Original Article

Community pharmacy brief screening intervention to improve health outcomes for patients diagnosed with chronic diseases

Olutayo Arikawe[1], Hana Morrissey[1*], Patrick Ball[1]

[1]School of Pharmacy, Faculty of Science and Engineering, University of Wolverhampton, United Kingdom, WV11L.

Correspondence: Hana Morrissey, School of Pharmacy, Faculty of Science and Engineering, University of Wolverhampton, United Kingdom, WV11L. Hana.morrissey@wlv.ac.uk

ABSTRACT

This study aimed to develop a new screening model designed for use in community pharmacies, to support people living with chronic health conditions. We hypothesized that poor memory and mental health may affect patients' level of adherence to medications and self-care, resulting in poor long-term health outcomes. There were three main interventions: screening for adherence, mental health, and memory; referral as required to other healthcare professionals and medication optimization. In addition to demographics, four validated tools were used: the Morisky 8-items scale, the clinically useful anxiety scale, the clinically useful depression scale, and the dementia UK concerned about your memory questionnaire. All pharmacy staff who were involved in the delivery of the model received prior training and certification. To ensure safety for all concerned, pharmacists and their staff involved in the study also received training and certification in Mental Health First Aid. The study concluded that the designed model is workable for delivery from community pharmacies. Community pharmacies are better placed too early intervene at the point of medication dispensing (initiation or repeat) to engage with the patient and share or review information about their conditions and medications, the consequences of good and poor adherence to therapy, and clarify their responsibility in self-management. The self-completed screening surveys for adherence, mental health, and cognitive function also proved successful to ensure that the patient is capable to undertake self-management task, pharmacology, lifestyle, and self-care, which is passed to them from their treating teams while they are waiting for their prescriptions.

Keywords: Chronic diseases, Mental illness, Adherence, Community pharmacists, Memory screening

Introduction

In the United Kingdom, one in four adults experiences at least one diagnosable mental health problem in any given year [1]. In the UK "Mental ill-health is widespread, disabling, yet often hidden. It accounts for 23 percent of the total burden of disease, yet those with mental health problems struggle to get the support they need. The cost to the economy is estimated at £105 billion a year – roughly the cost of the entire NHS." [2] People with long-term physical conditions suffer more complications if they also develop mental health problems, worsening their outcomes and increasing the cost of care to the NHS by an average of 45% [2]. By the age of 14, half of all mental health problems would have been established and this rises to 75% by the age of 24 [1]. The early onset of mental health illness can be predictive of the future mental health of individuals [3]. One in ten children aged between 5 and 16 years has experienced a diagnosable problem such as a conduct disorder (6%), anxiety disorder (3%), attention deficit hyperactivity disorder (ADHD) (2%), or depression (2%). Local community pharmacies dispense medications daily and are better positioned to support the health system in early detection and supporting patients in managing their medications to achieve optimal outcomes from those medications by understanding how they work and their side effects [3].

According to the statistics from the Pharmaceutical Services Negotiating Committee [4], people with severe and prolonged mental ill-health (MIH) are at risk of dying, on average, 15 to 20 years earlier than others. In itself, this may fall under a health

Access this article online	
Website: www.japer.in	**E-ISSN:** 2249-3379

How to cite this article: Arikawe O, Morrissey H, Ball P. Community pharmacy brief screening intervention to improve health outcomes for patients diagnosed with chronic diseases. J Adv Pharm Educ Res. 2022;12(3):1-8. https://doi.org/10.51847/bmamIaRVB8

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

inequality definition that requires addressing. There is also a lack of access to physical healthcare for people with MIH, where less than a third of people with schizophrenia in hospital, received the recommended assessment of cardiovascular risk in the previous 12 months. One in five older people living in the community and 40% of older people living in care homes are affected by depression.

Community pharmacies in the UK are visited by around six million people a day [4]. They are ideally placed to promote and champion public health and reduce health inequalities [4]. Screening services for MIH are not readily available, and when used by GPs, it is usually part of a consultation, not the focus. It is mostly conducted based upon a patient's request for a diagnosis, rather than part of screening for prevention or early detection. Excessively long waiting times for first appointments with a psychologist or counselor mean that people with MIH often become acutely unwell or experience a crisis before receiving the assessment, resulting in poorer outcomes and a higher reliance on healthcare services [5]. Stigma affects the behavior of many of the helpers, including carers, family, friends, and healthcare professionals, in starting a conversation, offering support to those who are in need or at risk of MIH, and preventing those experiencing MIH from help [6, 7]. Other barriers to care may include lack of access, financial resources, and lack of knowledge regarding the disease itself.

Self-completed screening questionnaires can be completed in a community pharmacy, whilst patients are waiting for their prescriptions to be filled. They can empower the pharmacy workforce (pharmacists and non-pharmacists) to identify early, people who are at risk to experience MIH and accelerate their path to effective care through referral to GPs as the initial point of contact.

Mental Health First Aid© [6] is a training program that aims to increase mental health knowledge and impart to the participants the required skills to be able to provide immediate first aid support to anyone who is experiencing an acute mental health crisis until professional help arrives or becomes accessible. Training the community pharmacy workforce in MHFA© could enable the NHS to utilize the large footprint and community presence of pharmacies to contribute to creating good mental health and resilience awareness among the community members [7].

According to 'Dementia UK,' dementia affects people's feelings, emotions, and day-to-day life. The effects are not limited to those experiencing the condition, impacting family and carers. Community pharmacists also have a role in supporting people with dementia, their caregivers, and family, to manage their medication and condition and can further this support to assist with screening for cognitive impairment and MIH in both individuals and their carers, to enable referral to the GP for further professional care [8]. In the future they may also effectively screen for delirium superimposed on dementia, which is important as delirium can usually be improved by appropriate treatment [9].

Mental health issues have been identified by the UK Department of Health as one of the key areas that require action in the next five years [5]. The clinically useful depression outcomes scale (CUDOS©)[10] and the clinically useful anxiety outcomes scale (CUXOS©)[11] questionnaire were the screening tools used in this study. The effect of mental health on an individual's quality of life and their self-caring behavior in long-term conditions cannot be ignored. Medications used to treat MIH are dispensed by pharmacies with many patients taking antipsychotic, anti-anxiolytic, and anti-depressant drugs [1].

The MMAS-8© was developed to identify factors that are responsible for adherence to medication for long-term conditions [12-14]. Each of the MMAS-8© items measures a specific medication-taking behavior which is further divided into two main domains intentional and unintentional. These are visible only to the assessor, not the patient, to prevent self-reporting bias [14]. According to NHS England, "The cost of medicines in England in 2013 exceeded £15 billion, including costs in hospitals. In 2013, over 1 billion prescription items were dispensed in the community in England. This is an average of 2.7 million items every day. On average, 18.7 prescription items were dispensed per head of population in England in 2013" [15]. However, it is estimated that the overall wasted medicine cost in the UK is about £300 million annually [15, 16]. Patients' poor awareness of the medicine cost to the NHS or the consequences of non-adherence on their health are contributing factors to this wastage cost and also to the cost of treating the complications of chronic conditions arising from poor therapeutic outcomes [16]. It is estimated that about 50% of the medications dispensed in England are not taken as intended [17]. This will increase the cost of healthcare and affect the quality of life of the patient increasing morbidity and mortality [16]. The MMAS-8© score helps to determine the patient's adherence to their medication. It can range from 0 to 8 and has been grouped into the levels, and they indicate whether the patient's non-adherence is intentional (that is the patient is deliberately not taking their medication due to reasons such as side effects, inconvenience experience, or any other reasons) or unintentional due to forgetting to take their medication or other mental health issues [17]. Stating levels for depression (0-10 no depression - no action, 11– 20 minimal depression -self-help, 21-30 mild depression - self-help, 31-45 moderate depression – referral and $\geq$46 severe depression – referral) anxiety (0-10 no anxiety - no action, 11– 20 minimal anxiety -self-help, 21-30 mild anxiety - self-help, 31-40 moderate anxiety – referral and $\geq$41 severe anxiety – referral), and adherence (0-1.75 very low adherence – further assessment, 2-3.75 low adherence -further assessment, 4-6.75 moderate adherence – monitor and 7-8 high adherence – no action) enable the healthcare provider to offer appropriate support [10-14].

Materials and Methods

Study question

Can community pharmacists support the national screening effort for mental ill-health and cognitive impairment in patients with long-term health conditions who are receiving ongoing pharmaceutical care services from their community pharmacy setting?

Measurable outcomes

1. Improvement in adherence e by at least one level (from low to moderate or high) compared to baseline (BL) score.
2. Improvement in depression and/or anxiety by one level (from severe to moderate or moderate to mild and mild-low or very low).
3. Improvement in disease markers as applicable to reach the target for the individual patient including a reduction in pain score.
4. Weight reduction, smoke cessation, alcohol reduction.
5. Referral to allied health or GP for further investigation of MIH or cognitive impairment.

Study design and protocol

A prospective observational study, based on using validated and non-validated screening tools to develop a follow-on action such as referral for professional support or medication use reviews. The study was conducted over several phases; pharmacists' training and site preparation, patients' enrolment and data collection, and interpretation supporting the development of the pharmacy screening services algorithm or pathway.

MHFA© certification [6] as the first aider was a compulsory aspect for the research team before the commencement of any data collection. The study used several tools to collect data; two were developed for this study to collect anthropological, medications, medical and social history, and a master sheet to enter all patients' results for analysis. The other tools are validated, and commercially available tools used with either written permission or license: concerned about your memory (CAYM©) [18], Morisky 8-Item Medication Adherence Scale (MMAS-8©) [14], the clinically useful depression outcome scale (CUDOS©) [10] and the clinically useful anxiety outcome scale (CUXOS©) [11].

There were 10 community pharmacies, 11 pharmacists, 5 pre-registration pharmacists, 3 Pharmacy technicians, 10 dispensary technicians, and 2 medicine counter assistants from ten sites invited to participate. After the pharmacists received the invitation letter and completed the initial expression of interest to participate, they met with the researcher and signed the informed consent forms. They then completed a one-day workshop training on the study protocol and forms, two days of workshops on MMAS-8© use and interpretation, CAYM© use, and interpretation, two days of MHFA™ for adults, the center for postgraduate pharmacy education mental health online self-directed module [19], plus a one day workshop on interpreting diagnostic results which included laboratory biochemistry results, blood pressure measuring and interpretation, monofilament test, correct weight, height, waist, hips measurement, and medication review process. After non-pharmacist staff enrolment, they completed; a workshop training on the study protocol, two days MHFA™ for adults, correct measurement of weight, height, waist, and hips. After the completion of the training and the consent, forms were signed-off, the community pharmacies' enrolment was completed, and they were included as approved study sites through minor amendments to the HRA/IRAS ethics approval. Community pharmacists then commenced patient recruitment, with a maximum of 2 patients per day to allow sufficient time to complete the screening without interrupting the pharmacy's core business. At BL demographics, medication history, medical history, weight, height, waist, and hips, blood pressure, monofilament score, cardiovascular and diabetes risk calculation were measured, levels of memory, adherence, depression and anxiety were investigated and advice on weight management, lifestyle changes, diet and referrals as appropriate. All activities were repeated at the FU except of the collection of demographical data, and end of study feedback was collected from participants.

Sample

This study aimed to screen up to 200 patients receiving pharmacological therapy for LTHCs, but the onset of the first Covid-19 lockdown and resultant changes to face-to-face consultations caused recruitment to cease at 175 patients. Pharmacy workforce were included if they were employed in a Healthy Living Pharmacy and completed their healthy living training and are registered (for pharmacists) and above the age of 18 for non-pharmacists workforce and excluded if not willing to deliver the entire study protocol, for 6 months per patient or not willing to deliver the study intervention to patients free of charge. Patients were included if ther were ongoing customer in the recruiting pharmacy site, have diagnosis with one or more LTHCs (physical or mental) or recently discharged from hospital, taking complex therapy for long or short term, experiencing problems with adherence to medication and lifestyle advise and expressed their wish and consented to participate in the study, and they were excluded if they were living dependently in a care home who do not collect their prescriptions in person or in palliative care service.

Results and Discussion

While all patients with long-term non-communicable diseases at the study sites were invited, as a result of changes arising from the first Covid-19-related lockdowns and isolation regulations, a total of 173 patients have enrolled 95 (53%) females and 81 (47%) males.

Only six participants (3.5%) were under the age of 35 years (n=5 females and one male), 15 (9%) participants under the age of 45 years (n=9 females and n=6 males), 23 participants (13%) under the age of 55 years (n=10 females and 13=males), 38 participants (22%) under the age of 65 years (n=26 females and

n=11 males), 45 participants (26%) under the age of 75 years (n=21 females and n=23 males), 37 participants (22%) under the age of 85 years (n=19 females and n=19 males) and nine participants (5%) under the age of 100 years (n=2 females and n=7 males). While the mean age was 37 years, this is skewed as the range of ages is very high (Range=74, Max 94, Min=20) the mode and media are more reflective of the population age (Mode=66 and Median=65).

Weight change from BL to FU was insignificant for the entire population, however, some participants gained weight (n=16 participants, 11 females and 5 males, the maximum gain was 9.7 kg, and the minimum was 0.1 kg) and others lost weight (n=18 participants, 7 females and 11 males, the maximum gain was 10.6 kg, and the minimum was 0.2 kg). The remaining participants (n=134, had an insignificant weight change during the 6 months of the study (under 100gm).

The WHO guide for a wait-to-hip ratio (WHR of 0.9 or less in men and 0.85 or less for women) was used to identify those with a healthy ratio at BL and those who had changed after their participation in the study [20]. Only 96 participants had healthy WHR (n=28 males and n=68 females) At FU which was measured just after the first COVID-19 first lockdown in March 2020, only 86 participants had healthy WHR (n=22 males and n=64 females). Waist circumference change was insignificant (means from 98.8 to 99.1, mode from 99 to108, median from 99.9 to 100 and range from 132.8 to 132.8). similarly the change in mean Hip circumference was insignificant (means from 106.4 to 105.3, mode from 117 to 103, median from 106 to 104.8 and range remains at 133.8). This may be a result of restricted access to exercise, working from home, and unhealthy eating during the Covid-19 lockdowns.

Systolic blood pressure (BP) was reduced in 31 participants (Range of reduction is 1-61 mmHg) and elevated in 20 participants (Range of elevation is 1-49 mmHg), and 120 participants had no change in their systolic BP by the end of the 6-month study participation. Means systolic changed from 133 to 132.6, mode from 121 to 140, median from 131.5 to 133 and range from 116 to 99). Diastolic BP was reduced in 28 participants (Range of reduction is 1-39 mmHg, 12 females, and 16 males) and elevated in 16 participants (Range of elevation is 1-22 mmHg, 9 females and 7 males)and 127 participants had no change in their diastolic BP by the end of the 6-month study participation. Means diastolic changed from 80.8 to 80.1, mode and medians remained at 80 and range from 69 to 54). The change in the BP was in both directions improvement and worsening which requires further invitigation and follow-ups during ongoing routin healthcare.

The most prevalent medical conditions (in more than 25 participants) were hypertension, dyslipidemia, gastroesophageal reflux disease (GORD), depression, pain, asthma, diabetes, and COPD. The most prevalent medical conditions in males (in more than 25 participants) were hypertension, dyslipidemia, GORD, depression, and pain. The highest prevalent medical conditions in females (in more than 25 participants) were hypertension, dyslipidemia, GORD, and depression (Supplementary 1-3). Overall, the highest used medications (by more than 20 participants) were salbutamol, atorvastatin, omeprazole, lansoprazole, bisoprolol, metformin, aspirin, ramipril, co-codamol, amlodipine, and simvastatin. Overall, the most used medications in males (by more than 20 participants) were atorvastatin, salbutamol, omeprazole, ramipril, and bisoprolol. Overall, the most used medications in females (by more than 20 participants) were salbutamol, atorvastatin, and lansoprazole (supplementary 4-6). Regarding medication use reviews, 109 patients received reviews at BL vs. only four at the end of the study during the FU consultation. Regarding checking the inhaler technique, 65 participants underwent a technique check at BL vs. only five participants at the end of the study during the FU consultation. Pain score was checked for people with chronic pain as one of their comorbidities, self-reported scores were recorded on the numerical pain scale of 0-10, where zero is no pain at all and 10 is unbearable/disabling pain, 57 patients had their pain score recorded at BL vs. 39 participants at the FU consultation. Only 11 (28%) patients had improvement in their pain scores from BL to FU review (7 females and 4 males), 26 (67%) participants had no change and two (5%) males had worse pain scores at the FU compared to BL. The means in this section (6.6 BL and 5.9 FU) are not representative of the most common score due to the wide range (8 BL and 9 FU) of the data, where modes and medians were similarly improved from BL and FU (8 and 5 respectively).

The 10g monofilament screening test for peripheral neuropathy was performed for patients diagnosed with diabetes or in the category of pre-diabetes (n=34). There were nine points tested on both left and right foot and reported as the points the patient felt like a maximum of possible nine. For example, R9/L9 was reported for a person who felt all nine pressure points on both the right and left foot and R5/L7 for a person who felt only five points on the right foot and seven on the left foot. Of those tested 27 patients recorded R9/L9 during the duration of their participation in the study, and seven patients had lower readings. One person had R8/L9, R7/L7, R6/L8, R5/L6, R1/L1, and the lowest was R1/L0. While no further statistical analysis was conducted on this test, patients learned how to frequently check their feet. HbA1c was based on self-reporting as currently, community pharmacists in the UK do not have access to e-health patients' records. Only 10 patients were able to report on their HbA1c at BL (Mean = 53.8, Range = 26, Min=48, Max=74 mmol/mol) and only two at the FU consultation (48 and 90 mmol/mol). One patient had both BL and FU and showed improvement from 56 mmol/mol to 48 mmol/mol. As the number of patients reported to be diagnosed with diabetes in the study sample was 41, no meaningful analysis could be made of the data collected. The one person who was able to report their HbA1c at both encounters displayed improvement in their diabetes control.

COVID-19, not only impacted people's physical health but also their cognitive and mental health. Lai *et al*. [21] carried out a cross-sectional survey of 1257 hospital healthcare workers' mental health during the pandemic. The findings suggested that

depression, anxiety, insomnia, and stress were prevalent amongst the healthcare workers. It has also been found that those who had COVID-19 infection and recovered, experienced post-traumatic stress [22]. Memory and thinking ability can be affected by conditions such as stress, depression, pain, chronic illness, medication or alcohol, menopause, or early dementia [8]. Using the 'Concerned about your memory?' checklist [18], participants' memory scores were recorded out of possible 8 scores, where yes=1, no-=0, and sometimes=0.5 points. If the participant answered yes or sometimes to more than four questions, expressed a recent change in their memory, or expressed worry about their memory state at all, they were asked to discuss their memory concerns with their GPs. At BL 122 patients participated in this assessment vs. 31 participants at FU consultation. For those participants who had two episodes of scoring, 13 participants (eight male and five females) did not demonstrate any change between BL and FU, four participants (one male and three females) demonstrated worsening in their memory, and 13 showed improvements by a reduction in their total score (five males and eight females). Means (2.2 BL and 2.1 FU), mode (0.5 BL and 1 FU), median (1.5 BL and 1.5 FU) were not significantly different, however the range was wider (7.5) in BL than in FU (6.5). Depression scores were calculated using the CUDOS© scale, 165 patients took part in this assessment at BL vs. 151 at the FU consultation. Of those who had records of two readings, 15 (nine females and six males) did not show any change from BL to FU consultation, 13 of those participants' scores were under 10% (not depressed), and one patient had a score of 13% (minimal depression) and one had a score of 41% (moderate depression). There were 32 (16 females and 16 males) participants who showed an increase in their scores by 1% to 27% from BL, with 16 patients remaining in the 'non-depressed' category (0-10%), and six participants moved up to the 'minimal depression' category (11-20%), three patients remained or moved up to the 'mild depression' category (21-30%), four patients moved up to the 'moderate depression' category (31-45%) and three patients moved up to the 'severe depression' category (>46%). 104 patients showed a reduction in their scores, ranging between 1% and 46%. Seventeen patients moved from the 'mild to minimal depression' category, 15 moved from the 'moderate to mild depression' category, 14 patients remained or moved down from the 'severe to moderate depression' category, and three patients improved but remained in the 'severe depression category'. Patients who returned scores above 20% at any of the two encounters were referred to their GP for further investigation. All depression parameters improved (reduced) from BL to FU (means from 19.4 to 14.2, modes from 2 to 1, medians from 15 to 8 and range from 69 to 59).

Similarly, anxiety scores were calculated using the CUXOS© scale, 163 patients took part in this assessment at BL vs. 152 at the FU consultation. Of those who had records of two readings, 10 (four females and six males) did not show any change from BL to FU consultation, six scores were under 10% (not anxious), two had a score under 30% (mild anxiety) and two had scored above 40% (severe anxiety). There were 41 (24 females and 17 males) participants who showed an increase in their scores by 1% to 29% from BL, while 17 patients remained at 'non-anxious' (0-10%), seven participants moved up to 'minimal anxiety' (11-20%), eight patients remained or moved up to 'mild anxiety (21-30%), two patients moved up to 'moderate anxiety' (31-40%) and seven patients moved up to 'severe depression' (>40%). 97 patients showed a reduction in their scores, ranging between 1% and 60%. Of those, 59 patients stayed at or moved to the not-anxious category, 13 patients moved from the 'mild to minimal anxiety' category, nine moved from 'moderate to mild anxiety' category, and seven patients remained or moved down from 'severe to moderate anxiety' category and eight patients improved but remained in the 'severe anxiety category'. Patients who returned scores above 20% at any of the two encounters were referred to their GP for further investigations. All anxiety parameters changed, but not significantly improved (reduced), from BL to FU except of the means and medians (means from 21.4 to 15.7, modes from 2 to 5, medians from 16 to 7 and range from 74 to 78).

Adherence scores were calculated using the MMAS-8© as a total score and then as separate intentional and unintentional adherence scores. There was improvement at all levels of adherence, where high adherence improved from 68% to 88% of the total sample population, low/very low combined adherence reduced from 12.5% to 4%, and moderately reduced from 21% to 9%. At the end of the study, there were no patients in the very low adherence category **(Table 1)**. The mean adherence score changes from BL to FU were small (intentional=0.3 points, unintentional=0.6 and total score= 0.7), however, this should not be seen as a true measure as the range was very vast (0-7) accordingly the overall move from lower levels of adherence to higher adherence is a better reflection **(Table 5)**. All adherence parameters changed, but not significantly improved (increased), from BL to FU except of the means and medians (means from 6.5 to 7.3, modes 8 for both, medians from 7 to 8 and range from 7 to 5.5).

Table 1. Measuring adherence using MMAS-8©

Period	Level of adherence	Number of patients	% of the total sample*
BL	Very low intentional adherence	10	6%
	Very low unintentional adherence	8	5%
	Low intentional adherence	18	10%
	Low unintentional adherence	24	14%
	Moderate intentional adherence	51	29%
	Moderate unintentional adherence	43	25%
	High intentional adherence	95	55%
	High unintentional adherence	99	57%
FU	Very low intentional adherence	3	2%
	Very low unintentional adherence	1	0.6%
	Low intentional adherence	8	5%

	Low unintentional adherence	7	4%
	Moderate intentional adherence	25	15%
	Moderate unintentional adherence	31	18%
	High intentional adherence	135	79%
	High unintentional adherence	131	77%
Total BL	Very low adherence	6	3.5%
	Low adherence	15	9%
	Moderate adherence	36	21%
	High adherence	117	68%
	Very low adherence	0	0%
Total FU	Low adherence	7	4%
	Moderate adherence	15	9%
	High adherence	150	88%

*n=173 at baseline and n=170 at follow-up.

Table 2 shows the paired sample correlation for the various observations. The observation for the BL and the FU period are significantly correlated for all the particulars at a 1% significance level except for the adherence intentional score, which is significant at the 5% level. The correlation is highest for weight and waist circumference, which is higher than 90%. The paired correlation is lowest for intentional adherence, i.e., 17%. While the correlation score for memory is 61%, that for depression and anxiety is above 75%.

Table 2. Paired Sample Correlation

Particulars	Number of patients	Correlation	*p*-value
Weight (kg)	168	0.997	<0.001
Waist circumference (cm)	167	0.935	<0.001
Hips circumference (cm)	168	0.957	<0.001
Systolic BP	127	0.833	<0.001
Diastolic BP	127	0.493	<0.001
Memory score	42	0.614	<0.001
Adherence score intentional	171	0.170	0.026
Adherence score non-intentional	171	0.334	<0.001
Depression score	171	0.781	<0.001
Anxiety score	170	0.755	<0.001

Table 3 shows the significant statistical results for the paired differences for the various parameters. The p-values are highlighted in bold for those parameters where the difference is significant. It is evident that adherence score, depression score, and anxiety score are significant at one percent level and memory score is significant at 10%. The negative figures in the Mean (BL and FU) state that the FU values are higher than the BL values. Thus, for all the parameters except for weight, waist circumference, and adherence sores the FU values are lower.

Table 3. Paired Differences

Particulars	Number of patients	Mean	SD	*P*-value
Weight (kg)	168	-0.053	1.540	0.656
Waist circumference (cm)	167	-0.319	6.648	0.537
Hips circumference (cm)	168	0.673	5.473	0.113
Systolic BP	127	1.228	11.645	0.237
Diastolic BP	127	1.598	13.611	0.188
Memory score	42	0.500	1.627	**0.053**
Adherence score (intentional)	171	-0.488	1.141	**<0.001**
Adherence score (non-intentional)	171	-0.423	1.049	**<0.001**
Depression score	171	5.696	10.815	**<0.001**
Anxiety score	170	5.988	12.478	**<0.001**

Table 4 shows the result of the paired-sample tests for i) the number of prescribed medications and ii) the total number of referrals. It is evident that there is no significant difference between the BL and the FU values for both parameters. However, for only the number of medications, the correlation is significant for the number of prescribed medications. The correlation is significant at the 1% level.

Table 4. Paired Samples Statistics - number of medications

Particulars	Number of patients		Mean	SD	Correlation	*p*-Value	Paired Diff. (*p*-Value)
Number of Medications	169	BL	7	4.92	0.98	<0.001	0.334
		FU	7	4.02			
Total number of referrals	18	BL	1	0	0.357	0.15	0.260
		FU	1	0			

Table 5 examines the impact of various interventions on blood pressure. The results reveal that, except for the total number of referrals, all the rest of the variables have a significant impact on blood pressure. It is important to note that the impact of these variables is negative and is significant at a 1% level. Adherence, depression, anxiety, and several medications have a coefficient of more than 0.65.

Table 5. Examining the Impact of Intervention

Particulars	Number of patients	*coefficient*	*p*-Value
Memory Score	42	-0.117	<0.001
Adherence score (Intentional)	171	-0.650	<0.001
Adherence score (non-Intentional)	171	-0.591	<0.001
Depression Score	171	-0.652	<0.001
Anxiety Score	170	-0.649	<0.001
Total number of Referrals	18	-0.027	0.279
Number of Medications	169	-0.680	<0.001

Participants' feedback was then collected, to reflect on the study protocol and the participant's experience during their participation. **Table 6** shows the result of the responses of male and female participants. The responses were collected through a Likert scale (strongly disagree = 1, strongly agree = 5). It is important to note that for both males and females the mean scores are above 4. Further, it should be noted that there is no significant difference between the responses of male and female participants. This suggests that the respondents believed they

benefitted from the program. Overall, more female participants responded to the questionnaire than male participants. It is critical to note that the respondents stated the program was worthwhile and that staff was well organized. The mean scores were 4.79 and 4.80 respectively **(Table 6)**.

Table 6. Feedback on the study protocol and participants' experience

Particulars	Gender	Number of patients	Mean	SD	*p*-Value
Programme worthwhile	Male	80	4.79	0.469	0.672
	Female	94	4.76	0.522	
Programme helped to set goals	Male	80	4.68	0.569	0.565
	Female	94	4.72	0.537	
Needed information given	Male	80	4.68	0.569	0.261
	Female	94	4.77	0.496	
Pharmacists well organised	Male	80	4.88	0.333	0.307
	Female	94	4.81	0.492	
Staff well organised	Male	80	4.80	0.560	0.98
	Female	94	4.80	0.540	
Preferred GP	Male	80	2.08	0.759	0.281
	Female	94	1.95	0.795	
Prefer pharmacist at the GP surgery	Male	80	2.28	0.871	0.232
	Female	94	2.11	0.967	
Prefer service by community Pharmacist only	Male	80	3.10	1.249	0.221
	Female	94	2.87	1.193	
Did not mind combined care	Male	80	4.50	0.616	0.255
	Female	94	4.61	0.609	
Worth my time and effort	Male	80	4.44	0.760	0.178
	Female	94	4.59	0.679	
Difficult topics handled well	Male	80	4.76	0.457	0.708
	Female	94	4.73	0.532	
Relevant content to my situation	Male	80	4.63	0.487	0.662
	Female	94	4.59	0.679	
Chance to speak	Male	80	4.35	0.813	0.653
	Female	94	4.41	0.822	
People worked well together	Male	80	4.83	0.382	0.603
	Female	94	4.76	0.522	

Limitations

The project commenced in late 2019 and was planned to continue data collection and recruitment for up to 24 months. However, due to the global pandemic, it was closed earlier in March 2020. The COVID-19 pandemic caused several issues around the availability and provision of healthcare. The survival and ongoing quality of life of these individuals may be dependent on the services available and accessible to them. Many health services were either reduced or ceased to accommodate areas where there was higher demand. Health services such as GP practices were closed to face-to-face services during the pandemic. Most were offering telephone service and later video consultation. Community pharmacies remained open throughout the pandemic, providing face-to-face, telephone, and virtual services to all those who required them. Community pharmacies felt overwhelmed by the demand for services with many pharmacists posting their experiences on social media to gain the attention of the government. The experience led to the government-sponsored 'the pandemic delivery service' so that medication could be delivered to the people who were either isolated or shielded which meant they could not leave their houses for any reason including collecting their much-needed medication. This means that community pharmacies, apart from being able to offer face-to-face service were also sometimes the only healthcare practitioner seeing patients in a given area. One evident thing was the need to preserve both the mental health of the staff and the community.

Disclaimers

1. The concerned about your memory short questionnaire was used in this study with permission from Dementia UK.
2. The use of the MMAS-8© was granted by Mr Steven Trubow.
3. The use of CUDOS© and CUXOS© was granted by Professor Mark Zimmerman.

Conclusion

Against the background of collecting data through the emerging COVID-19 pandemic, lockdowns and isolation could have seriously compromised the benefits of this study, but the data obtained demonstrate the value of the approach, and the patients found it pleasant and valuable experience. The COVID-19 Pandemic has caused a major re-thinking of the way a wide range of health services are provided, and the model demonstrated in this study would easily fit with emerging ideas on future service models. The study concluded that the designed model is workable for delivery from community pharmacies. Community pharmacies are better placed too early intervene at the point of medication dispensing (initiation or repeat) to engage with the patient and share or review information about their conditions and medications, the consequences of good and poor adherence to therapy, and clarify their responsibility in self-management. The self-completed screening surveys for adherence, mental health, and cognitive function also proved successful to ensure that the patient is capable to undertake self-management task, pharmacology, lifestyle, and self-care, which is passed to them from their treating teams while they are waiting for their prescriptions. It is worth noting that with appropriate training, the community pharmacy workforce can become mental health champions in their communities.

Acknowledgments: The authors thank all patients and pharmacists took part in the study.

Conflict of interest: None

Financial support: None

Ethics statement: This study gained the following ethical clearance and approvals from the Health Research Authority (HRA): IRAS: 251042.

References

1. RPSGB. No Health Without Mental Health: How can Pharmacy support people with Mental Health Problems. London. Royal Pharmaceutical Society of Great B. 2018. Available from: https://www.rpharms.com/Portals/0/Documents/RPS%20mental%20health%20roundtable%20report%20June%202018_FINAL.pdf?ver=2018-06-04-100634-577.
2. NHS England. Our 2018/2017 Business Plan. London. England N. 2017. Available from: https://www.england.nhs.uk/wp-content/uploads/2016/03/bus-plan-16.pdf.
3. Kelly DV, Young S, Phillips L, Clark D. Patient attitudes regarding the role of the pharmacist and interest in expanded pharmacist services. Can Pharm J (Ott). 2014;147(4):239-47.
4. PSNC. Pharmacy: The Heart of our Community London: Pharmaceutical Services Negotiating Committee 2022. Available from: https://psnc.org.uk/pharmacy-the-heart-of-our-community/.
5. NHS England. Next Steps on the NHS Five Year Forward View. London. England N. 2017. Available from: https://www.england.nhs.uk/wp-content/uploads/2017/03/NEXT-STEPS-ON-THE-NHS-FIVE-YEAR-FORWARD-VIEW.pdf.
6. MHFA England. Mental Health First Aid, England, Homepage: Mental Health First Aid; 2022. Available from: https://mhfaengland.org/. 17/06/2022: {17/06/2022}.
7. Rickles N, Wertheimer A, Huang Y. Training Community Pharmacy Staff How to Help Manage Urgent Mental Health Crises. Pharmacy (Basel). 2019;7(3):133.
8. Dementia UK. Diagnosis and specialist support: Dementia UK; 2022. Available from: https://www.dementiauk.org/get-support/diagnosis-and-specialist-suppport/. 17/06/2022: {17/06/2022}.
9. Ball PA, Morrissey H. First ripples in a tidal wave? Int Psychogeriatr. 2021;33(1):3-5.
10. Zimmerman M, Chelminski I, McGlinchey JB, Posternak MA. A clinically useful depression outcome scale. Compr Psychiatry. 2008;49(2):131-40.
11. Zimmerman M, Chelminski I, Young D, Dalrymple K. A clinically useful anxiety outcome scale. J Clin Psychiatry. 2010;71(5):534-42.
12. Bress AP, Bellows BK, King JB, Hess R, Beddhu S, Zhang Z, et al. Cost-Effectiveness of Intensive versus Standard Blood-Pressure Control. N Engl J Med. 2017;377(8):745-55.
13. Berlowitz DR, Foy CG, Kazis LE, Bolin LP, Conroy MB, Fitzpatrick P, et al. Effect of Intensive Blood-Pressure Treatment on Patient-Reported Outcomes. N Engl J Med. 2017;377(8):733-44.
14. Morisky DE, Ang A, Krousel-Wood M, Ward HJ. Predictive validity of a medication adherence measure in an outpatient setting. J Clin Hypertens (Greenwich). 2008;10(5):348-54.
15. Hazell B, Robson, R. Pharmaceutical waste reduction in the NHS. London. England N. 2015. Available from: https://www.england.nhs.uk/wp-content/uploads/2015/06/pharmaceutical-waste-reduction.pdf.
16. Oswald A, Czupryn J, Wiseman J, Snell L. Patient-centred education: what do students think? Med Educ. 2014;48(2):170-80.
17. Barnett GD, Mann RE. Cognition, empathy, and sexual offending. Trauma Violence Abuse. 2013;14(1):22-33.
18. Kent County Council / Dementia UK. Concerned about your memory? A handy checklist of questions if you are worried about your own or a relative's memory. West Malling: Kent County Council; 2015. p. 5.
19. CPPE. Consulting with people with mental health problems (Online Course) Manchester: Centre for Postgraduate Pharmacy Education; 2022. Available from: https://www.cppe.ac.uk/programmes/l/mentheal-e-01. 17/06/2022: {17/06/2022}.
20. Healthline. What Is the Waist-to-Hip Ratio? San Francisco: Healthline; 2022. Available from: https://www.healthline.com/health/waist-to-hip-ratio. 17/06/2022: {17/06/2022}.
21. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, et al. Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. JAMA network open. 2020;3(3):e203976-e.
22. Bo HX, Li W, Yang Y, Wang Y, Zhang Q, Cheung T, et al. Posttraumatic stress symptoms and attitude toward crisis mental health services among clinically stable patients with COVID-19 in China. Psychol Med. 2021;51(6):1052-3.