

## The Effects Of Participating In The Journal Club On Scientific Inquiry Of Health Students

### Makale Kulübü'ne Katılımın Sağlık Alanı Öğrencilerinde Bilimsel Sorgulayıcılık Üzerine Etkilerinin Değerlendirilmesi

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## ABSTRACT

**Objective:** Journal clubs are organizations that scientific articles are shared and discussed with communities. The main purpose is to critically evaluate the literature and show the strengths and weaknesses. In particular, health educators use this to support students' critical thinking and clinical practice. The aim of this research was to evaluate the effects of participation in journal clubs on scientific inquiry in health field students.

**Material and Methods:** Students studying in health departments regularly attended journal club sessions. The students participating in the sessions completed the "Journal Club Comprehension and Confidence Instrument" (JCCCI) questionnaire before and after joining the journal club after answering demographic questions. The questionnaire was also delivered to students who did not attend the sessions (control group).

**Results:** A total of 283 health field students participated in the survey (Journal Club group, n=96; control group, n=187). There were significant differences in the pre- and post-surveys of the Journal Club group in eight of the 16 competencies; "process", "structure", "effect of the method", "importance to question", "self-confidence to question", "hypothesis development", "quality of the article" and "self-confidence to present". There was a 33.3% (n=32) increase in "quality of the article" competence when "strongly agree and agree" was compared before and after the survey in the Journal Club group. The second significant difference in positive responses was seen with a 29.2% (n=28) increase in "hypothesis development" competence. There were major changes in four competencies when the "strongly agree" responses of the students before and after the survey were compared. The first crucial change was with a 34.4% (n=33) increase in "process" proficiency. The second change was in "effect of the method" competency with a 33.3% (n=32) increase, while the third significant change was in "structure" competency with a 31.3% (n=30) increase. The fourth change was the "importance to question" competency. In the post-survey, an increase of 20.8% (n=20) was achieved in the "strongly agree" response. A decrease of 36.4% (n=35) was observed in the adequacy of "self-confidence to question" when the "negative answers" (strongly disagree and disagree) answers before and after the survey were compared. Again, there was a decrease of 18.7% (n=18) in the "self-confidence to present" proficiency when the "strongly disagree" answers given by the students before and after the survey were compared.

**Conclusion:** This study may show that club sessions encourage students to follow and analyze the literature and relate it to their educational experiences. Participating in undergraduate journal clubs for students in the health field can help them become successful researchers in the future.

**Keywords:** Journal Club, Literature Review, Research, Critical Review, Hypothesis Development



## Ö Z E T

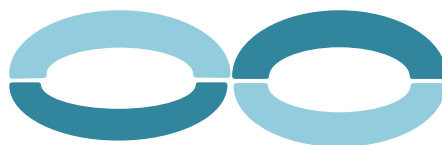
**Giriş:** Makale kulüpleri, bilimsel makalelerin topluluklarla paylaşıldığı ve tartışıldığı oluşumlardır. Esas amaçları literatürün eleştirel değerlendirmesini yapmak, güçlü ve zayıf yönlerini göstermektir. Özellikle, sağlık eğitimcileri tarafından, öğrencilerin eleştirel düşünmesini ve klinik uygulamalarını desteklemek için sıklıkla kullanılmaktadır. Bu araştırmanın amacı, makale kulüplerine katılımın sağlık alanı öğrencilerinde bilimsel sorgulayıcılık üzerine etkilerinin değerlendirilmesidir.

**Metot:** Sağlık bölümlerinde okuyan öğrenciler düzenli olarak makale kulübü oturumlarına katıldı. Bu oturumlara katılan öğrenciler (Journal Club grubu), demografi sorularını cevapladıktan sonra makale kulübüne katılmadan önce ve katıldıktan sonra "Journal Club Comprehension and Confidence Instrument" (JCCCI) isimli anketi doldurdular. Anket aynı zamanda oturumlara katılmamış (kontrol grubu) öğrencilere de ulaştırıldı.

**Bulgular:** Ankete toplam 283 sağlık alanı öğrencisi katıldı (Journal Club grubu, n=96; kontrol grubu, n=187). Journal Club grubunun pre- ve post-surveylerinde 16 yeterliliğin sekizinde önemli farklılıklar vardı; "process", "structure", "effect of the method", "importance to question", "self-confidence to question", "hypothesis development", "quality of the article" ve "self-confidence to present". Journal Club grubunda anket öncesi ve sonrasında "positive yanıtlar" (strongly agree ve agree) karşılaştırıldığında "quality of the article" yeterliliğinde %33.3'lük (n=32) bir artış vardı. Positive yanıtlarda ikinci anlamlı fark "hypothesis development" yeterliliğinde %29.2'lik (n=28) bir artış ile görülmüştür. Anket öncesi ve sonrasında öğrencinin bildirdiği "strongly agree" yanıtları karşılaştırıldığında dört yeterlilikte büyük değişiklik meydana geldi. Birinci en büyük değişiklik "process" yeterliliğinde %34.4'lük (n=33) artış ile gerçekleşti. İkinci en büyük değişiklik "effect of the method" yeterliliğinde %33.3'lük (n=32) bir farkla artışla meydana gelmişken üçüncü en büyük değişiklik %31.3'lük (n=30) bir artışla "structure" yeterliliğiydi. Dördüncü en büyük değişiklik ise "importance to question" yeterliliğiydi. Post-surveyde "strongly agree" yanıtında %20.8 (n=20) oranında artış sağlanmıştır. Anket öncesi ve sonrası "negative yanıtlar" (strongly disagree ve disagree) yanıtları karşılaştırıldığında ise "self-confidence to question" yeterliliğinde %36.4'lük (n=35) bir azalma görülmüştür. Yine anket öncesi ve sonrasında öğrencinin bildirdiği "strongly disagree" yanıtları karşılaştırıldığında "self-confidence to present" yeterliliğinde ise %18.7'lik (n=18) bir azalma olmuştur. Journal Club grubu (post-survey) ve kontrol grubu arasında 16 yeterliliğin üçünde keşfedilen önemli farklılıklar vardı; "process", "quality of the article" ve "prefer articles for up to date". "Process" yeterliliği için, kontrol grubundaki öğrencilerin %4.3'ü "strongly agree" yanıtı bildirirken, Journal Club grubunun %46.9'u bu yanıtı bildirmiştir, fark %42.6'dır. "Quality of the article" yeterliliği için, öğrencilerin %10.4 ve %34.3'ü sırasıyla Journal Club grubunda ve kontrol grubunda neutral yanıt bildirdi. Bu yeterlilik için %23.9'luk bir farkla neutral yanıt Journal Club grubunda daha azdı. "Prefer articles for up to date" yeterliliğinde, öğrencilerin %40.7'si kontrol grubunda, %72.9'u Journal Club grubunda %32.2'lik bir artışla "strongly agree" yanıtı bildirmiştir.

**Sonuç:** Makale kulüpleri; literatür taramak, eleştirel düşünme becerilerini geliştirmek ve kanıta dayalı tıp uygulamaları oluşturmak için araç olarak kullanılmaktadır. Bu çalışma, kulüp oturumlarının öğrencileri literatürü takip ve analiz etmeye, eğitim deneyimleriyle ilişkilendirmeye teşvik ettiğini göstermiştir. Oturumlarda oluşan tartışmacı ortam yeni hipotezler geliştirebilmeleri konusunda öğrencilerin kendilerine olan güvenlerini artırmıştır. Bu da uzun vadede literatürün gelişimine katkı sağlayabilir. Makale kulüpleri sağlık alanı öğrencilerinin teorik ve uygulama becerileri arasındaki boşluğu doldurmak için de etkili bir yoldur. Sağlık alanındaki öğrencilerin lisans düzeyinde makale kulüplerine katılmaları gelecekte başarılı bir araştırmacı olmalarına yardımcı olabilir.

**Anahtar Kelimeler:** Makale Kulübü, Literatür Değerlendirmesi, Araştırma, Eleştirel Değerlendirme, Hipotez Geliştirme



## 1. Introduction

Scientific articles are written and printed reports containing original research results. Presenting the results of a study with an article for publication in a scientific journal is a common process for researchers (1). Journal clubs are groups that scientific articles are shared and discussed with communities. Their main purpose is to critically evaluate the literature and show its strengths and weaknesses (2,3). Journal clubs are important because of drawing attention to the limitations of research and support the implementation of evidence-based practices (4).

Journal clubs are often described as "a bridge between research and clinical practice" because the club promote research in day-to-day clinical work. Participation in the club enables the presentation of research and the development of critical assessment skills (5). Journal clubs are a way to stay current on relevant literature (6). The club are often used by health educators to develop students' critical thinking and clinical practice (7).

Students' participation in journal clubs is an effective way to increase research awareness and fill the theory-practice gap for students (8,9). Club meetings are held in the form of meetings where the article is presented by one person and the members then discuss the article (10). Running successful journal clubs is a challenge. The success of journal clubs depends on the student-centered approach. Key elements such as counseling and the use of active learning techniques are also important for success. However, there is no standard layout for the journal club (11,12).

In a study, pharmacy students' perceptions of literature review in a student-led journal club were examined. Accordingly, attending the sessions improved students' self-confidence and understanding of literature review (13). The results show that journal clubs can contribute to students' approach to literature. Another recent study looked at the effectiveness of a pharmacy student-led internet-based journal club. Accordingly, the club has achieved the determined learning goals (14). The results show that journal clubs can function efficiently.

The aim of this study is to evaluate the effects of participation in the journal club on the scientific inquiry of health students. In addition, we also investigated students' self-assessment skills regarding literature review and their competencies in generating new hypotheses.

## 2. Material and Method

### Participants

Students studying in health departments were included in this study. The students who participated in the Journal Club sessions that lasted for 18 weeks formed the Journal Club group (n=96). In the control group, there were students who had never participated in similar journal clubs (n=187).

This study received ethical approval from the Health Sciences University Hamidiye Scientific Research Ethics Committee (SBUHBAEK) on 14.01.2022 with the project proposal titled "Evaluation of the effects of participation in the Article Club on scientific inquiry in health field students" with registration number 22/18.

### Journal Club Sessions

Journal Club sessions were held on Friday evening of every week from November 2021 to March 2022, with 18 sessions online via the Google Meet application. At least 5 days before the session, the article determined for that week was shared in the WhatsApp announcement group of the Journal Club. All of the students in the group were invited to participate in a one-hour session discussing a predetermined journal article. The purpose of the article has been clarified. The development part took about 20-30 minutes. The abstract of the article was explained in detail. As necessary, a short PowerPoint presentation was made with additional information for a better understanding of the

subject. Key findings were conveyed to the audience. The introduction was briefly mentioned. Figures and tables are explained in detail. The result part took about 5 minutes. In this section, the findings, conclusions and discussion parts of the article are explained. The limitations and advantages of the article are indicated. Closing part took about 15-20 minutes. In this section, the participants presented their questions and/or contributions. The moderator answered the questions. Possible new hypotheses were discussed and brainstormed. At the end of all these stages, an attendance form was sent to the chat section and the participants were expected to fill it out.

## Survey Form

Sixteen core competencies (“process”, “literature”, “structure”, “method”, “effect of the method”, “figure and table”) related to understanding Journal Club and evaluating its impact on students' scientific inquiry, “strengths/limitations”, “importance to question”, “self-confidence to question”, “ability to question”, “hypothesis development”, “quality article awareness”, “self-confidence to present”, “prefer articles for Up To date”, “finding articles functional for Up to date”, “clinical questioning”), a questionnaire named “Journal Club Comprehension and Confidence Instrument” (JCCCI) was created (Table 1). A 5-point Likert scale (5=strongly agree, 4=agree, 3=undecided, 2=disagree, 1=strongly disagree) was used to evaluate each competency item. Demographic information such as gender, age, education level, faculty, previous Journal Club participation, Journal Club participation that we organized, asking questions/contributing, and presentation experience were also included in the survey. This questionnaire was sent online via WhatsApp to both the Journal Club group and the control group. The Journal Club group completed this questionnaire twice, before and after attending the sessions. The control group completed this questionnaire once.

**Table 1: Journal Club Comprehension and Confidence Instrument (JCCCI)**

Competency	Survey question
Process	I understand how a journal club works.
Literature	I know what the literature review means and how it is done.
Structure	I understand what can be included in the abstract, introduction, method, results, discussion sections of the article.
Method	I feel confident in evaluating the methods of the articles
Effect of the method	I understand that the results reflected by an article may be affected by the method used in the article.
Figure and table	I understand how to read figures and tables.
Strengths/limitations	I feel confident in assessing the strengths and limitations of the articles.
Importance to question	I find it productive to ask questions and/or contribute after the presentations of the articles.
Self-confidence to question	I feel confident to ask questions and/or contribute after article presentations.
Ability to question	While reading an article, I feel confident in generating questions about the work done.
Hypothesis development	I feel confident to form new hypotheses while reading an article.
Quality of the article	I understand the importance of the journal in which an article is published should be Q1 quartered and have a high impact factor.
Self-confidence to present article	I can also present at a Journal Club.

Prefer articles for Up to date	I know that I can refer to articles to follow current developments in the field of health.
Finding articles functional for Up to date	I find article clubs functional to follow current developments in the field of health.
Clinical questioning	I think that the treatment methods used in the clinic are always reliable.

### Statistical Analysis

The SPSS 25 package program was used to analyze the data. Frequency and percentage values are presented for qualitative variables. Chi-square test was used for comparisons between independent qualitative variables.  $P < 0.05$  was accepted as significantly changed in the study.

## 3. Results

### Participants

During the study period, 18 Journal Club sessions were held. A total of 283 students (96 in the Journal Club group and 187 in the control group) completed the survey, of which 272 were undergraduate, 6 graduate, 4 doctoral, and one associate degree. Most of the respondents were medical students (41.7%); percentage of women was 80.2% and their ages are between 17-21 (54.4%). Data on experience with prior Journal Club participation and presentation are also reported. Additional details on participant demographics are described in Table 2.

**Table 2: Baseline Demographic Characteristics**

	Journal Club Group		Control Group	
	N (total= 96)	%	N (total= 187)	%
<b>Gender</b>				
Male	18	18.76%	38	20.3%
Female	78	81.24%	149	79.7%
<b>Age (in years)</b>				
17-21	61	63.5%	93	49.7%
22-26	28	29.2%	93	49.7%
Over 27	7	7.3%	1	0.6%
<b>Degree</b>				
Associate degree	0	0%	1	0.6%
Bachelors	88	91.6%	184	98.4%
Masters	4	4.2%	2	1.0%
Doctoral	4	4.2%	0	0%
<b>Faculty</b>				
Medical School	66	68.8%	52	27.8%
Faculty of Dentistry	0	0%	5	2.6%

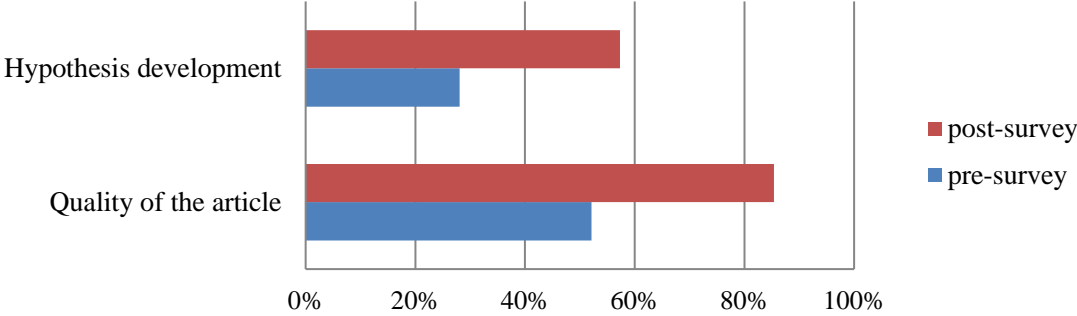
Faculty of Pharmacy	6	6.3%	51	27.2%
Faculty of Health Sciences	12	12.6%	74	39.6%
Faculty of Life Sciences	1	1.0%	3	1.6%
Vocational School of Health Services	0	0%	1	0.6%
Faculty of Veterinary Medicine	1	1.0%	0	0%
Faculty of Arts and Sciences	7	7.3%	0	0%
Faculty of Education and Technology	1	1.0%	0	0%
Faculty of Chemistry/Metallurgy	1	1.0%	0	0%
Institute of Science	1	1.0%	0	0%
Engineering Faculty	0	0%	1	0.6%
<b>Number of Article they Presented on an Academic Platform</b>				
None	42	43.7%	149	79.7%
1-5 times	48	50.0%	35	18.7%
6-10 times	6	6.3%	3	1.6%
<b>The Number of Attendance in a Similar Journal Club Before</b>				
None	78	81.2%	187	100.0%
1-6 times	7	7.3%	0	0%
7-12 times	11	11.5%	0	0%
<b>The Number of Sessions in a Similar Journal Club Where They Asked Questions After the Presentation</b>				
None	79	82.3%	187	100.0%
1-6 times	13	13.5%	0	0%
7-12 times	4	4.2%	0	0%
<b>The Number of Attendance in our Journal Club</b>				
1-6 times	56	58.3%	0	0%
7-12 times	40	41.7%	0	0%
<b>The Number of Sessions in our Journal Club Where They Asked Questions After the Presentation</b>				
None	30	31.2%	0	0%
1-6 times	52	54.2%	0	0%
7-12 times	14	14.6%	0	0%
<b>Prior Reading the Presented Article in our Journal Club</b>				
No	34	35.4%	0	0%
Yes	62	64.6%	0	0%

**Pre- vs. post-survey journal club group JCCCI responses**

There was a statistically significant difference ( $p < 0.05$ ) in eight of the sixteen competencies when the responses to the JCCCI were compared before and after the survey: “Process”, “Structure”, “Effect of the method”, “Importance to question”, “Self -confidence to question”, “Hypothesis development”, “Quality of the article” and “Self-confidence to present” (Figure 1).

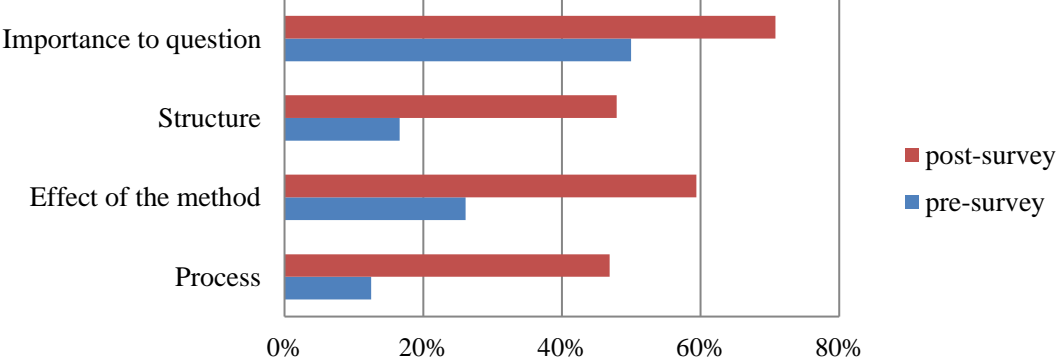
**A.**

**Positive Responses  
(Strongly Agree and Agree)**

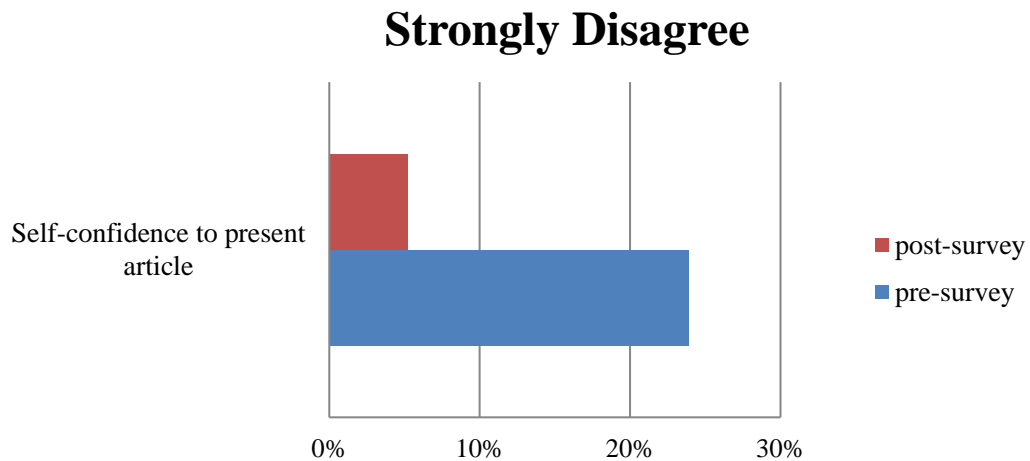


**B.**

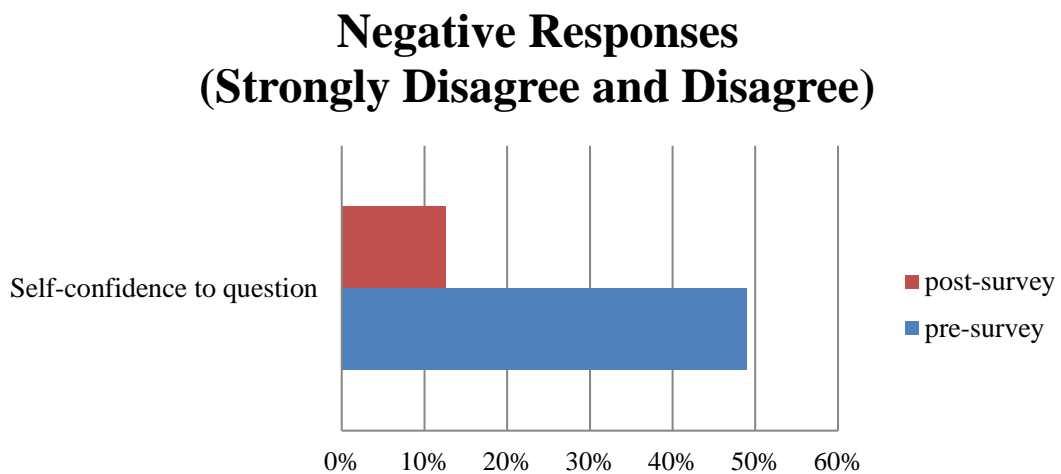
**Strongly Agree**



C.



D.



**Figure 1: Journal Club Pre- and Post-Survey Responses.** A. "quality of the article" and "hypothesis development" are the competencies that show the greatest change, with 33.3% and 29.2% increase, respectively when the "positive responses" (strongly agree and agree) reported by the students are compared. From this point of view, after the journal club sessions, the students' high scores can be said that the probability of the orientation towards quality articles and the ability to create new hypotheses increase. B. The competencies that show the greatest change when the "strongly agree" answers given by the students are compared. C. "Strongly disagree" in the "self-confident to present article" adequacy in the post-survey. There was a decrease of 18.7% in the answers. From this point of view, it can be said that the self-confidence of the students in their ability to make a presentation increased after the journal club sessions. D. The "negative responses" (strongly disagree and disagree) of the students were compared. According to the results, "self-confidence to question" proficiency, a significant difference was observed with a 36.4% decrease in post-survey. Students' self-confidence in asking questions about the article has increased.

There was a 33.3% (n=32) increase in the "quality of the article" competency before and after the survey when the "positive responses" (strongly agree and agree) reported by the student were compared. This rate increased to 85.4% (n=82) in the post-survey while there was a positive response rate of 52.1% (n=50) in the pre-survey. The second significant difference in positive responses was seen in "hypothesis development" competence. This rate was 57.3% (n=55) in the post-survey while there was 28.1% (n=27) positive response in the pre-survey.

Important significant change occurred in the "process" competency when the "strongly agree" responses of the students before and after the survey were compared. In this qualification, 12.5%



(n=12) of the students answered as “strongly agree” in the pre-survey, while this rate was 46.9% (n=45) in the post-survey. 34.4% (n=33) of the students reported an increase in the “strongly agree” response. Another key change occurred in the “effect of the method” proficiency. The “strongly agree” answers given by the students in the pre-survey of 26.1% (n=25) reached 59.4% (n=57) in the post-survey with an increase of 33.3% (n=32). The third significant change was the “structure” competency, with an increase of 31.3% (n=30); 16.6% (n=16) reported a “strongly agree” answer in the pre-survey. In the post-survey, this rate was 47.9% (n=46). The fourth change was the “importance to question” competency. In the post-survey, an increase of 20.8% (n=20) was achieved in the “strongly agree” response.

A significant difference was observed in the "self-confidence to question" proficiency when the "negative answers" (strongly disagree and disagree) answers given by the students before and after the survey were compared. This rate decreased to 12.6% (n=12) in the post-survey, with a decrease of 36.4% (n=35) while 49.0% (n=47) negative responses were reported in the pre-survey.

There was a decrease of 18.7% (n=18) in the "self-confidence to present" proficiency, when the "strongly disagree" answers of the students before and after the survey were compared. Negative responses at the rate of 23.9% (n=23) in the pre-survey decreased to 5.2% (n=5) in the post-survey. Additional details on Journal Club group participant responses were provided in Table 3.

**Table 3: Responses to the journal club comprehension and confidence instrument (JCCCI)**

	Journal Club Group				Control Group	
	Pre-survey		Post-survey		Post-survey	
	N (total=96)	%	N (total=96)	%	N (total=187)	%
<b>1. I understand how a journal club works.</b>						
Strongly agree	12	12.5%	45	46.9%	8	4.3%
Agree	27	28.1%	41	42.7%	66	35.3%
Neutral	28	29.2%	9	9.4%	74	39.6%
Disagree	14	14.6%	0	0%	24	12.8%
Strongly disagree	15	15.6%	1	1.0%	15	8.0%
<b>2. I know what the literature review means and how it is done.</b>						
Strongly agree	24	25.0%	47	49.0%	40	21.4%
Agree	32	33.4%	34	35.4%	76	40.7%
Neutral	20	20.8%	12	12.5%	44	23.5%
Disagree	12	12.5%	2	2.1%	17	9.1%
Strongly disagree	8	8.3%	1	1.0%	10	5.3%
<b>3. I understand what can be included in the abstract, introduction, method, results, discussion sections of the article.</b>						
Strongly agree	16	16.6%	46	47.9%	40	21.4%
Agree	46	47.9%	34	35.4%	95	50.8%

Neutral	18	18.8%	14	14.6%	38	20.3%
Disagree	11	11.5%	1	1.0%	10	5.3%
Strongly disagree	5	5.2%	1	1.0%	4	2.2%

**4. I feel confident in evaluating the methods of the articles**

Strongly agree	10	10.4%	17	17.7%	18	9.6%
Agree	10	10.4%	31	32.3%	33	17.7%
Neutral	35	36.4%	43	44.8%	79	42.2%
Disagree	23	24.0%	3	3.1%	39	20.9%
Strongly disagree	18	18.8%	2	2.1%	18	9.6%

**5. I understand how to read figures and tables**

Strongly agree	12	12.5%	29	30.2%	25	13.4%
Agree	21	21.9%	35	36.5%	67	35.8%
Neutral	36	37.5%	26	27.1%	59	31.6%
Disagree	20	20.8%	5	5.2%	24	12.8%
Strongly disagree	7	7.3%	1	1.0%	12	6.4%

**6. I feel confident in assessing the strengths and limitations of the articles.**

Strongly agree	10	10.4%	17	17.7%	14	7.5%
Agree	10	10.4%	32	33.3%	52	27.8%
Neutral	35	36.5%	39	40.6%	76	40.7%
Disagree	28	29.2%	6	6.3%	30	16.0%
Strongly disagree	13	13.5%	2	2.1%	15	8.0%

**7. I find it productive to ask questions and/or contribute after the presentations of the articles.**

Strongly agree	48	50.0%	68	70.8%	80	42.8%
Agree	29	30.2%	22	22.9%	84	44.9%
Neutral	13	13.5%	4	4.2%	15	8.0%
Disagree	5	5.2%	2	2.1%	3	1.6%
Strongly disagree	1	1.0%	0	0%	5	2.7%

**8. I feel confident to ask questions and/or contribute after article presentations.**

Strongly agree	8	8.3%	18	18.7%	23	12.3%
Agree	13	13.5%	29	30.2%	57	30.5%
Neutral	28	29.2%	37	38.5%	70	37.5%
Disagree	29	30.2%	6	6.3%	27	14.4%
Strongly disagree	18	18.8%	6	6.3%	10	5.3%

**9. I understand the importance of the journal in which an article is published should be Q1 quartered and high impact factor.**

Strongly agree	32	33.4%	58	60.4%	35	18.7%
Agree	18	18.7%	24	25.0%	29	15.5%
Neutral	11	11.5%	10	10.4%	64	34.3%
Disagree	17	17.7%	2	2.1%	32	17.1%
Strongly disagree	18	18.7%	2	2.1%	27	14.4%

**10. I can also present at a Journal Club.**

Strongly agree	11	11.5%	23	24.0%	13	6.9%
Agree	11	11.5%	23	24.0%	41	21.9%
Neutral	33	34.4%	35	36.5%	82	43.9%
Disagree	18	18.7%	10	10.4%	31	16.6%
Strongly disagree	23	23.9%	5	5.2%	20	10.7%

**11. I feel confident to form new hypotheses while reading an article.**

Strongly agree	9	9.4%	22	22.9%	14	7.5%
Agree	18	18.7%	33	34.4%	63	33.7%
Neutral	35	36.5%	34	35.4%	71	38.0%
Disagree	23	24.0%	3	3.1%	29	15.5%
Strongly disagree	11	11.5%	4	4.2%	10	5.3%

**12. While reading an article, I feel confident in generating questions about the work done.**

Strongly agree	8	8.3%	23	24.0%	21	11.2%
Agree	30	31.3%	34	35.4%	75	40.1%
Neutral	26	27.0%	29	30.2%	67	35.8%
Disagree	22	22.9%	7	7.2%	19	10.2%
Strongly disagree	10	10.4%	3	3.1%	5	2.7%

**13. I know that I can refer to articles to follow current developments in the field of health.**

Strongly agree	47	49.0%	70	72.9%	76	40.7%
Agree	34	35.4%	20	20.8%	84	44.9%
Neutral	10	10.4%	4	4.2%	20	10.7%
Disagree	5	5.2%	1	1.0%	2	1.0%
Strongly disagree	0	0%	1	1.0%	5	2.7%

**14. I find article clubs functional to follow current developments in the field of health**

Strongly agree	48	50.0%	71	73.9%	58	31.0%
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Agree	27	28.0%	20	20.8%	86	46.0%
Neutral	16	16.7%	3	3.1%	36	19.2%
Disagree	2	2.1%	1	1.0%	4	2.2%
Strongly disagree	3	3.1%	1	1.0%	3	1.6%

**15. I think that the treatment methods used in the clinic are always reliable.**

Strongly agree	8	8.3%	9	9.3%	15	8.0%
Agree	21	21.9%	25	26.0%	63	33.7%
Neutral	44	45.8%	37	38.5%	73	39.0%
Disagree	16	16.7%	20	20.8%	29	15.5%
Strongly disagree	7	7.3%	5	5.2%	7	3.8%

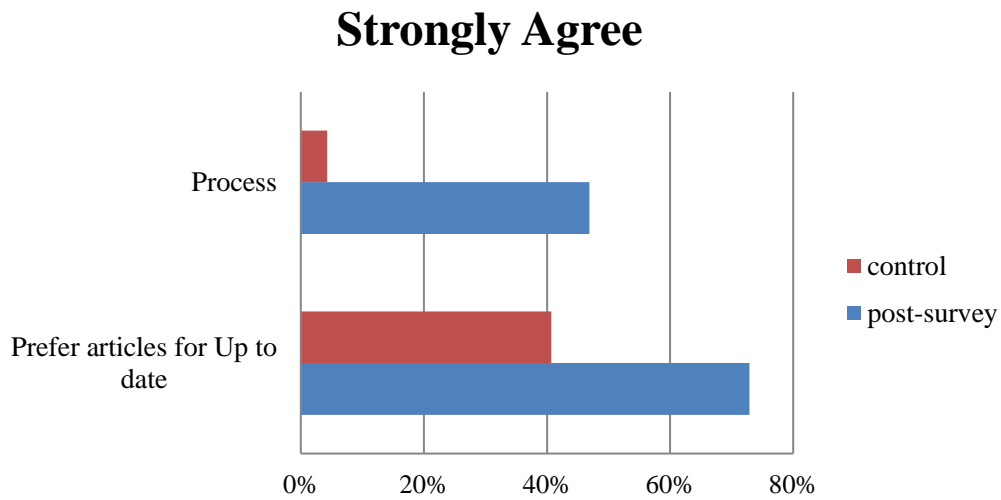
**16. I understand that the results reflected by an article may be affected by the method used in the article.**

Strongly agree	25	26.1%	57	59.4%	48	25.6%
Agree	41	42.7%	33	34.4%	101	54.0%
Neutral	17	17.7%	5	5.2%	29	15.5%
Disagree	9	9.3%	1	1.0%	4	2.2%
Strongly disagree	4	4.2%	0	0%	5	2.7%

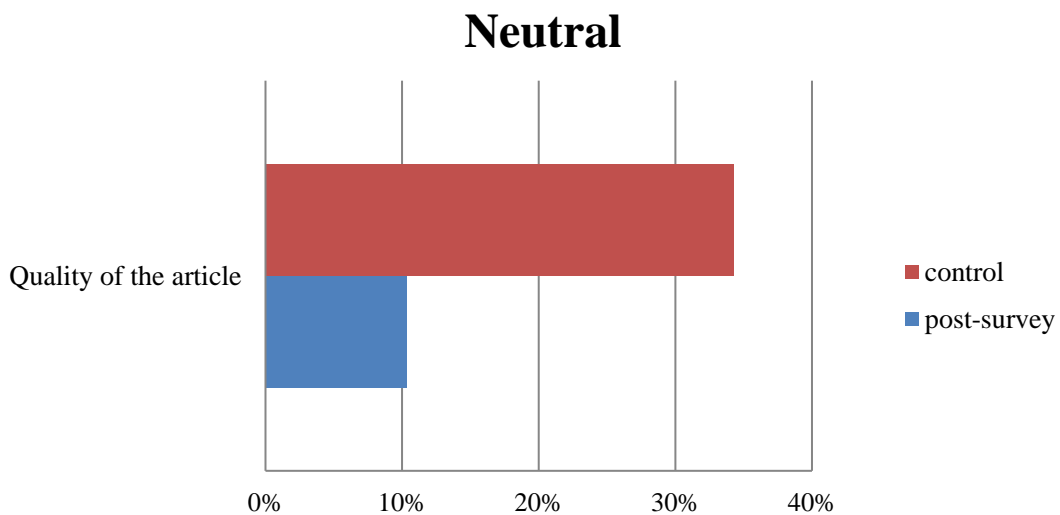
**Journal Club group vs. control group JCCCI responses**

There was a statistically significant difference ( $p < 0.05$ ) in three of the sixteen competencies: "process", "quality of the article" and "prefer articles for up to date" (Figure 2) when the Journal Club group post-survey responses were compared with the control group responses. For "Process" proficiency, 4.3% of the students in the control group reported "strongly agree", while 46.9% of the Journal Club group reported this response, the difference being 42.6%. For the "Quality of the article" qualification, 10.4% and 34.3% of students reported a neutral response, with a difference of 23.9% in the Journal Club group and control group, respectively. In the "Prefer articles for up to date" qualification, 40.7% of the students in the control group and 72.9% in the Journal Club group stated "strongly agree" with a difference of 32.2%. No significant differences were reported in other qualifications. Additional details on the control group and Journal Club group responses were available in Table 3.

A.



B.



**Figure 2: Journal Club Post-Survey and Control Group Responses.** **A.** When the "strongly agree" answers given by the students were compared, the most important changes occurred in the "process" and "prefer articles for up to date" competencies, with 42.6% and 32.2% differences, respectively. From this point of view, it can be said that the students participating in the journal club know better the functioning of the journal club and are more likely to prefer articles in order to stay up to date. **B.** Comparing the "neutral" responses reported by students, the crucial change occurred in "quality of the article" proficiency, with a difference of 23.9%. Accordingly, the number of students who participated in the journal club sessions was significantly less neutral while the students in the control group remained neutral in evaluating the quality of the articles.

#### 4. Discussion and Conclusion

Students in health field participating in the study scored the literature evaluation skills and scientific inquiry using the JCCCI. Data reported that students got efficiency from the journal club sessions. Therefore, the current developments in the field of health and strengthening the scientific inquiry may make a great contribution to the professional life. The questionnaires for the Journal Club group were organized in two steps as before and after the journal club. For the control group, this process is one

step. In this way, the reported differences and the effect of participation in the journal club can be clearly identified. After participating in the journal club, students' mastery of concepts including articles, presentations and hypotheses increased. However, the control group was not as successful as the club participants. These results are similar to the results of another study investigating the effect of the journal club on pharmacy students with the JCCCI (13). The results of journal article club organized between 2010-2014 to improve their literature interpretation skills also overlap with the results of these two studies (15).

A journal club that included ophthalmology residents examined the ability to evaluate evidence and critically read an article. Competencies including applying knowledge about statistical methods were evaluated (16). In another journal club organized by pharmacy students, the ability to critically evaluate clinical research and interpret statistical methods was measured (17). Improvements were observed in the ability to interpret statistical methods in both studies. However, statistical competence was not a measured criterion in our study. In the questionnaire, methodology and figures competencies were evaluated, but no significant increase was observed. This topic can have a focus area in future journal club sessions.

A 15-question Likert questionnaire was applied to medical school students (n=36) who participated in the journal club and students' interest in surgery and their ability to critically analyze articles increased (18). In another study, the journal club was integrated into the residency program. Journal clubs contribute to critical thinking (19) and results are in high agreement with the improvements we have achieved in clinical questioning and effect of the method competencies in our study. Thus, it can be said that journal clubs increase scientific inquiry visibly. The ability to search the literature is essential in terms of being up-to-date and developing new hypotheses. Nurses in Africa have difficulties in accessing the literature due to obstacles such as difficult to translate journal content and payments. The journal club created within the hospital prevented these restrictions. After the sessions, nurses stated that the access to the literature and the skills in literature search increased (20). In our study, literature proficiency was evaluated and the results showed that Journal Club group may have a better grasp of the literature search after the journal club. Based on this, it can be said that journal clubs contribute to the understanding of the concept of literature. In our study, the adequacy of "prefer articles for up to date" was also measured in order to evaluate access to current information. A questionnaire was applied to medical faculty students about article clubs and it is aimed to find out whether students are aware of the journal club. Some of the students gave a negative answer because the club takes time while some students requested the journal club as a course, as it would help them gain confidence in presenting cases in clinics (21). The effect of journal clubs on increasing self-confidence in students was stated in our study and the significant statistical increase in the competences of "self-confidence to question" and "self-confidence to present article" in our scale proves this.

In conclusion, our study revealed the effects of the journal club sessions. In this study, competencies of the students are evaluated and the progress of the students participating in the journal club is shown. Journal clubs may encourage students to analyze the literature, critically evaluate articles, and contribute to open discussions with the peers. The spread of journal clubs may contribute to the training of more qualified students.

## Declaration of Ethical Code

*In this study, we undertake that all the rules required to be followed within the scope of the "Higher Education Institutions Scientific Research and Publication Ethics Directive" are complied with, and that none of the actions stated under the heading "Actions Against Scientific Research and Publication Ethics" are not carried out.*

This study received ethical approval from the Health Sciences University Hamidiye Scientific Research Ethics Committee (SBUHBAEK) on 14.01.2022 with the project proposal titled "Evaluation of the effects of participation in the Article Club on scientific inquiry in health field students" with registration number 22/18.

## References

1. Mateu Arrom, L., Huguet, J., Errando, C., Breda, A., Palou, J., 2018. "How to write an original article", *Actas urologicas espanolas*, 42, 9, 545–550.
2. Sackett, D.L., Rosenberg, W.M., Gray, J.A., Haynes, R.B., Richardson, W.S., 1996. "Evidence based medicine: what it is and what it isn't", *BMJ*, 312, 7023, 71–72.
3. Guyatt, G., Rennie, D., Meade, M.O., Cook, D.J., 2015. "Users' guides to the medical literature: a manual for evidence-based clinical practice", 3rd ed. New York, NY: McGraw-Hill Education, <http://jamaevidence.mhmedical.com/book.aspx?bookid=847>, Accessed 7 September 2019.
4. Gurney, M. K., Buckley, K., Karr, S., 2019. "Evaluation of a journal club preparatory session on student confidence for a graded journal club", *Currents in pharmacy teaching and learning*, 11, 12, 1221–1230.
5. Coghill, J., 2019. "Running a successful journal club", *Paediatrics and Child Health*, 30, 2, 84-86.
6. Deenadayalan, Y., Grimmer-Somers, K., Prior, M., Kumar, S., 2008. "How to run an effective journal club: a systematic review", *Journal of evaluation in clinical practice*, 14, 5, 898–911.
7. Cole, J. D., Ruble, M. J., Povlak, A., Nettle, P., Sims, K., Choyce, B., 2020. "Self-directed, higher-level learning through journal club debates", *Health Professions Education*, 6, 4, 594-604.
8. Sherratt, C., 2005. "The journal club: A method for occupational therapists to bridge the theory-practice gap", *BJOT*, 68, 7, 301–306.
9. Thompson, C.J., 2006. "Fostering skills for evidence-based practice: The student journal club", *Nurse Educ Pract.*, 6, 2, 69–77.
10. Ranganath, R., Elizabeth, S., Mahadevwala, D., 2021. "Students' perception of implementing journal clubs in an undergraduate medical curriculum" *Res Dev Med Educ.*, 10, 5.
11. Harris, J., Kearley, K., Heneghan, C., Meats, E., Roberts, N., Perera, R., Kearley-Shiers, K., 2011. "Are journal clubs effective in supporting evidence-based decision making? A systematic review", *Beme guide No. 16. Med. Teach.*, 33, 9–23.
12. Matthews, D.C., 2011. "Journal clubs most effective if tailored to learner needs", *Evid. -Based Dent.*, 12, 92–93.
13. Mezgebe, M., Chesson, M. M., Thurston, M. M., 2019. "Pharmacy student perceptions regarding understanding of and confidence in literature evaluation following a student-led journal club", *Currents in pharmacy teaching & learning*, 11, 6, 557–564.
14. Wombwell, E., Caligiuri, F.J., Englin, E., Paul, S., Nguye, T., Palacek, W., 2014. "Assessment of student perceptions on a series of live internet-based student journal clubs presented synchronously to multiple distance locations, a pilot study", *J Pharma Care Health Syst.*, S1 (01) 10.4172/2376-0419.
15. Ismail, S., Al Khansa, S., Aseeri, M., Alhamdan, H., Quadri, K., 2017. "From Learning to Decision-Making: A Cross-Sectional Survey of a Clinical Pharmacist-Steered Journal Club", *Pharmacy (Basel, Switzerland)*, 5, 1, 3.
16. Lee, A. G., Boldt, H. C., Golnik, K. C., Arnold, A. C., Oetting, T. A., Beaver, H. A., Olson, R. J., Zimmerman, M. B., Carter, K., 2006. "Structured journal club as a tool to teach and assess resident competence in practice-based learning and improvement", *Ophthalmology*, 113, 3, 497–500.
17. Landi, M., Springer, S., Estus, E., Ward, K., 2015. "The Impact of a Student-Run Journal Club on Pharmacy Students' Self-Assessment of Critical Appraisal Skills", *The Consultant pharmacist: the journal of the American Society of Consultant Pharmacists*, 30, 6, 356–360.
18. Berman, D., Braig, Z., Simms, B., Anderson, T., Dougherty, K., Marcinkowski, K., Seaman, R., 2019. "Efficacy of Medical Student Surgery Journal Club", *Journal of surgical education*, 76, 1, 83–88.
19. Burris, J. N., Frederick, E. K., Malcom, D. R., Raake, S., Shin, M., Daugherty, K. K., 2019. "Impact of a Journal Club Elective Course on Student Learning Measures", *American journal of pharmaceutical education*, 83, 7, 6827.

20. Leonard, A., Power, N., Mayet, S., Coetzee, M., North, N., 2022. "Engaging nurses in research awareness using a new style of hospital journal club - a descriptive evaluation", *Nurse education today*, 108, 105123.
21. Ranganth, R., Elizabeth, S., Mahadevwala, D., 2021. "Students' perception of implementing journal clubs in an undergraduate medical curriculum", *Research and Development in Medical Education*, 10, 1, 5-5.