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Effectiveness of Health Coaching on 3 & 6 month GlycemicControl;Systematic Review

Deni Purnama[1], Hadi Pratomo[2], Rita Damayanti[2]

[1]Doctoral Program, Faculty of Public Health, University of Indonesia
[2]Department of Health Promotion and Behavior Science, Faculty of Public Health, University of Indonesia

Abstract— **Objectives:** The increasing prevalence of diabetes has become a challenge for global health professionals. Health coaching is one of the approaches used in self-management in diabetes patients. The aim of this study was to assess the effect of health coaching on 3 and 6 months of glycemic control in people with type 2 diabetes. **Methods:** This literature study was conducted in a randomized controlled trial design that used health coaching interventions in people with type 2 diabetes, while the control group used usual care. The electronic databases used were PROQUEST, SAGE, WILLEY and CINAHL published between January 2010 and December 2020. The outcome measured was the effect of intervention on changes in HbA1c levels at 3 and 6 months from the baseline. **Results:** We found 5 selected articles of the 72 articles that were screened, of these 5 articles 3 articles had low bias and 2 articles had some concern. Health coaching intervention had a significant effect on decreasing HbA1c levels at 3 and 6 months compared to usual care. The health coaching method used uses face to face, telephone, text or a combination. Coaching can be carried out by health professionals or peers who have been trained. **Conclusions :**Health coaching is an effective approach to glucose control in type 2 diabetes patients.

Keyword: Health coaching, type 2 diabetes, HbA1c, Glycemic control

Introduction

The increasing prevalence of diabetes has become a challenge for global health professionals. In 2019 around 463 million adults (20-79 years) in the world are living with diabetes and it is estimated that this will increase to 700 million by 2045, of which 79% are in low and middle income countries [1]. Diabetes causes at least 760 billion dollars in health expenses or the equivalent of 10% of total adult expenses [1].

Diabetes is a chronic disease that occurs when the pancreas does not have the ability to produce insulin, or when the body cannot properly use the insulin it produces [2]. Management of diabetes is carried out by multidisciplinarity, but the most important thing is the patient's active participation in managing himself. Empirical evidence suggests the best approach in diabetes management is self-management [3].In recent years, health coaching has emerged as an innovative health promotion intervention approach to improve patient adherence to self-management behaviors that can support health improvement efforts in people with chronic diseases such as diabetes. [3, 4]

Health coaching is a patient-centered approach in which patients at least define their goals, use self-potential and become active learners, control and increase accountability for their health [5]. In the UK, health coaching is one of the innovation programs in the health sector [6]. One of the effects of

health coaching is the ability to control glycemic load. several studies performed HbA1c measurements after coaching interventions at 3 months, 6 months and 12 months, 18 months. The limited reference for determining the best method for implementing health coaching and how it affects glycemic control, requires a systematic literature review. The aim of this study was to assess the effect of health coaching on glucose control at 3 and 6 months in people with type 2 diabetes.

Methods

Study criteria considered for review

Studies were conducted and reported according to the guidelines for systematic review and meta-analysis (PRISMA). The study criteria were determined using the PICO method (Problem, Intervention, Comparison, Outcome). The study was carried out only in a randomized control trial (RCT) study design involving patients with type 2 diabetes mellitus, using coaching interventions compared to usual management and the outcome seen was a clinical indicator, namely the HbA1c value.

The inclusion criteria for this literature study are studies that have been peer reviewed, published between January 2010 - December 2020, contain the words "coaching", "diabetes" and "HbA1c" in the abstract, use English, use RCT design, full text article is available. , the subjects were people with type 2 diabetes. While the exclusion criteria were the measurement of HbA1c outcome> 6 months.

Study / Article Identification

The data base used for this study is the electronic database PROQUEST, SAGE, WILLEY Online Library, CINAHL (Cummulative Index to Nursing and Alied Health Literature), database access using the online library access of the University of Indonesia. Database searches use the keyword Coaching AND Diabetes AND HbA1c in the abstract on 4 (four) electronic data sources that are used with a time limit for publication of January 1, 2010 to December 31, 2020.

Data Collection and Analysis

Study Selection:

All abstracts of the articles obtained were read carefully by one reviewer (DNP), the articles were entered into the Mendeley application to check for duplication, then the articles were screened using PICO followed by screening based on the research method used. Protocol study articles, systematic reviews and other RCTs were excluded. Then it was checked according to the established criteria, articles that did not match the inclusion and exclusion criteria were excluded. The number of articles that fit the criteria is thoroughly reviewed by (DP) and verified by (RD) and (HP).

Data Collection and Management

Data collected in the form of study demographic baseline (age and sex), method and sample size, details of interventions, outcome measures, donors, conflicts of interest [8], data collected from articles that meet the criteria reviewed by (DP) and verified by (RD) and (HP) using standardized data collection forms.

Risk of Bias (RoB) Assessment

The bias risk assessment was carried out by reviewer (DP) using the excel tool to implement RoB 2 and verified by (RD and HP).The risk assessment of bias was based on the risk of bias tool for randomized trials version 2 from Cochrane whichincludes Bias arising from the randomization process, Bias due to deviations from intended interventions, Bias due to missing outcome data,*Bias in measurement of the outcome, Bias in selection of the reported result*by rating categoryLow risk of bias, Some concerns, High risk of bias. [9]

Measurement of the effect of the intervention

The data analysis used to measure the effect of the intervention was the mean difference (mean difference) HbA1c between before and after the coaching intervention and the difference between the coaching intervention group and the control group at 3 and 6 months. The reviewer ensured that the data analysis unit was homogeneous, namely the individual who was used as the unit of analysis.

Summarizing findings and assessing certainty of the evidence:

The method for summarizing the review findings and assessing the certainty of the quality of evidence for the main study outcome using the GRADE (Grading of Recommendations Assessment, Development and Evaluation) approach is presented in tabular form.

Results

Description of Studies

The search results from 4 electronic databases used found 72 relevant published articles. Checking for duplication using Mendeley's software and found 7 duplicated journal articles and then merged, so that the number of articles after the duplicated articles were issued totaled 65.Screening was carried out related to the criteria starting by screening abstract articles that did not use the RCT design, then checking the eligibility of 17 full text articles found that the subject of prediabetes (2), the subject of type 1 diabetes (3), HbA1c measurement> 6 months (3), the definition of the intervention was unclear (2) and cluster design (2) so that the final article reviewed was 5 articles (figure 1) .

Study Participant

The subjects of this literature study amounted to 1492 people with type-2 diabetes mellitus in primary health care and hospitals with an age range of 40 years and over, 43.2% were women, HbA1c> 7.0.

Risk of Bias

We assessed the risk of bias in the articles we reviewed, the overall assessment of 3 articles had a low risk of bias, whereas 2 articles were of concern.

Arising bias from the randomization process

3 articles had clear statements about the randomization process, but 2 articles did not clearly state how the randomization process was carried out.

Bias due to deviations from intended intervention

Two articles stated that the participants did not know which group they belonged to, and almost all articles stated that those who provided the intervention knew the intervention given but there was insufficient evidence to suggest that it influenced the results of the study.

Bias due to missing outcome data

Data were available on all articles according to study objectives

Bias in measurement of the outcome

The measurement method was appropriate for all articles, and the outcome rater may not have known the status of the intervention

Bias in selection of the reported result

We believe the published results are in accordance with previous intentions and have used appropriate measurement methods.

Characteristics of Health Coaching Intervention interventions

Telephone is the coaching method that is widely used [10, 11,12 13] a combination of telephone and face to face [13] and face to face plus via messaging applications [14]. The majority of coaching is provided by health professionals such as nurses [11,14] and nutritionists [10] in health services, but coaching can also be provided by trained peers [13]. Coaching is given for a period of 3 months [12,14] and 6 months [10,11,13], with an average frequency of 1 time per month [10,11,12] and 2 times per month [13]. The duration of coaching is between 20 - 45 minutes per session either by telephone or face-to-face.

Health Coachingon Glycemic Control

HbA1c as an indicator of glucose control showed a significant difference in the intervention group between baseline and timepoint [10,11,12,13,14]. The difference in the mean HbA1c in the intervention group with the 3-month outcome measurement decreased between 0.5% - 0.7% ($p = 0.01$), while the 6-month outcome measurement decreased between 0.5% - 1.07% ($p. = 0.01$). The control group did not show any significant difference between baseline and timepoint. The decrease in HbA1c in the control group was 0 – 0.3%. The difference in HbA1c levels between the intervention group and the control group was between 0.3 – 0.86% (see table 1).

Discussion

The results of the review show that health coaching is effective in controlling glycemic. Studies in 5 articles published in the last 10 years involving 1492 type 2 diabetes patients showed a decrease in HbA1c levels in the health coaching intervention group compared to usual care. HbA1c is an objective measure of glycemic control, HbA1c reflects mean plasma glucose over the previous eight to 12 weeks [15]. Changes in HbA1c indicate an individual's ability to control their blood sugar levels. In this study, the health coaching intervention group showed a decrease in HbA1c by 0.5% [10,11,14] and> 0.5% [12,13], while the control group did not find any significant differences between baseline and endpoint.

The ability to control glycemic is related to the ability in self-management, including adherence to treatment programs and behaviour change [17]. Coaching increases accountability for the stated behaviour change goals [5], so that it has responsibility for self-management. Patients become more motivated and confident in carrying out good self-management because the determination of the action plan is carried out according to their capacity and there are learning efforts that grow all the time. Coach accompanies and appreciates the achievement of the goals set.

A health coach should be a health worker who has received special training [5]. In this study, the role of a coach is a health worker, namely a nurse [11, 14] and a nutritionist [10], but in this study there is 1 study that shows peers who receive special training to become an effective health coach for their peers and the results show a good effect [13]. The delivery coaching method is done by face to face, telephone, text or a combination.

Conclusion

Health coaching is effective in optimizing glycemic control in people with type 2 diabetes, Health coaching can be carried out face-to-face, via text or by telephone or in combination, coaching can be provided by trained health professionals and peers.

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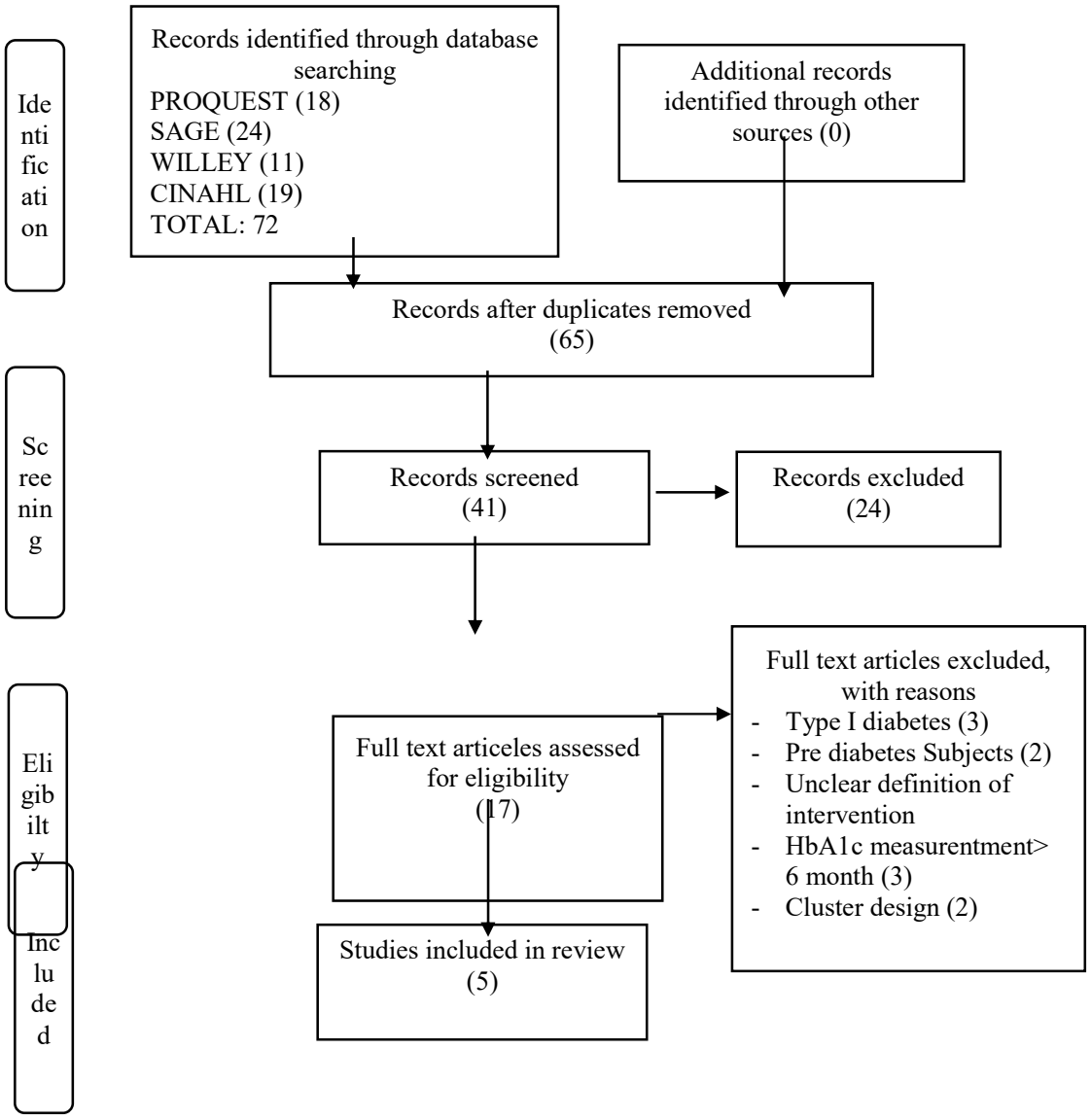

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Figure 1 :Articeles flow diagram

Table 1
Health coaching effect on HbA1c (%) changes

Study (Author / Years)	Intervention		Mean 7ehaviou within	Control		Mean different within	Mean diff between
	Baseline	Endpoint		Baseline	Endpoint		
Cho et al. (2011) *	8.0 +1	7.50 +0.9	0.5	8.0 +0.8	7.8 +1.1	0.2	0.3
Bollylky et al (2018) *	7.5+ 1.8	6.6 +1.3	0.9 +1.5	7.6 +2.1	7.5 +1.3	0.1 + 1.6	0.8
Thom et al. (2013) **	10.05 +2	8.89 +2	1.07	9.85 +2	9.55 +2.3	0.3	0.86
Odnoletkova et al	7,9 + 1	7.4 +0.9	0.5	7.8 +0.8	7.8 + 1.1	0	0.5

(2016) **							
Varney et al. (2014) **	8.2 (8-9.7)	7.7 (7,4-8,1)	0.5	8.5 (8.1-8.9)	8.5 (8.1-8.8)	0	0.5

Information :
*) 3 month endpoint
**) 6 month endpoint