

Educational comic book versus pamphlet for improvement of health literacy in older patients with type II diabetes mellitus: a randomised controlled trial

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ABSTRACT

Background. This study aimed to compare the efficacy of an educational comic book versus a pamphlet in improving the health literacy of older patients with type II diabetes mellitus (T2DM) in Hong Kong.

Methods. Between August and October 2016, T2DM patients aged ≥ 50 years were recruited from the Risk Assessment and Management Clinic of Tsan Yuk Hospital. Their health literacy was assessed using the Chinese Health Literacy Scale for Diabetes – Multiple Choice Version (CHLSD-MC). Those with an imperfect health literacy score were randomised to the intervention or control group and to read an educational comic book or a pamphlet, respectively. Health literacy was reassessed immediately after the intervention.

Results. A total of 165 patients were assessed. The mean CHLSD-MC score was 59.99 out of 68; health literacy was inadequate in 13.3% of patients. Among patients with an imperfect CHLSD-MC score, 88 agreed to participate and were randomised to the intervention ($n=42$) or control ($n=46$) group. After the intervention, the intervention group had a significantly higher absolute change in CHLSD-MC score (3.48 vs. 0.93, $t(80)=3.28$, $p=0.002$).

Conclusion. An educational comic book is more effective than a pamphlet in improving the health literacy of older patients with T2DM in Hong Kong.

Key words: Diabetes mellitus, type 2; Health literacy; Patient education handout

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INTRODUCTION

In Hong Kong, the prevalence of type II diabetes mellitus (T2DM) is approximately 10% among the general population and 15% to 25% among those aged ≥ 50 years.^{1,2} In 2014, T2DM as the 10th most common cause of mortality accounted for over HK\$2

billion in annual healthcare cost.^{1,2} Those aged >50 years are disproportionately affected by T2DM; 75% of the 2015 global diabetes-related health expenditure was for this age-group.^{3,4}

Health literacy is defined as the capacity to obtain, communicate, process, and understand basic

health information and services to make appropriate health decisions.⁵ Lower health literacy is associated with higher medication errors and preventable hospitalisations, poorer management of chronic conditions, and higher mortality for elderly patients.^{5,6} In the United States, the prevalence of low health literacy among patients is estimated to be 26% to 68%.⁷ Because old age is a risk factor for inadequate health literacy, health literacy interventions for older diabetic patients may improve their health outcome and hence reduce the burden of diabetes on healthcare and social systems.^{7,8} Patients prefer simpler and more colourful publications over text-based materials,^{9,10} but such studies are few in Hong Kong.¹¹ This study aimed to compare the efficacy of an educational comic book and a pamphlet in improving the health literacy of older patients with T2DM in Hong Kong.

METHODS

This study was approved by the Institutional Review Board of The University of Hong Kong and Hospital Authority Hong Kong West Cluster and conducted in compliance with the Declaration of Helsinki. Between August and October 2016, T2DM patients aged ≥ 50 years were recruited from the Risk Assessment and Management Clinic of Tsan Yuk Hospital. Their health literacy was assessed. Those with an imperfect health literacy score were randomised to the intervention or control group and given 5 minutes to read the educational material and 3 minutes to ask questions. Health literacy was reassessed immediately after the intervention.

For the intervention group, the education material was a 20-page comic book titled '藥有所思 老友所依' designed by two university students. This comic book described a conversation between an elderly patient, her grandson, and her pharmacist about standard medication labels, correct timing of drug taking, and the correct way to store medications.

For the control group, the education material was a pamphlet titled '口服降血糖藥' produced by the Hong Kong Department of Health. The pamphlet presented information on types of anti-diabetic medication, major medication side-effects, correct timing of drug taking, necessary lifestyle modifications, and the proper way to store medications.

Health literacy was assessed using the validated Chinese Health Literacy Scale for Diabetes–Multiple Choice Version (CHLSD-MC) that comprises remembering (18 items), understanding (4 items), applying (4 items), and analysing (4 items). The highest possible score is 68; a score of <52 is classified as inadequate health literacy. Cronbach's α for CHLSD-MC and its subscales are 0.884, 0.885, 0.667, 0.654, and 0.717, respectively.¹² Intraclass correlation coefficient is 0.970.¹³

The intervention and control groups were compared using the Chi-squared test for categorical variables and independent sample *t* test for continuous variables. A *p* value of <0.05 was considered statistically significant. Absolute changes in CHLSD-MC score for the two groups were compared using the independent sample *t* test.

RESULTS

A total of 165 patients were included. Their mean age was 64.71 years; 46.7% of patients were male. The mean CHLSD-MC score was 59.99 out of 68; health literacy was inadequate in 13.3% of patients (**TABLE 1**).

Among patients with an imperfect CHLSD-MC score, 88 agreed to participate and were randomised to the intervention ($n=42$) or control ($n=46$) group. 82 patients were re-assessed with CHLSD-MC (**FIGURE**).

Before the intervention, the two groups were comparable in terms of age, gender, and CHLSD-MC score (**TABLE 1**). After the intervention, the intervention group had a significantly higher absolute change in CHLSD-MC score (3.48 vs. 0.93, $t(80)=3.28$, $p=0.002$) [**TABLE 2**].

DISCUSSION

Compared with the pamphlet, the comic book was more effective in improving the health literacy of older patients with T2DM. Inadequate health literacy in diabetic patients is associated with worse glycaemic control, higher rates of diabetes-related complications, and negative health consequences, especially among older adults.¹⁴⁻¹⁷

Improved health literacy can lead to better self-

TABLE 1
Characteristics and Chinese Health Literacy Scale for Diabetes - Multiple Choice Version (CHLSD-MC) scores of patients

Characteristic	Patients recruited (n=165)	Intervention group (n=42)	Control group (n=46)	p Value
No. of males: females*	77:77	20:19	20:23	0.905
Mean±SD age (years)	64.71±8.10	65.21±8.08	66.00±8.85	0.666
Mean±SD pre-intervention CHLSD-MC score	59.99±8.77	57.14±8.57	57.00±9.15	0.940
CHLSD-MC score for health literacy (no. [%] of patients)				
<52 (inadequate)	22 (13.3)	-	-	-
≥52 (adequate)	143 (86.7)	-	-	-

* The sums of the numbers of males and females are less than the totals due to missing data

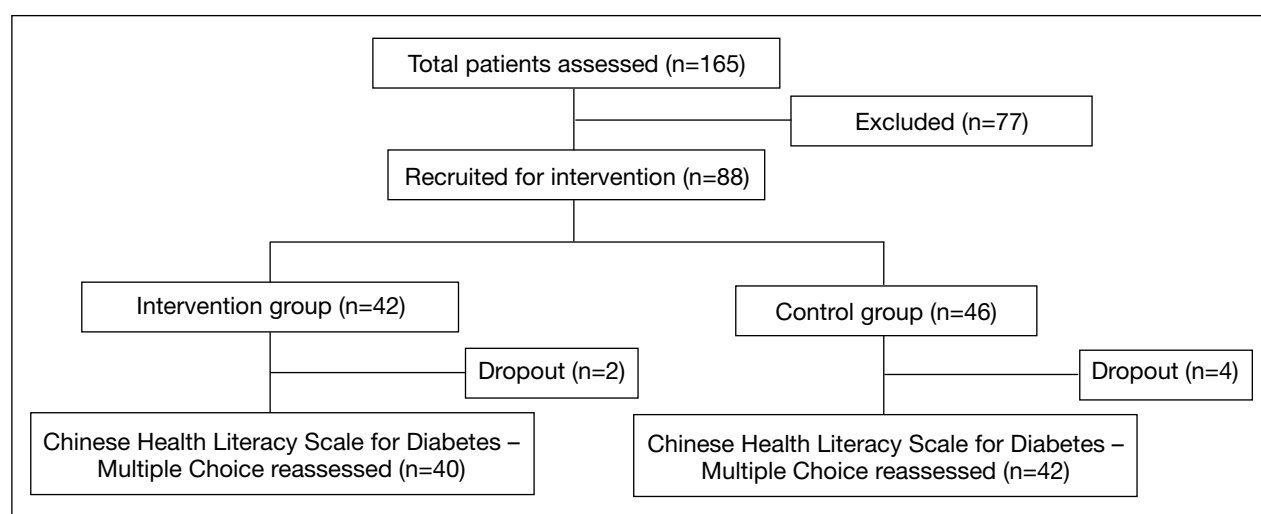


FIGURE. Flow chart for patient recruitment and dropout

TABLE 2
Absolute changes in Chinese Health Literacy Scale for Diabetes - Multiple Choice Version (CHLSD-MC) score

Absolute change	Intervention group	Control group	p Value	95% CI of difference
Mean±SD CHLSD-MC score	3.48±4.05	0.93±2.93	0.002	1.00-4.09

efficacy, health-related communication skills, and self-care behaviour, and thus health literacy is a target for patient education.¹⁸ Associations between health literacy and health outcomes are multifactorial, and alternative interventions are needed to enhance health literacy and medication compliance.¹⁹

The comic book used in this study fulfils the recommendations for health information dissemination by the US National Action Plan to

Improve Health Literacy, namely picture-based instructions, less reliance on written communication, and user-centred design.⁵ Success in improving health literacy has been demonstrated by other forms of intervention, such as web-based programmes, telephone calls, group workshops, and personalised education sessions.²⁰⁻²⁴ Our comic book carries an extra advantage of being convenient, small, and easily distributable, and requires limited additional time and resources to implement. In addition, pictorial

aids have been shown to promote information comprehension and recall, as humans have a cognitive preference for pictures over other forms of data presentation.²⁵ Hence, comic books, rather than text-based pamphlets, should be adopted in patient education strategies.

There are a few limitations to this study. Patients were recruited from only one clinic in a relatively affluent area where the average health literacy is generally higher than in other regions. The higher baseline health literacy could have confounded the results by limiting the extent to which the patients' health literacy could be further improved, or by increasing the patients' ability to understand and apply the health information provided. Moreover, changes in health behaviours and diabetes outcomes could have been evaluated.

Future studies should include patients in multiple districts and assess concrete health behaviours (such as lifestyle modification and the ability to communicate health needs), and diabetes outcomes (such as haemoglobin A1c and diabetes-associated co-morbidities). Additional baseline characteristics such as cognitive function, education level, and social support should be obtained, as all of these can affect health literacy and behaviour. Cost-effectiveness should be calculated in order to provide quantifiable evidence on how the healthcare system may benefit from health education by comic books.

CONCLUSION

An educational comic book is more effective than a pamphlet in improving the health literacy of older patients with T2DM in Hong Kong.

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