Effectiveness of an Instructional Program Concerning Secondary Polycythemia Knowledge on Clients Attending Iraqi National Blood Bank

تأثير البرنامج التوجيهي المتعلق بمعارف المرضى بزيادة كريات الدم الحمراء الثانوي للمراجعين لمصرف الدم الوطني العراقي

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الخلاصة:

خلفية البحث: زيادة عدد كريات الدم الحمراء الثانوي في الجسم تعني أن قيمة خضاب الدم (الهيموغلوبين) أكثر من 18غم/ دسي لتر من الدم لدى الذكور أو 16 غم/ دسي لتر لدى الإناث. وارتفاع كريات الدم الحمراء عن المعدل الطبيعي يسبب الكثير من المضاعفات مثل الانسداد الخثري للأوعية الدموية و ارتفاع ضغط الدم و أمراض المفاصل و داء النقرس.

الهدف: تهدف الدراسة الى تقييم اثر تطبيق البرنامج التوجيهي المتعلق بزيادة عدد كريات الدم الحمراء الثانوي على المرضى المراجعين لمصرف الدم الوطني العراقي.

المنهجية: دراسة شبه تجريبية أجريت في مصرف الدم الوطني العراقي ، للمدة من 13 كانون الأول 2015 ولغاية 1 من أيلول 2015,تكونت عينة الدراسة من (70) مراجع لمصرف الدم الوطني العراقي والذين يعانون من زيادة نسبة الهيموغلوبين و قسمت العينة بشكل متساوي إلى مجموعة الدراسة (35) مراجع والمجموعة الضابطة (35) مراجع.

تألفت أداة الدراسة من ثلاث محاور حيث تضمن المحور الأول المعلومات الديموغرافية للمراجع والمتضمنة (الفئة العمرية والجنس والحالة الاجتماعية ومستوى التعليم والمهنة) المحور الثاني شمل التاريخ الطبي للمراجع وهو (كتلة الجسم) ونسبة الهيموغلوبين ومدة الإصابة بالمرض وجود أمراض مزمنة و التدخين وتناول الكحول)، وتكون المحور الثالث من (11) محور تتعلق بمعارف المراجع بالمرض وشملت (تعريف المرض وأسبابه وأعراضه, تشخيص المرض, علاج المرض, محاور الخطة العلاجية وشملت (الغذاء, التدخين والكحول, الرياضة, السيطرة على ضغط الدم, والتبرع بالدم, والترفيه عن النفس, والمتابعة الصحية).

تم تحديد مصداقية أداة الدراسة من خلال عرضها على (10) خبراء في مجال الاختصاص، وتم قياس ثبات الاستبيان من خلال تطبيق معامل كرونباخ الإحصائي والمساوي 0.75.

تم تحليل البيانات من خلال تطبيق الإحصاء الوصفي (التكرارات، والنسب المئوية، والمتوسط الحسابي), والتحليل الاستدلالي (تحليل التباين) وتم استخدام الحقيبة الإحصائية الإصدار رقم 20 لإدخال البيانات لغرض تحليلها.

النتائج : أشارت نتائج الدراسة الحالية بأن معظم عينة الدراسة (97.1%) هم ذكور ضمن الفئة العمرية 37-41 سنة وفيما يتعلق بالحالة الاجتماعية فان اغلب المرضى كانوا من المتزوجين71.4% وان غالبية عينة الدراسة هم خريجو المدرسة الابتدائية 31.4% و 54.3% يعملون أعمال حرة و 68.6% كانوا من يدخنون السجائر و 28.6% كانوا يدخنون الاركيلة و 25.7 كانوا يشربون الخمر وبينت الدراسة بأن البرنامج التوجيهي على مجموعة الدراسة كان مؤثرا". وأشارت النتائج أيضا بوجود دلالة إحصائية مؤثرة على معارف المرضى المتعلقة بزيادة كريات الدم الحمراء الثانوي قبل وبعد البرنامج التوجيهي لمجموعة الدراسة و بين مجموعة الدراسة والمجموعة الضابطة بمستوى دلالة $\leq 0,05$

الاستنتاج: استنتجت الدراسة بان البرنامج له اثر واضح على تحسين معارف المراجعين المتعلقة بتعريف واعراض وكيفية السيطرة على المرض من خلال الاختبار القبلي والبعدي للبرنامج.

التوصيات: توصي الدراسة نشر الوعي الصحي بين الشباب من خلال تنفيذ دورات ومحاضرات للشباب بالتنسيق مع وزارة الصحة والتربية والتعليم العالي بغية السيطرة على اسباب الاصابة بالمرض ومخاطرها.

Abstract

Background: Secondary Polycythemia (SP) mean an elevated of erythrocytes numbers and hemoglobin above normal levels which as more than 18 g / liter in males or 16 g / liter in females, and the elevated red blood cell above the normal level lead to many complication as thromboembolisim, hypertension, and gout.

Objectives: The study aims to assess find out the effectiveness of instructional program application on secondary polycythemic clients.

Methodology: A quasi-experimental design study conducted in Iraqi national blood bank from the period of January, 13th 2015 to September, 1st 2015, the study sample consist of 70 clients have hemoglobin level more than 18 mg/dl for males and 16 mg/dl for females, divided into two groups (35) case and (35) control groups.

The study instrument was composed of three parts which as socio- demographic information was included; (age group, gender, marital status, level of education and occupational, and second parts deals medical history which include (weight, height, Hb level, other diseases, smoking and alcohol drinking). part three consist of 11 domains

concerned to clients knowledge toward the SP which include (general information about SP include (definition, causes and symptoms), diagnosis, complication, treatment, and treatment plan which include (diet, smoking and alcohol, exercise, control on blood pressure, blood donation, relaxation and follow. The validity of the instrument was established through a panel of (10) experts, the reliability of the items was based on the internal consistency of the questionnaire was assessed by calculating Cronbach s' Coefficient alpha which as= 0.75. The data have been analyzed through the application of: descriptive frequency, percentages; mean of scores; and the inferential analysis that include: Analysis of variance and the researcher used the SPSS version 20 to analysis of data.

Results: the findings revealed that the 97.1% of the case group were males at age 37-41 years old, 71.4% were married, 31.4% primary school graduate, 54.3% of the case group have free job, 68.6% of them were cigarettes smokers, low percent of the case group smoking water pip, and 25.7% of them have drinking alcohol.

Conclusion: the study concluded that the program has a clear impact on improving the knowledge of clients relating to the definition and symptoms and how to control the disease through the pretest and posttest of the program.

Recommendations: the study recommends increase health awareness among young people through the implementation of courses and lectures for youth in coordination with the Ministries of Health and Education and Higher Education in order to control the causes of disease and their risks.

Keywords: Instructional Program, Secondary Polycythemia, Knowledge, hypertension, blood disease

INTRODUCTION:

Secondary Polycythemia (SP) is an elevated of erythrocytes numbers and hemoglobin above normal levels and it is cause by the underlying disease which produces low arterial oxygen saturation. Any condition associated with a reduced of oxygen amount transported into the blood flow (low arterial PO2) leads to increased of erythropoietin production which lead to increase numbers of erythrocytes numbers in the blood. The condition may be associated with lung emphysema, fibrosis of the lung that impairs the oxygenation of the blood. Secondary polycythemia also develop in peoples have congenital heart diseases, smoking cigarettes, neoplasm (eg, renal cell carcinoma) or in nonpathologic conditions such as high altitude [(1)].

Polycythemia is mainly a disease of the elderly [(2)]. But now many bad habits for young individuals lead to appear of secondary polycythemia [(3)]**.** Incidence men are more than women

Secondary polycythemia affects people of any age or origin and characterized by an increase production of erythrocytes due to hypoxia, diseases (as renal diseases) and tumors [(4,5,6)]**.**

Common manifestations include itching (pruritus), and severe burning pain in the hands or feet that is usually accompanied by a reddish or bluish coloration of the skin. Headache, dizziness and hearing and vision disruption because of hypertension. Plethora, ruddy, red color of the feet, hands, face and mucous membranes due to the venous stasis. Patients with polycythemia are more likely to have gouty arthritis [(7)].

The diagnosis may appear during common blood investigations, and his manifestations are caused by increased blood viscosity and volume. Secondary polycythemia treated by resolve the main causes, can be induced directly to withdraw some blood by phlebotomy. The main goals of treatment secondary polycythemia are prevent complications as hemorrhage and thrombosis by correction hemoglobin and hematocrite of the blood. Treatment focusing on releasing the main causes which lead to increase erythrocytes production as smoking, relocation for patient's life in high altitude, treating tumors of kidney or liver, give some medications to decreased blood viscosity as aspirin and made phlebotomy to correct the circulating blood volume[(6)].

Objectives

The study aims to evaluate the effectiveness of instructional program on secondary polycythemic clients

METHODOLOGY:

Design of the Study: A quasi-experimental design study is carried out through the application of pre-test and post-test approach for the study and control groups, from the period of January, 13th 2015 to September, 1st 2015.
Setting of the Study: The present study is carried out in Iraqi national blood bank.
Sample of the Study: A purposive (Non probability) sample of (70) clients are selected. The sample is divided into two groups; (35) clients (case group) are exposed to the instructional program and (35) clients are not exposed to the program, considered as the control group. The selection of clients was simply randomly hemoglobin level 16-21 mg/dl.
Instrument: consists of three parts:
Part I: The demographic data which included the clients characteristic, such as age, gender, level of education, marital status, employment, and environment.
Part II: include the medical history as physical measurements (high and weight), hemoglobin level, and packed cell volume, duration of Polycythemia, suffering diseases, smoking and drinking.
Part III: Assessment of client's knowledge consists of 10 domains based on likert scale score as I know 3; uncertain 2; don't know

A. Client's knowledge related to definition, causes, and signs and symptoms of secondary polycythemia disease knowledge domain (32) items.
B. Client's knowledge related diagnosis of secondary polycythemia domain (4) items.
C. Client's knowledge related to complication of secondary polycythemia domain (7) items.
D. Client's knowledge related to treatment of secondary polycythemia domain (5) items.
E. Client's knowledge related to diet for patients with secondary polycythemia domain (13) items.
F. Client's knowledge related to advantages of smoking cessation and alcohol leaving for patients with secondary polycythemia domain (11) items.
G. Client's knowledge related to advantages of exercise for patient with secondary polycythemia domain (5) items.
H. Client's knowledge related to important of follow up for patient with secondary polycythemia domain (4) items.
I. Client's knowledge related to blood donation for patients with secondary polycythemia domain (4) items.
J. Client's knowledge related to relaxation advantages for patients with secondary polycythemia domain (3) items.

Validity and Reliability: The content validity of the instrument was established through a panel of (10) experts, the reliability of the items was based on the internal consistency of the questionnaire was assessed by calculating Cronbach s' Coefficient alpha which as= 0.75.

Statistical Analysis: The data have been analyzed through the application of: descriptive frequency, percentages; mean of scores; and the inferential analysis that include: Analysis of variance, and the researcher used the SPSS version 20 to analysis of data.

RESULTS:

Table 1: Distribution of the Study Samples by Socio- Demographic Characteristics NO. =70 (Case and Control Groups)

No.	Variable	Case Group (35)		Control Group (35)	
		NO.	%	NO.	%
Gender	Male	34	97.1	32	91.4
	Female	1	2.9	3	8.6
Age (year)	19 - 24	5	14.3	4	11.4
	25 - 30	7	20.0	13	37.1
	31 – 36	5	14.3	5	14.3
	37 – 41	12	34.3	3	8.6
	48 – 53	1	2.9	4	11.4
	54 - 59	3	8.6	4	11.4
	60 and over	2	5.7	2	5.7
Marital status	Single	10	28.6	9	25.7
	Married	25	71.4	26	74.3
Level of education	Unable to read & write	1	2.9	3	8.6
	Read & Write	2	5.7	1	2.9
	Primary school graduate	11	31.4	11	31.4
	Intermediate school graduate	8	22.9	9	25.7
	Secondary school graduate	5	14.3	4	11.4
	Institute graduate	5	14.3	1	2.9
	College and above graduate	3	8.6	6	17.4
Employment	Free to study	10	28.6	9	25.7
	Government employee	3	8.6	20	57.1
	Non-governmental employee	1	2.9	0	0.0
	Retired has job	1	2.9	0	0.0
	Retired not having job	1	2.9	2	5.8
	Free jobs	19	54.3	4	11.4

Table 1 shows that the 97.1% of the case group were males at age 37-41 years old, 71.4% were married, 31.4% primary school graduate, and 54.3% of the case group have free job, the socio-demographic characteristics of control group were 91.4% were males, 37.1% of theme at age 25-30 years old, 74.3% were married, 31.4% primary school graduated, and 57.1% of them government employee.

Table 2: Medical History of the Study Sample (Case and Control groups) NO.= 70

No.	Variables	Case Group (35)		Control Group (35)	
		NO.	%	NO.	%
Body Mass Index	Normal weight	11	31.4	7	20.0
	Over weight	14	40.0	7	20.0
	Obese	7	20.0	18	51.4
	Very Obese	3	8.6	3	8.6
Hemoglobin level	16 - 17.9 mg/dl	1	2.9	5	14.2
	18 - 19.9 mg/dl	27	77.1	24	68.5
	20 - 21.9 mg/dl	7	20.0	6	17.3
Duration of Polycythemia	Less than 1 year	21	60.0	25	71.5
	1 - 3 year	10	28.6	8	23.0
	4 - 6 year	4	11.4	2	5.5
Diseases	Hypertension	3	8.5	3	8.0
	Respiratory diseases	1	2.9	3	8.0
	Gastrointestinal diseases	1	2.9	1	2.9
	Joint disease	3	8.6	3	8.0

	renal diseases	2	5.7	3	8.0
	Increase Triglycerides	2	5.7	1	2.9
	No disease	23	65.7	21	62.2
Smoking	Yes	24	68.6	25	71.4
Cigarettes	No	11	31.4	10	28.6
Smoking	Yes	10	28.6	10	28.6
Cigarettes	No	25	71.4	25	71.4
Drinking	Yes	9	25.7	12	34.2
Alcohol	No	26	74.3	23	65.8

Table 2 presented the medical history of the case and control group which as 40% of case group over weight, 77.1% were at 18-19.9 mg/dl of hemoglobin, 60% of the case group were have secondary polycythemia less than one year, 65.7% not have other diseases, 68.6% of them were cigarettes smokers, low percent of the case group smoking water pip, and 25.7% of them have drinking alcohol and the medical history of the control group which as 51.4% of case group obese, 68.5% were at 18-19.9 mg/dl of hemoglobin, 71.5% of the case group were have secondary polycythemia less than one year, 62.2% not have other diseases 71.4 them were cigarettes smokers, low percent of the control group smoking water pip, and 34.2% of them have drinking alcohol.

Table 3: Statistical Differences between pre- and post Study group concerning Instructional Program about Clients Knowledge related to polycythemia

Pre and post study	**Mean**	**N**	**SD**	**t. test**	**df**	**Sig. p≥ 0.05**
Pre- program	178.08	35	10.929	22.82	34	.051
Post - program	218.20	35	5.002			**S.**

Table 3 presented the effective of instructional program for case group between pre and post program by significant differences between them at p≥ 0.05 level

Table 4: Statistical Differences between pre study - and pre control concerning Instructional Program about Clients Knowledge related to Polycythemia

Pre-study and pre-control	**Mean**	**N**	**SD**	**t. test**	**df**	**Sig. p≥ 0.05**
Pre-control	217.24	35	9.701	-.584	34	.466
Pre-study	218.95	35	11.376			N.S.

Table 4 shows that there were not significant differences between pre case and pre control concerning Instructional Program for Clients Knowledge related to polycythemia

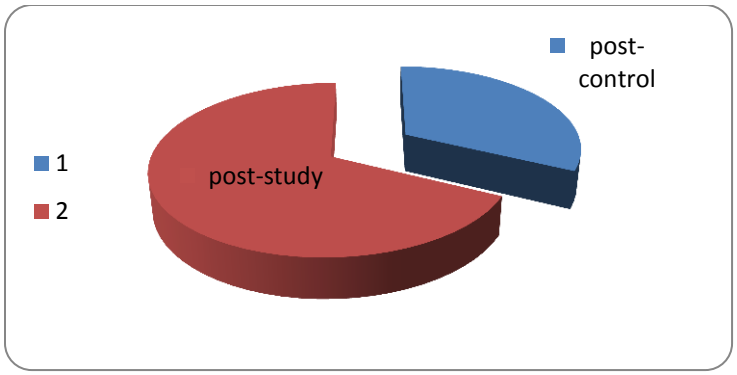

Figure 1: differnces between post study and post control rgarding Instructional Program concerning client knowledge about Polycythemia

Figure 1 shows the differences between client responses for instructional between case and control group at post test

Table 5: Comparison between the Clients' Knowledge and their Age concerning Domains of Instructional Program

Domains of Instructional Program		Sum of Squares	df	Mean Square	F	Sig. p≤0.05
Definition	Between Groups	80.535	6	13.423	2.378	**.055**
	Within Groups	158.036	28	5.644		**S.**
	Total	238.571	34			
Diagnosis	Between Groups	3.004	6	.501	.942	.481
	Within Groups	14.882	28	.531		
	Total	17.886	34			
complication	Between Groups	.702	6	.117	.283	.940
	Within Groups	11.584	28	.414		
	Total	12.286	34			
treatment	Between Groups	.062	6	.010	.320	.921
	Within Groups	.909	28	.032		
	Total	.971	34			
Diet	Between Groups	.096	6	29.163	3.893	**006**
	Within Groups	.875	28	7.491		**H.S**
	Total	.971	34			
Smoking cession	Between Groups	4.674	6	.779	.747	.617
	Within Groups	29.212	28	1.043		
	Total	33.886	34			
Exercises	Between Groups	.249	6	8.735	2.940	**.024**
	Within Groups	3.636	28	2.971		**S.**
	Total	3.886	34			
Follow-up	Between Groups	.386	6	.064	1.200	.335
	Within Groups	1.500	28	.054		
	Total	1.886	34			
Blood donation	Between Groups	.096	6	.016	.514	.792
	Within Groups	.875	28	.031		
	Total	.971	34			
relaxation	Between Groups	.159	6	.026	.287	.938
	Within Groups	2.584	28	.092		
	Total	2.743	34			

Table 5 presented the comparison between instructional program and age of case group which revealed that there were significant differences between age and their knowledge concerning definition of disease, diet and exercise at p≤0.05 level .

Table 6: Comparison between the Clients' Knowledge and their Level of Education concerning Domains of Instructional Program.

Domain of Instructional Program		Sum of Squares	df	Mean Square	F	Sig. p≤0.05
Definition	Between Groups	14.874	6	2.479	1.361	.265
	Within Groups	51.011	28	1.822		
Diagnosis	Between Groups	80.535	6	13.423	2.378	.065
	Within Groups	158.036	28	5.644		
complication	Between Groups	3.004	6	.501	.942	.481
	Within Groups	14.882	28	.531		
treatment	Between Groups	.702	6	.117	.283	.940
	Within Groups	11.584	28	.414		
Diet	Between Groups	.062	6	2.233	3.726	**.008**
	Within Groups	.909	28	.599		**H.S**
Smoking cession	Between Groups	.096	6	.016	.514	.792
	Within Groups	.875	28	.031		
Exercises	Between Groups	4.674	6	.779	.747	.617
	Within Groups	29.212	28	1.043		
Follow-up	Between Groups	.249	6	.042	.320	.921
	Within Groups	3.636	28	.130		
Blood donation	Between Groups	.159	6	12.625	2.753	**.031**
	Within Groups	2.584	28	4.586		**S.**
relaxation	Between Groups	.159	6	.026	.287	.938
	Within Groups	2.584	28	.092		

Table 6 presented the comparison between instructional program and level of education of case group which revealed that there were significant differences between level of education and their knowledge concerning diet and blood donation at $p \leq 0.05$ level.

Table 7: Comparison between the Clients' Knowledge and their Employment concerning Domains of Instructional Program

Domain of Instructional Program		Sum of Squares	df	Mean Square	F	Sig. p≤0.05
Definition	Between Groups	80.535	5	37.356	2.559	
	Within Groups	158.036	29	14.600		**.049**
	Total	238.571	34			**S.**
Diagnosis	Between Groups	3.004	6	.501	.942	.481
	Within Groups	14.882	28	.531		
	Total	17.886	34			
complication	Between Groups	.702	5	8.869	5.816	**.001**
	Within Groups	11.584	29	1.525		**H.S**
	Total	12.286	34			
treatment	Between Groups	.062	6	.010	.320	.921
	Within Groups	.909	28	.032		
	Total	.971	34			
Diet	Between Groups	.096	6	29.163	3.893	**006**
	Within Groups	.875	28	7.491		**H.S**
	Total	.971	34			
Smoking cession	Between Groups	4.674	6	.779	.747	.617
	Within Groups	29.212	28	1.043		
	Total	33.886	34			
Exercises	Between Groups	.249	6	8.735	2.940	**.003**
	Within Groups	3.636	28	2.971		**H.S**
	Total	3.886	34			
Follow-up	Between Groups	.386	6	.064	1.200	.335
	Within Groups	1.500	28	.054		

	Total	1.886	34			
	Between Groups	.096	5	4.524	2.432	**.059 S.**
Blood donation	Within Groups	.875	29	1.860		
	Total	.971	34			
	Between Groups	.159	5	6.735	3.733	**.010**
relaxation	Within Groups	2.584	29	1.804		**H.S**
	Total	2.743	34			

Table 7 revealed that there were significant differences between employments and the case group knowledge concerning definition, smoking cession, complication, exercise, blood donation and relaxation at $p \leq 0.05$ levels

DISCUSSION:

The demographic characteristics of present study revealed that the 97.1% of the case group were males at age 37-41 years old, 71.4% were married, 31.4% primary school graduate, and 54.3% of the case group have free job, and the demographic characteristics of control group were 91.4% were males, 37.1% of theme at age 25-30 years old, 74.3% were married, 31.4% primary school graduated, and 57.1% of them government employee. (Table 1) Amin, et al., (2011) [(8)], fined in their study that the male patients were 86.5% and 13.5% were female, and mean age was 58 years (ranged 37 to 72 years), Levitz, et al., (2015) [(9)] funded that the rates of clients did not differ between unmarried and married person in their knowledge, Green and Cavanaugh, (2015) [(10)] determined that the low educational level lead to increase risk to injury of chronic diseases, Memon, et al., (2015) [(11)] stated that the people who not read and write have low knowledge toward their illness.

The results of the present study revealed that the medical history of the case group which as 40% of case group over weight. This results agree with Nadeem, et al., (2013) they presented that the patients with venous thromboembolisim related to polycythemia have high body mass index, high percent (77.1%) of the study sample were at 18-19.9 mg/dl of hemoglobin level[(12)], this results similar that results for Biswas, et al,. (2003), they presented in their study which conducted in united kingdom, the hemoglobin level of two cases admitted to the hospital was 21.6 gm/dl and 19.1 gm/dl, the first has myocardial infarction and the second has pulmonary embolism related to polycythemia[(13)], the results of present study revealed that 60% of the case group were have secondary polycythemia less than one year, Kumar, (2012) concluded in their study that there were significant association between Knowledge score and age, Sex, occupation, residence, body mass index, duration of illness[(14)].

High percent of the case group (68.6%) were cigarettes smokers. These results agree with Almarshad, et al., (2014), they stated that the smoking lead to increase hematocrit level and blood viscosity[(3)]

low percent of the case group were smoking water pip this results disagree with Tadmor, et al., (2011) they stated in their case study that the water pip consider as a cause of secondary polycythemia, the findings of the present study presented that (25.7%) of the study sample have drinking alcohol [(15)], this results disagree with results of Kotani, et al,. (2008). they discovered that alcohol intake increase risk of blood disorders [(16)].

The effectiveness of instructional program concerning the client's knowledge toward secondary polycythemia for case group at pre and post period was clear in table 3 which presented that the post program was improved in the clients knowledge than pre instructional program and these results supported by Huang, et al., (2015) they assessed knowledge

improvement on 848 participants in a pharmacist-facilitated national community education program over a 4-month semester and to identify the educational needs of adults related to medications, (42.8%) of them completed the pre-to-post questionnaire[17]. Baseline medication knowledge was positively correlated with participants' education level and negatively correlated with age. Significant improvement in medication knowledge was evident at the end of the program. The age and education level were significant determinants in the improvement of the pre-to-post program test score. The clients responses at pre period for case and control group appears in table4 which presented that there were not significant differences between pre case and pre control for instructional program, this findings supported by Shah, et al., (2015) they determine in their study which conducted on 122 Indian subjects average age was 41 years and 67% had more than a high school education was significantly improved knowledge and lower education was associated with a lower post-test score[18]. The effectiveness of instructional program on clients knowledge for case group at post program period comparative with control group regarding to domains of instructional program showed in figure 1 which indicated the improvement of case knowledge at post-test more than control group, this results supported by Hu, (2015) He concluded after apply their program that a short education lecture made for patients had a good effect on their knowledge[19].

The study presented that there were statistical differences between instructional program and age of case group regarding diet and exercise at P≤0.05 level. Kumar, (2012) stated in their study that the patients knowledge regarding to their disease diet 43.42% patient had poor knowledge regarding disease diet and exercise[14] .

The comparison between instructional program and educational level of the case group was revealed that there were significant differences between level of education and their knowledge concerning diet and blood donation at p≤ 0.05 level. This result agree with. Shriraam, et al., (2015) determined in their study, persons not read and write associated with low knowledge about complication of their disease[20].

There were significant differences between employments and the case group knowledge concerning definition, smoking cession, complication, exercise, blood donation and relaxation at p≤ 0.05 levels table (7). Present results supported by Shriraam, et al., (2015) showed in their study which conducted on 366 patients in India were illiterate, low socioeconomic status and older age associated with low knowledge about complication of their disease [20].

CONCLUSION:

The study concluded that the program which applied by the researchers has a clear impact on enhancing the knowledge of clients related to definition and symptoms and how to control the disease through the pretest and posttest of the program.

RECOMMENDATION:

Based on the results of study the researcher recommended that an increase health awareness among young people through the implementation of courses and lectures for youth in order to control the causes of disease and their risks, and needs for more education for Secondary polycythemia clients for better understanding of disease, experience, knowledge, misconception, motivation, and perception.

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