

ORIGINAL RESEARCH:
EMPIRICAL RESEARCH – QUANTITATIVE

Effects of oral hygiene programme and home phone counselling for hepatitis C patients receiving antiviral treatment

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Funding information

This study was funded by Chang Gung Memorial Hospital (BMRP148).

Abstract

Aims: To explore the effectiveness of an oral hygiene programme combined with home phone counselling on hepatitis C patients during antiviral treatment.

Background: Hepatitis C virus infection is the leading cause of liver diseases. Evidence indicates that the antiviral treatment for hepatitis C virus infection has been successful, albeit its many side effects, such as discomfort symptoms of oral ulcers, which, in turn, leads to discontinued treatment. Inappropriate oral hygiene may worsen the side effects and increase the risk of dropping out of the treatment.

Design: A quasi-experimental pre–post-test design was used.

Methods: The oral hygiene programme was based on a standardized protocol of oral health care combined with home phone counselling. The participants were recruited from an outpatient clinic between August 2016 and July 2017. The generalized estimating equation was used for repeated measures of oral health behaviour, oral health status and discomfort symptoms.

Findings: Thirty-four participants completed this study. The findings indicated that the oral hygiene programme significantly improved tooth brushing, use of dental floss and oral comfort. The result showed that the participants' oral health status significantly improved in 3 months.

Conclusions: This pilot study supports the finding that an oral hygiene programme can reduce oral discomfort, improve oral hygiene behaviour, and enhance the oral health status of hepatitis C patients receiving treatment. This is a simple and low-cost programme, which can be performed at home easily and boosts the completion of antiviral treatment.

KEYWORDS

antiviral treatment, early prevention, hepatitis C, infection, nursing, oral health status, oral hygiene, plaque index

1 | INTRODUCTION

Approximately 130–150 million people worldwide have chronic hepatitis C infection (World Health Organization [WHO], 2017a, b);

500,000 individuals die from hepatitis C-related diseases every year (Centers for Disease Control [CDC], 2017). Evidence indicates that the antiviral treatment for hepatitis C virus infection has been successful. However, many side effects, including discomfort symptoms

of oral ulcers, will induce discontinued treatment. Inappropriate oral hygiene may worsen the side effects and increase the risk of dropping out of the treatment. This study explores whether an oral hygiene programme combined with home phone counselling for hepatitis C patients receiving antiviral treatment could improve their oral health status and completion rate of treatment.

1.1 | Background

As chronic diseases occupied most of the top 10 deaths globally, hepatitis C virus infection is a concern in many countries. Consequently, infection control should be a priority of the nursing profession. Among these top global causes of death is hepatitis C virus (HCV), a leading cause of liver cirrhosis and hepatocellular carcinoma (WHO, 2017a,b). In addition, 70%–80% are chronic carriers; 20% develop liver cirrhosis; and 3%–5% experience liver cancer (CDC, 2017). HCV infection also increases the prevalence of carotid atherosclerosis and ischaemic heart disease (Liu, Lin, & Hwu, 2014). Compared with patients who are anti-HCV seronegative, those with an HCV infection have a higher mortality rate from both hepatic and nonhepatic diseases (Hsu et al., 2014). Fortunately, antiviral treatment (AVT) is successful in 50%–90% of persons treated, depending on the treatment used and has also been shown to reduce the development of liver cancer and cirrhosis (WHO, 2017a,b).

Liver cancer is the second cause of death in Taiwan, with a mortality rate of 34.9 per 100,000 population (Ministry of Health and Welfare, 2018). In Taiwan, the commonly used interferon-alpha (INF- α) and ribavirin therapy have been shown to clear the virus significantly and cure the infection (Moon et al., 2015). Studies have indicated that antiviral treatment has many significant side effects, including influenza-like symptoms, haematologic abnormalities, neuropsychiatric symptoms, dermatitis, tinnitus, coughing, oral ulcers, weight loss, gastrointestinal disturbances, etc. (Al-Huthail, 2006; Chiu, Huang, Lin, & Chen, 2017; Conversano et al., 2015). However, owing to the lack of correct information, the treatment rate is low, especially in rural areas. As many of the side effects of AVT are oral health-related, such as oral mucosal damage (e.g., constant feeling of thirst, oral ulcers, gingival swelling, inflammation and bleeding, stomatitis, and difficulty in swallowing) (Alavian, Mahboobi, Mahboobi, & Karayiannis, 2013; Chang et al., 2015; Chiu et al., 2017; Heggul et al., 2012; Nagao, Hashimoto, & Sata, 2012) and decrease in appetite and immunity, improving oral care among hepatitis C patients may, thus, increase their completion rate of treatment and, at the same time, reduce their risk of oral ulcer or inflammation effect (Chiu et al., 2017). Although many scholars have focused on patients' virological response, they have scarcely examined the fundamentals of oral hygiene.

Previous studies have indicated that most hepatitis C patients have low socioeconomic backgrounds, which could explain why they have more oral health problems compared with healthy people (Coates et al., 2000; Hayashi et al., 2013; Jane, Chiu, Chen, Lin, & Chen, 2016) and this, in turn, increases their tendency to drop out

Why is this research or review needed?

- Hepatitis C virus infection is the leading cause of liver diseases.
- Evidence indicates that the antiviral treatment for hepatitis C virus infection has been successful, albeit its many side effects, such as discomfort symptoms of oral ulcers, which, in turn, leads to discontinued treatment.
- Inappropriate oral hygiene may worsen the side effects and increase the risk of dropping out of the treatment.

What are the key findings?

- The oral hygiene programme that combines home phone counselling benefits hepatitis C carriers during antiviral treatment.
- The oral hygiene programme can enhance the patients' perceived oral comfort as their oral hygiene behaviour and oral health status improve while receiving treatment.

How should the findings be used to influence policy/practice/research/education?

- The proposed oral hygiene programme that combines home phone counselling can be used to develop health policies for preventing such side effects as oral ulcers during treatment.
- Nurses and other clinicians can apply the proposed oral hygiene programme as routine care for hepatitis C patients during treatment.

of the AVT, which lasts for 24–48 weeks (Heggul et al., 2012; Nagao et al., 2012; Saito et al., 2014).

The WHO (2017a,b) defines oral health as, among others, lacking chronic oral pain, oral infections, ulcers, periodontal disease, dental caries, and tooth loss. The mouth is a natural barrier against microbiological and bacterial invasion (Cinar, Ozdogan, & Alahdab, 2015; Sischo & Broder, 2011), and thus good oral hygiene can prevent oral diseases and help improve the quality of personal life (Sischo & Broder, 2011; WHO, 2017a,b). Accordingly, poor oral hygiene causes plaque accumulation and leads to many oral discomfort symptoms, such as bad breath, dental caries, periodontal disease, oral mucosal lesions, and results in dropping out of the treatment (Chiu et al., 2017). In recent study, Chiu et al. (2017) reported that, among 642 participants, 19% ($N = 122$) discontinued treatment because of complications. In addition, 59.8% complained of oral ulcers, toothache, dry mouth, and gingivitis.

Previous studies have stated that ideal oral hygiene must include: (a) brushing teeth after meals at least twice daily; (b) using dental floss at least once a day, especially before bedtime; (c) undergoing dental checkups and scaling; and (d) avoiding betel nut chewing, smoking, and alcohol drinking (American Dental Association, [ADA],

2016; National Health Insurance [NHI], 2017; Taiwan Oral Health Care Association, 2013). Most studies related to oral health have focused on vulnerable groups, such as people with mental illness, in intensive care units, in rehabilitation and with disabilities; older people; and people with cancer (Chan, Lee, Poh, Ng, & Prabhakaran, 2011; Danckert, Ryan, Plummer, & Williams, 2016; Liu et al., 2014; Saito et al., 2014). Given the lack of studies on oral hygiene among HCV carriers during AVT, this study explores whether the standard oral hygiene programme (OHP), combined with home phone counselling for HCV patients receiving AVT, could improve their oral health behaviours, oral health status, and completion rate of treatment.

2 | THE STUDY

2.1 | Aims

The purpose of this study was to explore the effects of an OHP and home phone counselling for hepatitis C patients receiving antiviral treatment.

2.2 | Participants

The participants were recruited from an outpatient clinic in a teaching hospital in southern Taiwan between August 2016 and July 2017. Face-to-face interviews were conducted to assess their oral health behaviour, plaque index, and oral health status. Each participant underwent the oral health programme proposed in this study for 3 months after their initial oral health assessment. Each participant repeated four measurements during the first, second, and third months, when they came back to the hospital for a follow-up.

The inclusion criteria included: (a) patients who were diagnosed with hepatitis C with anti-HCV positive and received interferon combined with ribavirin treatment; (b) those aged at least 20 years, who were conscious and able to perform self-care; (c) those who could communicate in Mandarin or Taiwanese; (d) those who had at least 10 natural teeth; and (e) those who agreed to participate in this study and signed the consent form. The exclusion criteria included: (a) patients who were unable to perform self-care; (b) those who had dementia or low intelligence; and (c) those who had fewer than 10 natural teeth.

2.3 | Design

A one-group, quasiexperimental, pre–post-test design was used.

2.4 | Data collection

2.4.1 | Standardized procedure of oral hygiene programme

The OHP was developed using the following four steps. Step 1: Participants were provided a set of PowerPoint directions developed

from previous studies (Department of Mental and Oral Health, 2016; WHO, 2017a,b), including why and how oral health should be maintained, proper ways to brush teeth, and use dental floss. It took around 15–20 minutes for each participant. Step 2: Patients were asked to rehearse using teaching aids of a tooth model, toothbrush, and dental floss. Whenever necessary, the researcher would redemonstrate how to brush teeth properly and use dental floss or interdental brush. This took around 5–10 minutes. A pamphlet with text and photo guidelines was given to each patient; he/she was reminded to use them at home. Step 3: Home phone counselling, lasting 5–10 minutes, was conducted twice a week for 3 months. During the phone call, the researcher asked the patients about their oral hygiene behaviours and recorded any discomfort symptoms. Step 4: Each month for 3 months, when the patients came back to the hospital for a follow-up, the researcher evaluated their oral hygiene behaviour, oral health status, and plaque index score. Whenever necessary, the researcher would redemonstrate proper oral hygiene techniques. The total average time of counselling for each participant was between 60 and 80 minutes. Ideally, each patient was evaluated three times when he/she came back to the hospital for a regular follow-up. Because of the different treatment courses for each participant, such as varying duration of the course taken (e.g., certain patients participated in 24- or 48-week courses), the consequent duration of data collection for each participant was inconsistent.

2.4.2 | Measurement

Participant's characteristics

The questionnaire designed for this study contained items on the participant's characteristics (e.g., gender, age, marital status, educational level, body height, and body weight), living arrangement, number of natural teeth, smoking behaviour, alcohol drinking behaviour, and betel nut chewing habits. The questionnaire also asked about their oral hygiene behaviours (frequency of tooth brushing, using dental floss or interdental brush, and undergoing dental checkup or scaling), perceived changes in oral discomfort symptoms before and after the intervention and the completion rate of antiviral treatment (via chart review).

Oral health status

Their oral health score (OHS) and plaque index score were derived to assess their oral health status. To calculate their OHS, the eight-item oral assessment guide by Eilers, Berger, and Petersen (1988) was modified into a six-item one, which included only the lips, tongue, oral membrane, gingival, teeth, and bad breath; it was measured on a three-point Likert scale, where 1 point represents normal; 2 points, fair and light symptoms, including dry or chapped lips and redness; and 3 points, poor and severe symptoms, including ulceration or bleeding and bad breath. The researcher was in close contact with the patients to evaluate a patient's oral odour, where 1 point represents no unpleasant smell; 2 points, a slightly unpleasant smell; and 3 points, bad smell. A high score means having worse oral symptoms.

Dental plaque index

The dental plaque index proposed by Podshadley and Haley (1968) was employed to measure a patient's hygiene performance (PHP). It is the first index that was developed with a purpose of estimating a person's view of oral hygiene in removing debris after brushing instructions. PHP index is simpler and more sensitive than the inspection plaque index and can be used both in offering dental health education and research. The dental plaque indicator with content of erythrosine was dropped onto cotton swabs to smear on a participant's teeth; possible changes caused by the dental plaque indicator were observed. The examination was performed on the following teeth in this order: (a) maxillary right first molar (third tooth); (b) maxillary right central incisor (eighth tooth); (c) maxillary left first molar (fourteenth tooth); (d) mandibular left first molar (nineteenth tooth); (e) mandibular left central incisor (24th tooth); and (f) mandibular right first molar (30th tooth). The examiner divided a patient's teeth into five sections, scored them from 0–5, then assessed the debris on each surface. A score of 0 represents excellent; between 0.1 and 1.7 is good; between 1.8 and 3.4 is acceptable; and between 3.5 and 5.0 is poor. The score was marked with "S" if the patient had a substitute tooth; and "M" if there was a missing tooth. Teeth marked thus were not calculated in the PHP calculation. A patient's PHP was calculated by dividing the sum of his/her score on each tooth. A high score means having worse oral symptoms.

2.4.3 | Validity and reliability

The primary researcher (first author) was the only data collector, who had 7 years of nursing experience in the gastroenterology ward with HCV-related infection unit. She acquired a certificate of oral hygiene instructor (36 hours training and practice) by the Taiwan Dental Association and obtained her Master's degree in nursing in 2017. To test the validity of the instruments, including the self-developed questionnaire with participants' characteristics, scoring of oral health status, dental plaque index, and the standardized procedure of OHP, the content validity index (CVI) was used. Five experts (i.e., two dentists, one physician in internal medicine, and two members of faculty in community health nursing) were invited to give their opinions on the relevance and appropriateness (1 = not relevant, 2 = relevant, and 3 = very relevant). The CVI was computed based on the proportion of the experts' agreement on the relevance of an item. The mean CVI was 0.89.

2.5 | Ethical consideration

The institutional review board of Chang Gung Memorial Hospital (IRB No: 201601205B) approved the conduct of this study. The study purpose and procedures were explained to the participants, on agreeing to sign the consent form; face-to-face interviews and OHP guidance were conducted in a private area at the outpatient clinic.

2.6 | Data analysis

Based on a two-tailed *t* test (Cohen, 1992), the sample size was set at 34, which was calculated by the G*power 3.1.9.2 version, when the effect size = 0.5, α = 0.05 and power = 0.80. Considering the retraction rate, 50 participants were recruited to this study. The generalized estimating equation (GEE) was used for repeated measures on oral health status and plaque index score. The McNemar test was applied to explore oral hygiene behaviour and changes in perceived oral comfortability. Data analyses were conducted using SPSS 22 (IBM SPSS, Armonk, NY: IBM Corp).

3 | RESULTS

3.1 | Demographic characteristics

The criteria were met by 50 patients at the beginning of the study, of which 12 refused to participate and four moved to another county. Finally, 34 participants completed the study. The overall sample size was back-calculated and the actual effect size of the OHP intervention was 0.495 in this study. The mean age of the participants was 50 (*SD* 12) years; most of them were aged ≤ 65 years. Most participants were women (55.9%); had only completed junior high school (61.7%); and were married and living with their families (94%) (Table 1). Many participants were smoking (41.2%), drinking alcohol, (47.1%) and chewing betel nuts (26.5%). The mean number of natural teeth was 22 (*SD* 5.4) and 41.2% ≤ 20 (Table 1). After 3 months' intervention and follow-up for each participant, all completed the treatment between 24 and 48 weeks (*N* = 34, completion rate 100%).

3.2 | Changes in OHS and plaque index

Table 2 presents the participants' OHS and plaque index score after the intervention. The percentage of participants who had normal oral health (score = 1) in the lips (67.6%), tongue (85.3%), oral membrane (58.8%), gingival (50%), and teeth (32.4%), and bad breath (52.9%) was lower before the intervention. After undergoing OHP for 3 months, more participants experienced normal oral health (score = 1) in each of the six dimensions: lips (94.1%), tongue (97.1%), oral membrane (88.2%), gingival (85.3%), teeth (94.1%), and bad breath (97.1%). The plaque index showed that all participants had fair and poor scores before the intervention, with a mean of 2.38 (*SD* 0.49). After 3 months, 97.1% of the participants obtained a good score.

As shown in Table 3, the GEE analysis showed that the OHS improved significantly in the first (β = -1.56, p < 0.001), second (β = -2.07, p < 0.001), and third (β = -2.25, p < 0.001) months of the intervention. After adjusting for gender, the male participants' OHS was significantly worse than their female counterparts (β = 1.59, p < 0.001). As shown in Table 4, the GEE analysis showed that the plaque index improved significantly in the first (β = -1.73,

TABLE 1 Characteristics of participants at baseline (N = 34)

Variables	N (%)	Mean (SD)	Range
Age (years)		50.0 (11.9)	21–76
≤64	30 (88.2)		
≥65	4 (11.8)		
Gender			
Female	19 (55.9)		
Male	15 (44.1)		
Education			
≤Middle school	21 (61.7)		
≥High school	13 (38.3)		
Marital status			
Married	24 (70.6)		
Single/Divorced/Widowed	10 (29.4)		
Living arrangement			
With family	32 (94.1)		
Alone/others	2 (5.9)		
Smoking			
Never/formerly	20 (58.8)		
Current user	14 (41.2)		
Drinking			
Never/former	18 (52.9)		
Current user	16 (47.1)		
Chewing betel nut			
Never/formerly	25 (73.5)		
Current user	9 (26.5)		
Number of natural teeth		22.2 (5.4)	11–30
<20	14 (41.2)		
≥20	20 (58.8)		

$p < 0.001$, second ($\beta = -2.12$, $p < 0.001$), and third ($\beta = -2.49$, $p < 0.001$) months of the intervention.

3.3 | Oral hygiene behaviours and oral comfortability

As shown in Table 5, the McNemar test displayed that the frequency of tooth brushing per day improved significantly ($p < 0.001$) from inappropriate (38.2%) to appropriate (97.1%). The habit of using dental floss or interdental brush per day improved significantly, from never to sometimes or every day ($p = 0.007$). Moreover, the participants reported improved oral comfortability ($p < 0.001$) after the intervention.

4 | DISCUSSION

This study explored the effectiveness of an oral health programme that was combined with home phone counselling for hepatitis C

TABLE 2 Distribution of oral health score in different time (N = 34)

Variables/time/score	1	2	3	Mean (SD)
	N %			
Lips (baseline)	23 (67.6)	11 (32.4)	0	1.32 (0.48)
1st month	29 (85.3)	5 (14.7)	0	1.15 (0.36)
2nd month	31 (91.2)	3 (8.8)	0	1.10 (0.30)
3rd month	32 (94.1)	2 (5.9)	0	1.08 (0.27)
Tongue (baseline)	29 (85.3)	5 (14.7)	0	1.15 (0.36)
1st month	32 (94.1)	2 (5.9)	0	1.06 (0.24)
2nd month	32 (94.1)	2 (5.9)	0	1.00 (0.00)
3rd month	33 (97.1)	1 (2.9)	0	1.04 (0.20)
Oral membrane (baseline)	20 (58.8)	12 (35.3)	2 (5.9)	1.47 (0.62)
1st month	28 (82.4)	4 (11.8)	2 (5.9)	1.24 (0.55)
2nd month	29 (85.3)	4 (11.8)	1 (2.9)	1.19 (0.48)
3rd month	30 (88.2)	2 (5.9)	2 (5.9)	1.19 (0.57)
Gingival (baseline)	17 (50.0)	16 (47.1)	1 (2.9)	1.53 (0.56)
1st month	27 (79.4)	7 (20.6)	0	1.21 (0.41)
2nd month	28 (82.3)	6 (17.6)	0	1.16 (0.37)
3rd month	29 (85.3)	5 (14.7)	0	1.04 (0.20)
Teeth (baseline)	11 (32.4)	20 (58.8)	3 (8.8)	1.76 (0.61)
1st month	29 (85.3)	5 (14.7)	0	1.15 (0.36)
2nd month	30 (88.2)	4 (11.8)	0	1.10 (0.30)
3rd month	32 (94.1)	2 (5.9)	0	1.04 (0.20)
Bad breath(baseline)	18 (52.9)	15 (44.1)	1 (2.9)	1.50 (0.56)
1st month	25 (73.5)	9 (26.5)	0	1.26 (0.45)
2nd month	31 (91.2)	3 (8.8)	0	1.00 (0.00)
3rd month	33 (97.1)	1 (2.9)	0	1.04 (0.20)
	Good	Fair	Poor	
Plaque index score (baseline)	0	21 (61.8)	13 (38.2)	2.38 (0.49)
1st month	20 (58.8)	14 (41.2)	0	2.41 (0.50)
2nd month	28 (82.4)	6 (17.6)	0	1.19 (0.40)
3rd month	33 (97.1)	1 (2.9)	0	1.04 (0.20)

Note. Oral health score; 1 point = normal; 2 point = light or mild symptom; 3 point = severe symptoms. Total score, range from 6 to 18; the higher score the worse of oral health status; Plaque index; 0 point means excellent; 0.1–1.7 means good; 1.8–3.4 means fair; 3.5–5.0 means poor.

patients who were receiving AVT. Owing to the small sample size and lack of a control group, this study could be considered as a pilot study to test basic yet important nursing care; therefore, further testing using a larger sample is necessary.

Most participants in this study had a low socioeconomic status (as indicated by their lack of formal education), were older people, and had poor oral hygiene behaviours before the intervention. Additionally, many participants were smoking, drinking alcohol, and chewing betel nuts while receiving AVT. The participants' characteristics support the findings of previous studies that most patients with HCV are from a low socioeconomic status and, thus, have poor oral hygiene behaviours (Chang et al., 2015; Jane et al., 2016). The present finding echoed previous studies that men adopt less oral

TABLE 3 Comparison of oral health score after oral health programme

Variables	β	SE	Wald χ^2	p
Oral health score				
Baseline	0			
1st month	-1.56	0.25	37.76	<0.001
2nd month	-2.07	0.28	56.34	<0.001
3rd month	-2.25	0.29	58.32	<0.001
Gender (female)				
Male	1.59	0.37	18.28	<0.001

Note. SE = standard error. β = parameter estimates. GEE test, statistical adjustment of gender.

TABLE 4 Comparison of plaque index after oral health programme

Variables	β	SE	Wald χ^2	p
Plaque Index				
Baseline	0			
1st month	-1.732	0.085	407.452	<0.001
2nd month	-2.120	0.107	395.157	<0.001
3rd month	-2.490	0.107	537.185	<0.001

Note. SE = standard error. β = parameter estimates. GEE test.

TABLE 5 Oral hygiene behaviours and subjective oral comfortable changed

Variables	Pretest	Post-test	p
	N (%)		
Using tooth brush time per day			<0.001
Inappropriate (<1 time)	13 (38.2)	1 (2.9)	
Appropriate (≥ 2 time)	21 (61.8)	33 (97.1)	
Using dental floss or interdental brush			0.007
Never	25 (73.5)	14 (41.2)	
Sometime/every day	9 (26.4)	20 (58.8)	
Participants with improved oral comfort			<0.001
Feeling uncomfortable	28 (82.3)	7 (20.6)	
Feeling comfortable	6 (17.6)	27 (79.4)	

McNemar test.

hygiene practice and had poorer oral health status than women (Thapa et al., 2016; Tsai, Lin, Jane, Tu, & Chen, 2015). Thapa et al. (2016) found that cleaning teeth twice a day and visiting a dentist are significantly less common among male adults. In addition, this study found that men had more smoking habits than women. Therefore, further studies should consider focusing on the male gender when initiating an oral health promotion programme.

This study implemented a four-step OHP over a period of 3 months, receiving between 60 and 80 minutes of counselling. The results indicated that OHP can significantly enhance patients' perceived oral comfortability and improve their oral hygiene behaviours, oral health status, and completion rate of AVT. Although this is a pioneering study to initiate OHP to HCV carriers who are receiving

AVT, it found similar findings on the importance of oral hygiene care while receiving treatments. Therefore, it is recommended that OHP can be used as part of the routine assessment and basic nursing care for HCV carriers who are receiving AVT.

Notably, all the study participants reported overcoming their side effects, including oral ulcers, fatigue, poor appetite, anxiety, and flu-like symptoms. They likewise completed more than half a year of AVT without discontinuing the treatment. This phenomenon might be attributed to the researchers' regular provision of home phone counselling that focused on oral hygiene care. Many participants described the benefits of the dental instruction offered, such as the importance of flossing. They were also grateful for the opportunity to talk about overcoming the side effects of HCV infection while undergoing AVT.

4.1 | Limitations

Despite the evidence to support the use of the proposed OHP in improving oral hygiene behaviour, oral health status, and enhancing subjective feeling of oral comfort, this study is limited by its sample size, and its use of convenience sampling and one-group design. First, the sample size was small. The population selection was not entirely random because all the participants were from one outpatient clinic. Second, the absence of a control group and the potential threats to the internal validity of the instrumentation must be considered, as these might limit the generalization of the study findings. Third, the potential for a social desirability response bias also needs to be taken into consideration.

5 | CONCLUSIONS

The present work developed a standardized procedure for the implementation of an OHP as a 3-month intervention programme that significantly improved oral hygiene behaviours, oral health status, and self-reported oral comfort in HCV carriers during AVT. The OHP that combines home phone counselling can be used to prevent the discontinuation of AVT. Indeed, this simple, low-cost OHP can be taught to patients for them to practice at home to improve their oral health. The results could be available as references to clinicians. The study further recommends that oral care be included in the routine care for HCV patients receiving AVT.

ACKNOWLEDGEMENTS

The authors would like to thank all the participants who participated in this study for their support in making this study possible. We would like to acknowledge all staffs in the Chang Gung Memorial Hospital, Chiayi branch.

CONFLICT OF INTEREST

The authors declared no potential conflicts of interest.

AUTHOR CONTRIBUTIONS

All authors have agreed on the final version and they meet at least one of the following criteria (recommended by the ICMJE [<http://www.icmje.org/recommendations/>]):

- Substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data;
- Drafting the article or revising it critically for important intellectual content.

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How to cite this article: Wu I-J, Chang T-S, Hwang S-L, Chen M-Y. Effects of oral hygiene programme and home phone counselling for hepatitis C patients receiving antiviral treatment. *J Adv Nurs*. 2018;00:1–8. <https://doi.org/10.1111/jan.13896>

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