

**COMMUNITY PHARMACISTS' INTERVENTION: *How a 6-episode of one-on-one intervention changed patients' attitudes towards their medication and disease self-management***Hana Morrissey^{1*}, Patrick Ball¹, David Jackson², Louis Pilloto³¹School of Psychological and Clinical Sciences, Charles Darwin University, Ellengowan Drive, Darwin NT 0909, Australia²29 Brentwood Avenue, Blackheath, NSW 2785, Australia³Murrumbidgee Medicare Local Ltd., 1/185 Morgan Street, Wagga Wagga, NSW 2650, Australia***Corresponding author e-mail:** Hana.morrissey@cdu.edu.au**ABSTRACT**

Adherence to medication is reported to be <33%. Most people who suffer chronic conditions require pharmacological intervention; they collect prescription repeats every month creating an opportunity for further regular intervention by the community pharmacist. to investigate if pharmacist intervention in Chronic Disease Management in rural Australia could improve patients' outcomes through better monitoring of disease markers, self-management skills and medication adherence. This project was a pilot before and after, pragmatic study, which was designed as a foundation to support future definitive studies. The data was analysed in ASReml-R™ using linear mixed models or generalised linear mixed models. Using modified Health Education Impact Questionnaires™, there was 29.65% improvement in patients' total score from pre and post clinical intervention. Patient education and ongoing interaction between patients and pharmacists enforced the importance of monitoring improving patients' knowledge and self-management commitment. The use of prescription repeat collections as an opportunity to reinforce disease management messages deserves further investigation.

Key Words: Health Education Impact Questionnaires (heiQ™), community pharmacy, pharmacist, chronic disease, self-management, patient**INTRODUCTION**

It is common knowledge that “*Drugs (Medications) don't work in patients who don't take them*” [1][2] and increasing the effectiveness of chronic diseases treatment through greater adherence to medications may have greater impact on health outcomes than many other aspects of therapy.[3] Studies show that medication adherence is generally <33%, and further that medication works better if diet and lifestyle advice is also adhered to. Finally it has been shown that one-on-one personal professional intervention, regardless of the health discipline of the person delivering this intervention, is the most effective strategy to change behaviour.[1][2] According to the

early results from the 2011-2012 Australian health survey, arthritis, mental health, asthma and heart disease accounts for 43.3% of the top long-term disease experienced in Australia.[4]

The Health Education Impact Questionnaires (heiQ™ at: <http://www.heiQ™.org.au/>) was designed to detect knowledge improvement or changes that occur because of patient education interventions, through the comparison between the individual participant answer at the baseline (BL) and follow-up (FU). It can also measure the effectiveness of this education by comparing the sample mean score to the national mean score.[5] In a study conducted in Western Australia to evaluate the introduction of the Standard Chronic Disease Self-Management Program

(CDSMP) into rural health services, the program utilised the heiQ™ and the Activity Card Sort - Australia Recovery Version (ACS) to measure participant outcomes.[5]The concept of their study was based on the five key strategies of the “Better Health Initiative” promoted by the federal government. Two of those key strategies are; adoption of self-management and self- management support. Seven health professionals (GPs and area health services staff, not including pharmacists) and 3 others were enrolled and trained to deliver the CDSMP to 21 participants with chronic diseases. The leaders and participants were trained on the proposed program over 3 courses. Stone *et al.*(2010) concluded that there was improvement in participants’ knowledge of their chronic disease self-management issues.The study had a number of recommendations; of which two are applicable to the objectives of this project; integrating CDSMP into everyday practice, “a whole-of-system approach that includes system redesign to focus on continuity of care among service providers” and establishing and maintaining group leadership skills and responsibilities, “self-management is characterised by a genuine partnership between clients and clinicians, a paradigm shift that is not well understood or embraced by health professionals”.[5]

The original heiQ™ covers 9 domains where the questions in each domain are not consecutive but rather can be anything between one and 49. This allows participants to answer the individual questions based on their perspective rather than the domain title, whilst allowing the analyst later on to measure their answers within each domain.HeiQ™ carries a scoring system for each domain. When used, the domain mean score achieved in the project site is compared to national mean score to determine if the participants’ knowledge has improved after the delivery of the relevant patient disease education.

In this study, *New Roles for Health Professionals in Patient Centred Health Care Services in Rural and Remote Australia: Sharing the Chronic Disease Patient Management Responsibility*, a modified heiQ™ was used. Written approvals were obtained from Melbourne University for the heiQ™ baseline(BL) and follow-up(FU) to be used in a modified form(by not including all questions or adding any questions) but not changing the content of any of the current questions.

DESIGN AND METHODS

Ethics: The study was approved by the Charles Sturt University Human Research Ethics Committee reference number 406/2011/11.

Design: This project was a pilot before and after, pragmatic study, which was designed as a foundation to support future definitive studies.The fullheiQ questionnaire was considered problematic to administer in a community pharmacy environment. Accordingly some questions not directly relevant to this study were removed. The modified heiQ™ BL had 12 questions and FU had 18 questions of which the first 12 questions were identical, plus an additional 5 questions and one open ended question in the FU to provide a comment for thematic analysis.The total score for the modified domains one, four, five, six, seven and eight, before and after the intervention for each patient were compared and used as an indicator of their knowledge level improvement. The modified domain nine was used as patient feedback on the clinical intervention phase conducted by their local community pharmacy (Table1).

Method: After a patient has agreed to participate in the study, and prior to receiving any intervention, the pharmacists asked them to complete the heiQ™ BL survey. The guidelines for administering the heiQ™ were provided to patients to help their understanding of the purpose of administering the questionnaire before the education intervention. Pharmacists were asked to read and explain the statement (adapted from the questionnaire developers’ template) to participants before administering the baseline heiQ™. Following the completion of final consultation at the end of the 6 months intervention phase, participants were asked to complete the heiQ™ FU. Participants’ chronic disease medications and conditions knowledge before and after the clinical intervention phase were compared.Pharmacists assisted patients in reading the questions when requested by the participant.

RESULTS

The data was analysed in ASReML-R™ using linear mixed models or generalised linear mixed models (<http://www.r-project.org/>). Feedback was thematically analysed. The complete heiQ™ does not recommend the use of total score as a measure; this is easily explained by the fact the individual question score does not mean good or bad but rather the degree of agreement and disagreement. The user guidelines for heiQ™ interpretation require each domain mean score for the sample to be compared within the sample (BL and FU) then to the national mean score (the confirmatory factor analysis) for that question. The national mean score for domains are updated regularly to include new study results. The national mean score could not be used for

interpreting the result of our study, as we did not use all questions in each domain, and we excluded the partially agree or partially disagree and not sure.

We used the total score for the 12 questions used in both the heiQ™ BL and heiQ™ FU as indication of increasing the number of questions answered as agree or strongly agree. It was accepted that this would mean that this study's results will not be included in the national database or mean score, however it is also useful for the future development by heiQ™ of a model of the questionnaire that suits different settings such as community pharmacies.

Analysis of heiQ™ Responses Before and After the Clinical Intervention Phase:

Eighty-four heiQ™ BL forms were completed, but at the end of the intervention phase only 65 (77.4%) heiQ™ FL were completed. Of these, three were patients enrolled at a site which had withdrawn in the middle of the study due to the pharmacist's other commitments. Three more patients formally withdrew from the study due to diagnosis of new conditions or worsening of existing conditions (cancer, arthritis and COPD) that rendered them housebound and prevented continued participation. The remaining 13 patients (15%) failed to keep or were not given their final appointments.

A log-likelihood ratio test was required to determine whether there is a significant amount of variability associated with the different sites and the individual patients. All the interaction terms were checked for significance and dropped if the p-values = >0.05. None of the interaction terms were significant - the final analysis of variance is at table 2. The Sex variable showed that there was an effect on the number of heiQ™ total scores, as it had a p-value = 0.046. The predicted mean number of the total scores for the pre and post intervention times is shown in the table 3. The intervention showed that there was an effect on the heiQ™ total scores, as it had a p-value =< 0.001. The predicted mean of total score for the pre and post intervention times are shown in table 4.

Communications: The following table summarises the communication activities between pharmacists, patients, GPs and other health professionals (Table 5). The use of the heiQ™ was appropriate for this type of study as it allows the measurement of 6 areas that affect the patients adherence to treatment, the importance of monitoring, the importance of self-management and their ability and understanding of how they can reach for professional help and social support (Table 6).

There was a perception at the research sites that completion of the heiQ™ BL led to a realisation that there was more to understand and changes that could be made to have a better quality of life was

empowering in itself, encouraging them to ask questions and to receive more information and education.

heiQ™ Responses: Table 7 shows the comparison between the individual questions responses by all patients before and after the clinical intervention and percentage of improvement in knowledge. There were significant improvements seen in all domains, with the highest improvement in health services navigation (33.25%). Table 24 shows a comparison between the individual questions and the responses by all patients for pre- and post- the clinical intervention.

The heiQ™ Follow-up Additional Questions (41-50):

These questions were only asked in the heiQ™ FU; they concern the participants' opinions regarding the project and whether they consider it feasible to continue with the intervention or if they believe another approach might work better. Question 50A had the highest mean satisfaction score, followed by 50B and 50C. Question 42 returned the lowest mean score (Figure 1). Score above three can be interpreted as the patients answers were towards agree and strongly agree, where 4 is the highest possible equal to strongly agree.

Patients Comments: Positive (17 comments): it was worth participating and receiving additional services
Negative (one comment): equipment did not work every time (Accutrend® Plus). The most common themes gathered from question 50-D were (patients comments are at table 8):

- The intervention was Beneficial
- The study was well arranged
- New source of knowledge
- One-on-one communication when needed, with no delay
- Good to have when the town only has a part time GP
- Early detection of changes
- Equipment was not reliable

DISCUSSION

No similar pharmacy study to date has used heiQ™ to determine patients' knowledge in the way it was used in our study, accordingly it was not possible to critically review of the literature to allow comparison of our results. The concept of pharmacist intervention during prescription repeat has been previously evaluated in part of the Freemantle Diabetes study.[6] Adherence to medication and disease markers improved.

In chronic disease management once the diagnosis has been made, for the majority of conditions, ongoing medication plus self-management of the modifiable risk factors can lead to control of most of the features of the disease. Non-adherence leads to disease progression, development of complications and hospitalisation. Improving adherence takes time and effort that costs money but there is growing evidence that overall it can be cost effective. An important point for Australia to consider in this context is that under the present funding model, 'doing the right thing' would increase costs for the federal government through increased primary health costs, whilst the savings are found at the secondary and tertiary level and therefore benefit the states and territories. However this must be resolved outside of this study.

CONCLUSION

This pilot study produced a modest positive result. The monthly visit to the pharmacy to collect medication repeats is a missed opportunity for ongoing additional intervention. In this pilot study, heiQ™ functioned as an appropriate tool and was perceived to add value in preparing participants to receive the additional information. Medication and disease-management lifestyle modification in Australia remains low which will lead to poor disease control, complications and hospital admissions. The

use of the 12 annual prescription repeat visits to the pharmacy should be considered a potential resource in chronic disease management and further explored.

ACKNOWLEDGEMENTS

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Table 1 - Domains included in the modified heiQ™ BL and FU

Domains	Actual questions Included in Each Domain	Modified questions Included in Each Domain
Domain 1 BL and FU - Health directed behaviour	Questions 1, 9, 13, 19	Question 9
Domain 2 BL and FU –positive and active engagement in life	Questions 2, 5, 8, 10, 15	Nil
Domain 3 BL and FU – emotional wellbeing – negative effect	Questions 4, 7, 12, 14, 18, 21	Nil
Domain 4 BL and FU - Emotional wellbeing	Questions 3, 6, 11, 16, 17, 20	Questions 3, 6, 11, 16, 20
Domain 5 BL and FU - Constructive attitude	Questions 27, 34, 36, 39, 40	Question 40
Domain 6 BL and FU - Skill and technique acquisition	Questions 23, 25, 26, 30	Question 30
Domain 7 BL and FU - Social integration and support	Questions 22, 28, 31, 35, 37	Question 31
Domain 8 BL and FU - Social Services navigation	Questions 24, 29, 32, 33, 38	Questions 24, 32,38
Domain 9 FU - Study Evaluation	Questions 41, 42, 43, 45,46, 47, 48, 49	Questions 41, 42, 43, 45,49

Table 2 –Predicted mean number of total heiQ™ scores for the pre and post intervention

Time	Predicted Value	Standard Error	Ranking
Before	37.2	0.7	a
After	39.4	0.7	b

Table 3 - Predicted mean number of total heiQ™ scores for males and females

Sex	Predicted Value	Standard Error	Ranking
Male	37.5	0.7	a
Female	39.0	0.7	b

Table 4 - Predicted mean number of total heiQ™ scores for the pre and post intervention

Time	Predicted Value	Standard Error	Ranking
Before	37.2	0.7	A
After	39.4	0.7	B

Table 5 – Communication Summary

Site ID	Time spent with patient initial	Time spent with patient every	HMR - requested by the pharmacy	Written material on diseases or	Number communiqué between	Number of communiqué from other	Number of referrals to GP	Number of referrals to other health	Number of practice process	Number of clinical interventions
PR	42	15	17	17	17	17	34	17	3	75
BS	58	15	6	22	10	5	10	5	7	5
LO	62	20	6	3	13	3	4	4	0	4
C										
GD	40	18	6	6	6	0	6	0	2	6
JJ	45	20	0	10	1	0	6	17	5	20
CV	45	20	15	15	15	2	15	2	3	15
HA	45	20	4	4	4	0	0	0	0	4
PE	60	20	4	4	4	0	4	0	5	4
TF	70	20	0	0	0	0	0	0	0	0

Table 6 – Areas used to compare patient knowledge improvement

Domain 1 BL and FU - Health directed behaviour
Domain 4 BL and FU - Emotional wellbeing
Domain 5 BL and FU - Constructive attitude
Domain 6 BL and FU - Skill and technique acquisition
Domain 7 BL and FU - Social integration and support
Domain 8 BL and FU - Social Services navigation

Table 7 - heiQ™ Responses

Question	knowledge (increased)	Changes from before the clinical intervention																
Q3 - Domain 4 - <i>Self monitoring and insight</i> - As well as seeing my doctor, I regularly monitor changes in my health	34.8%	<table border="1"> <caption>Data for Q3 Bar Chart</caption> <thead> <tr> <th>Change</th> <th>Count</th> </tr> </thead> <tbody> <tr><td>-3</td><td>0</td></tr> <tr><td>-2</td><td>1</td></tr> <tr><td>-1</td><td>1</td></tr> <tr><td>Same</td><td>43</td></tr> <tr><td>1</td><td>21</td></tr> <tr><td>2</td><td>3</td></tr> <tr><td>3</td><td>0</td></tr> </tbody> </table>	Change	Count	-3	0	-2	1	-1	1	Same	43	1	21	2	3	3	0
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Q6 - Domain 4 - <i>Self monitoring and insight</i> - I know what things can trigger my health problems and make them worse	26%	<table border="1"> <caption>Data for Q6 Bar Chart</caption> <thead> <tr> <th>Change</th> <th>Count</th> </tr> </thead> <tbody> <tr><td>-3</td><td>0</td></tr> <tr><td>-2</td><td>1</td></tr> <tr><td>-1</td><td>7</td></tr> <tr><td>Same</td><td>43</td></tr> <tr><td>1</td><td>16</td></tr> <tr><td>2</td><td>2</td></tr> <tr><td>3</td><td>0</td></tr> </tbody> </table>	Change	Count	-3	0	-2	1	-1	7	Same	43	1	16	2	2	3	0
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Q9 - Domain 1 - <i>Health directed behaviour</i> - I do at least one type of physical activity every day for at least 30minutes (e.g., walking, gardening, housework, golf, bowls, dancing,Tai Chi, swimming)	24.6%	<table border="1"> <caption>Data for Q9 Bar Chart</caption> <thead> <tr> <th>Change</th> <th>Count</th> </tr> </thead> <tbody> <tr><td>-3</td><td>1</td></tr> <tr><td>-2</td><td>2</td></tr> <tr><td>-1</td><td>8</td></tr> <tr><td>Same</td><td>41</td></tr> <tr><td>1</td><td>15</td></tr> <tr><td>2</td><td>1</td></tr> <tr><td>3</td><td>1</td></tr> </tbody> </table>	Change	Count	-3	1	-2	2	-1	8	Same	41	1	15	2	1	3	1
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Q11 - Domain 4 - <i>Self monitoring and insight</i> - I have a very good understanding of when and why I am supposed to take my medication	31.9%	<table border="1"> <caption>Data for Q11 Bar Chart</caption> <thead> <tr> <th>Change</th> <th>Count</th> </tr> </thead> <tbody> <tr><td>-3</td><td>0</td></tr> <tr><td>-2</td><td>1</td></tr> <tr><td>-1</td><td>8</td></tr> <tr><td>Same</td><td>38</td></tr> <tr><td>1</td><td>21</td></tr> <tr><td>2</td><td>1</td></tr> <tr><td>3</td><td>0</td></tr> </tbody> </table>	Change	Count	-3	0	-2	1	-1	8	Same	38	1	21	2	1	3	0
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Q16 - Domain 4 - <i>Self monitoring and insight</i> - When I have health problems, I have a clear understanding of what I need to do to control them	30.4%	<table border="1"> <caption>Data for Q16 Bar Chart</caption> <thead> <tr> <th>Change</th> <th>Count</th> </tr> </thead> <tbody> <tr><td>-3</td><td>0</td></tr> <tr><td>-2</td><td>0</td></tr> <tr><td>-1</td><td>15</td></tr> <tr><td>Same</td><td>32</td></tr> <tr><td>1</td><td>19</td></tr> <tr><td>2</td><td>3</td></tr> <tr><td>3</td><td>0</td></tr> </tbody> </table>	Change	Count	-3	0	-2	0	-1	15	Same	32	1	19	2	3	3	0
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Q20 - Domain 4 - <i>Self monitoring and insight</i> - With my health in mind, I have realistic expectations of what I can and cannot do	23.2%	<table border="1"> <caption>Data for Q20 Bar Chart</caption> <thead> <tr> <th>Change</th> <th>Count</th> </tr> </thead> <tbody> <tr><td>-3</td><td>0</td></tr> <tr><td>-2</td><td>0</td></tr> <tr><td>-1</td><td>12</td></tr> <tr><td>Same</td><td>41</td></tr> <tr><td>1</td><td>16</td></tr> <tr><td>2</td><td>0</td></tr> <tr><td>3</td><td>0</td></tr> </tbody> </table>	Change	Count	-3	0	-2	0	-1	12	Same	41	1	16	2	0	3	0
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<p>Q24 - Domain 8 -Health services navigation - I have very positive relationships with my healthcare professionals</p>	33.4%	
<p>Q30 - Domain 6 -Skill and technique acquisition - I have a good understanding of equipment that could make my life Easier</p>	30.4%	
<p>Q31 - Domain 7 -Social integration and support - When I feel ill, my family and carers really understand what I am goingthrough</p>	26.1%	
<p>Q32 - Domain 8 -Health services navigation - I confidently give healthcare professionals the information they need to help me</p>	27.5%	
<p>Q38 - Domain 8 -Health services navigation - I work in a team with my doctors and other healthcare professionals</p>	39%	
<p>Q40 - Domain 5 - Constructive attitudes and approaches - If others can cope with problems like mine, I can too</p>	20.3%	
<p>Overall improvement all questions</p>	29.65%	<p style="text-align: center;">Changes in heiQ™ Total Scores</p>

Table 8 - Patients Additional Comments

JJ01	Some equipment was not reliable every time
CV03	If I will benefit from my participation I believe it is worthwhile
CV09	Very worthwhile, I am thankful
CV13	Great to know everyone is working towards my well being
BS01	Very worthwhile
BS12	Great to know where to get expert advice when I need it
BS26	Very well set up and informative, thanks
PR02	Told the Dr what I had been doing, i.e. keeping an eye on BP. Dr is pleased, eating habits have changed and I increased exercise
PR05	My irregular heartbeat was discovered in the pharmacy and I was advised to consult my GP. Have had an echocardiogram and have an appointment with cardiologist next week.
PR10	Very useful, got me off Pergout® as suggested but months later got mild gout which is disappointing, so started it again, will discuss with the GP about regular lower dose
PR11	Helpful as I am on many medications. It is useful to know if they will interact with anything new
PR12	Staff always very helpful with ideas and knowledge
GD05	I get to spent plenty of one on one time with pharmacist
LOC01	I get to spent plenty of one on one time with pharmacist
LOC02	It's free and easy to speak to my local chemist
LOC03	Friendly and trustworthy pharmacist and staff
LOC04	Local GP is working part time due to truck accident, is easy to ask for help and questions at pharmacy, I don't like the new DR
LOC05	The pharmacist speaks clearly and slowly
GD05	I get to spent plenty of one on one time with pharmacist



Figure 1 - Domain 9 heiQ™ FU

Appendix 1 – Modified heiQ™ BL and FL Questions

<p>Q3 - As well as seeing my doctor, I regularly monitor changes in my health</p> <p>Q6 - I know what things can trigger my health problems and make them worse</p> <p>Q9 - I do at least one type of physical activity every day for at least 30minutes</p> <p>Q11 - I have a very good understanding of when and why I am supposed to take my medication</p> <p>Q16 - When I have health problems, I have a clear understanding of what I need to do to control them</p> <p>Q20 - With my health in mind, I have realistic expectations of what I can and cannot do</p> <p>Q24 - I have very positive relationships with my healthcare professionals</p> <p>Q30 - I have a good understanding of equipment that could make my life easier</p> <p>Q31 - When I feel ill, my family and carers really understand what I am going through</p> <p>Q32 - I confidently give healthcare professionals the information they need to help me</p> <p>Q38 - I work in a team with my doctors and other healthcare professionals</p> <p>Q40 - If others can cope with problems like mine, I can too</p> <p>Q41- I intend to tell other people that the program is very worthwhile</p> <p>Q42- The program has helped me set goals that are reasonable and within reach</p> <p>Q43- I trust the information and advice I was given in the program</p> <p>Q45- I feel it was worth my time and effort to take part in the program</p> <p>Q49- The people in the group worked very well together</p> <p>Q50 A- The time spent in pharmacy for the initial interview was reasonable</p> <p>Q50 B- The time spent in pharmacy every month was reasonable</p> <p>Q50 C- The time spent in pharmacy for the intervention was worth your while</p> <p>Q50 D- Any other comments or suggestions OR other things you like to see</p>

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