Acta Medica Okayama

The effects of interval length between sessions in a hypercholesterolemia education class.

Kazuhiko Kotani[*]   Kyoko Saiga[†]

Naoki Sakane[‡]   Youichi Kurozawa[**]

[*]﻿Tottori University,
[†]﻿Tottori University,
[‡]﻿Kyoto Medical Center,
[**]﻿Tottori University,

The effects of interval length between sessions in a hypercholesterolemia education class.*

Kazuhiko Kotani, Kyoko Saiga, Naoki Sakane, and Youichi Kurozawa

Abstract

This study focused on the effects of different intervals between sessions of a hypercholesterolemia education class on post-intervention outcomes. The same comprehensive group-programme contents on hypercholesterolemia were delivered either monthly (for 6 months) or twice-monthly (for 3 months) by the same teaching professionals in a community setting. The twice-monthly programme included 46 participants (male/female = 7/39, average age: 65.8 years)and the monthly programme consisted of 48(male/female = 9/39, age: 66.4). At the beginning of the study, all subjects belonged to the 'contemplation' stage of diet and exercise habits within the Transtheoretical Model of Change. The stage-matched intervention helped many participants move to the 'action' stage by 6 months after the last session, especially in the twice-monthly group. The change rate of exercise from the 'contemplation' stage to the 'action' stage was significantly higher in the twice-monthly group (76.1 percent) than in the monthly (54.2 percent). In both monthly and twice-monthly formats, participants' satisfaction and understanding levels at the end of the programme were high, but were significantly higher in the twice-monthly group. Through favorable lifestyles and higher levels of satisfaction and learning, the twice-monthly format may produce more positive results in cholesterol management than the monthly format, as the shorter period of time makes the programme more intensive.

Original Article

Acta Medica Okayama

The Effects of Interval Length between Sessions in a Hypercholesterolemia Education Class

Kazuhiko Kotani[a,b]*, Kyoko Saiga[a], Naoki Sakane[b], and Youichi Kurozawa[a]

[a]Division of Health Administration and Promotion, Faculty of Medicine, Tottori University, Yonago, Tottori 683-8503 Japan, and
[b]Department of Preventive Medicine, Clinical Research Institute, Center for Endocrine and Metabolic Disease, National Hospital Organization Kyoto Medical Center, Kyoto 612-8555, Japan

This study focused on the effects of different intervals between sessions of a hypercholesterolemia education class on post-intervention outcomes. The same comprehensive group-programme contents on hypercholesterolemia were delivered either monthly (for 6 months) or twice-monthly (for 3 months) by the same teaching professionals in a community setting. The twice-monthly programme included 46 participants (male/female = 7/39, average age: 65.8 years) and the monthly programme consisted of 48 (male/female = 9/39, age: 66.4). At the beginning of the study, all subjects belonged to the 'contemplation' stage of diet and exercise habits within the Transtheoretical Model of Change. The stage-matched intervention helped many participants move to the 'action' stage by 6 months after the last session, especially in the twice-monthly group. The change rate of exercise from the 'contemplation' stage to the 'action' stage was significantly higher in the twice-monthly group (76.1 %) than in the monthly (54.2%). In both monthly and twice-monthly formats, participants' satisfaction and understanding levels at the end of the programme were high, but were significantly higher in the twice-monthly group. Through favorable lifestyles and higher levels of satisfaction and learning, the twice-monthly format may produce more positive results in cholesterol management than the monthly format, as the shorter period of time makes the programme more intensive.

Key words: hyperlipidemia, lifestyle, primary health care, patient education, Transtheoretical Model of Change

H ypercholesterolemia is a dangerous condition that should be treated with lifestyle modifications and drugs [1, 2]. Current clinical guidelines recommend lifestyle modifications such as diet and/or exercise as the initial treatment for raised blood total cholesterol (TC) and low-density lipoprotein cholesterol concentrations [3]. In both Japanese communities and companies, education classes for hyperlipidemic subjects have been implemented and have shown effectiveness as cholesterol risk management strategies [4, 5]. Despite the accepted importance of patient education, a routinely effective lifestyle modification programme for hyperlipidemia has yet to be incorporated into community health programmes. In previous studies, the classes for hyperlipidemic subjects were held less frequently than once a month [4, 5], and there have been few studies on the effect of class intervals on educational efficacy. Here, we compared 2 group programmes having the same content and structure but different class intervals (monthly vs. twice-monthly) in order to determine the effect of intervention intervals on

moderate asymptomatic hypercholesterolemic subjects' improvement in lifestyle behaviors and levels of satisfaction and understanding of the material.

With regard to lifestyle behaviors, recently the Transtheoretical Model of Change (TTM)-based approach has been developed and tested for a variety of populations and behaviors [6-13]. The TTM states that people pass through 5 specific stages when changing health behaviors. Individuals in the 'contemplation' stage have yet to change their behavior but intend to act within the next 6 months. Later, if they have made an overt behavior change within the past 6 months, they are in the 'action' stage. Interventions based on TTM constructs have been shown to be more effective than traditional approaches [12, 13]. Generally, approximately 40% of general populations are in the 'contemplation' stage [9], and many people are suitable candidates for positive interventions using a stage-matched approach to reduce hyperlipidemic risk. In the present study, we also applied TTM to evaluate behavior changes in a 'contemplation' stage hypercholesterolemic population in 2 educational classes.

Materials and Methods

Participants.   The study was planned as an annual project and was approved by the Ethics Committee of Tottori University. All subjects gave informed consent. All were residents of the same city in Japan. Asymptomatic subjects with overnight-fasting serum TC concentrations greater than or equal to 220 mg/ml (based on the Japanese guidelines [3]) in repeated 2-year results of community health examinations were screened to participate in the hypercholesterolemia education programme. Subjects with TC concentrations of 300 mg/ml or higher, who would be likely to receive medical referrals and pharmacological therapy, were excluded. Participants were excluded if they had a history of cardiovascular disease, a diagnosis of diabetes mellitus or renal disease, treatment with a lipid-lowering drug or lifestyle modifications under the advice of a professional. Also subjects who had a secondary form of hypercholesterolemia were excluded.

During the screening process, potential subjects were asked about their current diet and exercise habits. A mailing that described the education programme was sent to 721 people identified by the screening as having improper diet and exercise habits. The mailing also included an assessment on whether or not participants were con-

sidering habitual changes not immediately but within the next 6 months (in the 'contemplation' stage) [11, 12]. This allowed us to identify 112 'contemplation' stage respondents. After the exclusion of inappropriate answers, 108 subjects were eligible for the class.

Hypercholesterolemia   education   programme.   The hypercholesterolemia education programme included 6 sessions regardless of the group (Table 1). In 1 session, a physician primarily discussed behavioral treatment principles, the pathophysiology of the disease, and the need for cholesterol-reduction management. A dietician gave sessions that focused on improving knowledge of nutrition [14], and in another session an exercise instructor focused on exercise [15]. All sessions lasted 3 h and were conducted in a group setting. For each session, the same educators were used for both the twice-monthly programme and the monthly programme. The twice-monthly group completed the course in 3 months and thus had greater intensity than the monthly group, which finished in 6 months. Participants were randomly assigned to either group. All were followed up for at least 6 months after the end of the programme.

After behavioral treatment principles were emphasized first, the stage-matched approach to 'contemplation' stage was conducted in all sessions. Participants discussed ways to make lifestyle modifications as easy as possible to achieve. Particularly, a decisional balance was used as a construct suitable for the 'contemplation' stage (good validity and reliability have been indicated), representing the relative weighting of the advantages (pros) and disadvantages (cons) involved in decisions to change diet and exercise behaviors [12]. An example of a pro opinion is "Regular exercise would help me have a more positive outlook on life", and a con would be "I think I would be too tired to do anything in my daily life after exercising" [12].

Evaluated data.   Clinical characteristics such as age, body mass index (BMI), and serum lipid and lipoprotein levels at baseline were evaluated. For each group, 6 months after the last session all participants were interviewed to see if they had changed their diet and started exercising in response to the nutritional and exercise regimens that had been recommended to them. The stage level of change was then assessed through questions regarding diet and exercise, similar to the pre-class.

The participants rated the programme on 100-point

222

22222

Table 1   The syllabus in hypercholesterolemia education class

Session	Main contents
—	Baseline evaluation (choice of eligible subjects including the screening on serum total cholesterol levels)
—	Introduction of class
1.	A lecture on the pathophysiology of hypercholesterolemia, its related complications and the need for lifestyle modifications
2.	A lecture on nutrition and cooking[1]
3.	A lecture on proper exercise practices[2]
4.	A review of nutrition and cooking[1]
5.	A review of exercise[2]
6.	A lecture of maintenance of motivation of lifestyle modification
—	Follow-up including the assessment of lifestyle changes[3]

All sessions were in a group-meeting style. Session 1 and 6 were given by a physician, session 2 and 4 by a dietician and session 3 and 5 by an exercise instructor. The twice-monthly class had the session from 1 to 6 within 3 months. The monthly class had the session from 1 to 6 within 6 months. [1]With regard to nutrition (session 2, 4), according to the dietary patterns and weight of each participant, they were advised to reduce the energy provided by fat to 25% or less of total energy intake [14]. A daily intake of less than 300 mg of cholesterol and 25–30 g of fiber was also advised. The more recommended percentage of energy derived from carbohydrates was 60% and that from protein 15–20%. Advice on dietary change, a cooking and recipe guide, tips for eating out and motivational material were provided. [2]Regarding exercise (session 3, 5), each class was advised to build individualized skills of exercise at a level that increased the rate of breathing and caused each participant to break into a light sweat, without any pain or exhaustion, such as walking, jogging and swimming to increase physical fitness [15]. The frequency criterion of exercise was set at least 3 times per week and 20 to 40 min each time. Repeated advice on recommended levels and types of exercise was provided. [3] Follow-up was performed 6 months after the last session.

scales at the end of the 6-session programme. These ratings of the programme were obtained through an interview. The questionnaire used the following examples: "On a scale of 0–100, how satisfied were you with the programme?" and "On a scale of 0–100, how well do you feel you understand the levels of hypercholesterolemic management presented in the programme?"

Statistical analysis. The results for each measurement value are shown as a mean ± standard deviation. Using the Student's t test, the baseline clinical parameters were compared between the groups. Gender ratios were compared using the chi-square test or, if a gender group had fewer than 5 participants, Fisher's exact probability test. End-of-programme levels of satisfaction and understanding were analyzed with the Student's t test. To assess the difference in the distribution of 'contemplation' stage and 'action' stage participants from before to after the programme in each group, a chi-square statistic was used to test for differences between categorical variables. All analyses were conducted using SPSS 8.0J statistical software (SPSS, Inc., Chicago, IL, USA). Differences were considered significant at $P < 0.05$.

Results

Fifty subjects (4 subjects cancelled the participation

before the first session) were assigned to the twice-monthly group and 54 subjects to the monthly group. 3 women withdrew during the course of the twice-monthly programme, and 4 women and 1 man withdrew during the monthly programme. 1 man from the twice-monthly group and 1 woman from the monthly group did not participate in the follow-up. These exceptions were excluded from the analysis. In the final analysis, the twice-monthly group consisted of 46 (7 male and 39 female) subjects, aged 50–72 years (mean 65.8 ± 5.3 years) and the monthly group consisted of 48 (9 male and 39 female) subjects, aged 51–75 years (mean 66.4 ± 5.7 years). There was no significant difference between the groups in gender distribution, mean age, BMI or lipid and lipoprotein levels (Table 2).

Changes in habitual diet and exercise behaviors between groups. Among participants in the 'action' stage, none had returned to the 'contemplation' stage by the end of the follow-up. Concerning changes in diet, the percentage of subjects in the 'action' stage increased by 60–70% after completing the twice-monthly programme or the monthly programme without a significant difference in the rate of change between the programmes (Table 3). In the detailed analysis, no difference in gender or mean age was found between subjects with (5 male and 26 female, 65.2 ± 5.2 years) and those without (2 male and 13 female, 67.2 ± 5.4

Acta Medica Okayama, Vol. 59 [2005], Iss. 6, Art. 5

274   Kotani et al.   Acta Med. Okayama   Vol. 59, No. 6

Table 2   Clinical characteristics in respective classes (baseline)

	Monthly class (n = 48)	Twice-monthly class (n = 46)	P value
BMI (kg/m²)	23.0 ± 2.6	23.7 ± 2.4	NS
TC (mg/dl)	236.2 ± 17.9	236.2 ± 15.4	NS
TG (mg/dl)	124.9 ± 59.8	127.2 ± 96.3	NS
HDL-C (mg/dl)	57.3 ± 8.6	59.4 ± 15.0	NS

Values were expressed as mean ± SD. NS: not significant in comparison between the 2 groups (Student's *t* test). BMI, body mass index; HDL-C, high-density lipoprotein cholesterol; TC, total cholesterol; TG, triglyceride.

years) diet changes in the twice-monthly group. Similarly, no difference was found between subjects with (4 male and 25 female, 66.2 ± 4.6 years) and those without (5 male and 14 female, 66.7 ± 7.1 years) diet changes in the monthly group.

Concerning changes in exercise, there was a large increase in 'action' stage participants in the twice-monthly group (76.1%) compared with the monthly group (54.2%) (odds ratio, 2.6; 95% confidence interval, 1.11–6.52). No marked difference in gender or mean age was seen between subjects with (6 male and 29 female, 66.0 ± 5.4 years) and those without (1 male and 10 female, 65.5 ± 5.4 years) exercise changes in the twice-monthly group. Similarly, no difference was seen between subjects with (3 male and 23 female, 66.6 ± 3.9 years) and those without (6 male and 16 female, 66.2 ± 7.3 years) exercise changes in the monthly group. 13 participants in the monthly group did not achieve the 'action' stage with either their diet or exercise behaviors, and 9 in the twice-monthly group did not change either behavior.

Satisfaction and understanding levels between the groups.   The twice-monthly group felt significantly more satisfied and felt they had significantly better understanding of the material compared with the monthly group (Table 4). In subgroup analysis from the standpoint of behavioral changes, the twice-monthly subjects with changes in diet (n = 31, 88.7 ± 10.9 points) and exercise (n = 35, 88.0 ± 11.3) felt significantly more satisfied than those without changes in diet (n = 15, 79.3 ± 13.3) and exercise (n = 11, 78.2 ± 13.3) (Fig. 1). Within this group, the subjects with changes in diet (84.8 ± 11.5) and exercise (83.9 ± 12.2) showed significantly different levels of understanding compared to those without changes in diet (75.5 ± 8.8) and exercise (75.0 ± 5.5) (Fig. 2). Satisfaction scores in the monthly group were not significantly different between subjects with diet changes (n = 29, 77.6 ± 12.4) and those without

Table 3   The percentage of participants who changed their behaviors of diet and exercise in respective classes

	Monthly class (n = 48)	Twice-monthly class (n = 46)
Diet	60.4% (n = 29)	67.4% (n = 31)
Exercise	54.2% (n = 26)[a]	76.1% (n = 35)[a]

[a]$P < 0.05$, monthly class vs. twice-monthly class (chi-square test).

**Table 4**   Subjective scores on satisfaction and understanding in respective classes

	Monthly class (n = 48)	Twice-monthly class (n = 46)
Satisfaction	75.2 ± 11.3[a]	85.7 ± 12.4[a]
Understanding	76.0 ± 10.8[b]	81.8 ± 11.5[b]

Scores were rated between 0 and 100 points by each subject and expressed as mean ± SD. [a]$P < 0.01$, [b]$P < 0.05$, monthly class vs. twice-monthly class (Student's *t* test).
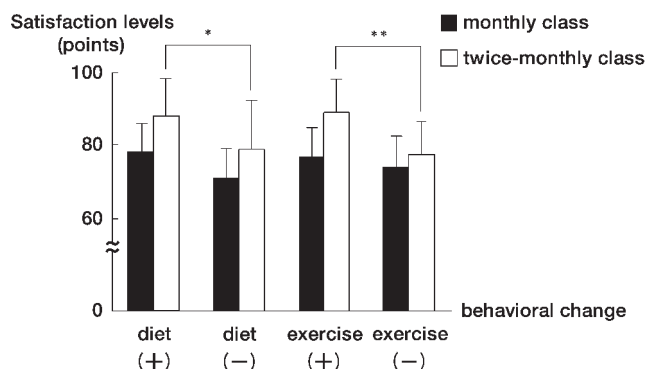
Fig. 1   Satisfaction levels in relation to behavioral changes. *$P < 0.05$, difference between participants with and those without diet changes in the twice-monthly group; **$P < 0.05$, difference between participants with and those without exercise changes in the twice-monthly group.
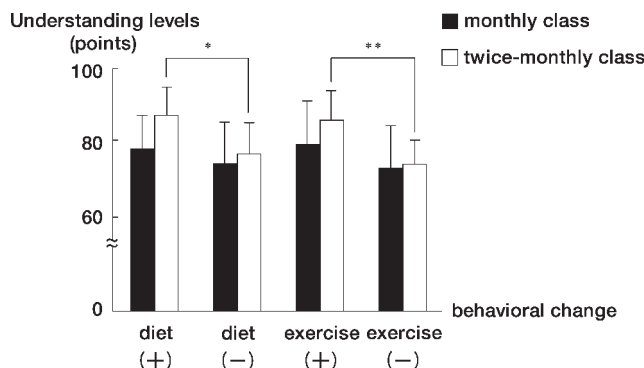
Fig. 2　Understanding levels in relation to behavioral changes. *$P < 0.01$, difference between participants with and those without diet changes in the twice-monthly group; **$P < 0.05$, difference between participants with and those without exercise changes in the twice-monthly group.

(n = 19, 71.6 ± 8.2), or between those with exercise changes (n = 26, 76.3 ± 10.9) and those without (n = 22, 73.9 ± 11.7). Understanding scores in the monthly group also were not significantly different between subjects with diet changes (77.6 ± 10.2) and those without (73.7 ± 11.4) or between those with exercise changes (78.7 ± 8.9) and those without (73.0 ± 12.1), respectively.

Discussion

At present, though patient education on hypercholesterolemia has contributed to disease control in Japan [4, 5], there is limited basic information to establish more effective educational programme models to help people lower their cholesterol levels. When we examined the influence of class intervals on measurements such as behavioral changes and subjective satisfaction and understanding of education classes in a moderate asymptomatic hypercholesterolemic population, the twice-monthly group appeared to have a more effective learning experience in cholesterol management than the monthly group even though the content was the same in both groups.

The programme we offered in this study had many components, including a combination of diet and exercise instruction in addition to TTM-based group meetings. Thus far, the usual lipid-lowering diet recommended to hyperlipidemic patients has been considered useful [16–21], although some researchers have maintained that the effects of diet are too small to be of value in clinical management [22] and that a more intensive diet than is

ordinarily available might be necessary in order to achieve a better response to the diet [19]. Exercise is considered effective in conjunction with dietary efforts and plays a subsidiary role in cholesterol-lowering education [15]. There have been no detailed reports on group meetings in hypercholesterolemia education. However, it has been suggested that a group setting, compared with an individual setting, could provide greater improvement in glycemic control in diabetes education [24]. Also, the behavioral scientific approach has shown significant effects in hyperlipidemia education [23]. For these reasons, our programme could have a favorable effect on hypercholesterolemia. Additionally, there were only a small number of dropouts during our study period, possibly because this comprehensive programme attracted participants' interest.

Although the effect of different intervention intervals on hypercholesterolemia education has been obscure, reports on intervention in diabetes education indicate that the contact methods, such as greater interaction [25] and more time [26] between participants and educators, are important in order to increase this effect. In our study, contact time was similar between the twice-monthly and monthly groups. The relative beneficial effect of the twice-monthly format could be associated with more intensive and timely contact through the shorter intervals between sessions.

Recent works have indicated prominent benefits of stage-matched behavioral methods from the TTM [12, 13]. Based on the construct of pros and cons in the 'contemplation' stage, we promoted group meetings to identify the participants' resources for behavioral changes and to minimize factors that inhibited recommended behaviors (barriers). Our results confirmed that the stage-matched intervention was successful at helping more participants engage in favorable behavioral changes in hypercholesterolemia education, similar to the findings of studies with other settings [7–13]. Many participants moved from the 'contemplation' stage to the 'action' stage in the present study, especially in the twice-monthly group. The higher rate of behavioral changes in this study compared to a previous report on diabetes education [13] was perhaps due to the difference between study populations: we chose individuals through screening in health examinations who were likely to have a high interest in their health. In particular, the rate of change in exercise behaviors was higher in the twice-monthly group than in the monthly group, while no such difference was obser-

ved in nutritional behaviors. This suggests that the intensive interval intervention is likely more effective than longer intervals for helping individuals adopt advised exercise behaviors.

We implemented the programme with attention toward motivation, knowledge and skill for undertaking recommended behaviors. When participants developed skills, we played a leading role in the continual reinforcement of the maintenance of positive behaviors. This might explain why subjective scores in both satisfaction and understanding levels were high in both groups overall. The twice-monthly group had both higher satisfaction and understanding levels than the monthly group. Further, in the twice-monthly group, diet and exercise behavioral changes were well correlated with satisfaction and understanding levels. These results seemed similar to those of another study, in which satisfaction was a determinant of learning and compliance with diabetes education [25].

Our results were limited to generalizations at the time because of the limited variety of subjects and because of the small sample size. Also, total fat intake and blood lipid and lipoprotein counts were not measured. Further research would include large-sample longitudinal follow-up to assess the maintenance of learned behaviors over time as well as long-term control of cholesterol, leading to the prevention of hypercholesterolemia-related complications. Moreover, though one report examining the long-term effect of a behavioral intervention on lipid regulation was found [27], continuing education methods or the promotion of self-support outside of continuing education must be considered an issue.

In conclusion, during the observation period, the intensive twice-monthly comprehensive format for delivering hypercholesterolemia education was generally superior to the monthly delivery format, as measured by diet and exercise behavioral changes as well as by participants' satisfaction and understanding levels, possibly leading to better cholesterol management. Consideration of the interval length between sessions in hypercholesterolemia education programmes appears necessary. An accumulation of epidemiological and biochemical evidence would also be required to reinforce this idea in the future.

References

1. Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults: Summary of the second report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel II). JAMA (1993) 269: 3015–3023.
2. Grundy SM: Cholesterol and coronary heart disease. The 21st century. Arch Intern Med (1997) 157: 1177–1184.
3. Japan Atherosclerosis Society: Guideline for diagnosis and treatment of atherosclerosis 2002, Japan Atherosclerosis Society eds, Tokyo (2002) (in Japanese).
4. Okayama A, Ueshima H and Chiba N: How to use the cholesterol-lowering programme and its feature; in Personalized Cholesterol-lowering Education, the working group of personalized medical education and health assessment eds, Hokendojin Ltd, Tokyo (2000) pp 22 –32 (in Japanese).
5. Soga K, Matsumoto N, Saho Y, Adachi A, Nakaura T and Akashi M: A study of the way to ameliorate living habits-for people with hyperlipidemia. Jpn J Rural Med (2003) 52: 53–64 (in Japanese).
6. Prochaska JO: Assessing how people change. Cancer (1991) 67 (3 Suppl): 805–807.
7. Prochaska JO, DiClemente CC, Velicer WF and Rossi JS: Standardized individualized, interactive, and personalized self-help programs for smoking cessation. Health Psychol (1993) 12: 399–405.
8. Prochaska JO, Velicer WF, Rossi JS, Goldstein MG, Marcus BH, Rakowski W, Fiore C, Harlow LL, Redding CA, Rosenbloom D and DiClemente CC: Stages of change and decisional balance for 12 problem behaviors. Health Psychol (1994) 13: 39–46.
9. Prochaska JO and Velicer WF: The transtheoretical model of health behavior change. Am J Health Promot (1997) 12: 38–48.
10. Nigg CR, Burbank PM, Padula C, Dufresne R, Rossi JS, Velicer WF, Laforge RG and Prochaska JO: Stages of change across ten health risk behaviors for older adults. Gerontologist (1999) 39: 473–482.
11. Laforge RG, Rossi JS, Prochaska JO, Velicer WF, Levesque DA and McHorney CA: Stage of regular exercise and health-related quality of life. Prev Med (1999) 28: 349–360.
12. Sarkin JA, Johnson SS, Prochaska JO and Prochaska JM: Applying the transtheoretical model to regular moderate exercise in an overweight population: validation of a stages of change measure. Prev Med (2001) 33: 462–469.
13. Jones H, Edwards L, Vallis TM, Ruggiero L, Rossi JS, Greene G, Prochaska JO, Zinman B: Changes in diabetes self-care behaviors make a difference in glycemic control; The Diabetes Stage of Change (DiSC) study. Diabetes care (2003) 26: 732–737.
14. Investigating Committee of Guideline for Diagnosis and Treatment of Hyperlipidemias, Japan Atherosclerosis Society: Guideline for diagnosis and treatment of hyperlipidemia in adults. J Jpn Atheroscler Soc (1997) 25: 1–34 (in Japanese).
15. Teramoto T: Exercise therapy; in Hyperlipidemia, Pathophysiology, Management and Therapy, Teramoto T eds, Nankodo, Tokyo (2002) pp 108–111 (in Japanese).
16. Betteridge DJ, Dodson PM, Durrington PN, Hughes EA, Laker MF, Nicholls DP, Rees JA, Seymour CA, Thompson GR, Winder AF, Winocour PH and Wray R: Management of hyperlipidemia: guidelines of British Hyperlipidemia Association. Postgrad Med J (1993) 69: 359 –369.
17. Imperial Cancer Research Fund OXCHECK Study Group: Effectiveness of health checks conducted by nurses in primary care; results of the OXCHECK study after one year. BMJ (1994) 308: 308–312.
18. Family Heart Study Group: Randomised controlled trial evaluating

cardiovascular screening and intervention in general practice; principal results of British family heart study. BMJ (1994) 308: 313–320.

19. Neil HA, Roe L, Godlee RJ, Moore JW, Clark GM, Brown J, Thorogood M, Stratton IM, Lancaster T, Mant D and Flowler GH: Randomised trial of lipid lowering dietary advise in general practice: the effects on serum lipids, lipoproteins, and antioxidants. BMJ (1995) 310: 569–573.

20. Van Gaal LF, Wauters MA and De Leeuw IH: The beneficial effects of modest weight loss on cardiovascular risk factors. Int J Obes Relat Metab Disord (1997) 21 (Suppl 3): S5–9.

21. Golay A and Bobbioni E: The role of dietary fat in obesity. Int J Obes Relat Metab Disord (1997) 21 (Suppl 3): S2–11.

22. Ramsay LE, Yeo WW and Jackson PR: Dietary reduction of serum cholesterol concentration: time to think again. BMJ (1991) 303: 953 –957.

23. Lynch DJ, Birk TJ, Weaver MT, Gohara AF, Leighton RF, Repka FJ

and Walsh ME: Adherence to exercise interventions in the treatment of hypercholesterolemia. J Behav Med (1992) 15: 365–377.

24. Rickheim PL, Weaver TW, Flader JL and Kendall DM: Assessment of group versus individual diabetes education: a randomized study. Diabetes Care (2002) 25: 269–274.

25. Gorman AR, Ludemann MA and Reichle SC: Comparing satisfaction levels of inpatients and outpatients with a diabetes teaching program. Patient Educ Couns (1988) 12: 121–129.

26. Norris SL, Lau J, Smith SJ, Schmid CH and Engelgau MM: Self-management education for adults with type 2 diabetes: a meta-analysis of the effect on glycemic control. Diabetes Care (2002) 25: 1159–1171.

27. Jairath N, Culpepper WJ 2 nd, Long J and Murtagh D: Effect of a behavioral nursing intervention on long-term lipid regulation. Outcomes Manag (2002) 6: 34–39.