ICPS
Published by ACM

ICMHI 2022

Kyoto, Japan

May 12-14, 2022

2022 6TH INTERNATIONAL CONFERENCE ON MEDICAL AND HEALTH INFORMATICS

The Association for Computing Machinery
1601 Broadway, 10th Floor
New York, New York 10019, USA

ACM ISBN: 978-1-4503-9630-1

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Proceedings of 2022 6th International Conference on Medical and Health Informatics (ICMHI 2022)

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Preface

We were so glad to announce that 2022 6th International Conference on Medical and Health Informatics (ICMHI 2022) was held successfully through the ZOOM Platform facilitating interactions among conference participants. It aims to provide a scientific platform and promote research in the field of Medical and Health Informatics, and to facilitate the exchange of new ideas and the establishment of research clusters in these fields among academicians, engineers, scientists and practitioners.

In addition to the contributed papers, internationally known experts from several countries are also invited to deliver speech at ICMHI 2022. The conference was highlighted by Keynote Speaker: Prof. Yu-Chuan Jack Li, Taipei Medical University, President of the International Medical Informatics Association. The speech title is 'AI for the Future of Healthcare'. Every participant learned and benefited a lot from the speech.

The proceeding tends to present to the readers the newest researches results and findings in the field of Medical and Health Informatics. The proceedings are organized in nine chapters under the topics of: Biomedical Image Processing and Data Analysis; Telemedicine and Healthcare Information System; Electronic Medical Record and Medical Data Processing; Machine Learning in Biomedicine and Computer Aided Diagnosis; Biomedical Electronics and Biological Signal Analysis; Medical Statistics and Modeling in Epidemic Forecasting; Bioinformatics and Biomedical Technology; Applied Computing in Hospital Management and Medical Resource Allocation; Public Health and Applied Statistics in Public Hygienics.

All papers were subjected to peer-review by conference committee members and international reviewers. The papers were selected based on high quality and relevance to the conference theme.

We would like to express our sincere appreciation to the organizing committee and the volunteers who had dedicated their time, effort and help in planning, promoting, and organizing the conference.

Prof. Chi-Chang Chang

Chung-Shan Medical University, Taiwan

ICMHI 2022 Conference Chair

September, 2022

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EFFECTS OF NIGELLA SATIVA ON FEMALE INFERTILITY: a SYSTEMATIC REVIEW

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ABSTRACT

Objective. Nigella sativa is a plant that contains a lot of antioxidants. Nigella sativa is an important medicinal herb that has been utilized for centuries. Given Nigella sativa efficacy in treating a variety of disorders, this systematic study attempts to assess Nigella sativa effect on the female reproductive system. *Materials and methods.* This systematic review was conducted on the Randomize Control Trial (RCT) through electronic databases such as Google Scholar, Science Direct, Pubmed, Scopus and Proquest from January 2012 to January 2022. The keywords or phrases used were Nigella sativa, Black Seeds, Black Cumin, Thymoquinonee, Infertility, Women dan Female. *Results.* 14 articles were selected for analysis. The results showed that Nigella sativa and its constituent, Thymoquinone can reduce MDA levels, increase SOD, increase TAS, increase the number of ovarian follicles, and increase body weight. *Conclusion.* Nigella sativa can improve reproductive parameters in women.

CCS CONCEPTS

• **General and reference**; • **Document types**; • **General conference proceedings**;

KEYWORDS

Nigella sativa, Infertility, Female, Systematic Review

ACM Reference Format:
AMIRUL, AMALIA*, HENDY, Hendarto, ARIFA, Mustika, and INTA, Susanti. 2022. EFFECTS OF NIGELLA SATIVA ON FEMALE INFERTILITY: a SYSTEMATIC REVIEW. In *2022 6th International Conference on Medical and Health Informatics (ICMHI 2022), May 13–15, 2022, Virtual Event, Japan.* ACM, New York, NY, USA, 4 pages. https://doi.org/10.1145/3545729.3545776

1 INTRODUCTION

Infertility is definded as the failure to conceive between partners after 1 year of active sexual intercourse without contraception. Infertility is a health problem that affects about 10-15% of couples trying to achieve pregnancy worldwide [1], [2]. It is estimated that there are 48 million couples and 186 million people living with infertility globally. The World Health Organization (WHO) presented data that female infertility was the cause of infertility by 35% and men only contributed 8% as the cause of infertility in couples diagnosed as infertile [3]. Some of the causes of infertility are hormonal disorders, genetic disorders, nutritional problems and lifestyle.

Female infertility develops after lack of ovulation, obstruction of the fallopian tubes in low-quality mice, endometriosis and polycystic ovary syndrome (PCOS) [4]. There are many types of drugs for infertility,namely by consuming anti oxidants, nutritional supplements and herbal medicines. One of the herbal plants that are rich in natural antioxidants is Nigella sativa. Visually, Nigela sativa has flowers with 5-10 petals that are white, yellow, pink, pale blue or pale purple. The fruit is a large capsule consisting of 3-7 follicles and contains several seeds. The seeds of black cumin are small dicotyledonous, trigonus, angular, tubercular, black outside and white inside, aromatic smell with bitter taste [5, 6]. Nigella sativa and its derivative component, thymoquinone (TQ) have radical scavenging potential and the capacity to inhibit oxidative stress by increasing antioxidant production [7]. Nigella sativa is also known to have medicinal properties as an antidote, protecting against toxicity in several organs, including the brain, kidneys, lungs, liver, heart, digestive tract and reproductive system [8].

Previous studies have shown that Nigella sativa includes immunomodulatory, anti-inflamatory, antimicrobial, and anti-oxidant drugs. Nigella sativa has not shown any serious complications in clinical trials and has not shown any toxic effects in animals. Nevertheless, the review is limited to studies on the effects of black cumin on female reproduction. Therefore the aim of this study was to evaluate the role of nigella sativa in female infertility.

2 MATERIAL AND METHODS

This systematic review was carried out by searching from various database, like Google Scholar, Science Direct, Pubmed, Scopus and Proquest from January 2012 to January 2022. The Search waslimited to relevant keywords or phrases, “Nigella sativa” or “Black cumin” or Thymoquinon and Infertility and Women or female. The largest search for articles in English.

The study design was limited to RCTs because it was the gold standard for experimental studies to prove causality. Case reports, review articles, abstract at symposiums and congresses were exclude. All article that met the inclusion criteria were included study. Duplications were also checked and unrelated articles were excluded (Figure 1). For each study, the data taken were the subject,

ICMHI 2022, May 13–15, 2022, Virtual Event, Japan

ACM ISBN 978-1-4503-9630-1/22/05…$15.00
https://doi.org/10.1145/3545729.3545776

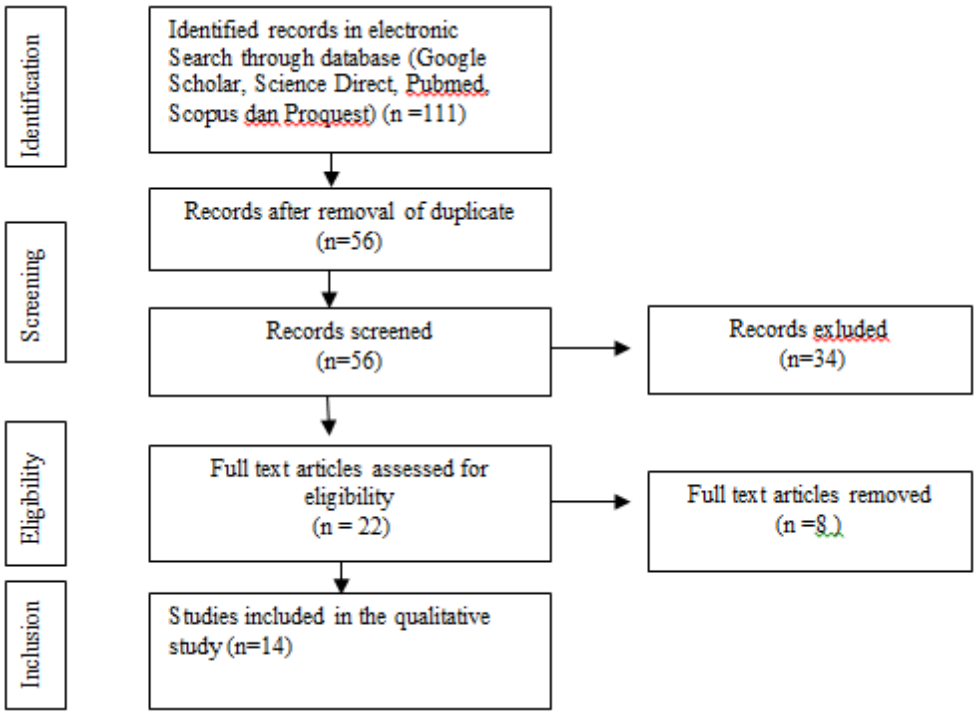

Figure 1: PRISMA Flow Chart

sample size, study design, type of Nigella sativa, dose and research results.

The characteristics of include studies are summarized in table 1.

3 RESULT

Our systematic review conducted from 14 RCTs, Article using the same method are categorized in the same group,we use studies relevant to the inclusion criteria in the results and discussion.

Study in human:

From the 14 articles selected,one study evaluated the effects of Nigella sativa in women. Islam M. Ammar, et al., showed that administration of a combination of metformin 500 mg and thymoquinonee in Nigella sativa oil 500 mg thress times daily for 6 months in PCOS patients can reduce the number of patients experiencing amenorrhea or oligomenorrhea, significant weight loss, increased SOD activity and decreased MDA levels [9].

Animal studies:

According to a study from Kamarzaman, et al., administration of 0,2 ml, 0,5 ml and 1,0 ml/100g of Nigella sativa oil for 5 days to mice injected with cyclophosphamide resulted in normal primary and secondary follicle counts including increased ovarians diameter. In this study, Nigella sativa was shown as a prophylactic property in the reproductive system of female mice [4].

The study conducted by Mohammed arif, et al. Thymoquinonee treatment 2 mg/200 ml olive oil can suppress NF-k core B translocation, COX2 expression, and ROS in PCO mice. In addition, TQ administration led to significant restoration of molecular normality of the ovaries, such as decreased cysts, increased ovulation rate, and normalization of key ovarian factors such as TNF-α, matrix metalloproteinase, COX2, during follicular maturation [10].

Noreen Anwar, et al. conducted an experiment to investigate Nigella sativa at doses of 1 and 4 mg/Kg BW in PCOS mice showed that there was a decrease in the number of cystic follicles [11].

According to Melahat and Zeyneb's study, administration of Nigella sativa 2 ml/Kg before laparotomy and 2 ml/Kg 1 hour after laparotomy showed an increased antioxidant status in the group 1 hour after laparotomy [12].

Pakdel, et al. showed that the administration of Nigella sativa at doses of 100 mg/kg, 200 mg/kg, 400 mg/kg in hypothyroidism rats could increase prolactin levels in the 400 mg/kg group [13]. According to research by Sima T, et al., Treatment with thymoquinonee 8 and 16 mg/kg for 30 days in PCOS model mice showed an increase in body weight, ovarian morphology, and ovulation. In addition, this study showed improvements in serum biochemical parameters such as glucose, tiglycerides, total cholesterol, lipoprotein, LH and FSH [14].

Fatemeh, et al. concluded that the administration of NSE at doses of 0,1; 50 and 100 g/ml in culture media showed higher rates of maturation, fertilization and blastocyst formation in the 50 g/ml treatment. Furthermore, oocytes at 50 g/ml treatment showed upregulation of mRNA expression in epigenetic-related genes, and down regulation of cyclooxygenase mRNA expression [15].

Based on the results obtained in the study of Khani, et al. administration of NS doses of 50, 100, 200 mg/kg for 30 days in PCOS model rats showed a decrease in LH, testosterone, glucose, insulin resistance, and MDA levels in the 200 mg/kg treatment. In addition,

Table 1: Characteristics of include studies

Author /Year	Sampel	Intervention	Dose	Results
Human				
Islam M Ammar, et al. (2021) (9)	207 PCOS patient	NSO	1500 mg/day + metformin for 6 month	Decreased amenorrhea, decreased body weight, increased SOD, and decreased MDA
Animal's				
Kamarzaman, et al. (2014) (4)	48 Mice cyclophosphamide	NSO intraperitoneal	0.2, 0.5 and 1ml/100g	Increase in primary, secondary follicles and ovarian diameter
Mohammed Arif, et al. (2016) (10)	Rats Wistar PCOS	TQ sub cutan	2mg / 200ml olive oil	TQ suppresses NF-k, COX2, and ROS
Noreen Anwar, et al. (2016)(11)	40 Mice BALB/c PCOS	NS	1 mg and 4 mg/ KgBW	Decreased number of cystic follicles
Melahat dan Zeynab (2017) (12)	48 Rats Wistar iskemia reperfusi	NSO	2 ml/kg before laparotomy and 2 ml/kg 1 hour after laparotomy	Antioxidant status in the 2 ml/kg 1 hour after laparotomy group increased
Roghayeh Pakdel, et al.(2017) (13)	70 Rats hipotiroidesme	NS	100 mg/kg, 200 mg/kg, 400 mg/kg	The results of T4 increased, the weight of the mice increased,
Sima T, et al. (2018) (14)	30 Rats PCOS	TQ	8 and 16 mg/kg for 30 days	TQ improves ovarian function and ovulation in mice
Seflek, et al. (2019) (2)	21 Rats DM	NSO	0,2 mg/Kg/hari for 4 weeks	NS reduces hyperglycemia, lowers TOS and MDA, increases TAS and SOD
Fatemeh Eini, et al. (2020) (15)	40 Rats PCOS	NSE	0, 1, 50 dan 100 μg/ml	Doses of 50 g/ml increase oocyte maturation, GSH concentration, GPx and epigenetic modification
Kaabi A, et al. (2020) (16)	Sheep	NSO	5%, 10%, dan 20% cultured for 24 hours	Sheep oocyte maturation rate was better at 5% NSO
Seiyedah N Naseran, et al. (2020)(17)	40 Rats PCOS	NS	300 mg/kg + honey 1200 mg/kg and 600 mg/kg + honey 2400 mg/kg for 28 days	Decrease in LH, estrogen and testosterone. Increased progesterone at the combined dose of NS and honey
Samira Khani, et al. (2021)(18)	36 Rats Wistar PCOS	NS	50, 100, 200 mg/kg for 30 days	LH, testosterone, glucose, insulin, and MDA decreased at a dose of 200 mg/kg, NS improved the structure of ovarian tissue
Khairani Sukatendel, et al. (2021)(19)	32 Rats Cisplatin chemoterapy	NS	500 mg/KgBW and 1000 mg/KgBW for 2 weeks	The highest number of primary, secondary and tertiary follicles was in the 500 and 1000 mg/KgBW .
Afrina Mustari, et al. (2022)(20)	80 male and female mice	NSO	0.5 ml/kg for 16 weeks	Males: increased testosterone Females: increased number of follicles

Nigella sativa has a role in improving the structure of ovarian tissue [18].

Study of Sukatendel, et al., administration of Nigella sativa 500mg/KgBW and 1000 mg/KgBW for 2 weeks to rats exposed to Cisplatin chemotherapy showed the highest number of primary, secondary and tertiary follicles in the 500 and 1000 mg/KgBW groups and the lowest number of atretic follicles in the 1000 mg/KgBW group [19].

4 DISCUSSION

The RCTs on the efficacy of Nigella sativa on female infertility are the focus of our systematic review. Beginning in 2012, we decided to conduct a systematic review. This paper examines 14 studies that looked at the impact of Nigella sativa on female infertility. It should be noted that the most relevant articles are found in the results section. Most studies report no negative effects from giving Nigella sativa.

Nigella sativa's mechanism of action in infertility has been widely reported in various studies, including as a bronchodilator,

gastroprotective, hepatoprotective, anti-tumor, anti-diabetic, antihypertensive, antioxidant, antifungal, immunomodulatory, anti-inflammatory, analgesic, antiviral, antipyretic, contraceptive, and anti-inflammatory. antibacterial, anticonvulsant, antitussive, anticancer, and antihyperlipidemic [6, 21, 22].

Polycystic ovary syndrome has received a lot of attention recently because it affects women of childbearing age and is a common cause of infertility [23]. The only effective drug for PCOS is metformin [24]. It is an insulin sensitivity drug that reduces weight and has an effect on increasing ovulation and fertility [25]. In the sima study, investigated the therapeutic effect of thymoquinone in rat model PCOS. Similar results to metformin were found in thymoquinone-treated animals. Thymoquinonee is a bioactive ingredient in Nigella sativa that has potential therapeutic properties. Polycystic ovarian syndrome is characterized by persistent inflammation. As a result, thymoquinonee's therapeutic efficacy in PCOS may be attributable to its anti-inflammatory effects [14]

Oxidative stress is a persistent imbalance between ROS and RNS exposure that exceeds antioxidants [26]. Endometriosis, tubal factor infertility, and polycystic ovary syndrome are all caused by oxidative stress [27]. Seflek et al. discovered antioxidant capabilities in a rat model of diabetes mellitus by reducing serum TOS and MDA levels while raising SOD and TAS levels [2]. Furthermore, Nigella sativa's antioxidant properties prevent oxidative stress and ovarian follicle damage [23].

Nigella sativa causes weight gain in hypothyroidism patients. The results of Niki, et al. on the effect of Nigella sativa oil on weight gain in hypothyroid rats [23]. More than 100 distinct chemicals have been discovered in Nigella sativa and have been reported in several studies to have antioxidant benefits, renal protection, and increased pancreatic insulin secretion. This impact could be responsible for the rise in body weight in Nigella sativa-treated hypothyroid rats, specifically the increase in insulin secretion [28].

5 CONCLUSION

Nigella sativa and its constituent, Thymoquinone can decrease MDA levels, increase SOD, increase TAS, increase ovarian follicle count, and increase body weight in animal studies. The antioxidant capabilities of Nigella sativa in radical scavenging are the most likely mechanism. Although the findings of this systematic review indicate that Nigella sativa is a good candidate for female infertility, there is still insufficient evidence to recommend the use of Nigella sativa as adjunctive therapy in infertile women. It is recommended to conduct further RCTs on the positive effects of clinical trials of Nigella sativa in the management of infertile women.

ACKNOWLEDGMENTS

The authors appreciate the support of the Research Council and Medical Research Center at Universitas Airlangga in this study.

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