbal counselling.

• Participant responses to questions on medication adherence were sometimes unreliable. Sometimes it turns out that the caregiver's answer can't be counted on.

CONCLUSION

Adherence to pharmaceutical treatment plans has been demonstrated to significantly increase with respondents' drug knowledge and appreciation for the significance of doing so. Regular medication use has been found to improve health-related quality of life. Improvements in patients' adherence to their prescribed medications after pharmacists provided counselling were striking. Prescription adherence may be further improved in participants in future research by using treatments such as medication reminder cards and medication reminder apps.

AKNOWLEDGEMENT:

REFERENCE

1. Brown MT, Bussell JK. Medication adherence: WHO cares? InMayo clinic proceedings 2011 Apr 1 (Vol. 86, No. 4, pp. 304-314).
2. Oung AB, Kushiro E, Chavez B, Brunner J, Saseen JJ. Evaluation of medication adherence in chronic disease at a federally qualified health center. Therapeutic Advances in Chronic Disease. 2017 Aug;8(8-9):113-20.
3. Lemay J, Waheedi M, Al-Sharqawi S, Bayoud T. Medication adherence in chronic illness: do beliefs about medications play a role? Patient preference and adherence. 2018; 12:1687.
4. Coleman CI, Limone B, Sobieraj DM, Lee S, Roberts MS, Kaur R, Alam T. Dosing frequency and medication adherence in chronic disease. Journal of Managed Care Pharmacy. 2012 Sep;18(7):527-39.

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5.   Gast A, Mathes T. Medication adherence influencing factors—an (updated) overview of systematic reviews. Systematic reviews. 2019 Dec;8(1):1-7.

6.   Rwegerera GM. Adherence to anti-diabetic drugs among patients with Type 2 diabetes mellitus at Muhimbili National Hospital, Dar es Salaam, Tanzania-A cross-sectional study. The Pan African Medical Journal. 2014;17.

7.   Pednekar PP, Agh T, Malmenäs M, Raval AD, Bennett BM, Borah BJ, Hutchins DS, Manias E, Williams AF, Hiligsmann M, Turcu-Stiolica A. Methods for measuring multiple medication adherence: a systematic review–report of the ISPOR medication adherence and persistence special interest group. Value in Health. 2019 Feb 1;22(2):139-56.

8.   Tan XI, Patel I, Chang J. Review of the four item Morisky medication adherence scale (MMAS-4) and eight item Morisky medication adherence scale (MMAS-8). INNOVATIONS in pharmacy. 2014;5(3):5.

9.   Stirratt MJ, Dunbar-Jacob J, Crane HM, Simoni JM, Czajkowski S, Hilliard ME, Aikens JE, Hunter CM, Velligan DI, Huntley K, Ogedegbe G. Self-report measures of medication adherence behavior: recommendations on optimal use. Translational behavioral medicine. 2015 Dec 1;5(4):470-82.

10.   Uchmanowicz B, Jankowska EA, Uchmanowicz I, Morisky DE. Self-reported medication adherence measured with morisky medication adherence scales and its determinants in hypertensive patients aged≥ 60 years: a systematic review and meta-analysis. Frontiers in Pharmacology. 2019 Mar 1; 10:168.

11.   Shrestha S, Karki R, Ghimire M. Impact of pharmacist counselling on medication adherence among elderly patients on antihypertensive therapy in a tertiary care hospital of Nepal. Europasian Journal of Medical Sciences. 2019 Dec 11;1(1):40-7.

12.   Al-Taie A, Izzettin FV, Sancar M, Köseoğlu A. Impact of clinical pharmacy recommendations and patient counselling program among patients with diabetes and cancer in outpatient oncology setting. European Journal of Cancer Care. 2020 Sep;29(5): e13261.

13.   Shima R, Farizah MH, Majid HA. A qualitative study on hypertensive care behavior in primary health care settings in Malaysia. Patient preference and adherence. 2014; 8:1597.

14.   Vascular health and risk management. 2016; 12:407.

15.   Ampofo AG, Khan E, Ibitoye MB. Understanding the role of educational interventions on medication adherence in hypertension: A systematic review and meta-analysis. Heart & Lung. 2020 Sep 1;49(5):537-47.

16.   Vinluan CM, Wittman D, Morisky D. Effect of pharmacist discharge counselling on medication adherence in elderly heart failure patients: A pilot study. Journal of Pharmaceutical Health Services Research. 2015 Jun;6(2):103-10.

17.   Gautam S, Basnet R, Regmi B. Impact of patient counselling in improving medication compliance among diabetic patients. European Journal of Biomedical. 2021;8(4):313-9.

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