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A disease-targeted picture book for children with Henoch-Schonlein purpura nephritis: A quasi-experimental study

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Abstract

Background: Children with Henoch-Schonlein purpura nephritis are frequently burdened with psychological problems besides disease treatment and adherence. Currently, there is a shortage of appropriate and effective educational materials to facilitate physical and psychological recovery.

Objectives: To examine a picture book for the effectiveness of disease-related knowledge, coping strategies, resilience, quality of life and depressive symptoms in children with Henoch-Schonlein purpura nephritis in China.

Design: A quasi-experimental design with repeated measures was adopted. The control group received standard care. The intervention group received the standard care plus a free picture book. This disease-specific picture book narrated the story of two rabbits diagnosed with Henoch-Schonlein purpura nephritis who underwent a series of examinations, faced difficulties taking medication, and eventually recovered.

Participants: The study recruited 60 children diagnosed with Henoch-Schonlein purpura nephritis.

Measurements: Disease-related knowledge, resilience, coping strategies, depression and paediatric quality of life were measured at baseline, the third day, the first month and the third month after recruitment. The acceptability of the picture book was evaluated at the last data-collection point.

Results: The data showed that children in the intervention group demonstrated higher levels of knowledge ($p < 0.001$), less usage of emotional coping strategies ($p = 0.003$), reduced depressive symptoms ($p = 0.003$), improved psychological resilience ($p < 0.001$), and better quality of life ($p < 0.046$) than those in the control group in the third month. Most children (83.3%) in the intervention group were satisfied with the picture book.

Conclusions: The targeted picture book is an effective educational tool for improving clinical outcomes and was highly accepted by children.

KEYWORDS

health education, Henoch-Schonlein purpura, nephritis, picture book, psychological resilience

INTRODUCTION

Henoch-Schonlein purpura (HSP) is the most common vasculitis in children, and its prognosis depends on the severity of the renal involvement (Eleftheriou et al., 2015). Henoch-Schonlein purpura nephritis (HSPN) is observed in approximately 30% of children with HSP (Davin & Coppo, 2014). Hormone and immunosuppressant therapy are the first-line treatments for HSP and HSPN, and the treatment required regular treatment for at least 6 months or longer according to Chinese guideline (The Subspecialty Group of Nephrology, 2017), and the recurrence rate of HSPN is 17.1% (J. Wang et al., 2018).

Children with HSPN experience disease burden, such as fear of renal biopsy, challenge of medication adherence, and side effects of the treatment. Studies have shown that 20%–30% of children with HSPN do not have sufficient disease-related knowledge (Li, 2008) and do not know how to cope with long-term moon face (central obesity) due to disease management (Gu et al., 2011; Li et al., 2008). Moreover, 12.7% of children with HSPN and chronic kidney disease showed mental stress, such as depression, anxiety and somatic symptoms. A few (9.0%) children also showed behavioural issues, such as rule-breaking or aggressive behaviour (Kang et al., 2019). Studies have also shown that emotional distress can lead to nerve dysfunction and compromised immunity, and these can lead to a worse prognosis (Catanzano et al., 2021; Lewis & Vitulano, 2003; Thabrew et al., 2018). Hence, improving disease-related knowledge and resilience are critical for the physical and psychological recovery of children with HSPN.

LITERATURE REVIEW

Picture books, rather than brochures or leaflets, offer a safe medium for educating children to seek various ideas, attitudes and feelings (Tsao et al., 2017). According to the social learning theory (Bandura et al., 1961), children learn from observation, imitation and modelling. Reading picture books can increase children's self-esteem, offer comfort and cope with difficult situations by observing similar characters in stories (Tielsch Goddard, 2011).

Picture books are widely distributed in the medical field to deliver information on disease progress. It is also an instrument for delivering knowledge and introducing potential coping strategies for children (Mayer & Sims, 1994). For example, one picture book was used as educational material to deliver disease-related knowledge among children with juvenile idiopathic arthritis in Israel (Mendelson et al., 2017). Other studies have shown that picture books have been used to improve awareness of children's epilepsy and reduce discrimination in Ethiopia (Tekle-Haimanot et al., 2016). These picture books were also used to improve Egyptian schoolchildren's lymphatic filariasis knowledge (el-Setouhy & Rio, 2003). Picture books have also been shown to reduce anxiety and distress in children undergoing tonsillectomy and adenoidectomy in Austria (Felder-Puig et al., 2003). In China, picture books have been used to

reduce distress in preschool-aged children receiving venipuncture (Tsao et al., 2017). Furthermore, picture books can promote healthy behaviours, such as increasing the consumption of fruits and vegetables among children in England (Owen et al., 2018). However, whether reading picture books could improve psychological resilience were rarely mentioned. We systematically searched and only found 1 one study examine the effectiveness of reading picture books on improving resilience of military children (Conover, 2020) However, the results showed that the bibliotherapy intervention was only beneficial for girls, but not for boys. Thus, the effectiveness of reading picture books in improving resilience in children with chronic diseases, especially among children with HSPN, particularly in China is unknown.

Therefore, this study aimed to examine whether a disease-targeted picture book can affect disease-related knowledge, depressive symptoms, coping strategies (especially resilience) and QOL among children with HSPN in China.

MATERIALS AND METHODS

Study design

This quasi-experimental study was conducted at the at the Second Xiangya Hospital of Central South University (one of the largest comprehensive hospitals in Hunan Province) and Hunan Children's Hospital (the largest children's hospital in Hunan Province). Randomization was not feasible because of the potential contamination between the intervention and control groups. All participants were in the same ward, interacted with their roommates during hospitalization, and could share the picture books. Thus, we divided the intervention and control groups according to time sequence.

Participants

The children were recruited between 7 and 12 years of age, had been diagnosed with HSPN, and could read or listen to stories. However, those with mental retardation, attention deficit hyperactivity disorder (ADHD), autism illnesses were excluded from the study.

Group allocation and intervention

Eligible children with HSPN hospitalized from May to August 2019 were assigned to the control group, whereas children with HSPN hospitalized from September to December 2019 were assigned to the intervention group. The control group received standard care, including self-management health education, medication adherence and daily care. The intervention group received standard care and a free picture book on two bunnies diagnosed with HSPN who underwent a series of examinations, had difficulty taking medication, and finally recovered physically and psychologically. The research

assistant read the picture book with the children for the first time, then, the children could read it by themselves or with their parents as many times as they wanted.

Our team developed the HSPN picture book titled 'A Special Growth—Fight with Henoch-Schonlein Purpura' (published by Central South University Press, ISBN: 978-5487-3845-1), based on social learning theory (Bandura et al., 1961). Children with HSPN can learn to cope with the diagnosis and manage the disease by learning from the main characters in the picture book. A multidisciplinary team, including medical professionals, paediatric psychologists and cartoonists, developed this picture book. Then, children with HSP or HSPN were pilot tested for readability. This picture book underwent several rounds of revisions before publishing. Table 1 shows the chapter titles, main contents, aims and illustrations of this book. Figure 1 shows the representative pictures in each chapter mentioned in Table 1.

Procedures

Initially, a flyer introduced this study to both hospitals, and potential participants could contact the research staff if they were interested. After obtaining written informed consent from parents, the research staff administered the questionnaire face-to-face with the children with HSPN at baseline (Times 1). A picture book was immediately provided to the children in the intervention group in the ward. For the first reading, the researcher led the children to complete it together. It took approximately 5–10 min to complete the reading. After that, the children were required to read the books once per day for 3 days. Children in the control group received conventional care, including explaining the cause of this disease and the rationale to take some examinations, the principle and side effects of treatment, how to take care of oral health, and self-management skills. Three days later (Times 2), the research assistant distributed follow-up questionnaires through face-to-face interviews. Considering the intervention of reading this

picture books last for 3 days, and during this period, the participants should be still hospitalized, thus we conducted the Time 2 evaluation immediately after intervention through face-to-face interviews, which were typically done in previous studies (Kassai et al., 2016; Li, 2008; Tsao et al., 2017). As most of the participants had been discharged, data for the 1-month (Times 3) and 3-month (Times 4) follow-ups were collected through an online professional survey provided with the assistance of the children's parents by a company named 'Sojump' (<http://www.sojump.com>). The online survey company had a confidential contract with the study team to encrypt the data and ensure the safety and privacy of participants' information.

Measures

Demographic characteristics

Children's information comprised age, gender, residence, whether they had siblings, whether they were suspended from school due to illness, and the number of hospitalizations. Parental variables included age, ethnicity, residence, education, marital status, employment and monthly income. It was collected only at baseline and was filled out by parents.

Chronic illness children's resilience scale (CICRS)

The Chronic Illness Children's Resilience Scale (CICRS) was developed by Kim and Yoo (2010). It was translated and tested in China by Yang et al. (2012). The CICRS includes three subscales: interpersonal characteristics (10 items), coping characteristics (12 items) and intrapersonal relationships (10 items). All items are rated on a four-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = agree and 4 = strongly agree). The higher the CICRS score, the stronger the resilience of the children. The Cronbach's α was 0.92 (Kim & Yoo, 2010) and 0.84 (Yang et al., 2012) for the English

TABLE 1 The picture book's chapter titles, main contents and aims of each chapter

Chapter title	Main content and aims
Chapter 1. 'Allergy'	Understanding the predisposing factors of HSPN.
Chapter 2. Hospitalization	Understanding the auxiliary examination of HSPN.
Chapter 3. Cause of disease	Understanding the pathogenesis of HSPN.
Chapter 4. Adherence to treatment	Understanding the treatment process of HSPN and enhancing the treatment compliance.
Chapter 5. My usual day	Understanding self-management of a typical day.
Chapter 6. Go to school	Simulating the scene of returning to school to enhance social adaptability.
Chapter 7. Recovery and growth	Establishing confidence for recovery and showing psychological resilience.
Appendix. Disease Knowledge class	Telling about the prevention of recurrence and demonstrating some delicious food recipes suitable for children with HSPN.

Abbreviation: HSPN, Henoch-Schonlein purpura nephritis.



FIGURE 1 The illustrations of this book. (a) Illustrations in Chapter 1. (b) Illustrations in Chapter 2. (c) Illustrations in Chapter 3. (d) Illustrations in Chapter 4. (e) Illustrations in Chapter 5. (f) Illustrations in Chapter 6. (g) Illustrations in Chapter 7. (h) Illustrations of appendix.

and the Chinese version, respectively. The data were checked at Times 1, 3 and 4.

Coping with disease questionnaire (CODI)

The self-reported CODI was adopted to assess children's disease-coping strategies. Petersen et al. (2004) developed it for children and adolescents (ages 8–18 years) in 2004, and Li et al. (2008) translated and tested it in China. The questionnaire comprised 29 items grouped into six factors: acceptance (e.g., I accept my illness; $\alpha = 0.74$), avoidance (e.g., I try to ignore my illness; $\alpha = 0.67$), cognitive-palliative (e.g., I think of worse situations; $\alpha = 0.56$), distance (e.g., I think my illness is not a big deal; $\alpha = 0.66$), emotional reaction (e.g., I cry; $\alpha = 0.80$), and wishful thinking (e.g., I wish I were healthy; $\alpha = 0.91$). Participants were instructed to consider situations wherein they were bothered or stressed because of their illness and then estimate the frequency of applying acceptance, cognitive-palliative, distance and wishful thinking on a five-point Likert scale ranging from 1 (never) to 5 (always), whereas 'avoidance' and 'emotional reaction' were scored in reverse (Q. Wang, 2011). The scores were summed and converted to a standard 0–100 scale. A higher score indicated greater use of the positive strategy. The Cronbach's α ranged between 0.72 and 0.88 (Petersen et al., 2004). In our study, the Cronbach's α of the Chinese version was 0.83 (Li, Wei, et al., 2008), which was checked at Times 1, 2, 3 and 4.

HSPN-related knowledge questionnaire (HRKQ)

The self-developed 12-item HRKQ includes three components: disease, self-care and medication knowledge. The content validity of the questionnaire's scale-level content validity index (S-CVI) test was 0.9, as evaluated by five paediatricians and paediatric nursing clinicians. Cronbach's α for the questionnaire in our study was 0.92. This was checked at Times 1, 2, 3 and 4.

Depression Self-Rating scale (DSRS)

The 18-item DSRS was used to evaluate depressive symptoms (Birlson, 1981). Su et al. (2003) adapted and tested the Chinese version. Subjects were asked to rate their condition during the most recent 1-week period on a three-point scale. Higher scores indicate stronger depressive tendencies, with a maximum score of 36. The test-retest reliability of the instrument was 0.80 (Birlson, 1981). Cronbach's α was 0.73 (Su et al., 2003), and was checked at Times 1, 2, 3 and 4.

Paediatric Quality of Life Inventory (PedsQL, version4.0)

The PedsQL (version4.0) is a modular instrument developed by Varni et al. (2001) to measure health-related quality of life in children and

adolescents aged 2–18 years. The PedsQL 4.0 questionnaire was translated to Chinese, and the Cronbach's α ranged from 0.74 to 0.82 (Lu et al., 2008). The score was converted to a scale of 0–100 using a Likert scale (0–4). A higher score indicates a better quality of life. Data were collected at Times 1, 3 and 4.

Acceptability

At Times 4, children and parents in the intervention group were briefly interviewed about their general impression of the picture book using a Likert scale, with responses ranging from 0 (very bad) to 10 (very good). These responses were based on the number of times they read the book, how long it took to finish one reading, whether they communicated with their parents after reading, and their willingness to introduce the book to others.

Data analysis

Data were exported from an online questionnaire platform. After data cleaning, the data were analyzed using SPSS 20.0. Categorical variables were described using frequencies and percentages, and means and standard deviations were used to describe the distributions of continuous variables. Statistical significance was set at a two-sided p value of $\alpha < 0.05$. The data-collection schedule is presented in Table 2. The analysis was based on intention-to-treat.

Sample size

The sample size was calculated using the F-test for repeated measures analysis of variance (ANOVA) within factors in the G*power programme (Faul et al., 2007). The effect of coping strategy (one of the primary outcomes) was determined according to previous research conducted on children with chronic diseases in the CODI (Hu & Dai, 2011; Q. Wang et al., 2012). The study revealed that the effect size was 0.160, considering 80% power and 5% significance, using two groups and four measurement points, and a total sample

TABLE 2 Schedule for questionnaire administration

Questionnaire/scale	Assessment
Self-made Knowledge Level Questionnaire (HRKQ)	Times 1, 2, 3, 4
Coping with Disease Questionnaire (CODI)	Times 1, 2, 3, 4
Depression Self-Rating Scale (DSRS)	Times 1, 2, 3, 4
Paediatric Quality of Life Inventory (PedsQL, version 4.0)	Times 1, 3, 4
Chronic Illness Children's Resilience Scale (CICRS)	Times 1, 3, 4
Acceptability	Times 4

size of 56 was needed. Considering a possible dropout rate of 10%, the final sample size was 60 children with 30 participants in each group.

Ethical considerations

The study was approved by the Institutional Review Board of the Xiangya School of Nursing, Central South University (# 2019022). Written informed consent was obtained from the parents of all participants before initiating the baseline questionnaire. All participants received a stationery package valued at 25 RMB (~€3.6) as time compensation immediately after completing the baseline questionnaire, and no gifts were given thereafter.

RESULTS

Participants' characteristics

Initially, 65 children were screened, of whom five did not meet the criteria. At the end, 60 children were enrolled in the study and all completed the 3-month's follow-up survey. Among the 60 children, 31 were male and 29 were female, with an average age of 9.15 ± 1.593 years. Two-thirds (66.7%) of the children lived in rural areas and 73.3% did not have siblings. Approximately half (56.7%) of the households had a median monthly income of 3000–4999 RMB (~€433.8–€722.8). The demographic variables of the intervention and control groups did not show statistical differences according to the F-test or χ^2 -test (Table 3).

The two groups showed statistically significant differences in resilience over time (Table 4). Among the three dimensions of the resilience scale, the repeated measures ANOVA results showed a statistically significant time \times group interaction between coping characteristics and intrapersonal characteristics ($F_{\text{characteristics of coping}} = 44.042$, $p < 0.001$; $F_{\text{intrapersonal relationship}} = 8.350$, $p < 0.001$). Only coping dimension characteristics differed significantly across the groups ($F = 37.703$, $p < .001$).

The scores on the HRKQ in these two groups were not significantly different at baseline; however, both groups' knowledge improved over time. The score of the intervention group was higher than that of the control group at each time point, and the impact lasted until Times 4 (third month). Repeated measures analysis of variance showed statistically significant differences between groups ($F = 46.637$, $p < 0.001$) and across time points ($F = 144.800$, $p < 0.001$). A statistically significant interaction was found between time points and groups ($F = 42.566$, $p < 0.001$) (Table 4).

In terms of coping strategies, the two groups did not show any significant difference over the study period, except for the emotional reaction dimension, which showed a statistically significant time \times group

TABLE 3 Characteristics of children and their parents of the two groups ($N = 60$)

Variable	Intervention group ($n = 30$) Mean (SD)/ n (%)	Control group ($n = 30$) Mean (SD)/ n (%)	F/χ^2	p
Children's characteristics				
Gender				
Male	17 (56.7)	14 (46.7)	0.601	0.438
Female	13 (43.3)	16 (53.3)		
Location				
City	9 (30.0)	11 (36.7)	0.300	0.584
Countryside	21 (70.0)	19 (63.3)		
Having siblings				
Yes	21 (70.0)	23 (76.7)	0.341	0.559
No	9 (30.0)	7 (23.3)		
Suspension of school				
Yes	29 (96.7)	28 (93.3)	0.000	1.000
No	1 (3.3)	2 (6.7)		
Hospital days	2.03 ± 0.96	2.17 ± 0.95	0.291	0.592
Number of hospitalizations	2.10 ± 0.92	2.20 ± 0.85	0.191	0.664
Caregiver				
Father	9 (30.0)	10 (33.3)	0.077	0.781
Mother	21 (70.0)	20 (66.7)		
Parents' characteristics				
Education level				
High school or lower	10 (33.3)	14 (46.7)	1.831	0.400
College	14 (46.7)	9 (30.0)		
Post-graduate	6 (20.0)	7 (23.3)		
Monthly income				
≤ 2999 (≤ 463 USD)	7 (23.3%)	8 (26.7)	1.292	0.731
3000–4999 (463–772 USD)	17 (56.7)	13 (43.3)		
5000–9999 (772–1,545 USD)	5 (16.7)	8 (26.7)		
$\geq 10,000$ (≥ 1545 USD)	1 (3.3)	1 (3.3)		

TABLE 4 Means, standard deviations and repeated measure ANOVA analysis of outcome variables

Measure	Dimension	Baseline Times 1 Mean ± SD	Posttest Times 2 Mean ± SD	Posttest Times 3 Mean ± SD	Posttest Times 4 Mean ± SD	ANOVA Group F	Group × time F
Resilience (CICRS)	Interpersonal characteristics	Intervention group (n = 30)	28.30 ± 2.28	30.50 ± 1.74	31.13 ± 1.33	0.029	2.612
		Control group (n = 30)	28.63 ± 2.41	29.77 ± 1.96	31.00 ± 1.39		
	Characteristics of coping	Intervention group (n = 30)	31.63 ± 2.30	33.80 ± 2.20	35.77 ± 2.32	37.703**	44.042**
		Control group (n = 30)	31.30 ± 2.04	31.30 ± 2.04	31.37 ± 1.96		
	Intrapersonal relationship	Intervention group (n = 30)	31.50 ± 2.03	31.73 ± 2.03	32.57 ± 1.65	0.421	8.350**
		Control group (n = 30)	31.77 ± 1.87	31.77 ± 1.87	32.37 ± 1.88		
Coping (CODI)	Avoidance	Intervention group (n = 30)	10.33 ± 3.07	9.87 ± 3.00	10.03 ± 2.91	0.326	0.313
		Control group (n = 30)	10.70 ± 3.08	10.30 ± 3.02	10.40 ± 2.98		
	Wishful thinking	Intervention group (n = 30)	15.87 ± 3.00	17.30 ± 3.18	18.37 ± 2.81	0.159	2.684
		Control group (n = 30)	17.03 ± 3.69	17.57 ± 3.76	18.43 ± 3.48		
	Emotional reaction	Intervention group (n = 30)	23.30 ± 3.15	24.83 ± 3.27	25.03 ± 3.22	9.573*	4.176*
		Control group (n = 30)	22.03 ± 2.55	22.37 ± 2.41	22.77 ± 2.22	0	1.017
	Cognitive-palliative	Intervention group (n = 30)	14.40 ± 0.77	14.77 ± 0.43	15.00 ± 0.00	0	1.017
		Control group (n = 30)	14.53 ± 0.68	14.63 ± 0.62	15.00 ± 0.00		
	Acceptance	Intervention group (n = 30)	18.67 ± 3.56	19.77 ± 3.90	21.47 ± 3.65	0.636	1.386
		Control group (n = 30)	17.93 ± 3.27	19.27 ± 2.73	20.37 ± 2.47		
	Distance	Intervention group (n = 30)	10.93 ± 2.63	11.33 ± 2.25	12.57 ± 2.19	0.128	0.763
		Control group (n = 30)	10.90 ± 2.60	11.20 ± 2.62	12.23 ± 2.19		
Knowledge (HRKQ)	Intervention group (n = 30)	7.97 ± 1.75	10.43 ± 0.97	11.97 ± 0.18	46.637**	42.566**	
	Control group (n = 30)	8.03 ± 1.45	9.03 ± 1.10	9.53 ± 1.33			
Depression (DSRS)	Intervention group (n = 30)	9.33 ± 2.48	5.40 ± 2.54	4.83 ± 3.44	0.015	6.334*	
	Control group (n = 30)	8.63 ± 2.41	5.57 ± 1.98	4.40 ± 3.06			
Quality of life (PedsQL)	Intervention group (n = 30)	65.11 ± 7.17	80.90 ± 6.12	87.57 ± 5.18	1.841	3.175*	
	Control group (n = 30)	64.71 ± 6.74	78.51 ± 6.19	86.12 ± 5.91			

Note: *p < 0.05; **p < 0.001; p < 0.05, were considered statistically significant.

interaction ($F = 9.573$, $p = 0.003$) (Table 4). There were no significant differences at baseline. However, at the 2-month follow-up (Times 3) revealed a reduction in depression in both groups, with the reduction in the intervention group was higher than in the control group. Repeated-measures ANOVA revealed a statistically significant time \times group interaction over the study period ($F = 6.334$, $p = 0.003$). In addition, the paediatric QOL showed no significant differences at baseline, but both were increased during the 2-month follow-up (Table 4). Repeated measures ANOVA showed minimal statistically significant time \times group interactions over time ($F = 3.175$, $p > 0.046$).

The acceptability of the picture book

Most children (83.3%) rated this picture book more than eight points for general satisfaction, 96.7% said they would keep it for a long time, 73.3% read it more than three times, and 100% said they would like to share it with their families and friends besides being eager to read the book again.

DISCUSSION

It is difficult to provide information on disease progression and management for children with illnesses (Tsao et al., 2017). Due to the challenges of children's maturity, to understand the situation. In addition, parents' attitudes toward disease progression and whether parents are willing to let their young children know the details of the examination and treatment, the treatment and recovery processes, and not increase mental stress during the course of the disease. This study demonstrated that providing a disease-targeted picture book appropriate for the age could improve children's knowledge, enhance positive coping strategies, relieve depressive symptoms, construct psychological resilience and improve their quality of life. This study demonstrates a new approach for health professionals to deliver health information to sick children in China.

Several studies have confirmed the effectiveness of picture books in improving children's disease-related knowledge has been confirmed (Kato et al., 2017; Katz et al., 2014; Shimazaki et al., 2018; Sinha et al., 2011). For example, reading the picture book could enhance youth's knowledge of how to prevent Human Papillomavirus (HPV) and provide parents and their adolescents with opportunities to discuss HPV vaccines (Katz et al., 2014).

This study showed that picture books could effectively improve disease-related knowledge compared with formal education or other written educational materials (e.g., brochures and leaflets) (Kassai et al., 2016; Shimazaki et al., 2018). Disease-related knowledge was delivered through picture books integrated with stories. Children acquire knowledge in a situational context with a more sustainable effect. Moreover, picture books can be read many times as an educational tool. Therefore, this knowledge can be reinforced. Our study findings indicated that children who read picture books many times presented with a higher level of disease knowledge than those who received the standard of health education during the 3-month follow-up.

In terms of coping strategies, a Chinese study showed that oral education had no impact on coping strategies for children with HSPN (Li, 2008), while our research indicated that children could adopt a less negative coping strategy for 'emotional action' by reading picture books. Studies have shown that children diagnosed with asthma, diabetes mellitus, or coeliac disease tend to adopt negative coping strategies to reject their illness by crying or being angry (Oppenheimer et al., 2018). However, according to the social learning model (Bandura et al., 1961), children can learn from models, and reading a picture book with examples of coping with disease stress can help children learn the coping technique and imitate the rationale of character and how to respond to the stress. Thus, children can be more optimistic and confident about coping with the disease. Although, in this study, the other dimensions were not statistically significant across the two groups, the scores of 'acceptances' and 'keeping distance' increased in both groups, indicating that reading picture books could enhance positive coping strategies.

This study demonstrates that reading a picture book can help develop children's resilience, relieve depressive symptoms and improve their quality of life. Similar studies using picture books to educate children with different illnesses have shown the same effectiveness in reducing depressive symptoms (Lin et al., 2016; Q. Wang, 2011; Xie et al., 2014), but none have examined resilience. Another multicenter study in Denmark found that resilience could be vital for mitigating negative stressors among children with hidradenitis suppurativa (Kirby et al., 2017), but they did not use picture books to measure resilience.

Children developed a sense of identity with the characters in the story by reading the picture book (Guo et al., 2008); they shared feelings, emotions and setbacks with the protagonists and learned their approach to solving problems. This allows children to release their inner negative emotions and be resilient to setbacks (Xie et al., 2014). A systematic review revealed that improved resilience could significantly improve quality of life, in addition to decreasing depressive symptoms and stress levels (Leppin et al., 2014). Moreover, findings suggest that bibliotherapy positive affects internalizing (e.g., anxiety and depression), externalizing (e.g., aggression) and prosocial behaviours (e.g., behavioural intentions and attitudes toward others), which helps children to better integrate into society and improve their quality of life (Montgomery & Maunders, 2015).

LIMITATIONS

This study had several limitations. First, the study participants were not randomly assigned therefore, potential contamination during the intervention. Second, study participants were followed for up to 3 months. Therefore, future studies should explore whether the effects can be sustained for a longer time. Third, the study enrolled only children aged between 7 and 12 years old. Thus, the results cannot be generalized to other age groups.

Despite these limitations, this study offers several innovations. First, considering the fewer disease-targeted picture books used for health education in China, our study used an HSPN-targeted picture book to confirm its effectiveness in clinical settings. Second, this

study's results reveal the powerful impact of picture books on children's resilience, which can facilitate these children return to society.

IMPLICATIONS FOR CLINICAL PRACTICE

This study has implications for future research and practice. Prospect studies should examine the long-term effects of using picture books as an educational tool. In addition, exploring the feasibility and effectiveness of reading picture books among other age groups of children should be considered. Consequently, clinical health professionals can disseminate picture books to targeted children with illness as educational material. This can decrease the challenge of explaining disease prognosis and coping with diseases. Moreover, based on this study, researchers and clinical health professionals should develop more picture books tailored to various childhood diseases. Such a clinical approach should embrace how children live with the illness and expect better disease prognosis.

CONCLUSIONS

This study demonstrates that a targeted picture book is a novel educational tool for children with HSPN. The picture book could effectively improve children's knowledge levels, enhance positive coping strategies, reduce depression symptoms and improve resilience and quality of life. Moreover, the picture book was accepted and welcomed by children with HSPN. Similarly, children's picture books focusing on different diseases should be developed to enhance disease recovery.

AUTHOR CONTRIBUTIONS

Yao Tang conceived study, participated in design and data collection, analyzed the data, wrote the draught of the manuscript. Weiti Chen participated in design, guided data collection, edited the manuscript. Jingping Li analyzed the data, read and approved the final manuscript. Yuqian Deng draw the picture book, read and approved the final manuscript. Shibo Liu participated in data collection, read and approved the final manuscript. Xia Zhou participated in design and coordination, read and approved the final manuscript. Jianhui Xie participated in participants enrolment and coordination, read and approved the final manuscript. Chaohong Zhan conceived study, participated in study design, read and approved the final manuscript. Xianhong Li principal project leader, conceived study, participated in design and coordination, analyzed the data, wrote the final manuscript.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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