HSI Health Sciences Investigations Journal

share

Send us an email: hsijournal@ug.edu.gh
Visit us: https://www.hsijournal.ug.edu.gh

ISSN Online 2704-4890 | ISSN Print 2720-7609

Online first publication

Original Research Article

HSI Journal (2024) Volume 6 (Issue 2):892-902. https://doi.org/10.46829/hsijournal.2024.12.6.2.892-902

Open Access

Development of a patient-centred toolkit for improving glaucoma medication adherence: a motivational interviewing approach

Benjamin ABAIDOO [1*], Khathutshelo P MASHIGE [2], Pirindhavellie GOVENDER-POONSAMY [2]

[1] Ophthalmology Unit, Department of Surgery, University of Ghana Medical School, College of Health Sciences, University of Ghana, Accra, Ghana; [2] Discipline of Optometry, School of Health Sciences, University of KwaZulu-Natal, Durban, South Africa.

Received September 2024; Revised October 2024; Accepted November 2024

Abstract

Background: Non-adherence to medication is reported among patients with glaucoma. The use of cognitive-based behaviour methods such as motivational interviewing (MI) is a promising approach to resolving non-adherence to medication among such patients.

Objective: This study aimed to develop a patient-centred MI manual for improving glaucoma medication adherence.

Methods: This study employed a descriptive methodological design conducted in three phases, namely, content development, validation, and training. Barriers and motivators of non-adherence to glaucoma medication were generated from a qualitative study. Scale level content validity index (SCVI) and intraclass correlation coefficients among the validators were calculated. The extent of collaboration between the interviewers and the interviewees and the fidelity of the MI process were analysed. P-values less than 0.05 were adjudged statistically significant.

Results: Barriers to glaucoma medication adherence included inadequate knowledge about glaucoma, lack of motivation, cost of medication, forgetfulness, and difficulty with drop administration. The SCVI and the intraclass correlation coefficient were 0.9 and 0.92 ($p = 0.0001$; 95% CI [0.68, 0.99]) respectively. The correlation coefficient for the extent of the collaboration between the interviewers and the interviewees was 0.931 ($p = 0.001$). The practitioner's mean score ± SD was 3.7 ± 0.2.

Conclusion: A patient-centred MI manual developed through a multidisciplinary approach with a good validity index and excellent inter-rater reliability can be beneficial in facilitating behavioural change to improve glaucoma medication adherence.

Keywords: Adherence, glaucoma, medication, motivational, behavioural

Cite the publication as Abaidoo B, Mashige KP, Govender-Poonsamy P (2024) Development of a patient-centred toolkit for improving glaucoma medication adherence: a motivational interviewing approach. HSI Journal 6 (2):892-902. https://doi.org/10.46829/hsijournal.2024.12.6.2.892-902

INTRODUCTION

Glaucoma involves a progressive and irreversible loss of vision. Non-adherence to anti-glaucoma medications has been reported to be one of the factors responsible for the devastating effects of the disease [1-4]. According to the World Health Organization (WHO), the development of effective interventions for reducing non-adherence to medications may have a far greater impact on health outcomes than improvements in specific medical treatments [5]. For this reason, several existing interventions for improving medication adherence among patients with glaucoma have been developed, including the use of patient instruction and educational materials, reminder applications, and telephone follow-up, among others [6-8].

Several barriers to glaucoma medication adherence, such as forgetfulness, difficulty with drop administration, fear of side effects, lack of symptoms, medication cost, and poor education, have been reported. [9,10]. Even though not all these barriers may be motivational, improving a patient's medication-taking behaviour through motivation may

* *Corresponding author*
Email: benjamin_abaidoo@yahoo.com

share
Send us an email: hsijournal@ug.edu.gh
Visit us: https://www.hsijournal.ug.edu.gh

significantly enhance positive changes in behaviour. We, therefore, set out to create an avenue that could enable patients with glaucoma to benefit from additional time with their care providers and feel more relaxed in interacting and asking questions about their eye health, which may cognitively influence behavioural change and improve adherence. A promising approach to resolving these barriers to medication adherence is the use of cognitive-based behaviour methods such as motivational interviewing (MI). MI is a collaborative, patient-centred approach to behaviour change, helping patients resolve ambivalence and enhancing their motivation and commitment [11-13]. As a counselling approach, MI has been used extensively in several health complications with significant outcomes in several studies [14-16]. Furthermore, this strategy is convenient and inexpensive and enables patients to examine the merits and demerits of behavioural change, develop intrinsic motivation for change, and facilitate collaborative decision-making for better health [11].

The use of MI in motivating patients with glaucoma to improve their adherence has not been extensively explored. In this paper, we report the development and validation of a patient-centred MI manual designed to improve glaucoma medication adherence among patients with glaucoma in Ghana.

MATERIALS AND METHODS

Study design

This study used a descriptive cross-sectional methodological design to develop and validate the MI manual for improving adherence to glaucoma medications. The study is part of a multi-centre randomised controlled trial to test the effectiveness of interventions for improving adherence to glaucoma medications. This was done in three phases, as described below (Figure 1).

Phase one: Content development of the manual

A preliminary qualitative exploratory study was conducted among patients with glaucoma at the Korle Bu Teaching Hospital to assess their educational needs and identify possible motivators and barriers to medication adherence. The Eye Centre of the Korle Bu Teaching Hospital is the largest eye hospital in Ghana and among the largest in Sub-Saharan Africa. It is located in Accra, the capital city of Ghana. It is a referral facility and a training and research centre for undergraduate, postgraduate and other cadres of eye care workers. A total of twenty-four (24) adult patients with glaucoma aged ≥ 30 years were conveniently selected for a face-to-face in-depth interview (IDI) and a focus group discussion (FGD) after voluntarily consenting to be part of the study. Bernard [17] provides guidance on sample size determination, stating that in an exploratory study, 10 to 20 knowledgeable individuals should be sufficient to identify and address the primary goal of discussion in any well-defined care setting. Those diagnosed with glaucoma for more than one year, who were on topical anti-glaucoma medications for one or more years and who were able to speak English, Twi or Ga were recruited. Participants with coexisting psychiatric disorders, including newly diagnosed patients with glaucoma, were excluded. Twelve (12) participants were involved in the face-to-face interview sessions, each lasting approximately 30 minutes. Two FGD sessions were done with six (6) participants in each session. Each FGD took approximately 60 minutes to complete. An interview guide was used to obtain responses from participants.

Participants' socio-demographic characteristics, such as age, gender, education, marital status, family history of glaucoma, duration of glaucoma, and duration of medication use were recorded. The interviews were moderated by the principal investigator. When more information was needed, participants were encouraged to provide it with a series of prompts. The questions were translated from English into the native language of the participants who could not speak English (Ga and Twi being the most common native language among the study participants). The principal investigator, who is fluent in both local languages, then translated the participants' responses back into English from the native language. Field notes were also recorded to augment the information gathered. Credibility was demonstrated by checking the audio recordings to ensure precise transcription.

The interviews were audio-taped and transcribed verbatim after each session. The socio-demographic details of the participants were analysed using descriptive statistics. An interpretive content analysis of the transcribed data was done to identify themes from the interviews. The themes describing motivators and barriers to medication adherence were identified from the analysis. These were used in developing the content of the manual. The motivators and barriers to medication adherence are presented in Table 1. The development of the MI manual was guided by the principles of the Four Habits Model: investing in the

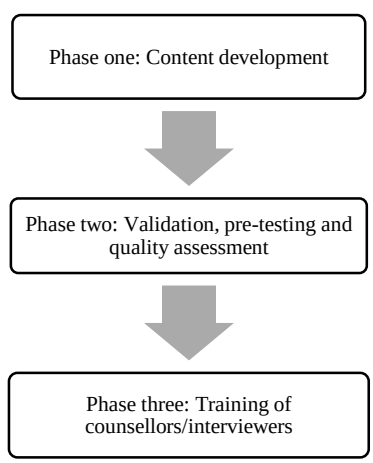

Figure 1. Schematic presentation of the development and validation of the MI manual

share
Send us an email: hsijournal@ug.edu.gh
Visit us: https://www.hsijournal.ug.edu.gh

beginning, eliciting the patient's perspective, demonstrating empathy, and investing in the end [18]. Investing at the beginning of the interview creates a quick rapport between the interviewer and the patient, elicits the patient's concerns, and plans the visit with the patient.

Eliciting the patient's perspective enables interviewers to find out the patient's goal in seeking care and exploring the impact of the disease on the patient's life. This helps the patient provide important diagnostic clues and uncover hidden concerns. Demonstration of empathy helps interviewers appreciate the patient's emotions, make an empathic statement and occasionally convey empathy non-verbally by using facial expressions. This is done to add depth and meaning to the visit and build trust, leading to better diagnostic information and increased adherence. While demonstrating empathy, interviewers must be careful not to allow emotions and reactions to disrupt the systematic schedule of the interview.

In the end, investing enables the interviewer to deliver diagnostic information, provide education, involve the patient in making decisions and finally complete the visit. This helps to increase the potential for collaboration, improves adherence and encourages self-care. Each of the habits constitutes a series of interviewing skills sequentially related to each other. The Four Habits Model is ideal for offering an efficient and practical framework for organising the flow of medical visits or encounters [18]. The principal investigator, trained in designing and implementing MI, was supported by clinical psychologists in training the study interviewers. The team worked together in pilot interviews to attain the desired level of competence.

Phase two: Validation, pre-testing and quality assessment of the MI manual

We followed the recommendations from the study by Steurer, who suggested a minimum sample size of 7 participants for an expert consensus [19]. Therefore, after the initial draft, the manual was sent to a group of ten purposively selected experts in clinical psychology (three), ophthalmology (six) and health communication (one) for an extensive review and content validation. Clinical psychologists were selected because the development of MI tools usually incorporates the use of cognitive-based behaviour methods and principles such as the Four Habits Model [18] used in clinical psychology. A health communication officer was involved to ensure competency in assisting the development, directing and implementation of communication strategies that can produce effective feedback from patients as end-users of the MI tool. Experts with five or more years of experience in their fields and willingness to be part of the review process were included.

The content validation was done to assess whether the content (specifically the probe questions used) of the manual is representative of all the aspects of the construct (barriers to glaucoma medication adherence) used. Each probe question in the manual was assigned an item rating model with a five-point Likert scale (from strongly disagree - 1, disagree - 2, neutral -3, agree - 4, and strongly agree - 5). The experts rated the extent of their agreement to each of the probe questions using the following criteria: informativeness, understandability, and usefulness. Informativeness refers to the state of the probe questions, which includes all the necessary parts of the barriers to adherence described earlier. Understandability refers to the presentation of the probe questions in a manner that interviewees can easily comprehend. Usefulness refers to the degree to which the MI manual meets the needs of the intended users. Fields were provided for experts to present their recommendations. Content validity index (CVI) and intraclass correlation coefficients (ICC) were then used to indicate the level of agreement among the experts on the items in the MI manual.

The manual was pre-tested with another group of 12 patients with glaucoma, and minor edits were made based on the interviewers' recommendations before finalising the version. These conveniently selected patients with glaucoma from the glaucoma clinic at the Eye Centre of the Korle Bu Teaching Hospital (who were different from the group used for the face-to-face and focus group interviews) with at least a basic level of education (from Primary to Junior High School level) in Ghana (equivalent to the US grade 9). Written consent to participate was sought from these participants. After the pre-testing, the Working Alliance Inventory-Short Revised (WAI-SR) [20] was administered to these participants to assess the extent of the collaborative relationship between them and their interviewers and the perceived quality of the interview. The WAI-SR measures three domains of the therapeutic alliance, namely, the agreement between patient and therapist on the goals of the treatment (Goal), an agreement between patient and therapist about the tasks to achieve these goals (Task), and the quality of the bond between the patient and therapist (Bond). Patients rate items on a 5-point Likert scale from "seldom (1) to always (5)". The Goal, Task and Bond domains each have mean scores ranging from 0 to 5. Higher scores indicate a better therapeutic alliance and a quality interview.

Additionally, the pre-tested interviews were assessed for fidelity testing using the Behaviour Change Counselling Index (BECCI) [21], a validated tool used for fidelity testing of MIs. The BECCI was designed to help trainers evaluate skills acquired by trainees during MI training sessions [21]. The BECCI questionnaire has four domains: Agenda Setting and Permission Seeking, The Why and How of Change in Behaviour, The Whole Consultation, and Talking about Targets. Scoring is done by using a Likert scale ranging from "Not at all (0)" to "A great extent (4)", describing the degree to which an action was carried out during the MI session [21]. A Mean score is calculated by adding all the total scores for the items in the various domains and dividing it by the number of items to establish the overall practitioner BECCI score, which is the mean score for all the domains. The practitioner's BECCI score is interpreted by the score on the Likert scale construct. A

share
Send us an email: hsijournal@ug.edu.gh
Visit us: https://www.hsijournal.ug.edu.gh

mean value greater than 3.0 is interpreted as good fidelity. [21]. The principal investigator reviewed the audio-taped interviews to identify challenges associated with the interviews and ways of improving the interviews.

Phase three: Training of counsellors/interviewers for the MI

Ophthalmic nurses were used as counsellors/interviewers for the MI training in a two-day interactive skills development training. A total of ten conveniently selected participants were involved in the training. A clinical psychologist and the principal investigator developed two training sessions. The first session was a didactic 3-hour group training to enable trainees to develop skills in reflective listening, open-ended questioning, the use of affirmations, and summarising. The second session was 4 hours of training on problem-solving, making complex reflections, identifying and promoting change talks, interactive and supportive rapport, and developing goals to improve glaucoma medication adherence. The second session involved role-playing, incorporating the target contexts, patients, and barriers to glaucoma medication adherence. Two rounds of role-playing with feedback were done. This was done to enable trainees to practice with feedback and acquire MI skills.

The structure of the developed MI manual

The final version of the MI manual has four sections. The first section (section A) gives a welcome address to participants with an introduction to the main purpose of the discussion, which is to collaborate with participants in finding ways to help them improve their level of adherence to medication. The second section (section B) allowed participants the opportunity to select two of the most possible barriers to their medication adherence for discussion. The interviewer encouraged participants to adhere to their medication by educating them on the need for adherence and demonstrating the right way of instilling eye drops. In the third section (section C), participants are presented with some suggested ways of overcoming the barriers they have mentioned. The final section (section D) allows participants to set goals for what they will do to help them adhere to their medication.

The general recommendation for using the MI manual

In using this MI manual, the interview should be conducted at a convenient place in the clinic in the participant's preferred language after each clinic visit. Participants must be told the interview will take an average of about 30 minutes and will be audio-taped for assessment. The following processes should be followed in conducting the MI:

1. The interviewer must start the conversation with a welcome address and an introduction, explaining glaucoma and non-adherence to participants and the main objective of the MI. Avoid the use of scientific terms and be careful not to give participants too much information, which may confuse them eventually.

2. Participants should be allowed to select the two most significant barriers to medication adherence on a list (a list of barriers will be made available for interviewers to use as conversational tools).

3. The interviewer must discuss possible solutions to these barriers and assist participants in setting goals for overcoming the barriers. This discussion is intended to elicit change talk in a collaborative manner that will change medication-taking behaviour by helping participants plan to fix the selected barriers.

4. The interviewer should encourage participants to adhere to their medication by educating them on the need to adhere to their medication. The interviewer can also ask them to demonstrate the right way of instilling their eye drops and also show them the right way of instilling the drops after they have done their demonstration.

5. Where possible, family members of participants can also join. This will enable them to better understand the patient's condition and discuss how they can assist the patient in meeting their goals of resolving non-adherence.

6. The interviewer should give a summary of the discussions at the end.

7. After the MI session, the interviewer should keep a copy of the documented barriers and plans for achieving the set goals as data is collected, while the participant is given a copy for keeping. The participants will be instructed to keep this at a place where they can easily remember as a reminder of the goal-setting agenda for resolving the barriers to medication adherence described by them.

8. The summarised information of the initial MI should be reviewed by the interviewer before the next follow-up appointment interview. During the next follow-up MI, interviewers must discuss the status of identified barriers and what the participants did to resolve the barriers. Interviewers must encourage participants to adhere to the plan discussed during the previous meeting.

9. After the MI, the WAI Questionnaire may be administered to each participant and the interviewer to assess the collaborative relationship between the interviewer and participants.

10. Follow-up information must be documented and used for subsequent visits.

Data analysis

Descriptive statistics were used to analyse the demographic characteristics of participants. An interpretive content analysis of the qualitative interviews in phase one was done to identify themes relating to the barriers and motivators of non-adherence to medication from the respondent's narrations. A table was used to present the results. Content Validity Index (CVI) was computed from the scores on the Likert scale ratings for validation. A score of 4 and above (agree and strongly agree) suggested an agreement among the experts [22]. Scale level content validity index (S-CVI)

share
Send us an email: hsijournal@ug.edu.gh
Visit us: https://www.hsijournal.ug.edu.gh

was computed on the item level content validity index (I-CVI). An intraclass correlation coefficient (ICC) was also calculated with IBM SPSS Statistics for Windows, Version 25 (IBM Corp., Armonk, N.Y., USA with a two-way random effect model with multiple raters and an absolute agreement. The significance level was set at 5% with a 95% confidence interval.

The extent of the collaborative relationship between the interviewers and the interviewees and the perceived quality of the interview was determined using the WAI-SR. The pre-testing interviews were assessed for fidelity using the BECCI scale. P-values less than 0.05 were seen as statistically significant.

Table 1. Motivators and barriers to glaucoma medication adherence

Motivators of glaucoma medication adherence
Fear of blindness
Faith in drop efficacy
Perceived benefits from treatment
Family support
A good provider-patient relationship
Barriers to glaucoma medication adherence
Inadequate knowledge about glaucoma
Lack of motivation
Cost of medication
Forgetfulness
Difficulty with drop administration

RESULTS

A total of twenty-four (24) patients with glaucoma participated in the preliminary qualitative interviews with a male majority (54.2%). The mean age of the patients was 53.9 ± 8.5 years, and the mean duration of medication use was 3.8 ± 1.4 years. (Table 2). From the preliminary qualitative analysis, the motivators of glaucoma medication adherence were fear of blindness, faith in drop efficacy, perceived benefits from treatment, family support, and a good provider-patient relationship. Barriers included inadequate knowledge about glaucoma, lack of motivation, cost of medication, forgetfulness, and difficulty with drop administration (Table 1). In assessing the informativeness of the MI manual, there was a total of 8 agreements out of the assessment from 10 experts with an ICVI of 0.8. Understandability assessment had a total of 9 agreements with an ICVI of 0.9. The usefulness of the manual recorded a 100% agreement among all the experts with an ICVI of 1.0. The SCVI was 0.9 (Table 3). The intraclass correlation coefficient was 0.92 (p = 0.0001) with a 95% confidence interval of 0.68 to 0.99 (Table 3). Spearman's correlation coefficient for the collaborative relationship between the interviewers and the interviewees for the Goal item was 0.830 (p = 0.001), indicating a strong relationship. There was no significant difference in the mean score between the interviewers and the interviewees for the Goal item (p = 0.536). For the task item, the correlation coefficient for the collaborative relationship between the interviewers and the interviewees was 0.885 (p = 0.001), indicating a strong collaborative relationship. There was no significant

Table 2. Demographic profile of the study participants

Socio-demographic characteristics	Number	Percentage
Content development participants (patients):		
Mean age±SD: 53.9±8.5 years		
Sex		
Male	13	54.2
Female	11	45.8
Mean duration of medication use±SD: 3.8 ± 1.4 years		
Content validation participants (experts):		
Area of expertise:		
Ophthalmology	6	60.0
Clinical psychology	3	30.0
Health communication	1	10.0
Pre-testing participants (patients):		
Mean age ± SD: 52.5 ± 3.3 years		
Sex		
Male	7	58.3
Female	5	41.7
Mean duration of glaucoma±SD: 5.4 ± 1.3 years		
Mean duration of medication use ± SD: 5.1 ± 1.6 years		
SD = Standard deviation		

share
Send us an email: hsijournal@ug.edu.gh
Visit us: https://www.hsijournal.ug.edu.gh

Table 3: Content Validity assessment and intra-rater reliability

Item	Experts										No. of agreement	ICVI
	1	2	3	4	5	6	7	8	9	10		
Informativeness	3	4	4	4	4	4	4	4	4	3	8	0.8
Understandability	4	3	5	5	5	5	4	4	4	4	9	0.9
Usefulness	5	5	5	5	5	5	5	5	5	4	10	1.0
S-CVI/mean												0.9

Intraclass Correlation Coefficient = 0.92; 95% confidence interval [0.68, 0.99]; p-value = 0.0001

Table 4: Extent of collaboration between interviewers and interviewees

Item	Patient Mean score±SD	Therapist Mean score±SD	P-value for mean score difference	Correlation	P-value for mean score correlation
Goal	4.4±0.3	4.3±0.3	0.536	0.830	0.001
Task	4.4±0.3	4.3±0.4	0.668	0.885	0.001
Bond	4.5±0.2	4.4±3.5	0.583	0.640	0.025
Overall	4.4±0.2	4.4±0.3	0.898	0.931	0.001

Table 5. Assessment of fidelity using the BECCI questionnaire

Domains	Mean score±SD
Agenda Setting and Permission Seeking	3.6±0.3
The Why and How of Change in Behaviour	3.7±0.2
The Whole Consultation	3.6±0.3
Talk about Targets	3.8±0.5
Practitioner mean score	3.7±0.2

difference in the mean score between the interviewers and the interviewees for the Task item (p = 0.668). For the bond item, the correlation coefficient for the collaborative relationship between the interviewers and the interviewees was 0.660 (p = 0.025), indicating a strong collaborative relationship. There was no significant difference in the mean score between the interviewers and the interviewees for the Bond item (p = 0.583) (Table 4).

Overall, the correlation coefficient for the collaborative relationship between the interviewers and the interviewees was 0.931 (p = 0.001), indicating a strong positive collaborative relationship and a high-quality interview. There was no significant difference in the mean score between the interviewers and the interviewees (p = 0.898) (Table 4). The pre-tested interviews were assessed for fidelity using the BECCI scale across the four domains. The mean scores for the four domains were as follows: agenda setting and permission seeking (3.6 ± 0.3), the why and how of change in behaviour (3.7 ± 0.2), the whole consultation (3.6 ± 0.3), and talk about targets (3.8 ± 0.5). Overall, the practitioner's mean score was 3.7 ± 0.2 (Table 5).

DISCUSSION

This study has applied the concept of MI in developing a patient-centred MI manual for improving adherence to glaucoma medication among patients with glaucoma. A multidisciplinary team of experts in ophthalmology, clinical psychology, health communication and patients with glaucoma spearheaded the development of the manual. The use of patients with glaucoma as representatives of the target population was very crucial in enhancing the credibility and acceptability of the manual. Our preliminary qualitative exploratory study identified inadequate knowledge about glaucoma, lack of motivation, cost of medication, forgetfulness, and difficulty with drop administration as barriers to medication adherence. Other studies have also revealed inadequate knowledge about glaucoma as a barrier to medication adherence (3,4,9). Knowledge about diseases helps patients to improve their understanding of diseases and increase adherence to the treatment regimen [22,23]. Patients with inadequate knowledge may underestimate the devastating effect of

share
Send us an email: hsijournal@ug.edu.gh
Visit us: https://www.hsijournal.ug.edu.gh

uncontrolled intraocular pressures and eventually ignore primary symptoms, which would culminate in delayed treatment. Education of patients with glaucoma could be delivered through verbal and written instructions, including pictures for those with low literacy. Other studies have underscored the significance of health literacy and adequate knowledge about medication adherence [24,25].

Lack of motivation as a barrier to medication adherence in this study was also mentioned by Legido-Quigley et al. [26]. Motivating patients to adhere to a medication regimen requires the effort of providers, patients, and their relatives. The motivation of patients with glaucoma may help in improving adherence as the individual examines the advantages and disadvantages of change, builds intrinsic motivation for change, and collaborates with the counsellor in decision-making to improve adherence. Other studies have also demonstrated the motivational role of families in improving adherence among patients in general [26,27]. Motivation may be in the form of providing financial and emotional support to patients. Consistent with other studies in low and middle-income countries (LMICs) [26,28,29], we found that the cost of medication was a barrier to glaucoma medication adherence. In Ghana, for instance, glaucoma drugs are very expensive, which may make some patients not buy their medications. Even with Ghana's National Health Insurance Scheme (NHIS), not all glaucoma drugs are covered under the NHIS. Also, there is currently no published data on the number of glaucoma patients with NHIS in Ghana. Future studies in this area would help to know the coverage of NHIS among patients with glaucoma in Ghana.

Forgetfulness as a barrier was reported among patients with glaucoma in the study. The use of mobile phone reminder applications and text messaging may help patients with glaucoma remember to take their medications promptly. Such patients may be encouraged to practise self-care by keeping a daily record of their medication dosage. In recent times, the proliferation of cell phones and internet connectivity offers several opportunities for patients to explore other ways of overcoming forgetfulness to improve their adherence [30,31]. Difficulty in drop administration was mentioned as another barrier to adherence. This was also reported by Hennessy et al. [32] in a video study of eye drop instillation in both glaucoma and retina patients with visual impairment. Another study has shown that at least one-third (1/3) of patients who even report that they can perfectly instil their eye drops still miss their eye, instil too many drops or touch the dropper bottle to the ocular surface or adnexa [33]. This finding suggests the need for patients to be trained to develop self-efficacy. Development of self-efficacy may require a combination of teaching skills such as proper instillation of eye drops, brainstorming solutions to perceived barriers, and building autonomous motivation to change [33].

Our study demonstrated a significant improvement in overall knowledge of MI concepts and confidence in applying MI skills after training the interviewers. Training modules designed for healthcare workers enhance MI knowledge uptake and interview skills [34]. Inadequate interview skills are said to be associated with poor treatment adherence and lower patient engagement among patients undergoing motivational interviews [35]. In this study, the use of role-play and feedback processes in training the interviewers was significantly useful in improving their skills and confidence levels. Studies have underscored the significance of role-playing as an efficient and effective method for improving communication competencies and MI skills [36,37]. For example, DeBate et al. [38] affirmed the importance of MI training in improving knowledge, techniques, and self-efficacy among trainees.

The study also promotes the involvement of ophthalmic nurses as counsellors in MI in a busy glaucoma clinic to improve adherence to glaucoma medication. The use of ophthalmic nurses as counsellors in motivating patients with glaucoma for medication adherence would give patients further opportunities to learn more about their condition and improve their medication-taking behaviours, as ophthalmic nurses are professionally trained in public eye health practice. The use of validation and reliability analysis in the development of manuals is known to ensure the rigour, quality and usefulness of manuals in clinical practice [39]. In this study, the intraclass correlation coefficient among the validators of the manual suggests an excellent intra-rater reliability ($p < 0.001$). The item content validity index (ICVI) for each of the evaluated items and the scale level content validity index were all greater than 0.80. There was a 100% agreement among all the experts with regard to the usefulness of the manual. Thus, the validators displayed a positive evaluation of the MI manual and described it as a good resource for motivating patients with glaucoma to improve their adherence levels. These observations among the validators were also seen in other studies [40,41]. There was a strong positive collaborative relationship between the interviewers and the interviewees. Additionally, our analysis shows that the interviews conducted were of high quality. Our fidelity assessment of the pre-tested interviews using the BECCI scale [21] revealed good fidelity. Findings from a meta-analysis investigating the impact of MI on medication adherence found that MI counsellors who underwent a fidelity assessment of their MI skills significantly improved medication adherence compared to those without an assessment [42]. These findings reinforce the value of counselling with high fidelity to MI principles. Fidelity assessment of MI-based interventions is highly encouraged to support claims for the validity of study findings about the impact of interventions [42]. The use of MI is a relatively inexpensive strategy [11]. People can be trained to implement it in their local languages as it does not require pre-existing skills in counselling.

Our MI manual is a carefully developed instrument that incorporates the spirit and understanding of MI as a patient-

share
Send us an email: hsijournal@ug.edu.gh
Visit us: https://www.hsijournal.ug.edu.gh

centred strategy for resolving issues of ambivalence in medication adherence. Patients with glaucoma could benefit from this MI manual as it has the potential to help them understand their condition, accept their prognosis and provide them with essential information for decision-making. An important implication of our findings is that expanding the role of ophthalmic nurses to offer counselling support services through the use of MI may be significant in enhancing the visual outcomes of patients with glaucoma. Our findings support the potential of integrating MI into glaucoma clinics. Although MI is a tool that can be very helpful when working with people who are reluctant about behaviour change, it is noteworthy that MI is not for everyone. It is usually suitable for people who feel naturally drawn to it and recognise it as a tool that could potentially resolve the problem of ambivalence.

The effectiveness of the MI manual in improving adherence to glaucoma medications will be evaluated utilising the Glaucoma Treatment and Compliance Assessment Tool (GT-CAT) as a measure of adherence in a 6-month follow-up randomised controlled trial. The present findings from this study should be interpreted in light of both the strengths and weaknesses of the study. This MI manual is not an all-inclusive material but a supplementary material for practitioners to use in helping patients improve their medication adherence. The effectiveness of this MI manual in improving adherence to glaucoma medications will be examined in a future multi-centre study involving a larger population. The strength of this study lies in its patient-centred and multidisciplinary approach involving patients with glaucoma, eye care providers, and other health care practitioners who collaborated to produce the manual. The use of MI strategy is an evidence-based method with clinical impact and economic benefits. It has demonstrated effectiveness in other studies but has limited use in ophthalmology. Although this MI manual was designed for patients with glaucoma, it may be beneficial to patients with other conditions as some of the barriers to adherence in this manual may generally apply to most health conditions.

Conclusion
This patient-centred MI manual, with a good validity index and excellent inter-rater reliability developed through a multidisciplinary approach, can be adapted and used in facilitating behavioural change among patients with glaucoma for improved eye health.

DECLARATIONS

Ethical consideration
Ethical approvals for the study were obtained from the Biomedical Research Ethics Committee of the University of KwaZulu-Natal with approval number BREC/00002965/2021 and the Korle Bu Teaching Hospital in Ghana with approval number KBTH-IRB/00048/2021. Permission to conduct the study was obtained from the study site, and informed consent was obtained from the study participants.

Consent to publish
All authors agreed on the content of the final paper.

Funding
None

Competing Interest
The authors declare that there is no conflict of interest regarding the publication of this article.

Author contributions
BA participated in the conceptualisation and data analysis of the study. BA, PKM, and PGP participated in the drafting, review and editing of the manuscript. PKM and PGP participated via supervision.

Acknowledgement
We want to acknowledge all patients and staff of the eye centre at the Korle Bu Teaching Hospital for their support in providing needed information where necessary.

Availability of data
Data is available upon request to the corresponding author.

REFERENCES

1. Flaxman SR, Bourne RRA, Resnikoff S, Ackland P, Braithwaite T, Cicinelli MV et al. (2017) Global causes of blindness and distance vision impairment 1990–2020: a systematic review and meta-analysis. Lancet Glob Health 5:e1221–34
2. Quigley HA (1982) Glaucoma's optic nerve damage: changing clinical perspectives. Ann Ophthalmol 14:611–2
3. Rossi GCM, Pasinetti GM, Scudeller L, Radaelli R, Bianchi PE (2011) Do adherence rates and glaucomatous visual field progression correlate? Eur J Ophthalmol 21:410–4
4. Sleath B, Blalock S, Covert D, Stone JL, Skinner AC, Muir K et al. (2011) The relationship between glaucoma medication adherence, eye drop technique, and visual field defect severity. Ophthalmology 118:2398–402
5. Chaudri NA (2004) Adherence to long-term therapies evidence for action. Ann Saudi Med 24:221–2
6. Sleath B, Blalock SJ, Carpenter DM, Muir KW, Sayner R, Lawrence S et al. (2014) Provider education about glaucoma and glaucoma medications during videotaped medical visits. J Ophthalmol 2014:238939
7. Sleath B, Blalock SJ, Carpenter DM, Sayner R, Muir KW, Slota C et al. (2015) Ophthalmologist-patient communication, self-efficacy, and glaucoma medication adherence. Ophthalmology 122:748–54
8. Sleath B, Sayner R, Blalock SJ, Carpenter DM, Muir KW, Hartnett ME et al. (2015) Patient question-asking about glaucoma and glaucoma medications during videotaped medical visits. Health Commun 30:660–8
9. Friedman DS, Hahn SR, Gelb L, Tan J, Shah SN, Kim EE et al. (2008) Doctor-patient communication, health-related beliefs, and adherence in glaucoma results from the Glaucoma Adherence and Persistency Study. Ophthalmology 115:1320–7

share
Send us an email: hsijournal@ug.edu.gh
Visit us: https://www.hsijournal.ug.edu.gh

10. Lacey J, Cate H, Broadway DC (2009) Barriers to adherence with glaucoma medications: a qualitative research study. Eye (Lond) 23:924–32

11. Miller WR, Rollnick S (2013) Motivational interviewing: helping people change. Guilford Press, New York

12. La DT, Cahill K, Qin Y, Tang JL (2010) Motivational interviewing for smoking cessation. Cochrane Database Syst Rev 2010:CD006936

13. Cook PF, Bremer RW, Ayala AJ, Kahook MY (2010) Feasibility of motivational interviewing delivered by a glaucoma educator to improve medication adherence. Clin Ophthalmol 4:1091–101

14. Nieuwlaat R, Wilczynski N, Navarro T, Hobson N, Jeffery R, Keepanasseril A et al (2014) Interventions for enhancing medication adherence. Cochrane Database Syst Rev 2014:CD000011

15. Ogedegbe G, Chaplin W, Schoenthaler A, Statman D, Berger D, Richardson T et al. (2008) A practice-based trial of motivational interviewing and adherence in hypertensive African Americans. Am J Hypertens 21:1137–43

16. Resnicow K, Teixeira PJ, Williams GC (2017) Efficient allocation of public health and behavior change resources: The "difficulty by motivation" matrix. Am J Public Health 107:55–7

17. Bernard HR (2013) Social research methods: qualitative and quantitative approaches. Sage, Thousand Oaks

18. Frankel RM, Stein T (2001) Getting the most out of the clinical encounter: the four habits model. J Med Pract Manage 16:184–91

19. Steurer J (2011) The Delphi method: an efficient procedure to generate knowledge. Skeletal Radiol 40:959–61

20. Cook S, Heather N, McCambridge J, United Kingdom Alcohol Treatment Trial Research T (2015) The role of the working alliance in treatment for alcohol problems. Psychol Addict Behav 29:371–80

21. Lane C, Huws-Thomas M, Hood K, Rollnick S, Edwards K, Robling M (2005) Measuring adaptations of motivational interviewing: the development and validation of the behavior change counseling index (BECCI). Patient Educ Couns 56:166–73

22. Morris LA, Halperin JA (1979) Effects of written drug information on patient knowledge and compliance: a literature review. Am J Public Health 69:47–52

23. Dusing SC, Van Drew CM, Brown SE (2012) Instituting parent education practices in the neonatal intensive care unit: an administrative case report of practice evaluation and statewide action. Phys Ther 92:967–75

24. Lee SK, Kang BY, Kim HG, Son YJ (2013) Predictors of medication adherence in elderly patients with chronic diseases using support vector machine models. Healthc Inform Res 19:33–41

25. Saqlain M, Riaz A, Malik MN, Khan S, Ahmed A, Kamran S et al. (2019) Medication adherence and its association with health literacy and performance in activities of daily livings among elderly hypertensive patients in Islamabad, Pakistan. Medicina (Kaunas) 55:163

26. Legido-Quigley H, Naheed A, de Silva HA, Jehan I, Haldane V, Cobb B et al. (2019) Patients' experiences on accessing health care services for management of hypertension in rural Bangladesh, Pakistan and Sri Lanka: a qualitative study. PLoS One 14:e0211100

27. Qureshi NN, Hatcher J, Chaturvedi N, Jafar TH (2007) Effect of general practitioner education on adherence to antihypertensive drugs: cluster randomised controlled trial. BMJ 335:1030

28. Khatib R, Schwalm JD, Yusuf S, Haynes RB, McKee M, Khan M et al. (2014) Patient and healthcare provider barriers to hypertension awareness, treatment and follow up: a systematic review and meta-analysis of qualitative and quantitative studies. PLoS One 9:e84238

29. Maimaris W, Paty J, Perel P, Legido-Quigley H, Balabanova D, Nieuwlaat R et al. (2013) The influence of health systems on hypertension awareness, treatment, and control: a systematic literature review. PLoS Med 10:e1001490

30. Osterberg L, Blaschke T (2005) Adherence to medication. N Engl J Med 353:487–97

31. Okeke CO, Quigley HA, Jampel HD, Ying GS, Plyler RJ, Jiang Y et al. (2009) Interventions improve poor adherence with once daily glaucoma medications in electronically monitored patients. Ophthalmology 116:2286–93

32. Hennessy AL, Katz J, Covert D, Kelly CA, Suan EP, Speicher MA et al. (2011) A video study of drop instillation in both glaucoma and retina patients with visual impairment. Am J Ophthalmol 152:982–8

33. Ryan RM, Patrick H, Deci EL, Williams GC (2008) Facilitating health behaviour change and its maintenance: interventions based on self-determination theory. Eur Health Psychol 10:2–5

34. Söderlund LL, Madson MB, Rubak S, Nilsen P (2011) A systematic review of motivational interviewing training for general health care practitioners. Patient Educ Couns 84:16–26

35. Dray J, Gilchrist P, Singh D, Cheesman G, Wade TD (2014) Training mental health nurses to provide motivational interviewing on an inpatient eating disorder unit. J Psychiatr Ment Health Nurs 21:652–7

36. Rollnick S, Heather N, Bell A (1992) Negotiating behaviour change in medical settings: the development of brief motivational interviewing. J Ment Health 25:25–37

37. Kim SJ, Kim HH (2013) Impact of communication competence and empathy abilities on interpersonal relationship abilities among dental hygiene students. J Dent Hyg Sci 13:304–13

38. DeBate RD, Cragun D, Gallentine AA, Severson HH, Shaw T, Cantwell C et al. (2012) Evaluate, assess, treat: development and evaluation of the EAT framework to increase effective communication regarding sensitive oral-systemic health issues. Eur J Dent Educ 16:232–8

39. Morse JM, Barrett M, Mayan M, Olson K, Spiers J (2002) Verification strategies for establishing reliability and validity in qualitative research. Int J Qual Methods 1:13–22

40. Cordeiro LI, Lopes TO, Lira LEA, Feitoza SMS, Bessa MEP, Pereira MLD et al. (2017) Validation of an

educational booklet for HIV/AIDS prevention in the elderly. Rev Bras Enferm 70:775–82

41. Galindo NNM, Caetano JA, Barros LM, Silva TM, Vasconcelos EMR (2017) First aid in school: construction and validation of an educational primer for teachers. Acta Paul Enferm 30:87–93

42. Palacio A, Garay D, Langer B, Taylor J, Wood BA, Tamariz L (2016) Motivational interviewing improves medication adherence: a systematic review and meta-analysis. J Gen Intern Med 31:929–40

share
Send us an email: hsijournal@ug.edu.gh
Visit us: https://www.hsijournal.ug.edu.gh

Supplementary

GLAUCOMA MOTIVATIONAL INTERVIEWING TOOLKIT

Target behaviour: Non-adherence to glaucoma medication

Patient ID:…… Date:……..
Starting time:……. Ending time:……
Interviewer initials:…… Venue of interview:……
Language for the interview: [ ] English [ ] Twi [ ] Ga [ ] Others. *Specify others*……

SECTION A: Introduction

This glaucoma motivational interviewing manual is designed to assist counsellors in motivating glaucoma patients to improve their level of adherence to glaucoma medication.

***Introduction**:*

Interviewer: "You are welcome to this discussion forum. I believe for some time now you have had challenges in adhering to your glaucoma medications as prescribed by your eye doctor. The main purpose of this discussion is to collaborate with you in finding ways to help you improve your level of adherence".

SECTION B: Possible barriers to glaucoma medication adherence

*Interviewer: "*I would be grateful if you could share with me two topmost reasons for your non-adherence".

Interviewee:

1. ……..
2. ……..

Barriers:	Possible probe questions:
Poor education on glaucoma	What do you know about glaucoma?
	What do you think is the cause of your glaucoma?
	Do you know of any cause or risk factor for glaucoma?
	Do you think glaucoma can be cured?
Lack of motivation	Do you have any family support to encourage you to take medication?
	Does your eye doctor motivate you to take your drops?
	Does the benefit of eye drop use motivate you to use it?
	Do you feel motivated to use your eye drops?
Cost of medication	Could you afford the cost of your eye drops?
	Do you have any active health insurance?
	How could you raise the money for your medication?
	Who takes care of your medical treatments?
Forgetfulness	Why do you forget to use your eye drops?
	Do you have any relation to remind you of your medication use?
	Do you think the use of reminder applications can be of help?
Difficulty with drop administration	Do you have someone to assist you in administering your drops?
	Can you show me how you usually administer your eye dropS?
	Would you be glad to learn how to administer eye drops?

Interviewer: "Is there anything else you would like to tell me about your eye condition"?

SECTION C: Suggested ways of overcoming the barriers mentioned

Interviewer: "Here are some ways that have worked for other people with glaucoma":

1. Keep your medicine nearer to something you use every day at the same time.
2. Taping a reminder note to your refrigerator, or a place that works for you.
3. The use of a reminder application or an alarm on a clock or cell phone.
4. Reading a lot about glaucoma from authentic online sources.
5. Joining glaucoma patients' associations to learn more about glaucoma and also enjoy subsidies on your medication purchases.
6. Have a relative to remind and assist you in administering your medication.

SECTION D: Goal setting

Interviewee: "My goal(s) for what I will do to help me adhere to my glaucoma medication":

1. ……
2. ……
3. ……
4. ……

Next Appointment date:……..

Thank you for your time