Using concept mapping through problem-based learning to facilitate lifelong knowledge of risk factors for cardiovascular diseases : Case university of Algiers

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Abstract

Background: This study explored the use of concept mapping through (PBL) process to facilitate lifelong knowledge risk factors for cardiovascular diseases (RF for CVD) study, and sought to analyze whether these methods could improve undergraduate learners' risk factors for cardiovascular diseases lifelong knowledge skills. Learners learn how to learn, how to ask the right questions to arrive at solutions. **Methods:** There were (40) undergraduate medical learners who were randomly selected and assigned to two groups, the group 1 (n = 20) and the group 2 (n = 20). In the Group (1) was taught to use concept mapping through (PBL) process to learn RF for CVD using FRS tool, while the group (2) was taught by traditional methods. After the training, all of the learners were assessed by having a RF for CVD using FRS tool diagnostic test. **Results:** Learners using concept mapping (CM) through (PBL) process in the group (1) appeared to be more proficient in the use and organization of relevant information do attain new concepts in constructing knowledge and moving toward better conclusions. Learners in the group 1 using concept mapping (CM) through (PBL) process were significantly more satisfied with the decision-making process. Furthermore, learners indicated a positive attitude to CM and PBL, and perceived them as a resource for lifelong knowledge skills learning of RF for CVD using FRS tool. **Conclusions:** Concept mapping through (PBL) process of risk factors for cardiovascular diseases (RF for CVD) helps to facilitate meaningful learning within the course in risk factors for (CVD) and the majority of learners (90 %) utilized it beyond the course. According to qualitative analysis, majority of learners accepted concept mapping through (PBL) process as a helpful tool for learning RF for CVD using FRS tool.

Key words: Concept maps, problem-based learning, lifelong knowledge, Cardiovascular diseases, risk factors for Cardiovascular diseases and Framingham Risk Score.

1 Introduction

Heart is the main organ of cardiovascular system (CVS) and it is responsible for distributing blood all over human body. The term "cardio" is derived from "cardiac" meaning heart (H) and the term "vascular" means blood vessels (BV). The main components of this

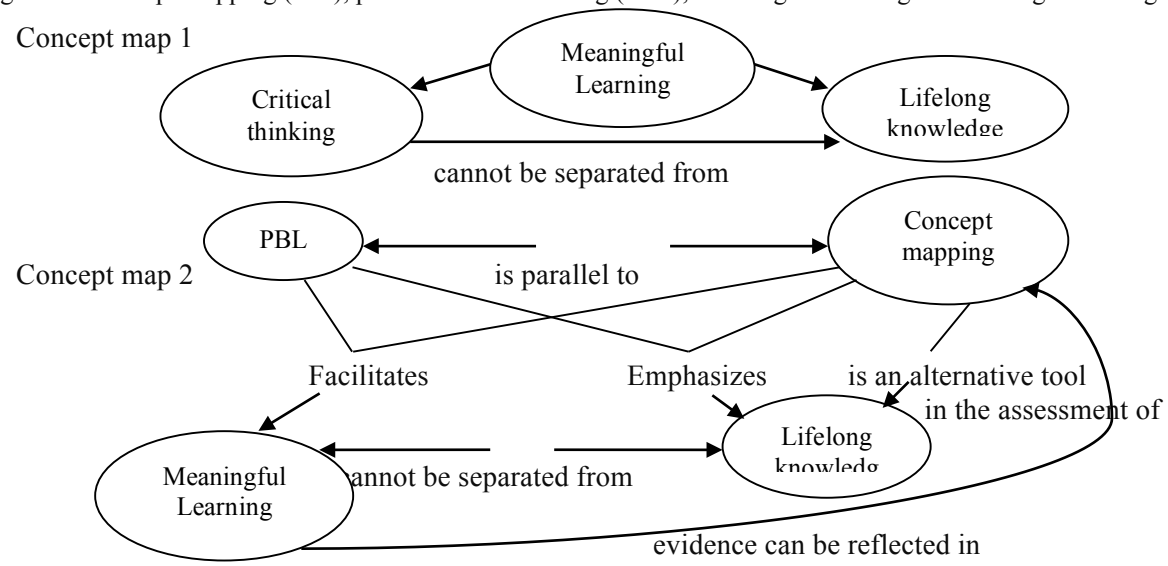
cardiovascular system are the heart, blood vessels, blood, arteries, veins, and capillaries. The cardiovascular system, also called the circulatory system (CS), moves blood throughout the human body. Heart disease (HD) is a term that refers to a variety of acute and chronic medical conditions that affect one or more of the components of the heart. Heart diseases (HD) can be present at birth (congenital) or may be acquired. Heart diseases are categorized as the "leading cause of death" in the worldwide. Cardiovascular diseases (CVD) are conditions that involve the blood vessels, the heart, or both (AHA,2011). In fact, there are over (60) different types of cardiovascular diseases. Many of these conditions can be life-threatening. It's important to understand which risk factors affect you and what actions you can take to lower your risk of developing heart disease. A risk is the product of several factors. Risk estimation attempts to determine the combined effects of several risk factors. A risk factor (RF) is defined as a measurable characteristic that is causally associated with increased disease frequency and that is a significant independent predictor of an increased risk of presenting with the disease. The emphasis is on the identification of risk factors, and the assessment of their predictive ability and their implications for disease prevention.

Cardiovascular disease (CVD) is a major cause of disability and premature death throughout the worldwide, and contributes substantially to the escalating costs of health care (WHO,2007). Cardiovascular disease (CVD) is an umbrella term that describes a range of conditions caused by blood clots (thrombosis) or build up of fatty deposits inside an artery that cause the artery to harden and narrow (atherosclerosis). CVD is caused by a narrowing of blood vessels that prevent your heart, brain or body from receiving enough oxygen from a restricted blood supply. Our bodies need the oxygen to be able to function. High blood pressure, heart disease, and stroke are the most common forms. Depending on the specific condition, cardiovascular disease treatment may involve medication, lifestyle changes, rehabilitation or special procedures. The goal of treating cardiovascular disease is to maximize the patient's quantity and quality of life. Prevention is the key to avoid cardiovascular disease and optimize treatment. Preventing cardiovascular disease requires paying attention to good cardiovascular health and understanding the cardiovascular system and diseases that can affect it, learning your risk factors for preventable cardiovascular diseases, learning the risk factors that apply to you and doing something about the risks you can modify. All major risk factors of (CVD) can be clinically useful for 3 purposes : 1) identification of high-risk patients who deserve immediate attention and intervention, 2) motivation of patients to adhere to risk-reduction therapies, and 3) modification of intensity of

risk-reduction efforts based on the total risk estimate. Many different risk factors (conditions or lifestyle habits and metabolic syndrome (MetS)) can affect your chance of developing heart disease-including some you can, and some you can't control. In addition, a variety of novel biochemical markers have been suggested to identify individuals at increased risk for CVD, such as: markers of inflammation (e.g. high sensitivity),C-reactive protein(CRP), Homocysteine , markers of fibrinolytic and haemostatic function (e.g. tissue type plasminogen activator antigen), fibrinogen and cardiac (proteins-enzymes) also used (e.g Troponin (e.g. C,I,T), Myoglobin ,Total Creatine Kinase (e.g . CK-MM ,CK-MB ,CK-BB).

Prior knowledge is generally considered of high importance as it is deemed to serve both as the foundation for integration of new concepts and as a potential obstacle to conceptual change (Mason, 2002; Vosniadou, 2002; Chi and Roscoe, 2002).So, What does it take to learn risk factors of Cardiovascular diseases to be relevant and practical to human life and facilitate lifelong knowledge? Using Concept mapping (CM) through (PBL) are tools for organizing and representing knowledge. Using Concept mapping (CM) through problem based learning (PBL) of risk factors for cardiovascular diseases (CVD) could be the answer to this. Using concept mapping through (PBL), learners acquire lifelong knowledge learning of the essential concepts of the course , meaningful learning and problem solving skills that include the ability to find and use appropriate learning resources of risk factors for cardiovascular diseases (see figures1-2-3). The basis of concept maps is the theory of “meaningful learning”. Prior knowledge of learner is an important factor for learning new knowledge should be linked to existing or old knowledge in order to produce “meaningful learning” a new knowledge. This helps learners organize multiple concepts in a single subject while learning the initial concepts and visualize abstract concepts and form their own cognitive structure. Concept maps describe top-down relationships, bottom-up relationships and composition of a hierarchical system. Comprehensive risk factors assessments tools, using FRS tool, help general practitioners (GPs) to effectively manage their patient’s cardiovascular disease (CVD) risk by providing a meaningful and ‘individualised’ risk level.

Figure1 – Concept mapping (CM), problem-based learning (PBL), meaningful learning and lifelong knowledge



When a concept maps through PBL (see figures 1-2-3) is drawn by the learners, they integrate their new knowledge with what they have learned previously. This a new approach may help learners to easily classify their old and new knowledge, emphasizing key concepts or main ideas, make them coherent to make a deeper understanding of different fields of RF for CVD. This would assist learners reaching higher levels of cognitive learning rather than memorizing a series of new concepts of RF for CVD using FRS tool.

This paper aims to : first introduction and review the concept maps through problem-based learning as a new potential pedagogical approach to medical RF for CVD learners learning, and then discuss implications for medical RF for CVD learners teaching and learning using both concept mapping (CM) and problem-based learning (PBL) as tools to improve lifelong knowledge learning of the essential concepts of the RF for CVD using FRS tool and problem solving skills that include the ability to find and use appropriate learning resources of risk factors for cardiovascular diseases (CVD).

2 Literature review:

According to (Schmidt,1983) "Education should help learners, in activating relevant prior knowledge, provide a context that resembles the future professional context as closely as possible, and stimulate learners to elaborate on their knowledge". In meaningful learning, the learners are "integrating" new knowledge into old knowledge. Prior knowledge may be characterized by varying levels affective entrenchment related to social values, ideology and identity (Limon, 2002; Pintrich et al., 1993), and presumably higher levels of affective

entrenchment would correspond with greater difficulty in achieving conceptual change. Revision of misconceptions may also prove costly at the level of cognitive processing if revision of a particular mental model will require revision of a number of related models.

According to (Hmelo-Silver &Author,2013) problem-based learning (PBL) is a learner-centered, conceptual knowledge and problem solving ,self-directed, lifelong learning, intrinsic motivation and collaborative learning approach which was first utilized by Howard Barrows and other researchers in a medical school program at McMaster University in Hamilton, Ontario, Canada back in the 1960s (Barrows, 1996). PBL was designed to engage learners in active learning and knowledge construction in higher level thinking. In PBL, learners learn subject-matter content by identifying and solving authentic problems of the discipline (Hallinger, 2005). As is true of other student-centered approaches, PBL is thought to help learners apply domain-specific knowledge to the solution of problems likely to be encountered in their future careers. Thus to that, (PBL) is a way to foster thinking and critical analysis and provide real focus or understanding of the objectives of the curriculum for both learners and staff, which traditional curricula and rarely do (Shanley, P. F., 2007 and Pester, Ofner et al. 2002). The problems lead the learners to learn basic concepts rather than being presented as applications of concepts they have already learned. In addition, integrating collaboration and concept mapping could help learners in their knowledge sharing and exchange, while also developing their communication skills and strengthening their learning motivation (Güvenç, & Ün Açikgöz, 2007; Hwang, Shi, & Chu, 2011; Kwon & Cifuentes, 2009; Roth & Roychoudhury, 1992; Wood & O'Malley, 1996). That is, having interactive groups is the key component to applying the concept mapping approach (Cheng, Wang, & Mercer, 2014).

The Concept Mapping (CM) and problem based learning (PBL) have parallel purposes, both based on a constructivist view of learning. Through concept mapping, metacognition is stimulated and (CVD) learners use prior knowledge, link facts and concepts, structure new learning and develop critical thinking (Harrison, & Gibbons, 2013;Latif, Mohamed, Dahlan, & Mat Nor, 2016). PBL has used concept mapping to evaluated the integration of knowledge and measure cognitive domains (Hung, & Lin, 2015; West et al., 2000). Concept mapping has been found to be a useful tool for this .It allows learners to connect their existing knowledge to the subject being learned (Novak,2002). PBL is a method of teaching that uses a patient situation or scenario to stimulate learners to acquire and apply knowledge to solve problems. Concept mapping can promote problem-solving and lifelong knowledge to help learners

organize complex patient data, process complex relationships and offer holistic care to patients. Concept mapping researchers have indicated that concept mapping could bring benefits to learners in terms of their learning (Caelli, 1998; Hwang, Kuo, Chen, & Ho, 2014; Weinerth, Koenig, Brunner, & Martin, 2014). In the lifelong process, it is possible to say that learners are faced with many real life problems (Augustine, 2011; Tortop, 2013). The goal is to guide learners to become skilled in acquiring application qualification. Many learners have not grasped the meaning of thinking as an objective of learning and education, and thus questions, which require thinking, are challenging. So,one of the helpful tool for development of creativity and critical thinking skills proposed is problem-based learning environments in classrooms using Concept mapping.

A variety of screening tools exist to help providers estimate the risk of first cardiovascular event in adult patients, including the Pooled Cohort Atherosclerotic Cardiovascular Disease (ASCVD) Risk Equations, Framingham Risk Score (FRS), Systematic Coronary Risk Evaluation (SCORE), Prospective Cardiovascular Münster (PROCAM), and the United Kingdom Prospective Diabetes Study(UKPDS). Risk assessment tools, such as the Pooled Cohort Risk Equations or Framingham calculator can facilitate the estimation of risk and open the door for shared decision-making regarding interventions to reduce cardiovascular risk. Shared decision making tools are sometimes built into risk assessment tools .Good conceptual lifelong knowledge in CVD is an essential requirement of RF for CVD learners, in that they are required to apply concepts learned in the classroom to a variety of different contexts. Using Concept mapping (CM) through (PBL) is an educational tool for evaluating conceptual knowledge, use to facilitating the development of richer knowledge and facilitate collaboration in problem solving by external representation of all collaborators' knowledge and information (Engelmann & Hesse, 2010). According to (Jonassen, 2005) concluded that "It is necessary to understand the conceptual relationships between the concepts in any problem domain in order to be able to transfer any problem-solving skills developed". In addition, structured feedback has the potential to develop good conceptual lifelong knowledge learning to agree with theory and experience.

3 Methods

The concept mapping through PBL process steps 1-2-3-4 involves a series of steps that lead to a final product that demonstrates one's understanding and comprehension of a subject or concept in real world problem. The process of constructing a concept map through

PBL both requires and encourages meaningful learning and aids understanding of the relationships between concepts (Novak, 1990, 2004; Novak & Canas, n.d., 2006) .

3.1 Population data

There were total 40 grade 4 undergraduate medical learners enrolled at Algiers University of medicine and Blida University of medicine in Algeria. The learners were randomly assigned to two groups. Group 1 (n = 20) was taught to use concept mapping through (PBL) to learn RF for CVD, while Group 2 (n = 20) was taught by traditional teaching approaches. Training and practice phases were adopted in both groups, meanwhile the learning objectives, teaching-learning contents and the practice RF for CVD stripe samples were all the same. Learner performance was measured using written knowledge tests (with a maximum score of 20). The learners also evaluated the relevance of the learning process using a 05-items survey.

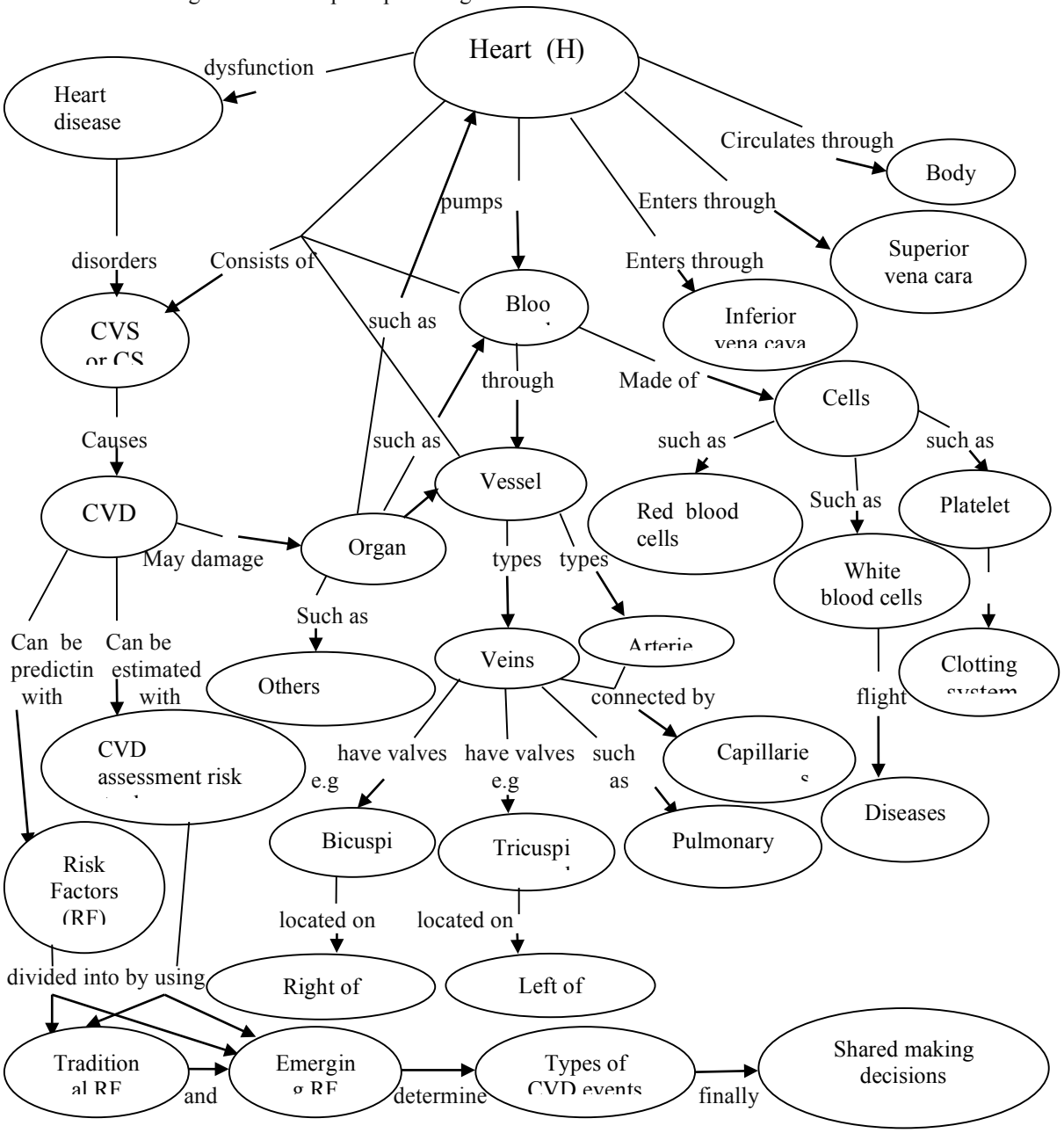
3.2 Training and practice by concept maps through PBL process

The goals are for learners to learn and be able to apply the disciplinary content, develop critical thinking abilities, and acquire skills of life-long learning, communication, and team building using FRS tools assessment to estimate RF for CVD (see figures 2 and 3 below).

3.2.1 Constructing concept maps of RF for CVD assessment tool

It is important to explain to learners how to construct a concept maps through PBL to estimate RF for CVD using (FRS) tool assessment risk.

Figure 2 – Concept maps through PBL of basic RF for CVD assessment tools



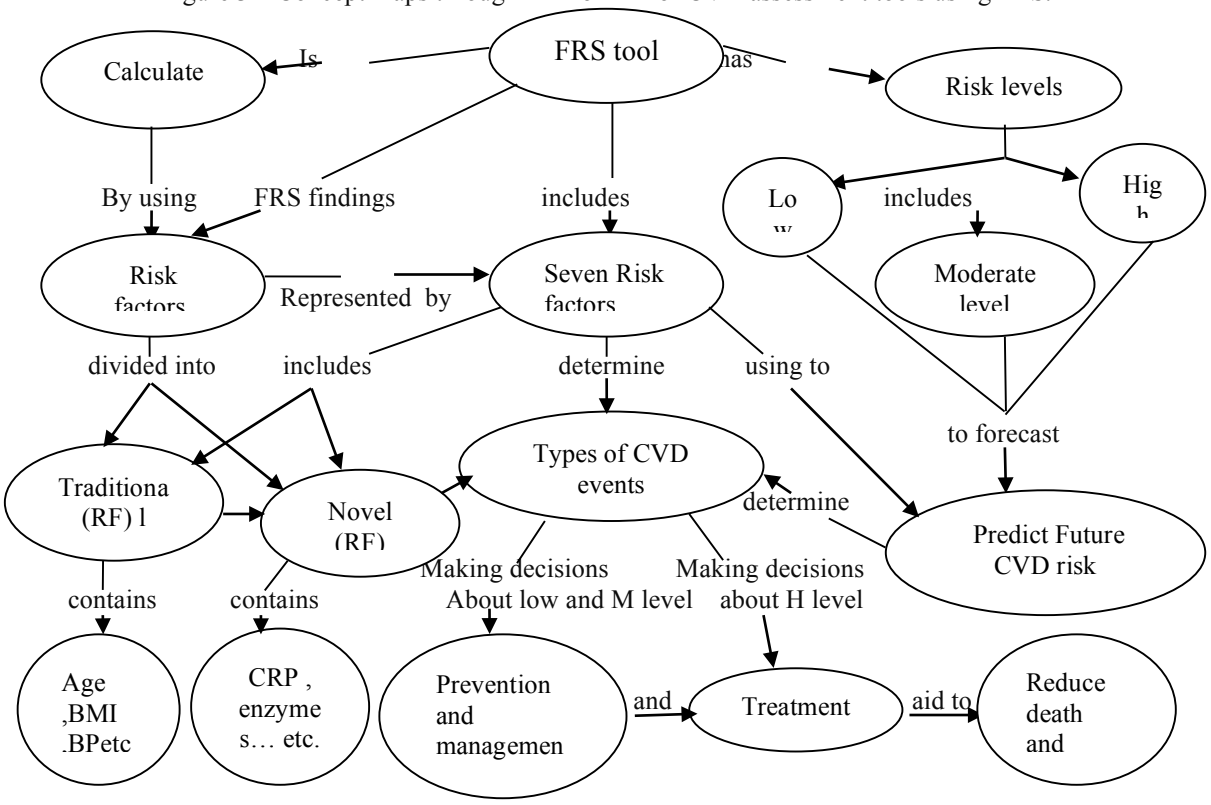
The general steps for map construction using PBL steps include 1) preparation, 2) development of a skeleton, 3) analysis 4) categorization of information and 5) analysis of relationships between the categories of information (Schuster, 2002) , whereas PBL process includes only four steps : 1) Presenting the problem 2) Identifying what should be learned 3) Learning 4) Applying it. Figures (see 2 and 3) showed examples of a concept map that describes the structure of concept maps through PBL about RF for CVD and illustrates the characteristics at Algiers University and Blida University of medicine in Algeria. The use of concept maps through PBL may help bridge the gap between theory and application in the clinical setting (Wheeler and Collins,2003). In this study, the learners in the group 1 used

PBL steps 1-2-3-4 to construct concept maps of RF for CVD that presented major issues of the problem, clarify , define and analyze the problems, solutions developed, and arguments to justify the solutions to predict future type of CVD. It was found that the learners who used the concept mapping through PBL process tool performed better than those who did not use the tool in providing arguments when defining the problem and justifying the solutions. The results indicated that concept mapping could facilitate learners' ill structured problem solving. The reason why conecpt mapping through PBL is considered to be beneficial for the lifelong knowledge is that it promotes the activation and elaboration of prior knowledge.

3.2.2 Learning RF for CVD using FRS concepts by concept mapping

Concept maps (CM) through PBL were applied in learning sufficient knowledge to diagnose ,calculate , estimate, interpretation ,prevention or treatment and predict future type of CVD using FRS tool (see figure 3 below).

Figure 3 – Concept maps through PBL of RF for CVD assessment tools using FRS.



However, concept mapping through PBL process steps can make a significant improvement in the knowledge of RF for CVD learners and were motivated and developed interest in the FRS assessment tool. So How is the ten-year CVD risk in the Framingham Risk Score (FRS) calculated? Both concept mapping (CM) and PBL tools helped learners to turn

abstract and difficult theories into concrete terms to facilitate lifelong knowledge learning and provided ability to estimate RF for CVD using FRS tool. In this concept maps through PBL process (see Figure 3) including the basic knowledge of FRS tool, we illustrated different FRS predictors related to risk factors, cohort study was the studying the risk factor and case control was the studying the disease. The RF of the CVD was typically shown as a tool to assist in determining a patient's risk to cardiovascular disease (CVD) then forecasting the future of (CVD) using FRS tool. It is the best method for determining the incidence and natural history of a condition.

3.2.3 Applying concept maps through PBL process to calculate FRS risk level

Learners in group 1 were required to use concept maps through PBL process by using steps 1-2-3-4 to diagnose RF for CVD using FRS tool. Previously established diagrams were used for comparison during each calculating and relevant new knowledge was added to the existing concept mapping.

✓ First case calculating an example of a level RF for CVD : Learners were instructed to use the concept maps through PBL of RF for CVD when estimating a level RF and to find different CVDs predictors corresponding to each node in the concept map and PBL steps 1-2-3-4. The learners who used the concept mapping tool performed better in problem solving than those who did not use it. The results showed that the learners in the group 1 and the learners in the group 2 demonstrated significant difference in their problem solving, the group 1 significantly performed better than the group 2.The learners' mapping performance was positively related to their problem solving performance.

✓ Second case prediction of risk for CVD: After learning FRS tool, learners were guided to create concept maps through PBL of RF for CVD representing different CVD with different risk factors. The learners were required to measure different predicators in accordance with the order of calculating an example of a level RF for CVD over a ten-year period using FRS tool. During this learning process, learners were also encouraged to expand the concept maps through PBL of forecasting future RF for CVD into a concept map of RF for CVD on their own, and even more to establish concept maps of differential diagnostic using predictors found in High-moderate and low level of RF for CVD using FRS score. Learners able to create Concept maps through PBL to clarify new concepts, define the problems and analyze the problem then to measurements related to the risk factors of first diagnostic of CVD using FRS tool assessment risk.

3.2.4 Review and Test setting

After the training and practice phases, learners from both group 1 and group 2 were asked to diagnose RF for CVDs in an hour. Presentations of the RF for CVD using FRS predictors were also demanded. These FRS score had not been used during practice phase, but were selected from the same training categories. Learners in Group 1 were also required to conduct a feedback questionnaire survey at the end of the course (see table1). The survey was consisted of items which were developed by the teachers. All of the items were close ended questions to record learners' perceptions about concept maps through PBL as learning and pedagogical tool in RF for CVD diagnoses using FRS tool.

Table 1 – learners' responses about concept maps through PBL used in RF for CVD learning (%)

No	Statements	SD	D	N	A	SA
1	Concept map was a meaningful learning tool to facilitate lifelong knowledge	0	0	2.5	10	87.5
2	Helped to integrate basic and new knowledge	0	0	2.5	20	75
3	Helped to link RF for CVD theoretical information to estimated risk level using FRS tool.	0	0	2.5	15	80
4	Helped to solve problem in RF for CVD using FRS diagnostic	0	0	2.5	10	87.5
5	Would you continue to use concept map to solve problem in RF for CVD using FRS diagnostic	0	0	2.5	7.5	90

Recording from learners' responses : SD strongly disagree, D disagree, N neutral, A agree, SA strongly agree.
The answers were recorded on a typical five-level Likert scale (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree).

3.3 Results

Most of the learners (87.5%) indicated that concept maps through (PBL) were helpful in RF for CVD assessment risk using FRS meaningful learning to facilitate lifelong knowledge learning. Among all 40 learners (75%), strongly felt that concept maps through PBL were helpful in integrating basic RF for CVD knowledge using FRS assessment, (80 %) pointed out that concept maps could link RF for CVD using FRS assessment theoretical information to estimate and diagnose CVD, and (87.5%) learners strongly agreed that concept maps through PBL were helpful to solve problem in RF for CVD using FRS assessment diagnosis. However, a significant majority of learners (90%) expressed that they would continue using concept maps to solve problem in FRS diagnostic. According to qualitative analysis (see table 1), majority of learners accepted concept maps using PBL process as a helpful tool. Difficult to learn at the beginning and time consuming are the two problems in using this approach, nevertheless most of the learners indicated to continue using it. Concept mapping through PBL could be a useful pedagogical tool in enhancing undergraduate medical learners' RF for CVD using FRS diagnostic and estimation skills. Furthermore, learners

indicated a positive attitude to concept mapping and PBL, and perceived them as a resource for lifelong knowledge learning of RF for CVD using FRS tool.

3.4 Discussion and limitation

By activating and elaborating on prior knowledge, concept mapping is expected to enhance and facilitate the production of learning goals about RF for CVD using FRS tool. In addition, concept mapping through PBL process could bring about more creativity and a better understanding of certain problems. Using concept mapping was significantly more satisfied about the execution of four crucial steps in the process of PBL : generating and analyzing preliminary ideas about the problem (step1-2) and systematically structuring the results of the analysis in a conceptual network (step 3-4). The use of concept mapping might stimulate learners as self-directed and collaborative learners to formulate additional learning issues than the ones that were intended by the problem designers. These additional learning issues could fall within the scope of the problem and the module or reflect personal interests of the learners. Majority of the learners (87.5%) in the study perceived concept mapping and PBL as an effective meaningful learning tool to facilitate a lifelong knowledge learning. Higher FRS diagnostic accuracy was observed in the learners using concept mapping through PBL. Thus, some special knowledge and technical terms should be understood in advance, and the accuracy of diagnostic partly depend on sufficient knowledge to define, recognize and understand the basic RF for CVD pathophysiology.

In our study, qualitative analysis suggests that the first contact of this pedagogical tool could improve learners' motivation to develop RF for CVD knowledge by using this approach. This can be explained that concept mapping through PBL could facilitate in learners the skill to construct their own individual cognitive processes. Concept mapping through PBL is a useful means for experienced practitioners to share information and problem solve client issues. Thus, in clinical education, concept maps through PBL have guided novices in creating care plans, enhancing and expanding critical thinking for client care, and assessing their learning and comprehension (All & Havens, 1997; Harpaz, Balik, & Ehrenfeld, 2004; Hsu & Hsieh, 2005; Schuster, 2002). Most of the learners in the study felt that concept mapping through PBL can improve their basic RF for CVD concepts understanding. In addition, as diagnostic accuracy test demands a greater level of problem-solving abilities than RF for CVD, concept maps could possibly enhance learners the skills to transfer the knowledge into solving real world problems. So both concept mapping and PBL proved to be complementary tools but not final tool because the method of information

gathering, hypothesis generation, and identification of learning issues allowed for the exposure of a broad range of knowledge needs that were visualized in the concept maps.

However (Wheeler and Collins,2003) conducted a quasiexperimental study with undergraduate nursing learners to compare critical thinking as measured on the California Critical Thinking Skills Test (CCTST; Facione & Facione, 1993). The experimental group used concept mapping to complete clinical care plans, and the control group used traditional methods. The researchers found that although the two groups did not differ significantly in their (CCTST) scores, there were significant differences in their Evaluation sub scale scores. Additionally, (Chastonay et al.'s,1999) research in public health education found that although learner perceptions of concept mapping are generally positive, the learners did not universally accept concept mapping, finding it time consuming and intensive. On the other hand, using uniform concept maps and PBL might possibly weaken learners' understand that concept maps and PBL are assisting them in learning how to learn and how to solve real problem. Recently, (Daley and Torre,2010) identified 350 articles reporting the uses of concept mapping in health professions education between (1989 and 2009). The authors examined a sample of 35 studies and concluded that "there is a growing body of evidence on the effectiveness of mapping as method to promote meaningful learning" and specifically "demonstrates that concept maps can assist in medical learner learning". Finally, concept mapping has used problem based learning process to evaluated the integration of knowledge and measure cognitive domains (Hung, & Lin, 2015; West et al., 2000).

4 Conclusion

Concept mapping (CM) through (PBL) could be a useful pedagogical tool to enhance lifelong knowledge learning undergraduate (RF CVD) medical learners' (FRS) diagnostic, estimation and prediction skills, as well as their deeper understanding of RF for CVD. In addition, learners indicated a positive attitude to Concept mapping (CM) and (PBL), and perceived them as a resource for lifelong knowledge learning. Finally, the use of concept maps through (PBL) process in learning and teaching of RF for CVD using FRS tool brings up the idea of the development and the exercise of learners' autonomy to solve different problems, since self-learning is one of the essential factors to make meaningful learning in which the learner lends new meaning to his mental contents : ideas, concepts, insights, attitudes, positions that were learnt in the past, and opens paths for learning of more complex contents in the future. They can be an effective teaching-learning strategy that allow a learner

to develop the ability to organize and group different knowledge in a meaningful way to solve different problems of CVD.

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Abbreviations
The following abbreviations are used in this article

CVS	Cardiovascular system
H	Heart
BV	Blood vessels
CS	Circulatory system
HD	Heart disease
CVD	Cardiovascular disease
AHA	American heart association
RF	Risk factors
WHO	World health organization
MetS	Metabolic syndrome
CRP	C-reactive protein
Tronponin	Troponin e.g. cTnI ,cTns, cTnT
CK	Creatine Kinsae e.g. CK-MM ,CK-MB ,CK-BB
CM	Concept maps
PBL	Problem-based learning
FRS	Framingham risk score
GP	General practitioners
ASCVD	Pooled Cohort Atherosclerotic Cardiovascular Disease
SCORE	Systematic Coronary Risk Evaluation
PROCAM	Prospective Cardiovascular Münster
UKPDS	The United Kingdom Prospective Diabetes Study
CCTST	California Critical Thinking Skills Test

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