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Aims & Scope

Compared to other fields, developments and innovations in the fields of medical and health sciences are very fast. In this century, where the human population is rapidly increasing and technology is developing rapidly, health problems are constantly changing and new solutions are constantly being brought to these problems. With the Covid 19 epidemic, it has emerged that a health problem affects all humanity and all areas of life. For this reason, this conference focused on the changes and innovations in the field of Medical and Health Sciences.

The aim of the conference is to bring together researchers and administrators from different countries, and to discuss theoretical and practical issues of Medical and Health Sciences. At the same time, it is aimed to enable the conference participants to share the changes and developments in the field of Medical and Health Sciences with their colleagues.

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ICGeHeS 2022: International Conference on General Health Sciences

Patient Safety Culture in Bulgarian Hospitals – A Web-Based Survey

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Abstract: Establishing a high culture of patient safety in hospitals is one of the main ways to prevent or reduce errors and improve the overall quality of healthcare. The aim of the study is to assess the perceptions on patient safety culture among healthcare specialists in Bulgarian hospitals. A national cross-sectional survey was conducted among 620 healthcare specialists. The study was conducted using the web-based Bulgarian Version of the Hospital Survey on Patient Safety Culture Questionnaire (B-HSOPSC). The B-HSOPSC includes 42 questions, grouped in 12 different dimensions measuring patient safety culture. No personal identification was possible of the participations in the survey using the e-platform. The data was analyzed with descriptive statistics and non-parametric tests. The results of the study show in general that the respondents demonstrate a positive attitude regarding patient safety culture. The dimensions "Staffing" and "Non-punitive response to error" are most problematic, as their percentage of positive response rates (PRRs) are lowest - 35.16% and 39.62%, respectively. However, "Handoffs and transitions" and "Overall perceptions of safety" show the highest PRRs – 66.65% and 65.48%, respectively. From all participants, 74.7% have never reported an adverse event or error. Non-parametric tests did not find significant statistical differences in "Patient safety grade" between physicians and other health care specialists. Based on the evidence, the hospital managements need to focus on improving problem areas.

Keywords: Patient safety culture, Web-based survey, Quality medical care, HSOPSC

Introduction

Developing a high culture of hospital patient safety is one of the main ways to prevent or reduce errors and to improve the total quality of medical care. Therefore, recently a number of more organizations encourage a safety culture as an effective approach to sustainable safety improvement (World Health Organization, 2022; Agency for Healthcare Research and Quality, 2022; Joint Commission International, 2020).

The safety culture is defined as "the product of individual and group values, attitudes, perceptions competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization's health and safety management" (World Health Organization, 2009). One of the well known and useful tools for assessing patient safety culture worldwide is the Hospital Survey of Patient Safety Culture (HSOPSC), developed by the Agency for Healthcare Research and Quality (Sorra et al., 2016). The aim of the study is to assess the perceptions on patient safety culture among healthcare specialists in Bulgarian hospitals using the Bulgarian version of HSOPSC (B-HSOPSC).

Method

A national cross-sectional survey was conducted among 620 healthcare specialists for period of one year. The study was conducted using the web-based translated, linguistic and cultural adapted B-HSOPSC and was part of the №11-2017 Project of the Medical University of Plovdiv. Using the e-platform, no personal identification was possible of the participations in the survey, nevertheless the present research was approved by the Medical University's research ethics committee, № 05/19.10.2017. The B-HSOPSC includes 42 questions, grouped in 12 different dimensions measuring patient safety culture. For the purposes of the study, the percentage of positive responses for each item was calculated. Then a score per dimension of the safety culture was calculated which corresponded to the average of the proportions of positive responses per item using the formula of the Agency for Healthcare Research and Quality (AHRQ). This formula is defined as "the total number of positive responses to the items in the patient safety dimension divided by the total number of items in each dimension (Westat et al., 2018). If the score was >75%, the dimension was considered as developed; 50% to 75%, the dimension needs to be improved; and <50%, the dimension was considered as undeveloped (Muftawu & Aldogan, 2020). The data was analyzed with descriptive statistics (mean, number and percentage) and non-parametric tests using the SPSS 23.0, and presented in the form of tables and figures.

Table 1. Work related characteristics of the respondents

Work related details		**N**	**%**
Profession	Non specified	16	2.6
	Physicians	210	33.9
	Other health professionals	394	63.5
	Total	620	100.0
Surgery/Non-surgery units	Non specified	27	4.4
	Surgery units	160	25.8
	Non-surgery units	433	69.8
	Total	620	100.0
Years in hospital	Non specified	12	1.9
	< 1	44	7.1
	1-5	194	31.3
	6-10	146	23.5
	11-15	89	14.4
	16-20	54	8.7
	≥ 21	81	13.1
	Total	620	100.0
Years in department	Non specified	14	2.3
	< 1	42	6.8
	1-5	189	30.5
	6-10	134	21.6
	11-15	77	12.4
	16-20	63	10.2
	≥ 21	101	16.3
	Total	620	100.0
Ownership of the hospital	Non specified	47	7.6
	Governmental/municipal	361	58.2
	Private	212	34.2
	Total	620	100.0
Teaching hospitals	Non specified	50	8.1
	Yes	435	70.2
	No	135	21.8
	Total	620	100.0
Contact with patient directly	Non specified	19	3.1
	Yes. often	545	87.9
	No	56	9.0
	Total	620	100.0

Results and Discussion

A total of 620 valid questionnaires were collected. The percentage of other health professionals was the highest - 63.5% (394), physicians represented 33.9% (210). Respondents from non-surgery units prevailed (69.38%), as well as from governmental or municipal hospitals – (58.2%). About 60.5% of the study participants had a work experience in department longer than 5 years and 87.9 % had direct contact with patients at the workplace. Other work related characteristics of the respondents are shown in Table 1. In general, the results show that the respondents demonstrate a positive attitude regarding patient safety culture (see Fig.1).

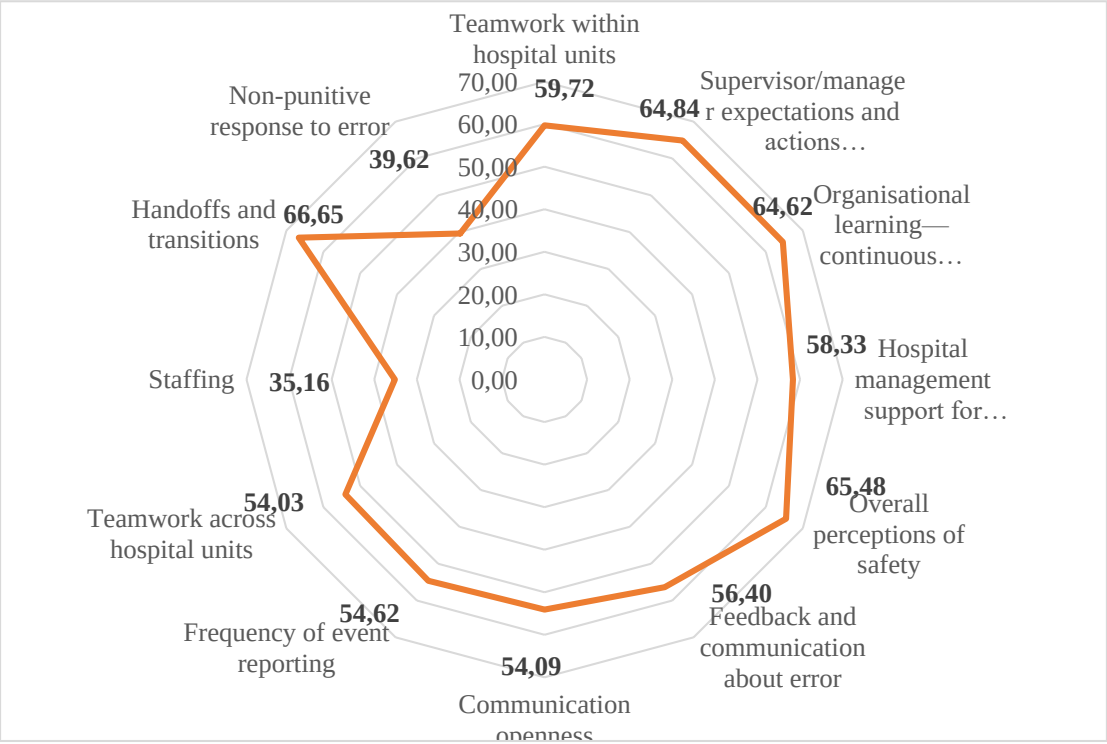

Figure 1. PRRs of the dimensions

The dimensions “Staffing” and “Non-punitive response to error” are most problematic, as their percentage of positive response rates (PRRs) are lowest - 35.16% and 39.62% (see Fig.1). Similar to our results was found in others studies. Aljaffary et al. reveal an even lower positive response score for the dimensions “Staffing” and Non-punitive response to error” respectively 20% and 21.4%, and explain these results with the lack of adequate number of staff and punitive attitudes towards error reports (Aljaffary et al., 2021).

Similar findings were also reported in a systematic review of 33 studies that assessed safety culture among healthcare professionals from 22 countries in different regions using HSOPSC (Reis et al., 2018). This proves that the punitive culture and staffing problems are common problems facing hospitals in different countries around the world. In nearly 70% of the studies included in the systematic review, the dimension "Non-punitive response to error" was scored as a weak (Reis et al., 2018).

The highest PRRs show the dimensions “Handoffs and transitions” and “Overall perceptions of safety “– 66.65% and 65.48%, respectively (see Fig.1). These results contradict the findings of the systematic review of 33 countries, where they are assessed as a problematic. The mean PRRs for the dimension “Handoffs and transitions” is 24.6–49.7% and for “Overall perceptions of safety”- 25–33.9% in the most of included studies there (Reis et al., 2018).

The high score of “Handoffs and transitions” in our study could be explained by the specifics of the post-communist countries: the persisting authoritarian and hierarchical management style, as well the presence of well-established co-ordination structures and mutual trust among healthcare specialists (Stoyanova et al., 2019).

Figures 2 and 3 show the overall assessment regarding "Patient safety grade" of the physicians and the other health professionals in their workplace.

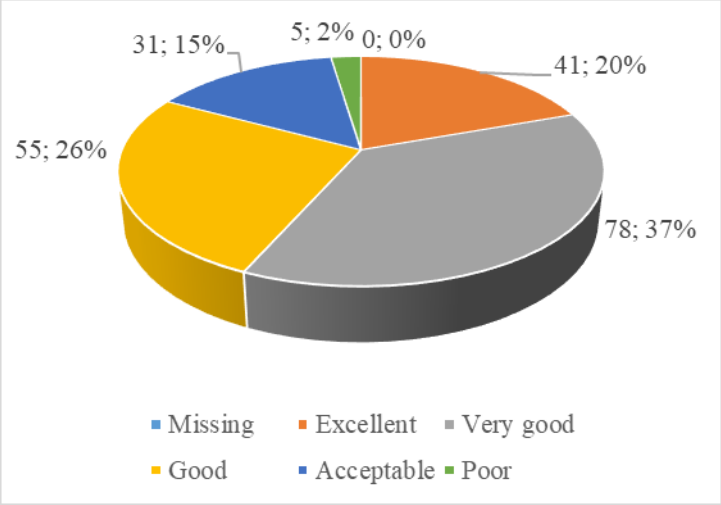

Figure 2. Patient safety grade according to Physicians

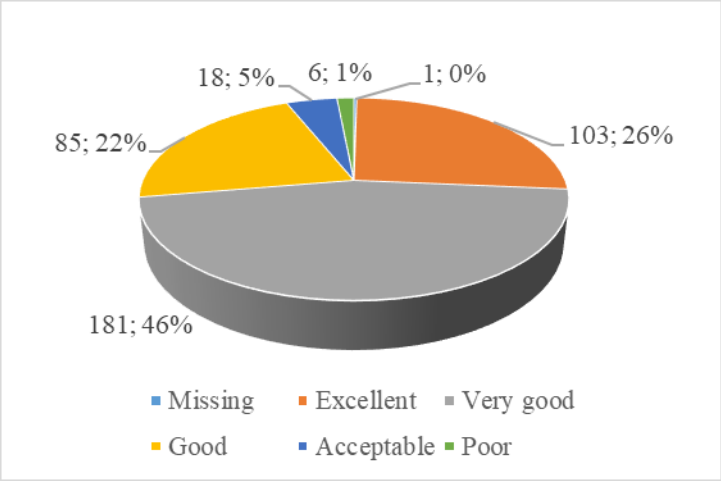

Figure 3. Patient safety grade according to other health professionals

Non-parametric tests did not find significant statistical differences in "Patient safety grade" between physicians and other health care specialists (P>0.05). In this connection it was interesting to note that 74.7% of all participants have never reported an adverse event or error.

Conclusion

The results of the survey revealed the most problematic areas related to the patient safety culture in Bulgarian hospitals. Based on these facts and evidence, the hospital managements need to focus on their improvement.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPHELS journal belongs to the authors.

Acknowledgements or Notes

* This article was presented as an oral presentation at the International Conference on General Health Sciences (www.icgehes.net) conference held in Istanbul/Turkey on August 25-28, 2022

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Monitoring of Heavy Metals Concentration in European Hake

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Abstract: Fish consumption ensure health benefits, nevertheless the existence of heavy metal pollution in seafood still deputize public health concerns. These study aims to evaluate the concentration levels of cadmium and chrome in muscle tissue of European Hake (*Merluccius merluccius*) with different size. Fish samples were collected and purchased regularly from the central fresh fish market of Tirana whereas a total of 44 samples of muscle tissue were evaluate by using atomic absorption spectrophotometer (AAS). The results of the investigation showed that, cadmium concentration levels (p=0.001) varied significantly between fish sample size of European Hake. According to the results concentration levels of cadmium made an exception (0.04 mg/kg ww), over passing (large fish size) the maximum permitted level for human consumption set by EC legislation. Based to the results of the investigation it will be of great interest the further evaluation and monitoring of European hake specie with the aim to protect Albanians consumers' health by cadmium contamination.

Keywords: Heavy Metals, European Hake, Muscle Tissue, Cadmium

Introduction

Fish are an excellent food source to consumers they are rich on proteins, polyunsaturated fatty acids, vitamins and minerals (Copat et al., 2010: Storelli, 2008). At the same time fish represent an important source in Iodine, vitamins B complex or D, phosphorus, calcium and trace minerals that are beneficial for health and growth. Therefore many doctors recommend the consummation of the fish at least twice in a week. Fish consumption is considered one of the key components of a cardioprotective diet (Mozaffarian et al., 2011). In 2008, the world production of fish reached 140 million tons (115 for human consumption), for an average per capita consumption of 17 kg/person/year (Hosomi et al., 2012).

Metal contaminants are naturally present in the environment but can be increased through industrial activity and pollution (Erasmus et al., 2004). During the last decade development of high technology has brought not only benefits but also negative impact on natural aquatic environment. Organisms at the top of food chain are the most exposed ones to environment pollution such as heavy metals, pesticides and also micro plastics. Fish especially benthic species tend to accumulate these chemical substances in their tissues. Heavy metals such as cadmium, mercury, lead, and arsenic pose a number of hazards to humans, these metals are also potent carcinogenic and mutagenic (IARC, 2009). Although heavy metals have no biological function in humans, but

- Selection and peer-review under responsibility of the Organizing Committee of the Conference

they can be very harmful to due to bio-accumulative and biomagnification potentials. Based on the capacity of such substances to accumulate in tissues of fish represents a serious threat to humans whereas these values are above the standards. Both essential and harmful minerals and metals present in the environment can be absorbed into living organisms from the surrounding water, sediment and diet (Munoz et al., 2001). One of the most dangerous ones is cadmium; it easily ingested and has the ability to bio accumulate. Cadmium concentrations are revealed to be higher in benthic fish species which lives into close contact with the sediment.

Albanian possesses 450 km costal area in diverse sea systems reach with a large variety of wild fish species that are consumed locally. European hake is a benthic important local species but not only while this specie has excellent and tasteful white meat. European hake is one of the most consumed fish species in Albania. Many studies have been conducted in the recent years in Albania to determine the quantity of heavy metals existence in fish by local authors (Ozuni et al., 2021, Ozuni et al., 2010). Nevertheless, there was no research to evaluate the presence of cadmium (Cd) and chrome (Cr) in European Hake. Based on the importance of the specie in human consumption the purpose of the study was to monitor and evaluate the concentration level of cadmium (Cd) and chrome (Cr) in muscle tissue of European hake, and then compare the results with the EC legislation limits for human consumption.

Method

The fish species named European hake (*Merluccius merluccius)* was collected and purchased during summer 2020. Fish samples of red mullet originated from Adriatic Sea, were purchased directly from the fisherman of Durres. The study included 44 samples of muscle tissue (small fish size, mean weight - 60 gr, and large fish sized, mean weight 140 gr). The fish samples were first, identified, weighed, catalogued and conserved at - 18°C and then they were sent for further investigation to the Laboratory of Toxicology, Institute of Veterinary and Food Safety, Tirana. A total of 44 samples of muscle tissue of were evaluated for the concentration level of cadmium (Cd), and chrome (Cr) by using an Atomic Absorption Spectrophotometer (AAS). Fish tissue was homogenized in a blender; and then they were dried at 100 ºC. One g of sample was weighed and then treated with 10 ml of HNO_3 and 5 ml of concentrated H_2SO_4 and let in overnight. The next day they were dried at 150º C for at least, 30 minutes and 50 ml of it were put into a normal flask, and filled with tap water. The heavy metals were measured by ICP-OES, Optima 2100 Dv produced by Perkin Elmer.

Statistical Evaluation

The statistical evaluation of the data was evaluated by using SPSS (Statistical Package for Social Sciences) 25.0. The level of significance was set as ($p \leq 5\%$). The comparison values between groups were performed by using student test. The statistical data on the below table comprised average, standard deviation, standard error, p value and interval of confidence.

Results and Discussion

The maximum levels for cadmium (Cd) and chrome (Cr) in fishery products is manifested in The European legislation (EC 2006; 2008). The concentration level and (SD) of cadmium and chrome (mg/kg wet weight) in muscle tissue of European hake samples are given in the below tables (Tab. 1). The results of the study show that cadmium and chrome are present at different concentration levels in all sample tissues of European hake according to weight (Tab.1). According to the results the concentration level (mg/kg ww) of cadmium (Cd) in sample muscle tissue of small fish size of European hake resulted within the maximum permitted level for human consumption (EC, 2006 & 2008), set by EC legislation.

Table 1. Average mean values of cadmium and chrome in muscle tissue of European hake (mg/kg wet weight)

Heavy metals		N	Mean	SD	T	df	p value
Cd	small	22	.0052	.00737	-3.838	42.000	.001
	large	22	.0432	.04585			
Cr	small	22	.0340	.01736	-.716	42.000	.478
	large	22	.0585	.15977			

Cd is a nonessential element and is considered one of the most toxic elements to humans, fishes, and environment, due to its capability of producing a chronic toxic effect even at a low concentration level (Rajeshkumar et al., 2018). The average mean concentration and (SD) of cadmium (mg/kg ww) in small fish size of European hake was 0.0052 ±0.0073 and 0.0432 ± 0.0458 in large fish size. The average mean concentration and (SD) value of chrome (mg/kg ww) was 0.0340± 0.0173 in small fish size and 0.0585 ± 0.1597 in large fish size. Referring to the results (Tab.1) the average mean value concentration of cadmium and chrome (mg/kg ww) detected in muscle samples tissue of European hake resulted lower in small fish size compare to large fish size. This research display that Cd has modest tendency to accumulate in European hake muscles. Several studies have demonstrated that Cd preferentially accumulates in active metabolic organs, such as kidney and liver (Vieira et al., 2011).

The results of the study also indicate that cadmium concentration level (p=0.001) showed significant statistical difference between small and large fish size samples. Similar results on cadmium concentration levels in European hake reported Storelli, 2008 (0.04 mg/kg ww), while Perugini et al., 2014 reported higher levels of cadmium concentration in muscle tissue of fish (0.06 mg/kg ww). In a similar study conducted by Omeldo et al., 2013, Perugini et al., 2009, Storelli et al., 2005, Gaspic et al., 2002, cadmium was not detected by the apparatus (ND).

Generally other studies sustain that benthic fish species which lives into near contact with the sediment accumulate higher quantities of heavy metals than other fish species (Storelli, 2008, Gaspic et al., 2002). Also, other factors that influence metal uptake are, age, sex, size, feeding behavior and living environment (Zhao et al., 2012, Mustafa et al., 2003, Storelli et al., 2000). The results obtained from the study revealed that the concentration level of cadmium in European hake sample tissue resulted within the permissible levels for human consumption set by EC regulation (Cd - 0.050 mg/kg wet weight, EC, 2006 & 2008). In the case of chromium, the maximum levels for human consumption has not been yet determined in fish.

Conclusion

Environmental pollution from heavy metals constitute worldwide problem, due to their tendency to accumulate above threshold concentrations. The result obtained in this study revealed that muscle tissue of European hake is contaminated with cadmium and chrome. Nevertheless, the concentration levels of cadmium resulted to be within the permissible levels for human consumption set by EC legislation. Anyway, annual monitoring programs to determine the concentartion of heavy metals in water and fish are nessessesary to garantie food safety.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPHELS journal belongs to the authors.

Acknowledgements or Notes

* This article was presented as an oral presentation at the International Conference on General Health Sciences (www.icgehes.net) held in Istanbul/Turkey on August 25-28, 2022

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Are You Willing to Vaccinate Your Children? Using Covid Risk Perception, Hesitate to Vaccinate, Covid Conspiracy Belief, and Vaccine Attitude to Assess Children's Vaccination Intentions

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Abstract: Children are vulnerable to the spread of the omicron variant of the covid-19 virus. Childhood vaccination inability will lead to low vaccination uptake, trying to make herd immunity difficult to achieve. The purpose of this study is to determine the role of the covid-19 conspiracy belief, perception of covid risk, vaccine hesitancy, and vaccine attitude for children in the intention to vaccinate children. Purposive sampling was used in this study, with the criteria of parents with children aged 6 to 11 years. This study's respondents amounted to 242 people, and research conducted in Indonesia. Path regression is the analysis technique used. According to the result of this research, this study proves that there is a significant direct and indirect role between belief in the covid-19 conspiracy, perception of covid risk, and vaccine hesitancy for children play a significant role in the intention to vaccinate children. Meanwhile, vaccine attitude has not been proven to play a role in parents' intention to vaccinate their children. The covid conspiracy belief, like the vaccine attitude, has not been proven to play a direct role in vaccine intention, but it has been shown to play a significant role in vaccine intention through covid risk perception and vaccine hesitancy. Based on research evidence, it is recommended that parents select COVID-19-related news with caution in order to guarantee their children's safety and health.

Keywords: Covid-19 conspiracy belief, Perception of Covid risk, Vaccine hesitancy, Vaccine attitude, Intention to vaccinate, Children

Introduction

The emergence of the Covid-19 Omicron variant at the end of 2021 warns that vigilance and efforts are still needed to increase the body's immune system. WHO classifies this species as a VOC or "Variant of Concern" meaning that this type can have a considerable impact on global public health or can be said to spread more quickly. Omicron has a very large number of mutations compared to other variants, indicating a greater risk of re-infection (Anugrah, 2021). The Indonesian Minister of Health, Budi Gunadi Sadikin, appealed not to panic, to remain calm and most importantly, immediately vaccinate, especially for vulnerable groups such as children (Rokom, 2021). According to Prof. Soedjatmiko (Rafie, 2021), this vaccine is safe and can stimulate immunity to COVID-19 based on the results of clinical trials in the age group of children. Further explained several reasons why {: gap {:kind:userinput}} should vaccinate children, (1) Groups of children must study offline at

school so that they risk transmitting it to themselves, fellow students, teachers, parents, and the elderly at home, (2) Considering the possibility low compliance of children in wearing masks that are not loose and sag, not crowding, keeping distance, also washing hands, (3) This vaccine is safe and can stimulate immunity against COVID-19 in children, (4) Children are accustomed to getting immunizations since infancy, toddlers and in school grades 1 to 5, (5) Puskesmas which is the implementing party for vaccination has long experience in implementing immunization programs, (6) The Convention on the Rights of the Child and the Child Protection Law state that children have the same right to be protected from illness. injuries, and various types of violence.

However, there are many pros and cons regarding this vaccination program for children. Suwandi (2021) explained that some parents in Jambi refused to have their children injected with vaccines due to health reasons. One of the causes of many rejections of the child vaccination process is the amount of fake news that is spread. Wicaksono (2021) mentions some false information circulating in the community, such as the issue that the covid-19 vaccine is dangerous for children because it contains polysorbate 80 which can poison the body and damage the brain, there is a spike in protein in children after being injected with the COVID-19 vaccine, which can cause organ damage, (as well as news that the Sinovac covid-19 vaccine is a trial material for Indonesian children. The spread of misinformation through various channels can have a major impact on the acceptance of the COVID-19 vaccine (Lushington 2020).

Paul et al., (2021) explained that most of the groups who are vulnerable to getting sick and dying from COVID-19 are those who come from ethnic minority backgrounds and have low incomes who tend to have negative attitudes towards vaccines and are less willing to be vaccinated against COVID-19. According to Junaidi, Arsyad et al., (2020) Vaccine doubt is a major barrier to vaccine uptake and the achievement of community immunity, which is necessary to protect the most vulnerable populations. Anti-vaccination activists are already campaigning in many countries against the need for a vaccine, with some denying the existence of COVID-19 altogether (Lushington 2020). The number of reports that COVID-19 is just a conspiracy has made many people begin to doubt the existence of COVID-19, this is in accordance with the research of Sallam et al., (2021) which also showed high vaccine doubts in Jordan and Kuwait because respondents believed that covid-19 was a man-made disease. . Some people start to think that covid is just a fabrication and is something that is not dangerous. This is in line with the results of research by Karlsson et al., (2021) where most parents think that COVID-19 will not pose a major risk to their personal health even though they consider the disease to be severe and many are worried that they will transmit it to others. Protection Motivation Theory states that public perceptions of the severity and vulnerability to certain health threats determine risk perceptions about a disease (Khosravi, 2020).

People's instinctive and intuitive reactions to danger are described as risk perception (Slovic et al., 2002, 2004; Slovic and Peters, 2006). demonstrates that people's reactions differ depending on the characteristics of a hazard Risks are deemed more dangerous when they cannot be explained scientifically, are characterized by natural disasters, or kill a large number of people at once (Slovic, 1987, 1992). Another important factor in risk perception is the influence that emerges, which limits the stimulus or context as positive or negative, depending on whether it is good or bad (Slovic et al., 2004). The perception of risk influences decision-making (Slovic et al., 2004). According to Finucane et al., (2000), when a person has positive feelings about an event or stimulus, they have a low risk perception, whereas when they have negative feelings about an event or stimulus, they have a high risk perception. According to Van Den Weerd et al. (2011), one of the factors that contribute to increased community participation in taking preventive measures is a person's perception of their risk in a pandemic.

On December 14, 2021, the Indonesian government launched a vaccination program for children aged 6 to 11. The administration of the Sinovac vaccine has passed the Covid-19 vaccination study for ages 6-11 years, according to the National Immunization Expert Advisory Committee (ITAGI), and has received EUA status / Emergency Use Authorization from BPOM (Mutiara, 2021). The availability of Covid-19 vaccination for children aged 6-11 years has several advantages, including: first, increasing body resistance (with the vaccine, it is hoped that children exposed to Covid-19 will not experience severe and dangerous symptoms), and second, lowering the risk of Covid-19 transmission. -19 from children to their parents, families, or the environment around them, and third, to hasten the emergence of herd immunity (communal immunity) (Hayati, 2020). Although the benefits of vaccination are significant in reducing the severity of COVID-19 cases, vaccination acceptance and absorption remain high. Vaccination has been widely rejected in some countries.

According to a survey conducted on a group of dentists in Italy by Michael et al., 39% of the total 421 participants were opposed to the vaccine due to a lack of information (Belingheri et al., 2021). According to Edwards et alstudy's of 3000 adults in Australia, 29% of participants had a low level of doubt about vaccination, while 7% had a high level of doubt. Those who hesitate and tend to refuse are women, people who live in disadvantaged areas, those who believe the risk of Covid-19 is excessive, and those who are religious (Edwards

et al., 2021). According to the Education and Teacher Association (P2G), which conducted a survey of 9,287 parents from 34 provinces in Indonesia, 36.7% of parents are hesitant and even refuse to vaccinate their children with Covid-19 (Harbani, 2010). There are several factors influencing parental acceptance of vaccination in Indonesia, one of which is the spread of negative and concerning information about vaccinations, the credibility of which is unknown, causing community controversy. This has hampered the government's goal of completing the vaccination program. Information that causes concern and uncertainty about credibility, such as: (1). skepticism about vaccine benefits (2) Concerns about unanticipated future consequences, beliefs about government commercialization, and beliefs about natural immunity (Martin & Petrie, 2017). The vaccine's attitude caused parents to be hesitant to vaccinate their children.

Vaccine hesitation is defined by Shapiro et al. as an attitude or behavior (worry or doubt) that refers to delays in receiving or refusing vaccinations despite the availability of services (Shapiro et al., 2017). Vaccine hesitancy is also defined as people's unwillingness to receive vaccines that have been proven to be safe and effective in protecting them from infectious diseases (Danabal et al., 2021). Vaccination skepticism is also linked to the belief that vaccine production is accelerated, that the risks of vaccination outweigh the benefits, and that vaccines are used to increase profits by large pharmaceutical companies (Bacon, & Taylor, 2021). Belief in conspiracy theories refers to the behavior of believing or believing in theories that are not yet known to be true. The term "conspiracy theory" refers to a theory developed to explain events as a powerful and evil secret act (Douglas, 2021). The figure behind the assassination of John F. Kennedy, the 35th President of the United States, who was shot dead on November 22, 1963, is one example of a major conspiracy theory that has circulated. In this assassination case, 61% of Americans believe there is a conspiracy. One theory is that FKJ was assassinated by the CIA in retaliation for the failure to depose the Cuban leader. Another theory holds that the killing was a mass act because it was in response to a mafia hit (Damara, 2021).

Another conspiracy theory that is still being circulated today is the COVID - as population control theory. Bill Gates is using the virus as population control, contrary to popular belief that microchips are implanted in vaccines to track people. According to other experts, COVID-19 is a "biological weapon." These theories have been repeatedly debunked, but they continue to circulate in the community (Damara, 2021). This happened during the Zika virus outbreak in 2015-2016, when conspiracy theorists claimed the virus was a biological weapon. Researchers discovered that the conspiracy arose as a way for people to cope with the uncertainty that occurs when a major event occurs. In Indonesia, popular anti-vaccine conspiracy theories include the belief that vaccines are "a tool created by Jews to reduce the Muslim population" (Sinuhaji, 2021). Other theories debate the halalness of vaccines, and some argue that vaccines are profitable (Intan, 2021). These conspiracy theories gave rise to three anti-vaccine groups: first, the group that refused due to the vaccine's halal status. This group believes that there are ingredients in the vaccine that should not be given; the second group rejects the vaccine concept. This group believes that vaccination is the result of a profit-seeking corporate conspiracy; third, vaccine safety and effectiveness. This group refuses vaccination because they are afraid of the side effects of the vaccine. As a result, many children have succumbed to the anti-vaccine movement's beliefs (Telaumbanua, 2017). The behavior of believing or believing in conspiracy theories is defined as belief in conspiracy theories themselves (Douglas, 2021). The emergence of conspiracy beliefs is driven by a lack of information and the inability to obtain reliable information, which creates the illusion of control over the situation in order to maintain self-esteem, reduce anxiety, and restore opportunities for activity (Egorova et al., 2020).

The behavior of believing or believing in conspiracy theories is defined as belief in conspiracy theories themselves (Douglas, 2021). According to Prooijen and Vugt, belief in conspiracy theories is always related to events, that there are people who deliberately carry out their secret plans, and that there are groups of people who work together to develop their conspiracy plans. It is also said that conspiracies are always secret and dangerous (Egorova et al., 2020). Hofstadter's initial research on conspiracy theory beliefs resulted in the statement that conspiracy beliefs tended to be paranoid. He also stated that belief in conspiracies can stem from a sense of powerlessness among people who believe they have no power, implying that people are experiencing despair as a result of the Covid-19 pandemic (Abalakina -Paap et al., 1999). Conspiracy thinking is usually fleeting, but it has long-term negative consequences and can increase social isolation (Leibovits et al., 2021). According to Sunstein and Vermeule (2008), belief in conspiracy is motivated by a lack of information and the inability to obtain reliable information, which occurs frequently, particularly in a crisis situation such as Covid-19. Typically, the information that emerges is contradictory or difficult to understand (Egorova et al., 2020). According to Egorova et al (2020), belief in conspiracy is included in a unidimensional variable, which stands alone and is not associated with other variables. This conspiracy theory is linked to belief in the conspiracy theory.

According to Sulfikar Amir, Associate Professor of Disaster Sociology at Nanyang Technological University (NTU) Singapore, this conspiracy belief is widespread not only in Indonesia but also in higher-education countries such as the United States, Singapore, and Europe. This can occur as a result of gaps in knowledge acquisition in a country's community (Shanti, 2022). Douglas research in 2021 revealed that conspiracy beliefs develop easily in times of crisis when a person feels threatened, unsure, and insecure, so that the spread of conspiracy theory beliefs is becoming increasingly out of control during this Covid-19 pandemic (Permana, 2021). Van Prooijen's research survey of 5,745 participants in the Netherlands found that those who believed in conspiracies were more likely to be exposed to or positive for Covid-19 than those who did not believe in conspiracies (Kamaliah, 2021). People who believe in or support conspiracy theories in general have a positive correlation with anti-science attitudes, including anti-vaccine attitudes, according to Hornsey et al (2018).

Vaccine hesitancy is defined as both an attitude (worry or doubt) and a behavior (Shaphiro et al., 2017). Vaccine hesitancy is also defined as people's unwillingness to receive vaccines that have been proven to be safe and effective in protecting them from infectious diseases (Danabal et al., 2021). Vaccine hesitancy, according to Noni and the SAGE Working Group on Vaccine Hesitancy (2015), is the behavior of being late in accepting or refusing vaccinations despite the availability of vaccination services (MacDonald, N.E & the SAGE Working Group on Vaccine Hesitancy, 2015). According to Shaphiro et al, vaccine doubts are complex and multi-layered; some people refuse some vaccines but agree with others, others delay vaccination, and still others receive vaccinations despite their reservations (Shaphiro et al., 2017). According to Shaphiro et al. (2017), vaccine skepticism can be divided into two categories: trust in health authorities and treatment (Level of confidence in the health authorities and mainstream medicine). This dimension describes the level of trust in health authorities who provide treatment programs, both medical and alternative. While the risk culture / healthism dimension is defined as a person's efforts to remain aware of the risks and opportunities in their own daily lives, particularly in terms of health, so that they can assess the risks and benefits for a safer future. Based on the observed phenomena, this study aims to investigate the role of covid risk perception, conspiracy covid belief, vaccine hesitation, and vaccine attitude in parents' intentions to vaccinate their children with covid.

Method

This study uses a statistical and correlational approach. The quantitative approach is used to examine specific populations or samples; data collection involves the use of research measuring instruments; data analysis is statistical; and the goal is to test and prove established hypotheses (Sugiyono, 2018). The survey method used is an online questionnaire distributed via Instagram social media.

Research Participants and Design

The population in this study is parents who have children with an age range of 6-11 years. This study has five variables to be studied. The variable (X) of this study is belief in the Covid-19 conspiracy theory, perception of the risk of covid and doubts about the vaccine, while the variable (Y) of this study is the attitude of the vaccine. In addition to variables X and Y, there is a variable Z, namely the intention to vaccinate children.

Research Scale

Covid Risk Perception

Perceptions of covid risk were measured using a scale created by Asefa et al., (2020). This scale is composed of two dimensions, namely perceived susceptibility and perceived severity. This instrument consists of 6 items of perceived susceptibility and 6 items of perceived severity. The type of scale used is a Likert scale with responses on a 6-point Likert-type scale ranging from "strongly disagree" to "strongly agree". The higher the score, the higher the perceived risk of covid.

Vaccine Attitude

Anti-vaccine attitudes were measured using the Vaccine Attitudes Examination (VAX) scale (Martin & Petrie, 2017) which has a reliability of 0.914 and is said to have high reliability. The VAX scale contains four subscales: Mistrust of vaccine benefit, Worries over unforseen future effect, Concerns about commercial

profiteering and Preference for natural immunity. This instrument consists of 12 items, 3 items favorable and 9 items unfavorable composed of 4 dimensions. The type of scale used is a Likert scale with responses on a 6-point Likert-type scale ranging from "strongly agree" to "strongly disagree".

Covid Conspiracy Beliefs Scale

Conspiracy beliefs scale is used to measure the covid-19 conspiracy beliefs referring to the scale developed by Egorova et al., (2020). Conspiracy beliefs scale consists of 4 items, all of which are favorable items. Conspiracy beliefs scale reliability level is 0.945 and is said to have high reliability.

Vaccine Hesitancy Scale

The scale used to measure vaccine hesitancy is the vaccine hesitancy scale. This scale was developed by Shapiro, et al (2017). This vaccine hesitancy scale has 9 items, 7 items favorable and 2 items unfavorable. This scale has two dimensions, namely Healthism/Risk Culture and Confident in the health authorities and mainstream medicine.

Vaccine Intenention

The scale used to measure the vaccine intention scale was developed by Karlsson, et al (2021). The vaccine intention scale is a research scale with a single item. To measure the intention to receive the COVID-19 vaccine, respondents were asked “How likely would you be to take the COVID-19 vaccine, if the vaccine was available, free of charge, and recommended for everyone by the authorities?”. Alternative answers ranged from 1 to 5 (1 = very unlikely, 2 = unlikely, 3 = difficult to say, 4 = very likely, 5 = very likely).

Procedure and Measurement

This study uses five research scales. The scale is in the form of a Likert scale. The Likert scale used in this study consisted of 6 answer options, including Strongly Disagree = value 1, Disagree = value 2, Slightly Disagree = 3, Somewhat Agree = 4 , Agree = 5, Strongly Agree = 6. This form of scale is usually used to measure attitudes, opinions, and perceptions of a person or group of people about social phenomena (Sugiyono, 2018). The measuring instrument used in this study is the Conspiracy Beliefs Scale, this scale is used to measure conspiracy theory beliefs and the Vaccine Hesitancy Scale is used to measure vaccine hesitancy. The research scale is distributed to parents who are the target subjects of this study. Filling in the instrument is done online using a google form distributed directly through social media. The social media chosen in this study is Instagram. Furthermore, at the data analysis stage, the researcher checked all the data that had been entered. This is done to ensure that the data obtained is in accordance with the criteria so that it can be used and carried out further processing.

Reliablility

The reliability test is designed to assess the instrument's level of confidence as well as its consistency over time. The scale used in this study is the Conspiracy Beliefs scale, which has a reliability level of 0.945 and was taken from the research of Akhrani, et al (2022), while the Vaccine Hesitancy scale has a reliability level of 0.930, the Covid Risk Perception (CRP) Scale has a reliability level of 0.927, and the vaccine attitude has a reliability level of 0.914, so it can be concluded that all measuring instruments are reliable.

Result

Testing the theoretical model of this research using Path Analysis. Path analysis through testing of 4 theoretical models to get a direct or indirect role between variables X, Y and Z. The 1st model only has a significance value of less than 0.05 on the hesitate to vaccine variable in table 1. Covid Risk Perception, Hesitate to Vaccinate, and Covid Conspiracy Belief all contribute 12% to Vaccine Attitude. The formula $\sqrt{1-0.12}$ is used to calculate the value of e1, which is 0.94. As a result, the regression diagram model 1 is as follows.

Table 1. 1st Model Summary

Model 1		Standardized Coefficients Beta	Sig.	R	R Square
1	(Constant)		.000	.346[a]	.120
	Covid Risk Perception	.047	.491		
	Hesitate to Vaccine	.292	.000		
	Covid Conspiracy Belief	-.056	.426		

a. Predictors: (Constant), Conspiracy Covid Belief, Covid Risk Perception, Hesitate to Vaccine

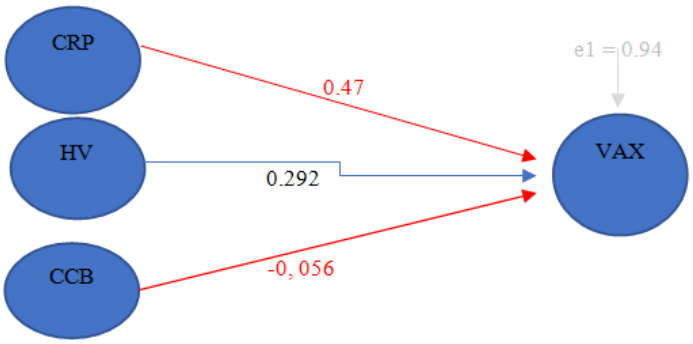

Figure 1. Model 1

Table 2. 2nd Model Summary

Model		Standardized Coefficients Beta	Sig.	R	R Square
2	(Constant)		.009	.669[a]	.447
	Covid Risk Perception	.167	.002		
	Hesitate to Vaccine	.540	.000		
	Conspiracy Covid Belief	-.044	.430		
	Vaccine Attitude	.038	.466		

a. Dependent Variable: Vaccine Intention
Predictors: (Constant), Vaccine Attitude, Covid Risk Perception, Conspiracy Covid Belief, Hesitate to Vaccine

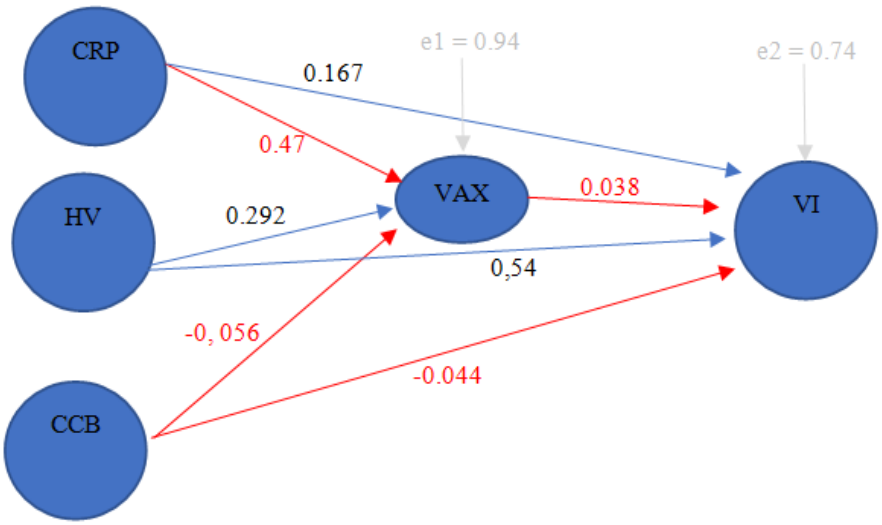

Figure 2. Model 2

The 2nd model shows the Covid Risk Perception sig value of 0.002, Hesitate to Vaccine of 0.000, Covid Conspiracy Belief 0.43 and Vaccine Attitude of 0.446. These results show that the 2nd model is only significant on the Covid Risk Perception and Hesitate to Vaccine variables on Vaccine Intention. The contribution of the

role in this model is 44.7%. The value of e2 is calculated by the formula √1-0.447 and the value of e2 is 0.74. So that the regression diagram model 2 is obtained as above:

Table 3. 3rd model summary

Model		Standardized Coefficients Beta	Sig.	R	R Square
3	(Constant)		.000	.619[a]	.384
	Covid Risk Perception	.389	.000		
	Conspiracy Covid Belief	-.425	.000		

a. Dependent Variable: Hesitate to Vaccine
Predictors: (Constant), Conspiracy Covid Belief, Covid Risk Perception

The 3rd model shows a Covid Risk Perception sig value of 0.000, and a Covid Conspiracy Belief of 0.000. These results indicate that 3rd model is significant for Hesitate to Vaccine. The contribution of the role in this model is 38.4%. The e3 value is calculated by the formula √1-0.384 and the e2 value is 0.787. So that the 3rd model regression diagram is obtained as below:

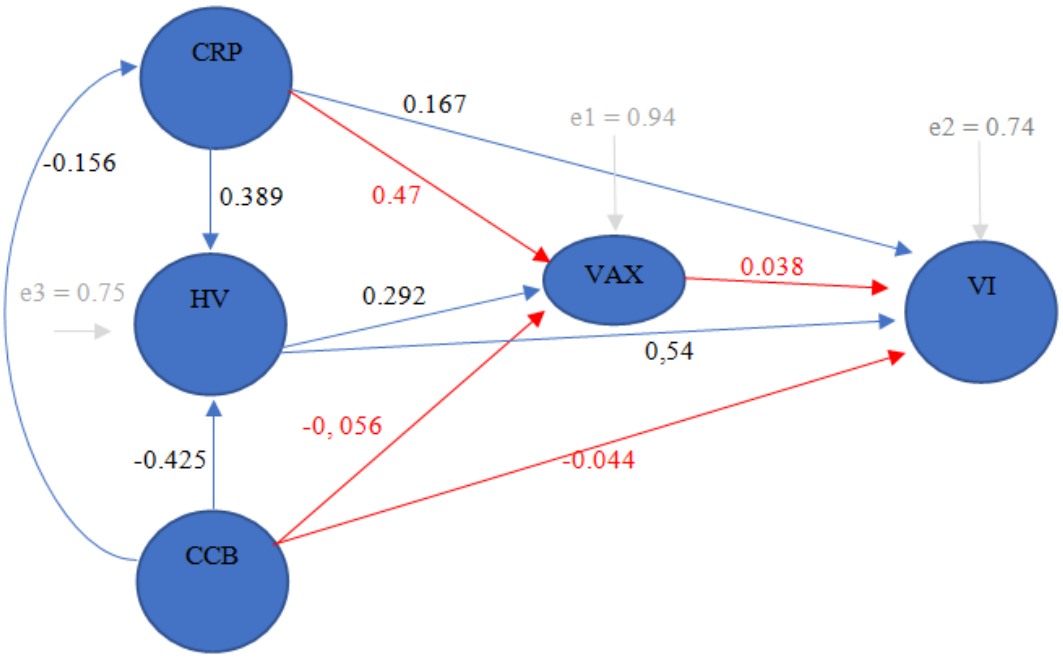

Figure 3. Model 3

Table 4. 4th Model Summary

Model		Standardized Coefficients Beta	t	Sig.	R	R Square
4	(Constant)		38.599	.000	.156[a]	.024
	Conspiracy Covid Belief	-.156	-2.452	.015		

a. Dependent Variable: Covid Risk Perception
Predictors: (Constant), Conspiracy Covid Belief

The 4th model shows the Covid Conspiracy Belief sig value of 0.015. These results show that model 4 is significant to Covid Risk Perception. The contribution of the role in this model is 2.4%.

Discussion

The study's results suggest that there is a direct or indirect relationship between the perception of covid risk, covid conspiracy belief, and vaccine intention. Path analysis was used by the researchers to explain the direct and indirect roles of variables in the four models studied.

Based on the results of the study, it is known that the belief in the covid conspiracy plays a role in the attitude of vaccines for children by parents. This result is in line with the research conducted by Yang et al., (2021) on conspiracy theories and public attitudes towards COVID-19 vaccination, revealing that different types of conspiracy theories have different impacts, only belief in conspiracy theories is relevant to vaccines (not only the covid-19 vaccine) which has a significant negative impact on the Chinese public's intention to vaccinate. The results of this research show that the higher the belief in conspiracy theories, the lower the attitude towards child vaccines by parents.

Cognitive, conative, and affective components make up attitude. The cognitive component includes beliefs and knowledge about a goal, with a particular emphasis on tangible physical forms (Pike & Ryan, 2004). In the current pandemic situation, the cognitive component refers to how individuals receive large amounts of information quickly and how they respond to it. According to Tasci (2009), the conative component is a different construction because many sources consider it synonymous with intentions and behavior. As was the case during this pandemic, the conative component refers to how individuals make decisions about whether or not to vaccinate, as well as how they follow government regulations aimed at preventing the spread of covid-19. Furthermore, according to Hallmann et al., (2015), the affective component refers to the individual's emotional response or assessment. The affective component in the current pandemic situation is related to the emotions that individuals feel whether they agree or disagree with the vaccination. Individual vaccine attitudes can be influenced by a variety of factors, including conspiracy theories. According to Sallam et al., (2021), conspiracy beliefs can lead to vaccine hesitancy by fueling distrust in governments, health care providers, and the pharmaceutical industry.

According to the findings of this study, conspiracy theories make parents hesitant to give their children the vaccine. The concerns stemmed from parents' concerns about the safety of vaccines for their children. According to a study conducted by Ruiz and Bell, (2021), when a COVID-19 vaccine is available, doubt will be a challenge. More than a third of those polled in this study said they were unlikely or unsure about getting the COVID-19 vaccine. Respondents were hesitant to be vaccinated for safety and effectiveness reasons. Based on the research presented above, it is clear that conspiracy theory beliefs influence vaccine attitudes. Another study has been conducted by Eberhardt & Ling, (2021) on the prediction of covid-19 vaccination intentions using protective motivation theory and conspiracy beliefs, showing that conspiracy beliefs and coronavirus play an important role in individuals' intentions to receive the covid-19 vaccine. Giving the right intervention can affect the vaccine attitude of parents. Health promotion regarding vaccines should consider techniques that lead to increasing perceptions of the severity of COVID-19. Those who do not get the vaccine will be vulnerable to contracting COVID-19. The results of this study indicate that conspiracy beliefs have a role because of the lack of education about the benefits of vaccines. Lack of education and a lot of negative news about vaccines, lead to negative attitudes of parents to give vaccines to their children. Providing the right education is expected to be able to provide a positive attitude for parents to give vaccines to their children.

Conspiracy beliefs play a role in parental child vaccination attitudes. This result is in line with the research conducted by Yang et al., (2021) on conspiracy theories and public attitudes towards COVID-19 vaccination, revealing that different types of conspiracy theories have different impacts, only belief in conspiracy theories is relevant to vaccines (not only the covid-19 vaccine) which has a significant negative impact on the Chinese public's intention to vaccinate. The results of this research show that the higher the belief in conspiracy theories, the lower the attitude towards child vaccines by parents.

This study has differences with previous studies such as the study of Milošević orđević et al., (2021) the criteria for the research subjects conducted by Milošević orđević were Serbian adults in general, while the subjects in this study were more specific to parents who have children. Ages 6 to 11 years. The results of this study have a small role, perhaps because there are other variables that have a large role in influencing vaccine attitudes, such as hoax news. The survey conducted by Mastel (2019) in 2017 from 1,146 respondents, 44.3% of respondents received hoax news every day and 17.2% received it more than once a day.

The research of Salali and Uysal (2021) says that belief in Covid-19 conspiracy theories and conspiracy mentality are the strongest predictors of vaccine doubt, so the more parents believe in the Covid-19 conspiracy theories circulating, the more parents have doubts. - doubts about childhood vaccines (Salali, & Uysal, 2020). This result is also in accordance with the research of Callaghan et al. who said that conspiracy thinking is one of the reasons parents delay vaccines (Callaghan et al., 2019). The greater the conspiracy beliefs about the bad effects of vaccines such as parental distrust of the benefits of vaccines, parental concerns with the long-term effects that will occur, the belief that the government only wants to take commercial advantage of the vaccine for children, and the belief that parents actually the body can naturally form immunity (Martin et al., 2017), the

greater the doubts of parents about child vaccination. This is because parents have believed in conspiracies regarding circulating child vaccines so they are reluctant to vaccinate their children. This is in line with what was written by Telaumbanua, who said that the impact of conspiracy beliefs was the emergence of three anti-vaccine groups, one of which was the rejection of the concept of vaccination (Telaumbanua, 2017).
According to the Spokesperson for the Covid-19 Vaccine from the Ministry of Health, Siti Nadia Tarmizi, the hesitation of parents to vaccinate their children can be overcome if there are efforts by the government or the authorities to provide education about the importance of giving vaccinations for children, especially where this year, offline or face-to-face teaching and learning programs have been implemented and the government can urge the public to be more critical in believing in a circulating conspiracy. Apart from the above efforts, a vaccine that is clinically tested and trusted also needs to be pursued by the government so that parents are calmer in deciding to give vaccines to their children. Apart from the above efforts, a vaccine that is clinically tested and trusted also needs to be pursued by the government so that parents are calmer in deciding to give vaccines to their children. This is in line with research conducted by Karlsson et al. that the strongest predictor of intention to vaccinate Covid-19 is trusting the potential safety of the vaccine (Karlsson et al., 2021).

This study still has several shortcomings, namely the researcher did not ask questions about the relationship between parents/guardians and children, such as the status of biological children, extended children, or adopted children because researchers only realized the importance of the relationship status of parents/guardians with children when the researchers conducted data processing. Researchers still use simple variables so that they cannot explain more complexly about the interrelationships of the variables studied. Researchers also did not choose more specific respondents so that it is not known whether the respondents are parents who have given vaccines to their children or not.

According to research conducted in the United States, belief in two popular variants of the COVID-19 conspiracy theory is the result of a combination of psychological tendencies: 1) to reject information from experts and other authority figures, and 2) to perceive major events as the result of a conspiracy, as well as partisan and ideological motivations. Conspiracy beliefs' psychological foundations have implications for the development of strategies to mitigate their negative consequences. 29% of respondents believe the COVID-19 threat has been exaggerated to President Trump's detriment; 31% believe the virus was intentionally created and spread. The strongest predictors of belief in these ideas were psychological tendencies to reject expert information and major event reports (denialism), psychological tendencies to view major events as the result of conspiracy theories (conspiracy thinking), and partisan and ideological motivations (Uscinski, et al, 2020). The existence of conspiracy beliefs related to the news of covid itself can reduce parents' perception of risk. The study's findings indicate a link between belief in the covid conspiracy theory and a negative weight, implying that the higher the belief in the covid conspiracy theory, the lower the perception of covid risk.

The findings of this study are supported by the findings of Egorova et al. (2020), who found that belief in the covid conspiracy theory has a relationship with perception of covid risk in the form of an assessment of the dangers of COVID-19. This COVID risk assessment influences decisions to engage in ineffective behavior, such as refusing quarantine, among other things. The media's role grew in importance as belief in the covid conspiracy theory spread (De Coninck, et al, 2021; Kim., & Kim, 2021; Luo., & Jia, 2021). Conspiracy theories are widely disseminated on the internet. This level of exposure determines an individual's belief in conspiracy theories. This exposure determines an individual's level of belief in conspiracy theories. The more people are exposed to digital media containing conspiracy theories, the more information they believe, which can cause anxiety, stress, and fear (De Coninck, et al., 2021). Belief in COVID-19 conspiracy theories undermines institutional trust, government regulatory support, physical distancing practices, and perceived risk, encouraging people to disregard health protocols. The findings highlight the serious social consequences of conspiracy theories in the context of COVID-19.

Conclusion

Based on the findings from this study, there is a significant both direct and indirect role between belief in the covid-19 conspiracy, perception of covid risk, and vaccine hesitancy for children in the intention to vaccinate children. Meanwhile, vaccine attitudes have not been shown to influence parents' willingness to vaccinate their children. The covid conspiracy belief, like the vaccine attitude, has not been shown to have a direct role in vaccine intention, but it has been proven to play a significant role in vaccine intention through covid risk perception.

Recommendations

The study's findings can be used by health professionals and the government to improve child vaccination education programs. The Indonesian government and the health office are expected to be able to educate parents about the benefits of vaccines for children and the dangers that will arise if children are not vaccinated, as well as education that emphasizes the benefits of child vaccinations in order to reduce parents' hesitations about vaccinating their children. Furthermore, parents are expected to be able to select COVID-19-related news from reliable sources.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPHELS journal belongs to the authors.

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Biochemical Enzymatic Study of Infertility

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Abstract: This study dealt with the issue of unexplained infertility in men, as it included the measurement of many biochemical variables in the semen plasma, where all of the variables total cholesterol, albumin, thiol group, manganese and zinc were measured TAC. where the results showed the presence of many significant differences between the measured variables when comparing the disease group With the control group, which indicates the different effects of these variables on patients with unexplained infertility. Also, during this study, the effect of hyaluronidase enzyme was followed up and studied by studying the activity of the enzyme as well as the purification stages of the enzyme and estimating the approximate molecular weight using the technique of gel filtration, ion exchange and electro-migration technique (SDS) This enzyme plays a pivotal role in the fertilization process, and any difference in the effectiveness of this enzyme leads to cases of unexplained infertility**.**

Keywords: Unexplained infertility, Hyaluronidase , Cholesterol, Thiol group

Introduction

Infertility is define as the inability of couples to conceive after a year of marriage without any hindrance and it's percentage affects 10-15 % of married couples. Infertility is diagnosed based on the seminal fluid analysis and parameters that are measured by the seminal fluid (cocentration, appearance, motility of the sperm). The causes of infertility are different including several factors such as hormonal imbalance physiological problems, genetic problems (including the single gene), abnormal chromosome (Babakhanzadeh et al., 2020). one of the enzyme that control this process hyaluronidase (E.C.3.2.1.25) are endo - B-N- acetyl hexosaminidase that break down B- 1,4 glycosidic linkages to form tetrasaccharides well based hyaluronidase enzyme is break down hyaluronic acid in to monosaccharides by cleaving it is glycosidic bonds and it is present both in organs (testis, spleen, skin,eyes, liver, kidneys and placenta) and in body fluids (tears, blood, and semen) on the surface of sperm and plays arole in the maturation of the sperm (Park et al., 2019).

The semen contains many sperms suspended in the middle of the so-called seminal plasma, and it is released from the accessory glands before and after the ejaculation process. (Juyena & Stelletta, 2012) Therefore, semen is considered not only a carrier for the sperm, but also provides them with protection and nourishment during the period of movement in the female reproductive system (Asadpour, 2012).Semen plasma consists of many different biochemical components such as glucose, protein, lipids, cholesterol and a large number of intracellular enzymes, antioxidants and mineral elements (Tvrdá *et al* ,2021) which are very important for sperm function and metabolism (El-Beshbishy et al., 2013).

The process of estimating the biochemical components and enzymes, including the enzyme hyalurinase, is one of the important recommendations to determine the quality and efficiency of semen, because it indicates the function of sperm and damage a number of them and cause the occurrence of so-called unexplained infertility

(Bhandari et al, 1998), where enzymes play a large and very important role in the process of sperm penetration of the egg and the occurrence of the fertilization process As well as the movement of the sperm, and it gives the sperm the energy needed for life, movement and the fertile period (Köster et al 1986).

Method

In this research , 34 sample of seminal fluid were collected by the intubation process and with abstinence for aperiod of 3 days from normal people and patients suffering from unexplained infertility who has diagnosed by aspecialist doctor and their ages ranged from 25-30 years. The samples were divided in two parts. The first section is to determenation biochemical parameters and the second part is the isolation of the hyaluronidase enzyme.

Patient and Controle

The study group consisted of 200 males devided to two group 50 normal and 150 patients. Patient who had attended the endrology clinic for diagnosis of unexplained infertility (normal volum, motility, sperm cell account, spermcell density account, and shap). Collection the sample from reviewers f national laboraties. According insruction word heath organazation (WHO).

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Sample Collection and Preservation

Seminal fluid collected on the same day.seminal fluid (2-6) ml were collectin by masturabatin on laboratory, after at least 3 days of sexual abstience after (15min) liquefecation were centrifuged at 600xg for 10 min to separate the spermatozoa from the seminal plasma. The each part storage in fresh tube at -20 c.

Determination the Activity of the Seminal Fluid Hyaluronidase Enzyme

The effectiveness of hyaluronidase was measured according to the method (Okunade & Murthy, 2002) with modification where sodium tetraborate was used instead of potassium tetraborate.

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Measurement the Activity Hyalorondase Enzyme in Crude and Seminal Plasma Basic Principle

Enzyme activity was measured by method (Farrukh,et al., 2012). The assay quantifies the amount of N-acetyl-D- glucosamine relased from hyaloronic acid by the enzyme .

Partial Purification of Hyaluronidase by Ion Exchange Chromatography

15 samples of frozen seminal fluid were taken and the supernatant from the sediment by centrifugation cooled at 700 xg from 15 minutes according to the method (Mohamed, 2005) with modification .the enzyme activity was measured by the supernatant because frezzing the samples breaks the acrosome membrane and release the enzyme in to the supernatant (Linder *et al* 1971). The protien was then precipitated using acetone where the addition was gradul for an hour at $-4c^0$. After which it was left in the refrigerater for 24 hours at $4c^0$.

Determination of Molecular Weight by Electrophoresis

The molecular weight of the hyaloronidase enzyme separated from the seminal fluid was determinned from the group of unexplained infrtile patients by applying an SDS-PAGE electophoresis where the protien solution obtained from package (1) concentrated was injected isolated polyethlene glycol and isolated from the process by applying ion excgange chromatography .through this process aprotien bandle was distinguished at adistance of (8 cm) cm from the starting point . this bundle was dopted in estimating the molecular wieght of the enzyme and it was found that is approximately equal to (≈ 59) kilo dalton by using the molecular weihgt of standard protien.

Biochemical Parameter in Seminal Plasma

Seminal plasma cholesterol was determined by using kit manufactured by manufactured by Biolabo (France) (Burits et al, 2012). Seminal plasma albumin was determine by using kit manufactured by Biolabo (France) . Seminal plasma SH group wss determined by using method (Marder et al., 1994) .TAC measured by (DPPH) methods (Okunade & Wunnava, 2002). Done estimation of element Zn , Mn, Se by uses atomic absorbation (Farrukh,et al 2012).

Results and Discussion

The results of this study indicated that there were many significant changes in the level of biochemical variables for the group of infertile men compared to the control group through the stages of enzyme separation and purification shown in Table No. (1).

Table 1. Experimental and control group comparison

Parametars	Fertile(50)	Infertile(150)	p-value
Total cholesterol (mg/dl)	21.63±12.25	33.58±15.78	0.01
Albumin (mg/dl)	0.66±0.18	1.06±0.62	0.01
Mn (µg/ml(	70.62±16.85	42.05±12.02	0.003
Zn (µg/ml)	274.01±90.23	95.44±58.75	0.014
Thiol group (µmol/L)	14.43±3.87	6.78±0.93	0.00
TAC (%)	12.16±0.66	1.85±0.42	0.00

1-Total Cholestrol

In this study, it was found that there was a significant increase in the level of cholesterol in the semen plasma of people with unexplained infertility compared with the group of healthy people without infertility and the reason may be due to this To the occurrence of insulin resistance in men who suffer from infertility and this occurs most often in men who suffer from obesity and thus increase the chances of unexplained sterility (Ouvrier et al., 2011). This increase leads to testicular damage and impaired reproductive processes due to the large formation of free radicals and significantly increased oxidative stress (Pushpendra and Jain 2015).

2-Albumin

In this study, it was observed that there was a significant increase in the concentration of albumin in the semen plasma of infertile subjects compared with healthy subjects, and the reason may be due to that patients with unexplained infertility have high levels of reactive oxygen species (ROS) which greatly affect the increase in the albumin level in the semen plasma and this greatly affects the sperm motility and vitality (Elzanaty et al., 2007), which increases the symptoms of unexplained infertility and the effect on fertility in infected men(Rodrigues *et al* 2013). As well as proteins increase the viscosity of the semen, which negatively affects the movement of sperm (Harchegani et al., 2019).

3- Trace Elements

In this study, it was observed that there was a significant decrease in the trace mineral elements that were measured in the semen plasma, which included zinc and manganese, in men suffering from unexplained infertility compared to healthy men, and this may be due to the role of zinc as an antioxidant, especially the types of reactive oxygen, as the decrease in zinc leads to significant damage resulting from oxidative stress, which greatly affects the quality of the semen and the mobility of the sperm (Lee, 2018). The cause of zinc deficiency may be a lack of zinc intake through food or a dietary interference that prevents the body from absorbing zinc (Powell, 2002). Also, many recent studies have proven that zinc affects the level of white blood cells, as the more of these cells, the higher the level of inflammation and work to reduce the level of zinc (Kerns et al., 2018)

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Manganese plays an important role in improving fertility properties in men through its action to regulate the role of many reproductive hormones, as it, in association with zinc, works to stabilize chromatin and the sperm membrane as well as enhance the mechanical and kinetic properties of sperm (Shquirat et al, 2013). The reason for the significant decrease in manganese in men who suffer from unexplained infertility may be due to a defect in the function of the prostate gland, which leads to a lack of manganese formation and secretion, as many studies have confirmed the role of the prostate gland in regulating the necessary amount of this element to determine the movement of sperm (Barber *et* al., 2005).

.

4-Thiol Group

In this study, a significant decrease in the thiol group was observed in men suffering from unexplained infertility compared to the control group, and the reason may be due to that the thiol group is considered one of the groups very sensitive to increase the oxidation processes and therefore large quantities of it are consumed to reduce the negative impact of oxidative processes that are in normal people within the normal level and therefore there is a decrease in the level of the thiol group in sterile men (Piomboni et al., 2012). Also, the reason may be due to an increase in oxidation processes leading to an effect on the protein structure and cellular function, especially when the oxidized groups correlate with the thiol group of the amino acid cysteine, which leads to a significant increase in the use of the thiol group and thus a decrease in the level (Gong et al., 2012) as well as some studies noted the presence of (ATPase) (Ca2 + -ATPase) Within the seminal plasma content, which indicates that oxidative processes greatly affect the specialized enzymes and thus reduce the level of thiol groups (Cabrillana et al., 2016).

5-TAC

It was observed during this study that there was a significant decrease in the amount of non-enzymatic antioxidants (31) when comparing infertile men with a group of healthy men, and the reason for this may be due to the fact that men with unexplained infertility have a very high percentage of free radicals, which leads to a significant decrease in the level of non-enzymatic antioxidants, which are considered to scavenge free radicals and work to reduce their formation (Agarwal & Sekhon, 2010) as the increase in free radicals leads to a decrease in the susceptibility of sperm Perhaps fertilization, which leads to the emergence of symptoms of unexplained sterility, where the effect is directly on the membranes (Subramanian *et al* ,2018).

6-Hyaluronic Enzyme

The results of this study showed the presence of significant biological changes in the level and activity of the hyalurinase enzyme when comparing the group of patients with the control group, and thus the role of the enzyme is very clear through the occurrence of cases of unexplained infertility in men who suffer from low activity of this enzyme in the plasma of semen and confirms the significant role This enzyme and the results of the purification process are shown in Table No (2).

Table 2. The stages of purification of the hyaluronase enzyme

Step	Volum	Protein con.	Activity	T.P	T.A	Spicific Activity	Flod	Recovery Ratio
crude	21	5.04	42.1	105.8	884.1	8.35	1	100%
Filtrate	18.5	3.91	41.98	72.44	776.73	10.72	1.28	87.86%
acetone precipitate	9.5	5.18	73.08	49.2	694.29	14.11	1.69	78.53%
DEAE-cellulose	25	0.35	21.59	8.75	539.74	61.68	7.38	61.04%
Sephadex-G100	20	0.113	24.4	2.27	487.94	214.95	25.74	55.74%

Gel Filtration Chromatography

The gel filtration technique was used to separate the protein bundles emerging from the ion exchange technology, where a separation column (60cm*2.5cm) containing a gel of the type (Sephadex G-100) was used. It is noted that there are two protein peaks the enzyme activity is at the second peak as shown in Figure No. (1).

Molecular Weight by Electrophoresis

The approximate molecular weight of hyalurinase was estimated using electro-migration technique SDS-PAGE electrophoresis Where the results showed the presence of a protein bundle close to the protein bundle of the standard substance with a molecular weight (58 KDa) As shown in Figure No. (2), and through the use of the standard curve between the value of (Rf) and the value of (log Mw), the approximate molecular weight of the enzyme was calculated, which is within (59 Kda).

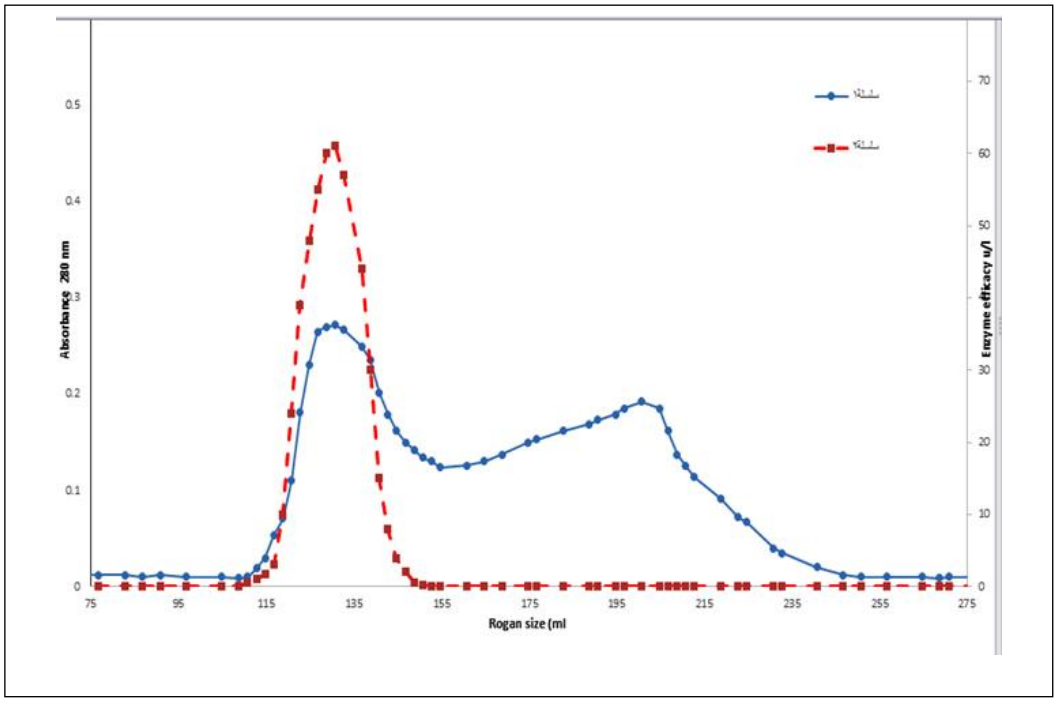

Figure 1. Profile shows the hyalorondase protein bundles generated from separating column (Sephadex G-100) of human seme.

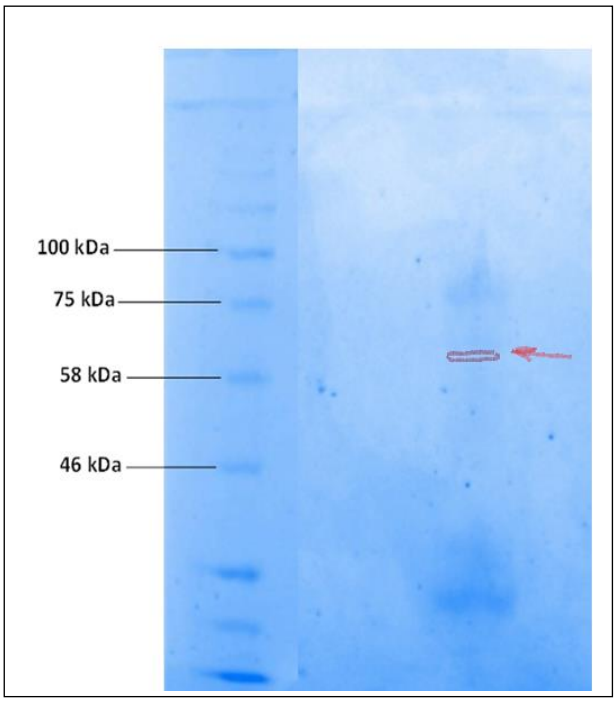

Figure 2. Separated protein bundles on a gel using SDS-PAGE electrophoresis

Conclusion

The results of the study showed the presence of significant effects of many biochemical variables on the occurrence of unexplained infertility through the role of these variables during various metabolic processes, especially lipid metabolism.

Recommendations

The study recommends examining the activity of hyalurinase enzyme in patients with unexplained infertility and measuring a number of biochemical variables to find out the reasons that may lead to infertility in men without a clear organic cause

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPHELS journal belongs to the authors.

Acknowledgements or Notes

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The Effect of a Facility Level Intervention on Disrespect and Abuse during Childbirth: A Controlled Before and After Comparison of Two District Hospital in Abuja, Nigeria

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Abstract: Disrespect and abuse of women by health care workers during pregnancy and childbirth is very common especially in developing countries like Nigeria. This is a deterrent to the utilization of available maternal health-care facilities with resultant high maternal morbidity and mortality. Hence there is a need for interventional strategies to reduce the prevalence. This study examines the effectiveness of an educational intervention on the prevalence of disrespect and abuse in two district hospitals in Nigeria. It employed a quasi-experimental design as a control before and after with a comparison to measure the effect of a single intervention on the prevalence of disrespect and abuse experienced by women during childbirth, using two health facilities. A total of three hundred and seventy four (374) women experiencing childbirth, one hundred and eighty seven from each health facility were randomly selected as research participants for a baseline study while the same total number of women were selected after a 3 days training on respectful maternity care targeted at health workers in only one of the hospitals. The overall prevalence of disrespect and abuse among the women at baseline was 92.33%. The results from the logistic regression analysis conducted at post intervention and the z-score comparison of proportion test indicates a significant reduction in the overall prevalence of disrespect and abuse at the intervention site, from 88.2% to 46% with no significant change in the overall prevalence of disrespect and abuse at the control site. It was concluded that there is a significant relationship between educational intervention and prevalence of disrespect and abuse hence recommendations were made for relevant stakeholders to implement strategies that will improve respectful maternity care.

Keywords: Disrespect and abuse**,** Facility based healthcare, Prevalence, Educational intervention, Health care professionals.

Introduction

Maternal mortality, defined as the "death of a woman in pregnancy or within 42 days of terminating pregnancy whatever the site or period of the pregnancy from any cause that has to do with the pregnancy or its management" (WHO, 2004 p3), still constitutes a major obstacle to health systems worldwide and is a tragedy for the entire community. High maternal mortality is a marker of global health inequality and has the largest discrepancy between the developed and developing countries of all human development indicators (Koblinsky, 2013). Therefore, maternal deaths and its reduction are of significant public health priority for the international community especially with the recent attention to the millennium development goals as it is one of the eight fundamental goals of enhancing human development (Koblinsky, 2013).

In the year 2000, the number of maternal deaths globally was 529,000. This figure was almost shared equally by Africa (251,000) and Asia (253,000) with only 22,000 deaths in Latin America and less than 1% of these maternal deaths occur in the developed countries (Carla, 2003). In 2015, developing countries accounted for 99% (302,000) of global maternal mortality with Sub-Saharan Africa contributing 66% (201,000) followed by Southern Asia(66,000) (WHO, 2015). Facility-based maternal care is critical to the reduction of these high maternal deaths. For instance, abuse and disrespect of women during facility-based care discourages women from seeking skilled attention and therefore directly affect maternal mortality and fetal outcomes (Miller & Lalonde, 2015; Patel et al. 2015).

In Nigeria, an estimated 576 women die out of every 100,000 live births (NDHS, 2013). This amounts to 36,000 maternal deaths annually. Presently, Nigeria contributes 14% to global maternal deaths and second to India in the estimates of global maternal mortality losing about 145 women of reproductive age daily (Kassebaum et al. 2013; Ajaegbu, 2013). Maternal mortality ratio, defined as "the number of maternal deaths during a given period per 100,000 live births during the same period" (Romans & Graham, 2006) increased by 31 maternal deaths per 100,000 live births between 2008 and 2013 (Wilmoth, 2009; NDHS 2013). The high maternal mortality ratio of 576 per 100,000 live births in Nigeria indicates that a critical aspect of our health care delivery services continue to be elusive. Therefore, the country was unable to meet the fifth Millennium development goal (MDG) of reducing maternal mortality ratio by 75% between 1990 and 2015 (Ndep, 2014). Despite the country's failure to meet the fifth MDG along with 193 countries, Nigeria signed into the sustainable development goals (SDGs). (SDGs) is defined as the provision of robust economic development, environmental sustainability, social inclusion and good governance at all levels and its addressed in a respectfully balanced and civilized way in an evidenced-based approach through appropriate economic organizations (Sachs, 2012). Therefore, Nigeria has made a commitment to reduce maternal mortality ratio to 12 per 100,000 live births in the next 15 years (2015-2030) (Murray, 2015). To achieve the sustainable development goals and the Millennium development goals, key factors that need to be addressed include increasing antenatal care and skilled birth attendance.

In Nigeria, only 5 out of 10 women attend ante-natal care in health facilities, only 38 out of 100 women are attended by a skilled birth attendant during childbirth, and only 36 out of 100 women give birth in health facilities (NDHS, 2013). In order to improve antenatal care and skilled birth attendance, there is the need to improve coverage and access to maternal health care facilities and also to improve the quality of maternal care provided in these institutions (Campbell, et al., 2006). There is evidence to show that women who are not satisfied with the quality of maternal care provided in health facilities usually do not visit a health center during the next pregnancy and childbirth and may also deter other women in the community from seeking maternal care in these facilities (Bohren et al. 2014). One important aspect of poor quality care that causes this dissatisfaction and unwillingness to seek skilled birth attendance is the disrespectful, abusive, and undignified maternal care that women experience during pregnancy and childbirth in health care facilities (Kujawaski et al. 2015).

Disrespect and abuse during pregnancy and childbirth are experienced by women globally, but the problem is more prevalent in developing countries (Okafor et al. 2015). For instance, an estimated 98% of the women who use health facilities during pregnancy and childbirth experience disrespect and abuse in Nigeria (Okafor, 2015). Mistreatment of women during pregnancy and childbirth is a violation of the Universal Rights of Childbearing Women charter which affirms that every woman has a right to dignified and respectful reproductive and maternal health care (WRAN, 2011). Respectful Maternity care is also a key strategy of the World Health Organization's (WHO) vision for quality of care for childbearing women and newborns (Tunçalp et al. 2015) and the mother-baby friendly birthing facilities initiative (Miller & Lalonde, 2015).

To help define and describe disrespect and abuse during childbirth, Bowser and Hill classified types of disrespect and abuse into: "physical abuse, non-consented clinical care, non-confidential care, non-dignified care, discrimination, abandonment, and detention in health facilities" (Bowser & Hill 2010 p.3). This typology has guided research and practice in respectful maternity care since it was developed in 2010. However, it has been expanded to include health system deficiencies and individual attitudes that create an enabling environment for disrespectful or abusive care during pregnancy and childbirth (Freedman et al. 2014).

Individuals and the community can encourage disrespect and abuse during pregnancy and childbirth by normalizing the issue. Other factors that can contribute to increased prevalence include the absence of national laws and proper enforcement, poor leadership and governance, poor standard of care and accountability. Interventions focused on reducing disrespect and abuse of women during pregnancy and childbirth includes advocacy and stakeholder’s mobilization, facility modification, legal reforms, accountability measures,

humanization of childbirth, reduction of HIV/AIDS stigmatization, education, and training programs (Browser & Hill 2010; Kruk et al. 2014).

This research will evaluate the impact of a 3-day educational training on values clarification, and attitude transformation (VCAT) used globally (White Ribbon Alliance, 2015) that is targeted at health workers. The research aims to estimate the prevalence of disrespect and abuse during pregnancy and childbirth and to provide evidence on the effectiveness of an educational intervention on the prevalence of this important public health problem. In a resource poor country like Nigeria, the evaluation of a simple cost effective intervention like education and training on the prevalence of disrespect and abuse during childbirth is critical in the present effort at increasing the utilization of facility-based maternal care.

Search Strategy

The search strategies employed in this study were adapted from Bohren et al. (2015) and George et al., (2015) studies on mistreatment of women during childbirth in health facilities globally and a systematic review of intervention that promote awareness of rights and its impact on increase use of maternity care services respectively. Four electronic databases were searched *(PUBMED, EMBASE, CINAHL, DISCOVERY).* PUBMED comprises of more than 26 million citations for biomedical literature from MEDLINE, EMBASE and CINAHL and are crucial databases for biomedical literature. The websites of main international organizations involved in maternal care like *WHO, UNICEF, USAID and UNFPA* were also searched. Experts working on respectful maternity care were also consulted to provide gray literatures which are not yet published. The strategies are listed in the table below.

Table 1a. Search strategy

	Database Searched		Search Terms	Result
Problem/Topic-disrespect and abuse during childbirth in health facilities	Mistreatment	#1	"disrespect"[tw] OR "disrespects"[tw] OR "disrespectful"[tw] OR "disrespected"[tw] OR "respectful"[tw] OR "abuse"[tw] OR "abused"[tw] OR "abusive"[tw] OR "abuses"[tw] OR "neglect"[tw] OR "neglected"[tw] OR "neglects"[tw] OR "confidentiality"[tw] OR "confidential"[tw] OR "non-confidential"[tw] OR "informed consent"[tw] OR "violence"[tw] OR "violent"[tw] OR "humiliation"[tw] OR "humiliate"[tw] OR "condescend"[tw] OR "condescending"[tw] OR "condescension"[tw] OR "intimidation"[tw] OR "intimidate"[tw] OR "yelling"[tw] OR "yell"[tw] OR "non dignified"[tw] OR "non-dignified"[tw] OR "undignified"[tw] OR "discrimination"[tw] OR "discriminate"[tw] OR "abandon"[tw] OR"abandonment"[tw] OR "detention"[tw] OR "human rights"[tw] OR "maltreatment"[tw] OR "mistreatment"[tw] OR "humanization"[tw] OR "humanized"[tw] OR "dehumanized"[tw] OR "dehumanization"[tw] OR "dignified"[tw] OR "undignified"[tw] OR "stigma"[tw] OR "dignity"[tw] OR "bullying"[tw] OR "bully"[tw]	513715
		#2	"confidentiality"[mesh] or "informed consent"[mesh] or "women's rights"[mesh] or "violence"[mesh] or "social stigma"[mesh] or "health services/ethics"[mesh] or "health care quality, access, and evaluation/ethics"[mesh]	174294
		#3	#1 OR #2	568258
	Perinatal and maternal health	#4	"perinatal service"[tiab] OR "peri natal service"[tiab] OR "perinatal services"[tiab] OR "peri natal services"[tiab] OR "perinatal health service"[tiab] OR "peri natal health service"[tiab] OR "perinatal health services"[tiab] OR "peri natal	552540

			health services"[tiab] OR "prenatal care"[tiab] OR "pre natal care"[tiab] OR "prenatal health care"[tiab] OR "prenatal healthcare"[tiab] OR "pre natal health care"[tiab] OR "pre natal healthcare"[tiab] OR "prenatal service"[tiab] OR "pre natal service"[tiab] OR "prenatal services"[tiab] OR "pre natal services"[tiab] OR "prenatal health service"[tiab] OR "pre natal health service"[tiab] OR "prenatal health services"[tiab] OR "pre natal health services"[tiab] OR "antenatal care"[tiab] OR "ante natal care"[tiab] OR "antenatal health care"[tiab] OR "antenatal healthcare"[tiab] OR "ante natal health care"[tiab] OR "ante natal healthcare"[tiab] OR "antenatal service"[tiab] OR "ante natal service"[tiab] OR "antenatal services"[tiab] OR "ante natal services"[tiab] OR "antenatal health" service "[tiab] OR " antenatal health service "[tiab] OR " antenatal health services "[tiab] OR " antenatal health services "[tiab] OR " maternal care "[tiab] OR " maternal health care "[tiab] OR " maternal healthcare "[tiab] OR " maternal service "[tiab] OR " maternal health service "[tiab] OR " maternal services "[tiab] OR " maternal health services tiab OR birth[tiab] OR births[tiab] OR childbirth[tiab] OR childbirths[tiab] OR delivery[tiab] OR deliveries[tiab]	
		#5	“birthing centers"[tiab] OR "maternal-child health centers"[tiab] OR "delivery rooms"[tiab] OR "maternity hospitals"[tiab]	1323
		#6	“obstetric delivery”[tiab] OR "obstetric deliveries”[tiab] OR "delivery, obstetric"[Mesh]	67005
		#7	“facility based delivery”[tiab] OR “facility based deliveries”[tiab] OR “facility delivery”[tiab] OR “facility deliveries”[tiab] OR “facility based births”[tiab] OR “facility based birth”[tiab] OR “facility birth”[tiab] OR “facility births”[tiab] OR “clinic delivery”[tiab] OR “clinic deliveries”[tiab] OR “clinic births”[tiab] OR “clinic birth”[tiab] OR “hospital delivery”[tiab] OR “hospital deliveries”[tiab] OR “hospital birth”[tiab] OR “hospital births”[tiab] OR “hospital childbirth”[tiab] OR “hospital childbirths”[tiab] OR “hospital based deliveries”[tiab] OR “hospital based delivery”[tiab] OR “hospital based births”[tiab] OR “institutional birth”[tiab] OR “institutional births”[tiab] OR “institutional childbirth”[tiab] OR “institutional childbirths”[tiab] OR “institutional delivery”[tiab] OR “institutional deliveries”[tiab]	1935
		#8	#4 OR #5 OR #6 OR #7	586028
		#9	#3 And #8	16760
		#10	respectful maternity care [tiab] OR respectful maternity care [Mesh]	24
		#11	#9 OR #10	16770
Setting	Developing countries	#12	"developing country"[tiab] OR "developin countries" [tiab] OR "developing nation"[tiab] OR "developing nations"[tiab] OR "developing population"[tiab] OR "developing populations"[tiab] OR "developing world" [tiab]	98560

	OR "less developed country"[tiab] OR "less developed countries"[tiab] OR "less developed nation"[tiab] OR "less developed nations"[tiab] OR "less developed population"[tiab] OR "less developed populations"[tiab] OR "less developed world"[tiab] OR "lesser developed country"[tiab] OR "lesser developed countries"[tiab] OR "lesser developed nation"[tiab] OR "lesser developed nations"[tiab] OR "lesser developed population"[tiab] OR "lesser developed populations"[tiab] OR "lesser developed world"[tiab] OR "under developed country"[tiab] OR "under developed countries"[tiab] OR "under developed nation"[tiab] OR "under developed nations"[tiab] OR "under developed population"[tiab] OR "under developed populations"[tiab] OR "under developed world"[tiab] OR "underdeveloped country"[tiab] OR "underdeveloped countries"[tiab] OR "underdeveloped nation"[tiab] OR "underdeveloped nations"[tiab] OR "underdeveloped population"[tiab] OR "underdeveloped populations"[tiab] OR "underdeveloped world"[tiab] OR "middle income country"[tiab] OR "middle income countries"[tiab] OR "middle income nation"[tiab] OR "middle income nations"[tiab] OR "middle income population"[tiab] OR "middle income populations"[tiab] OR "low income country"[tiab] OR "low income countries"[tiab] OR "low income nation"[tiab] OR "low income nations"[tiab] OR "low income population"[tiab] OR "low income populations"[tiab] OR "lower income country"[tiab] OR "lower income countries"[tiab] OR "lower income nation"[tiab] OR "lower income nations" [tiab] OR "lower income population"[tiab] OR "lower income populations"[tiab] OR "underserved country"[tiab] OR "underserved countries"[tiab] OR "underserved nation" [tiab] OR "underserved nations"[tiab] OR "underserved population"[tiab] OR "underserved populations"[tiab] OR "underserved world"[tiab] OR "underserved country"[tiab] OR "underserved countries"[tiab] OR "underserved nation"[tiab] OR "underserved nations"[tiab] OR "underserved population"[tiab] OR "underserved populations"[tiab] OR "underserved world"[tiab] OR "deprived country"[tiab] OR "deprived countries"[tiab] OR "deprived nation"[tiab] OR "deprived nations"[tiab] OR "deprive population" [tiab] OR "deprived populations"[tiab] OR "deprived world"[tiab] OR "poor country"[tiab] OR "poor countries"[tiab] OR "poor nation"[tiab] OR "poor nations"[tiab] OR "poor population"[tiab] OR "poor populations"[tiab] OR "poor world"[tiab] OR "poorer country"[tiab] OR "poorer countries"[tiab] OR "poorer nation"[tiab] OR "poorer nations"[tiab] OR "poorer population"[tiab] OR "poorer populations"[tiab]

		OR "poorer world"[tiab] OR "developing economy"[tiab] OR "developing economies"[tiab] OR "less developed economy"[tiab] OR "less developed economies"[tiab] OR "lesser developed economy"[tiab] OR "lesser developed economies"[tiab] OR "under developed economy"[tiab] OR "under developed economies"[tiab] OR" under developed economy"[tiab] OR "underdeveloped economies"[tiab] OR "middle income economy"[tiab] OR "middle income economies"[tiab] OR "low income economy"[tiab] OR "low income economies"[tiab] OR "lower income economy"[tiab] OR "lower income economies"[tiab] OR "low gdp"[tiab] OR "low gnp"[tiab] OR "low gross domestic"[tiab] OR "low gross national" [tiab] OR "lower gdp"[tiab] OR "lower gnp"[tiab] OR "lower gross domestic"[tiab] OR "lower gross national"[tiab] OR lmic[tiab] OR lmics[tiab] OR "third world"[tiab] OR "lami country"[tiab] OR "lami countries"[tiab] OR "transitional country"[tiab] OR "transitional countries"[tiab]	
Study Design	#13	"quantitative study"[tiab] OR "qualitative study " [tiab] OR "experimental study"[tiab] OR "randomised controlled trial"[tiab] OR "cross sectional study"[tiab] OR "quasi experimental"[tiab] OR "cross-sectional study"[tiab] OR "quasi-experimental"[tiab]	156003
Combination of Terms	#14	#11 AND #12 AND #13	40

Table 1b. Search Strategy/EMBASE

	Search terms	*Results*
1	(Disrespect$ or abuse$ or neglect$ or non dignified or abandon$ or mistreat$ or stigma$ or intimidate$ or dehumanize$).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]	337839
2	(Prenatal or peri natal or maternal or childbirth or child birth or ante natal or antenatal or deliver$ or obstetric).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]	1158689
3	(Birth centre or health facility or clinic or maternity home).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]	297619
4	1 and 2 and 3	1070
5	Respectful maternity care.mp.	21
6	4 or 5	1089

Table 1c. Search Strategy/CINAHL

	Search terms	*Results*
1)	TI “disrespect” OR TI “disrespectful” OR TI “disrespected” OR TI “abuse” OR TI “abused” OR TI “abusive” OR TI “abuses” OR TI “neglect” OR TI “neglected” OR TI “neglects” OR TI “humiliation” OR TI “humiliate” OR TI “intimidation” OR TI “intimidate” OR TI “non dignified” OR TI “non-dignified” OR TI “undignified” OR TI “discrimination” OR TI “discriminate” OR TI “abandon” OR TI “abandonment” OR TI “detention” OR TI “maltreatment” OR TI “mistreatment” OR TI “humanization” OR TI “humanized” OR TI “dehumanized” OR TI “dehumanization” OR TI “dignified” OR TI “undignified” OR TI “stigma” OR TI “dignity” OR TI “bullying” OR TI “bully” OR AB “disrespect” OR AB “disrespects” OR AB “disrespectful” OR AB “disrespected” OR AB “respectful” OR AB “abuse” OR AB “abused” OR AB “abusive” OR AB “abuses” OR AB “neglect” OR AB “neglected” OR AB “neglects” OR AB “humiliation” OR AB “humiliate” OR AB “intimidation” OR AB “intimidate” OR AB “non dignified” OR AB “non-dignified” OR AB “undignified” OR AB “discrimination” OR AB “discriminate” OR AB “abandon”	57,842

	OR AB "abandonment" OR AB "maltreatment" OR AB "mistreatment" OR AB "humanization" OR AB "humanized" OR AB "dehumanized" OR AB "dehumanization" OR AB "dignified" OR AB "undignified" OR AB "stigma" OR AB "dignity"	
2	TI "perinatal"OR TI "peri natal"OR TI"maternal"OR TI "childbirth"OR TI"child birth"OR TI"ante natal" OR TI"antenatal"OR TI "delivery"ORTI "obstetric" OR AB "perinatal"OR AB "peri natal"OR AB"maternal"OR AB "childbirth"OR AB"child birth"OR AB"ante natal" OR AB"antenatal"OR AB "delivery"ORAB "obstetric"	80,825
3	TI "birth centre" OR TI"health facility" OR TI"clinic or maternity home" OR AB "birth centre" OR AB"health facility" OR AB"clinic or maternity home"	552
4	S1 and S2 and S3	9
5	TI "respectful maternity care" OR AB "respectful maternity care"	4
6	S4 or S5	13

SOURCE: *Bohren et al. (2015), George et al. (2015).*
Note: The search strategy utilized in this study was adopted from other authors who have worked in similar area (cf; Bohren et al., 2015 & George et al, 2015).

Overall Prevalence of Disrespect and Abuse during Childbirth in the Included Studies

The prevalence of disrespect and abuse is defined as the proportion of women interviewed within six weeks after delivery who have experienced any type of disrespect and abuse during childbirth (Bohren et al., 2015). An experience of disrespect and abuse was measured either by a self-reported experience of disrespect and abuse during childbirth, during exit interviews or direct observation of patient-provider interactions. Prevalence of disrespect and abuse during childbirth ranged from 14.8% in Tanzania to 98% in Nigeria (Abuya et al., 2015b; Asefa&Bekele 2015; Kruk et al., 2014; Kujawski et al., 2015; Okafor et al., 2015; Rosen et al., 2015; Sando et al., 2014). The variation in prevalence of disrespect and abuse across studies could be due to the difference in definition and method of measurement as a result of health system variations in the different setting of these studies as well as true differences in the prevalence of abuse.

Types of Disrespect and Abuse and Their Prevalence

A systematic review (Bohren et al., 2015) of both qualitative and quantitative primary studies synthesized the various kinds of disrespect and abuse experienced by women during childbirth. These include; "physical abuse, sexual abuse, verbal abuse, stigma and discrimination, lack of informed consent and confidentiality, clinical examinations and procedures, neglect and abandonment, lack of supportive care, loss of autonomy, lack of resources and privacy and facility culture" (Bohren et al., 2015).

Physical Abuse

A woman is said to have been physically abused during childbirth if she has been slapped, pinched, beaten, or forcefully restrained or tied down during labor (Moyer et al., 2014; Bohren et al., 2015). Failure to protect a woman from physical harm or ill- treatment can also be regarded as physical abuse (Asefa and Bekele 2015). The proportion of women who have experienced any form of physical abuse during childbirth in the included studies varies from 0.8% by Asefa and Bekele (2015) in Tanzania to 35.7% by Okafor et al., (2015) in Nigeria. Kruk et al., (2014) showed that 1.9% of women interviewed immediately after giving birth in 8 health facilities in Tanzania were either slapped or pinched by health providers during childbirth. Direct observation of 2,164 provider-patient interactions conducted in 5 countries recorded only 18 observations of physical abuse of women during childbirth (Rosen et al. 2015).

Sexual Abuse

This is an experience of either sexual harassment or rape. Okafor et al., (2015) in their study on the prevalence of disrespect and abuse in Eastern Nigeria reported that 2.0% of women had experienced either rape or sexual harassment. In Kruk et al., (2014) 0.1% and o.23% of women who were interviewed immediately after childbirth had experienced sexual harassment and rape respectively.

Verbal Abuse

Verbal abuse includes shouting, scolding, blaming, using a harsh tone and making negative comments (Bohren et al. 2015). The prevalence of verbal abuse ranged from 4.16% in Tanzania to 29.6% in Nigeria (Abuya et al. 2015a; Abuya et al. 2015b; Kruk et al. 2014; Okafor et al. 2015; Sando et al. 2014).

Stigma and Discrimination

The experience of stigma and discrimination is said to occur if a woman feels humiliated or disrespected as a result of an individual attribute she possesses such as race, ethnicity and HIV status (Okafor 2015; Sando 2014). Okafor et al. (2015) reported a prevalence of 20% in his cross-sectional study of 446 post-natal women in Eastern Nigeria.

Lack of Informed Consent

The definition of non-consented care differed across these studies. The highest overall prevalence for non-consented care reported by Okafor et al. (2015) was 54.5% while the least prevalence of non-consented care reported in Kruk et al., (2014) was 0.06%.

Neglect and Abandonment

Various forms of neglect and abandonment experienced during childbirth include; cases where the provider did not encourage the woman to call for help when needed or did not come quickly when help was needed or was left alone or unattended to (Asefa & Bekele 2015). This category of disrespect and abuse can also be described as when a woman is specifically being left unattended to at the second stage of labor (Okafor et al. 2015). Asefa and Bekele (2015) in their cross-sectional study aimed at measuring the level of disrespect and abuse during facility-based childbirth in Ethiopia reported that 39.3% of women interviewed were left without care and unattended to. Abuya et al,. (2015b) reported at baseline that 12.7% of women who responded to the survey were abandoned during childbirth while Okafor et al., (2015) reported a prevalence of 29.1%.

Lack of Supportive Care

Lack of supportive care is defined as the denial of a birth companion (husband or relative) by a health provider (Okafor et al. 2015). Direct observations in 5 countries showed that 66.9% of women who were observed were not encouraged to have a support person during childbirth (Rosen et al. 2015).

Lack of Autonomy

Lack of autonomy arises when a woman is detained in the health facility for either failure to pay the medical bills or any other reason. Kruk et al. (2014) in their cross-sectional study of 1779 post-partum women in Tanzania found that 0.17% of the women were detained in the health facility for failure to pay. Okafor et al. (2015) reported that up to 17% and 4.9% of the 446 women in their cross-sectional study in Eastern Nigeria were detained for failure to pay their bill and that of their babies respectively. 0. 6% of women reported being detained after childbirth in the cross-sectional study of 173 post-partum women by Asefa and Bakele (2015) in Addis Ababa.

Lack of Privacy and Confidentiality

Confidentiality is breached when the health provider exposes confidential information about the patient to people outside the patient's care team (Bohren et al. 2015). Privacy is not protected when care is provided in a service delivery space that lacks audio-visual privacy or partitions between beds in a health facility. Kruk et al. (2014) reported that 4.39% of women who were interviewed immediately after birth experienced a breach in privacy and confidentiality during childbirth, while the prevalence of breach of confidentiality reported by Okafor et al. (2015) was up to 26%.

Factors that Contribute to an Experience of Disrespect and Abuse

Factors such as maternal age, tribe, marital status, educational level and parity have been found to have no association with a woman's experience of disrespect and abuse during childbirth in a cross-sectional study of 446 women in Eastern Nigeria (Okafor et al. 2015). However, a survey of 641 postpartum women by Abuya et al. (2015) in health facilities in Kenya showed that women delivering at night were associated with a higher risk of disrespect and abuse compared to those that deliver during the day (adjusted odds ratio 1.4; 95% CI: 1.0-1.8). This particular study also demonstrated that wealth, two previous deliveries and single marital status were associated with experience of disrespect and abuse. Women who were HIV positive had greater odds to experience non-consented care during childbirth compared to HIV-negative women (AOR 9.16; 95%CI: 1.73-115.00, p-value=0.03) (Sando et al. 2014). These findings are supported by a qualitative study by (Turan et al. 2008) which showed that HIV-positive women are more likely to experience disrespect and abuse. Moreso, Janevic et al. (2011) showed in their focused group discussion with 71 Romani women seeking maternal health care in Serbia and Macedonia that racism has also been implicated as a determinant of disrespect and abuse during childbirth.

Another factor that influences the experience of disrespect and abuse during childbirth includes health worker perspective of respectful maternity care (Erlandsson et al. 2014). For instance, health workers who participated in focused group discussions have the perception that they are protecting the woman and her baby by not encouraging her to relax during labor (Erlandsson et al. 2014). Poor working conditions, high staff turnover, technical malfunctions, inadequate infrastructure, and lack of training and ignorance of clients' rights issue also contribute to the perpetration of disrespect and abuse by health workers in Burkina Faso (Ouedraogo et al. 2014; Dao, 2012).

Factors that promote respectful maternity care include having a respectful, supportive and trusting relationship with service providers (Vedam et al. 2015). Promoting respectful maternity care requires political commitment, legislative reforms, budgetary allocation, engagement with health regulatory bodies and development of standards of practice (Jolivet, 2012).

Effectiveness of Interventions for Promoting Respectful Maternity Care and Reducing Disrespect and Abuse during Pregnancy and Childbirth.

An uncontrolled before and after evaluation of the effectiveness of an intervention for promoting respectful maternity care and reducing disrespect and abuse during childbirth in 13 health facilities in Kenya showed a 7% absolute decline in the prevalence of reported disrespect and abuse after the intervention (Abuya et al. 2015a). The prevalence of reported disrespect and abuse was 20% and 13% before and after the intervention respectively (Abuya et al. 2015a; Abuya et al. 2015b). The odds of experiencing disrespect and abuse after the intervention was 0.6 times less than before the intervention (OR 0.6; 95% CI: 0.4-0.8).

Critical Appraisal of Included Quantitative Studies

Systematic Review

The CASP checklist for systematic reviews was used to assess the methodological quality of Bohren et al. (2015). This review addressed a clearly focused question which was to elucidate the typologies of disrespect and abuse experienced by women during pregnancy and childbirth. The study included both quantitative and qualitative studies to address the research questions and objectives. These studies were selected through a robust search of electronic databases (PUBMED, CINAHL, EMBASE, DISCOVERY), reference list of other published studies, contact with experts and retrieval of gray literature. No meta-analysis was conducted due to a high level of heterogeneity in the included studies. However, a narrative synthesis was used to generate a typology for disrespect and abuse experienced by women during pregnancy and childbirth.

Uncontrolled Before and After

The CASP checklist for assessing trials and NIH/NHLBI checklist for the quality assessment of Before-After (Pre-Post) studies with no control group were used to conduct the methodological quality of Abuya et al. (2015).

The research question for this study was clearly stated. The study aims at evaluating the effect of a multi-component intervention on disrespect and abuse during childbirth in health facilities supported by the Heshima project in Kenya. The eligibility criteria for inclusion into the study were clearly stated. The participants were representative of the general population of interest and those who participated in the before and after client exit interviews had similar demographic and social characteristics. The intervention outcome measures were clearly described. The sample size was calculated and had enough power to detect a statistically significant effect size before and after the intervention. Appropriate statistical analysis (proportions and logistic regression) was conducted to elucidate change in outcome measure from baseline. The effect size noted in this study was statistically significant with narrow confidence intervals, however, the p-values of some of the association between exposure variables and the outcome variable were not stated.

Cross-Sectional Studies

Five cross-sectional studies (Asefa and Bekele 2015; Kruk et al.2014; Okafor et al. 2015, Rosen et al. 2015; Sando et al. 2014) included in this literature review had clearly defined the research question, study population, inclusion and exclusion criteria, exposure variables, and outcome variables. Only Okafor et al.(2015) clearly showed a sample size calculation.

Summary of Literature and Gaps Identified in Literature

The overall prevalence of disrespect and abuse varied widely across the included quantitative studies, probably because of methodological differences in the definitions of disrespect and abuse and measurement methods across the studies. The difference in prevalence may also be due to contextual factors such as health system conditions, socio-cultural practices in the different settings where the studies were carried out and true differences in the prevalence across settings and populations. However, there was no explanation on how context and setting influenced the prevalence of disrespect and abuse in the previous systematic review (Bohren et al. 2015).

Out of the few quantitative studies that elucidate the prevalence of disrespect and abuse, only one study evaluated the effectiveness of a respectful maternity care intervention. This evaluation used an uncontrolled before and after design. Observed changes from baseline in an uncontrolled before and after study cannot be wholly ascribed to the intervention because secular trends and sudden changes can influence the findings of outcomes of the intervention (Grimshaw et al. 2000). The Hawthorne effect which may occur in this study design may also lead to overestimation of intervention effect (Grimshaw et al. 2000). While the literature review has shown the effectiveness of a multi-component intervention, there is no evidence to support the effectiveness of an isolated educational intervention and this is the gap this study aims to fill.

Method

Study Design

The study used a quantitative methodology as it is a quasi-experimental research designed as a control before and after with a comparison to evaluate the effect of a single intervention on the prevalence of disrespect and abuse experienced by women during pregnancy and childbirth using two health facilities. Quasi-experimental studies are nonrandomized pre-post intervention study design used when it is not logically possible or ethically feasible to conduct a randomized control trial to evaluate the effects of a specific intervention. It aims to demonstrate causality between intervention and an outcome like in randomized control trials (Harris et al. 2006). Here a two-group pretest-posttest design was used to evaluate the effect of an educational intervention (Harris et al. 2006; White & Sabarwal 2014).

Health workers in one facility received the intervention while the other health facility did not receive any intervention. This intervention borders on a three-day educational training on value clarification and attitude transformation targeted at health workers with a view to providing them with knowledge on respectful maternity care and how to cultivate values and attitude that will prevent them from treating women with disrespect and abuse during childbirth (WRAN, 2015). Differences at baseline between the two facilities were tested. The prevalence and pattern of disrespect and abuse were measured before and after the intervention using the same survey in the two health facilities.

Research Setting

Abuja is the federal capital city of Nigeria with a population of 1, 406,239 people out of the total population of Nigeria which is 140,003,542 NPC (2006). Out of this population, only 54% of women deliver in health care facilities (NDHS, 2013). Abuja has fourteen General hospitals providing facility-based maternal care and these are: Maitama, Asokoro, Wuse, Nyanyan, Kubuwa, Life Camp, Kuje, Bwari, Karshi, Kwali, Abaji, Rubochi, Karu and Zuba general hospitals. Out of these, Bwari and Karshi general hospitals were selected for the study because they have a high volume of patients accessing maternity care and they are comparable in terms of their capacity to provide maternity care services (see Table 1 below).

Table 2. Comparison of selected health facilities

	Bwari district Hospital	Karshi district Hospital
Average facility attendance rate/month	6,300	3,358
Average Antenatal care attendance rate/month	820	962
Average number of deliveries /month	204	184
Number of beds	60	40
Number of Midwives	48	48
Number of Nurses	79	65
Number of Doctors	25	15

The intervention was implemented in Bwari General Hospital (treatment hospital) while Karshi General Hospital did not receive the intervention (control hospital). Bwari General Hospital was selected as the health facility to receive the intervention because the hospital administrator was willing to provide technical support for the training. However, the evaluation was conducted independently. Regarding the sampling procedure, a list of women whose expected date of delivery fell between six (6) weeks and one week before the intervention was delivered, was compiled for each of the two hospitals. A table of random numbers was used to randomly select women who were invited to participate in the pre- intervention survey in both health facilities. The same sampling procedure was employed to select women for the post-intervention survey. Therefore, the women that participated in the pre-intervention survey were not the same as those that participated in the post-intervention survey. The inclusion criteria include women who have given birth to a baby within six weeks before the survey in these two selected health facilities. This is borne out of the fact that women who have given birth to a baby within six weeks will still be receiving post natal care, and so their recall will not be affected. It also includes women who consented to be interviewed. On the other hand, the exclusion criteria include women that are 18 years old.

Sample Size

A baseline assumption of 98% prevalence of disrespect and abuse during childbirth in Nigeria was undertaken by using the figure from a previous study by Okafor et al. (2015) on 446 women attending post-natal care in a tertiary health care facility in Enugu state, Nigeria. By using epiifo and assuming a 95% absolute difference between the two health facilities in proportion of disrespect and abuse during childbirth following the intervention based on a study by Abuyaet. al. (2015), power of 80% and two sided alpha of 0.05, a sample size of 332 was calculated (166 for each health facility). With a non-response rate or missing data of 10% anticipated, a final calculated sample size of 182 in each facility giving a total sample size of 364 was arrived at for the pre and post intervention surveys. Furthermore, randomly selected women were approached by the researcher when they came for their post- natal care visit and introduced to the study. They were provided with the participant information sheet and given the opportunity to ask questions. Women who are willing to participate in the study were given a questionnaire to complete and an envelope in which to return it to the researcher once completed.

Regarding the instrument of data collection, a structured self-administered questionnaire on nine different types of abuse and disrespect: verbal abuse, physical abuse, stigmatization, sexual harassment, privacy violation, violation of confidentiality, failure to meet professional standard of care, poor rapport and detainment was used to collect the data. The questionnaire was adapted from the exit questionnaire used by Abuya et al. (2015) by including questions such as gravity, complications during delivery, history of attendance of anti-natal clinic, method of delivery and sexual harassment. A pilot study comprising of twenty (20) post-natal women in Nyanya General Hospital was conducted to ascertain the reliability and validity of the items employed. Discussions were held with these women after they received and filled the questionnaires. The discussion was aimed at eliciting difficulties that the women experienced when filling the questionnaires as well as to elicit how well they

understood it. Based on their responses, it was discovered that most of the women were unwilling to give information about their income probably because of tax reasons. Also, the women were unable to correctly respond to the variable "date of last delivery". They confused this response with the last delivery before the index delivery. Hence, these variables were subsequently deleted from the final survey. In the same vein, the items on attendance of ante-natal clinic and being accompanied to the clinic by a family member that were omitted in the pilot questionnaire were included in the final questionnaire base on suggestions from the respondents. English is widely spoken in Abuja, so there was no need to translate the questionnaire into other Nigerian Languages. A participant was taken as having experienced abuse and disrespect if she responds to yes for one or more of the 23 questions on the different types of abuse and disrespect.

[1]The researcher used a positivist epistemological approach or empiricism which is derived from scientific method originating from the physical sciences. By this approach, numerical data can be used to quantify or measure phenomena through objective assessment, a systematic process of analysis and a deductive process from existing knowledge (Bruce et al. 2008). This study assumes an objective reality about the prevalence of disrespect and abuse and that the effectiveness of an educational intervention can be measured by the analysis of the data collected from the self-reported experiences of the study participants.

[2]The intervention program which is in the form of three days education/training program was administered on doctors, nurses and other paramedics at the experimental site (Bwari General Hospital) by two skilled professionals who are class-room instructors in health disciplines in Nigerian institution of higher learning.

Data Analysis

Continuous data were summarized by using mean and standard deviation and were checked for normality by using normality plot and histogram (Kirkwood & Sterne 2003 P.33-44). Categorical data were then summarized as frequency and proportions. The data was entered into an Excel worksheet and imported into SPSS version 23 for analysis after which efforts were made to check for missing data and outliers using box plots. A participant was taken as having experienced abuse and disrespect if she responds to yes for one or more of the 23 questions describing the types of abuse and disrespect.

Moreso, a descriptive statistics was conducted to summarize and compare socio demographic- characteristics of the participants in both health facilities to identify any significant difference between the facilities according to these characteristics. The independent t-test was employed in testing for a significant difference in the age (continuous variable) of participants while the Mann-Whitney test was employed in testing for any significant difference in respondent's gravidity and parity since they are discrete variables (0latunji 2004). Categorical variables were summarized as frequencies and percentages, and the Chi-square test of difference was used to identify any difference in the categorical variables between the control and intervention sites. (0latunji, 2004).Secondly, frequencies and percentages were used to calculate the overall prevalence in both health facilities. Thirdly, a cross comparison of the two health facilities according to the various components of disrespect and abuse was carried out to determine if there is any significant difference in the prevalence of each component between the two facilities at baseline, while frequencies and percentages were used to calculate the prevalence of disrespect and abuse in the two sites. In addition, Chi-square test was used to check for any difference in prevalence of disrespect and abuse between the two health facilities.

To determine if any significant relationship exists between the experience of disrespect and abuse and the exposure variables at baseline, and in the prevalence of disrespect and abuse between the two health facilities, univariate logistic regression models were carried out separately for each of the variables since the outcome variable is binary (yes/no). The exposure variables that were found to be significantly associated with disrespect and abuse (type of health facility and experience of complications during delivery) were included in a separate multivariate logistic regression to control for their effect on the association between the type of health facility (control/intervention) on the outcome variable (disrespect and abuse). Lastly, the z-score test was used to test for the difference in the prevalence of disrespect and abuse experienced by the women before and after the intervention in both the control and intervention health facilities. P-value was set at 0.05 (Bruce et al, 2008).

Ethical approval was sort and obtained from the Federal capital territory administration in Abuja Nigeria. Letters were obtained from the administration of the two health facilities welcoming the researcher and ensuring their maximum cooperation. The participant information sheet (PIS) provided detailed information about the research including consent. The participants were given the PIS and allowed enough time to think over it and ask questions. Consent was implied when a woman reads this brief information ("*By completing this*

questionnaire you are consenting to take part in this study") and proceeded to complete the questionnaire. To ensure confidentiality, the questionnaires were completed in a private room at the exit gate of the two facilities. Identifiable information was not collected to ensure anonymity. Data will be kept for five years and then destroyed.

Results and Discussion

Results

Demographic Comparison of Study Participants in Both Control and Intervention Site at Baseline

There are a total 187 observations at the intervention site and 191 observations in the control site. There are no missing data in the entire variable in both the baseline data for the control and intervention sites. Age is normally distributed in the baseline data in both control and intervention sites, but gravidity and parity were not normally distributed.Moreso, the demographic characteristics of participants in the two facilities varied significantly regarding age, occupation, education level, language, time of delivery, experience of complication and being accompanied by a family member with the exception of method of delivery, gravidity and parity (see Table 4.1).

Table 3. Demographic characteristics of study participants in the control and intervention site

Continuous/discrete variables	Karshi (control site) N=191	Bwari (intervention site) N=187	Test Statistics	p-value	df
Age: Means (SD)	25.24(5.7)	28.50(4.61	(independent sample t-test)	0.000	376
Gravidity: Median (IQR)	2(2)	2(2)	(Mann-Withney test)	0.785	
Parity: Median (IQR)	2(2)	2(2)	(Mann-Witheytest)	0.949	
Categorical variables					
Occupation	N (%)	N(%)			
Unemployed	89 (42.6)	62 (33.2)	Pearson's Chi-square	0.012	2
Unskilled	82 (42.9)	91 (48.7)			
Skilled	20 (10.5)	34 (18.2)			
Ethnicity	N(%)	N(%)			
Major Nigerian Ethnic Group(Hausa, Yoruba, Igbo)	128 (67.02)	79 (42.25)	Pearson's Chi-square	0.000	1
Minor Nigerian Ethnic Group (Gbagi, others)	63 (32.98)	108 (57.75)			
Educational level	N(%)	N(%)			
None or primary	49 (25.65)	15 (8.02)	Pearson's Chi-square	0.000	1
Secondary +	142 (74.35)	172 (91.98)			
Language	N(%)	N(%)			
English and Major Nigerian languages (Hausa+Yoruba+Igbo)	125(65.45)	78 (41.71)	Pearson's Chi-square	0.000	1
Others	66 (34.55)	109 (58.29)			
Time of delivery	N(%)	N(%)			

Morning or Day	133 (69.6%)	96 (51.3%)	Pearson's Chi-square	0.000	1
Night	58 (30.4%)	91 (48.7%)			
Method of delivery	N(%)	N(%)			
Normal	121 (63.4%)	128 (68.4%)	Pearson's Chi-square	0.296	1
Caesarean Section	70 (36.6%)	59 (31.6%)			
Experienced complications during the current childbirth	N(%)	N(%)			
No	114 (59.7%)	157, 84.0%	Pearson's Chi-square	0.000	1
Yes	77 (40.3%)	3016.0%)			
Accompanied by a family member	N(%)	N(%)			
No	31 (16.2%)	6 (3.2%)	Pearson's Chi-square	0.000	1
Yes	160 (83.8%)	181, (96.8%)			
Attended ANC for this current childbirth	N(%)	N(%)			
No	26 (13.6%)	5 (2.7%)	Pearson's Chi-square	0.000	1
Yes	165 (86.4%)	182 (97.3%)			
Age group	N(%)	N(%)			
<=24	77 (40.31)	34 (18.18)	Pearson's Chi-square	0.000	2
34-44	105 (54.97)	133 (71.12)			
45+	9 (4.71)	20 (10.77)			
Gravidity (no of pregnancy)	N(%)	N(%)			
0-2	120 (62.83)	121 (64.71)	Pearson's Chi-square	0.704	1
3+	71 (37.17)	66 (35.29)			
Parity (no of Births)	N(%)	N(%)			
0-2	124 (64.92)	121 (64.71)	Pearson's Chi-square	0.965	1
3+	67 (35.08)	66 (35.29)			

Overall Proportion of Disrespect and Abuse and Comparison of Disrespect and Abuse in both Health Facilities at Baseline

Broadly, there are seven main varieties of abuse and disrespect which are several kinds of physical abuse such as kicking and beating, undignified care and non-consented care. Others are non-confidential care, discrimination due to a particular attribute of a patient, abandonment of care for a patient and being detained in health facilities (Browser & Hill 2010). The overall prevalence of disrespect and abuse in both health-care facilities at baseline was 92.33%. The prevalence of physical abuse was 9.52% while other forms of abuse vary from 69.05% for cases where providers do not provide answers to participant questions to 2.65% for experience of stigma and discrimination. These results and that of the comparison between the two health facilities are displayed in Table 4 below.

Table 4. Overall proportion of disrespect and abuse and comparison of disrespect and abuse in both health facilities at baseline

	N	%
Overall prevalence of Disrespect and Abuse		
No	29	7.67
Yes	347	92.33
Experience of Physical Abuse		
No	342	90.48
Yes	36	9.52
Beaten		

No	369	97.62
Yes	9	2.38
		Continues
Slapped		
No	354	93.65
Yes	24	6.35
Kicked		
No	354	93.65
Yes	24	6.35
Pinched		
No	350	92.59
Yes	28	7.41
Restrained		
No	372	98.41
Yes	6	1.59
Gagged		
No	374	98.94
Yes	4	1.06
Sexual Harassment		
No	367	97.09
Yes	11	2.91
Verbal Abuse		
No	263	69.58
Yes	115	30.42
Judgment		
No	356	94.18
Yes	22	5.82
Experience of Stigma and Discrimination		
No	368	97.35
Yes	10	2.65
Experience of Violation of piracy		
No	362	95.77
Yes	16	4.23
Experience of Violation of Confidentiality		
No	351	92.86
Yes	27	7.14
Experience of non-consented care		
No	151	39.95
Yes	227	60.05
Not give pain relief on request		
No	198	52.38
Yes	180	47.62
Experience of Abandonment		
No	315	83.33
Yes	63	16.67
Asked to share bed		
No	360	95.24
Yes	18	4.76
Provider answered question		
No	117	30.95
Yes	261	69.05
Denied companion during childbirth		
No	149	39.42
Yes	229	60.58
Allowed to stay in proffered position during childbirth		
No	267	70.63
Yes	111	29.37
Experience of detainment		
No	347	91.8
Yes	31	8.2

Continues
Continues

Comparison of Prevalence of Disrespect and Abuse in Both Facilities at Baseline

Experience of Disrespect and abuse.	Karshi (control site No 7(3.7%) Yes 184 (96.3%) Bwari (intervention site: No 22 (11.8%) Yes: 165 (88.2%) p-value: 0.003	Experience of physical abuse	Karshi (control site No 156(81.7%) Yes 35 (18.3%) Bwari (intervention site: No 186(99.5%) Yes: 1 (0.5%)	Beaten	Karshi (control site No 183 (95.8%) Yes 8 (4.2%) Bwari (intervention site: No 186 (99.5%) Yes: 1 (0.5%)
Slapped	Karshi (control site No 167 (87.4%) Yes 24(12.6%) Bwari (intervention site: No 187 (100%) Yes: 0 (0%)	Kiked	Karshi (control site No 167 (87.4%) Yes 24(12.6%) Bwari (intervention site: No 187 (100%) Yes: 0 (0%)	Pinched	Karshi (control site No 163 (85.3%) Yes 28 (14.7%) Bwari (intervention site: No 187 (100%) Yes: 0 (0 %)
Restrained physically	Karshi (control site No 183 (96.9%) Yes 6 (3.1%) Bwari (intervention site: No 187 (100%) Yes: 0 (0 %)	Gagged	Karshi (control site No 187 (97.9%) Yes 4 (2.1%) Bwari (intervention site: No 187 (100%) Yes: (0 %)	Experience of Sexual Harassment	Karshi (control site No 180 (94.2% Yes 11 (5.8%) Bwari (intervention site: No 187 (100%) Yes: 0 (0 %)
Experience of verbal abuse (harsh tone and shouting)	Karshi (control site No 173 (90.6%) Yes 18 (9.4%) Bwari (intervention site: No 90 (48 .1 %) Yes: 97 (51.9%)	Experience of judgmental and accusatory comments, threats and blames	Karshi (control site No 174 (91.1%) Yes 17 (8.9%) Bwari (intervention site: No 182 (97.3%) Yes: 5 (2.7%)	Experience of stigma	Karshi (control site No 185 (96.9%) Yes 6 (3.1%) Bwari (intervention site: No 183 (97.1%) Yes: 4 (2.1%)

Continues

Continues

Violation of privacy	Karshi (control site No 177 (92.7%) Yes 14 (7.3%) Bwari (intervention site: No 185 (98.99%) Yes: 2 (1.1%)	Violation of confidentiality	Karshi (control site No 1771 (89.5%) Yes 20 (10.5%) Bwari (intervention site: No 180 (96.3%) Yes: 7 (3.7%)	Experience of non – consented care	Karshi (control site No 118 (61.8%) Yes 73 (38.2%) Bwari (intervention site: No 109 (58.3%) Yes: 78 (41.7%)
Refused to provide pain relief	Karshi (control site No 31 (916.2%) Yes 160 (83.8%) Bwari (intervention site: No 167 (89.3%) Yes: 20 (10.7%)	Experience Abandonment	Karshi (control site No 138 (72.3%) Yes 53 (27.7%) Bwari (intervention site: No 177 (94.7) Yes: 10 (5.3%)	Asked to share a bed with another patient	Karshi (control site No 179 (93.7%) Yes 12 (6.3%) Bwari (intervention site: No 181 (96.8%) Yes: 6 (3.2%)
Health provider answered questions and attended to woman	Karshi (control site No 102 (53.4% Yes 89 (46.6%) Bwari (intervention site: No 15 (8.0%) Yes: 172 (92.0%)	Denied a birth companion	Karshi (control site No 110 (57.6%) Yes 81 (42.4%) Bwari (intervention site: No 39 (20.9%) Yes: 148(79.1%)	Allowed to stay in preferred position during labor or childbirth	Karshi (control site No 102(53.4%) Yes 89 46.6%) Bwari (intervention site: No 165 (88.5%) Yes: 22 (11.8%)
Experience of detainment	Karshi (control site No 161 (84.3%) Yes 30 (15.7%) Bwari (intervention site: No 186 (99.5%) Yes: 1 (0.5%)				

Comparison of Overall Prevalence of Disrespect and Abuse in Both Facilities at Baseline

In the control site, the overall prevalence of disrespect and abuse is 95.3% while in the intervention site, the overall prevalence of disrespect and abuse is 88.2%. This difference is statistically significant with p-value of 0.003 (see Table 4.2).

Univariate Association between Experience of Disrespect and Abuse and Exposure Variable

To determine if any significant relationship exists between the experience of disrespect and abuse and the exposure variable at baseline, univariate logistic regression models were carried out. Univariate logistic regression was also undertaken to test the association between abuse/disrespect at baseline and type of facility (intervention versus control).

Table 5. Unvariate association between experience of disrespect and abuse and exposure variable.

	Odds Ratio	95% CI	P-value
Health Facility:			
Control	Ref		
intervention	0.29	0.12-0.9	0.005
Age	0.97	0.90-1.04	0.368
Gravidity	1.13	0.81-1.56	0.470
Parity	1.11	0.79-1.55	0.545
Occupation			
Unemployed	Ref		
Unskilled	0.58	0.25-1.35	0.206
Skilled	1.08	0.28-4.14	0.913
Ethnicity			
Minor Nigerian EthnicGroup (Gbagi, others)Major Nigerian Ethnic Group (Hausa, Yoruba, igbo)	Ref 0.75	0.35-1.61	0.466
Educational Level			
None or Primary	Ref		
Secondary+	0.77	0.26-2.30	0.64
Language			
Others	Ref		
English and MajorNigeria Languages (Hausa+Yourba+Igbo)	0.79	0.37-1.69	0.543
Time of Delivery			
Morning or Day	Ref		
Night	2.16	0.90-5.18	0.086
Method of delivery			
Normal	Ref		
Caesarean Section	2.09	0.83-5.26	0.119
Experienced			
Complications during the current childbirth			
No	Ref		
Yes	3.68	1.09-12.42	0.036
Accompanied by a family member			
No	Ref		
Yes	1.07	0.31-3.72	0.916
Attended ANC for this current childbirth			
No	Ref		
Yes	0.82	0.18-3.61	0.79
Multivariable Logistic Regression of Significant Exposure Variable and Outcome (experience of disrespect and abuse)			
Health Facility			
Control	Ref		
Intervention	0.34	0.14-0.84	0.02
Experienced Complications during the current childbirth			
No	Ref		
Yes	2.71	0.78-9.40	0.12

As shown in Table 5 above, a significant relationship was observed between health facility and disrespect and abuse. That is, the respondents at the control site were more likely to experience disrespect and abuse than those at the intervention site at baseline (OR 0.29, 95% CI 0.12-0.69, P<0.05). The socio-demographic variables, except for method of delivery and the experience of complications at childbirth are not statistically associated with disrespect and abuse.

Multivariate Logistic Regression of Significant Exposure and Outcome (Experience of Disrespect and Abuse)

To control for the effect of the exposure variables that were significantly associated with the experience of disrespect and abuse, a multivariate logistic regression which includes health facility and experience of complications, was set up. This showed that while health facility has a significant effect on disrespect and abuse, the experience of complication during childbirth by the women does not have any significant association with disrespect and abuse. The result of this model as displayed in Table 6.

Change from Baseline in the Components of Disrespect and Abuse in the Control Site

To determine if there are significant changes in the various components of abuse and disrespect between the baseline and post-intervention at the control site, a Chi-square analysis which involves these two sets of data was carried out. As evidenced there was a significant increase in the prevalence of physical abuse, verbal abuse, and experience of stigma, violation of privacy, violation of confidentiality, abandonment, and bed sharing. However, there was a significant decrease in the prevalence of non-consented care and refusal to give pain relief. See Table 6 below.

Table 6. Change from baseline in the components of disrespect and abuse in the control site

Category	Results							
Experience of physical abuse	Pre-intervention No 156 (81.7%) Yes 35 (18.3%) Post-intervention No 61 (32.6%) Yes 126 (67.4%) P-Value 0.000	Beaten	Pre-intervention No 183 (95.80%) Yes 8 (4.20%) Post-intervention No 133 (71.10%) Yes 54 28.90%) P-Value 0.000	Slapped		Kicked		
				Pre-intervention No 167 987.4%) Yes 24 (12.6%) Post-intervention No 120 (64.2%) Yes 67 (35.8%) P-Value 0.000		Pre-intervention No 167 87.4%) Yes 24 (12.6%) Post-intervention No 154 (82.4%) Yes 33 (17.6%) P-Value 0.161		
Pinched	Pre-intervention No 163 (85.3%) Yes 28 (14.7%) Post-intervention No 156 (83.4%) Yes 31 (16.6%) P-Value 0.607	Restrained Physically	Pre-intervention No 185 (96.9%) Yes 6 (3.1%) Post-intervention No 169 (90.4%) Yes 18 (9.6%) P-Value 0.01	Gagged	Pre-intervention No 187 (97.9%) Yes 4 (2.1%) Post-intervention No 176 (94.1%) Yes 11(5.9%) P-Value 0.009	Experience of Sexual Harassment	Pre-intervention No 180 (94.2%) Yes 11 (5.8%) Post-intervention No 176 (94.1) Yes 11(5.9%) P-Value 0.959	

Experience of Verbal abuse (harsh tone and Shouting	Pre-intervention No 173 (90.6%) Yes 18 (9.4%) Post-intervention No 118 (63.1%) Yes 69 (36.9%) P-Value 0.000	Experience of judgmental and accusatory comments.	Pre-intervention No 174 (91.1%) Yes 17 (8.9%) Post-intervention No 34 (50.3%) Yes 93 49.7%) P-Value 0.001	Experience of stigma	Pre-intervention No 185 (96.9%) Yes 6 (3.1%) Post-intervention No 149 (79.7%) Yes 38 (20.3%) P-Value 0.000	Violation of privacy	Pre-intervention No 177 (92.7%) Yes 14 (7.3%) Post-intervention No 146 (78.1%) Yes 41 (21.9%) P-Value 0.000
Violation of confidentiality	Pre-intervention No 171 (89.5%) Yes 20 (10.5%) Post-intervention No 135 (72.2%) Yes 52 (27.8%) P-Value 0.000	Experience of non consented care	Pre-intervention No 73 (38.20%) Yes 118 (61.80) Post-intervention No 118 (57.80%) Yes 79 (42.20%) P-Value 0.000	Refused to provide pain relief	Pre-intervention No 31 (16.2%) Yes 160 (83.8%) Post-intervention No 123 (65.8%) Yes 64 (34.2%) P-Value 0.000	Experience abandonment	Pre-intervention No 138 (72.3%) Yes 53 27.7%) Post-intervention No 129 (69.0)%) Yes 58 (31.0%) P-Value 0.000
Asked to share a bed with another patient	Pre-intervention No 179 (93.7%) Yes 12 (6.3%) Post-intervention No 160 (85.6%) Yes 27 (14.4%) P-Value 0.000	Health provider answered questions and attended to woman's cancers	Pre-intervention No 102 (53.4%) Yes 89 (46.6%) Post-intervention No 15 (61.5%) Yes 72 (38.5%) P-Value 0.112	Denied the birth companion	Pre-intervention No 110 (57.6%) Yes 81 (42.4%) Post-intervention No 118 (63.1%) Yes 69 (36.9%) P-Value 0.274	Allowed to stay in preferred position during labor or childbirth	Pre-intervention No 102 (53.4%0 Yes 89 (46.6%) Post-intervention No 114 (61.0%) Yes 73 (39.0%) P-Value 0.138
Experience detainment	Pre-intervention No 161 84.3%) Yes 30 (15.7%) Post-intervention No 104 (55.6%) Yes 83 (44.4%) P-Value 0.000	Previous experience of disrespect and abuse	Pre-intervention No 147 (77.0%) Yes 44 (23.0%) Post-intervention No 150 (80.3%) Yes 37 (19.8%) P-Value 0.441				

Change from Baseline in the Components of Disrespect and Abuse in the Intervention Site

To determine if there are significant changes in the various components of disrespect and abuse between the baseline and post-intervention, at the intervention site, a Chi-square test was used to compare these sets of data. As indicated by the analysis, there was a significant decrease in the following types of disrespect and abuse: verbal abuse, non- consented care and denial of birth companion (see Table 7).

Table 7. Change from baseline in the components of disrespect and abuse in the intervention site

Change from Baseline in the components of Disrespect and Abuse in the Intervention site							
Experience of physical abuse	Pre-intervention No 168 (99.5%) Yes 1 (0.5%) Post-intervention No 186 (100%) Yes 0 (0%) P-Value 0.318	Beaten	Pre-intervention No 186 (99.5%) Yes 1 (0.5%) Post-intervention No 186 (100%) Yes 0 (0%) P-Value 0.318	Slapped	No 187(100%) Yes 0.(0%) Post-intervention No 186 (100%) Yes 0 (0%)	Kicked	Pre-intervention No 187 (100%) Yes 0 (0.0%) Post-intervention No 186 (100%) Yes 0 (0%)
Pinched	Pre-intervention No 187 (100.0%) Yes 0 (0.0%) Post-intervention No 186 (100.0%) Yes 0 (0%)	Restrained Physically	Pre-intervention No 187 (100.0%) Yes 0 (0.0%) Post-intervention No 186 9100.0%) Yes 0 (0%)	Gagged	Pre-intervention No 187 (100.0%) Yes 1 (0.0%) Post-intervention No 186 (100%) Yes 0 (0%)	Experience of Sexual Harassment	Pre-intervention No 187 (100%) Yes 0 (0.0%) Post-intervention No 186 (100%) Yes 0 (0%)
Experience of verbal abuse (harsh tone and shouting)	Pre-intervention No 90 (48.1%) Yes 97 (51.9%) Post-intervention No 145 (78.0%) Yes 41 (22.0%)	Experience of judgmental and accusatory comments, threats and blames	Pre-intervention No 182 (97.3%) Yes 5 (2.7%) Post-intervention No 183 (98.4%) Yes 1.6%) P-Value 0.479	Experience of stigma	Pre-intervention No 183 (97.9%) Yes 4 (2.1%) Post-intervention No 183 (98.4%) Yes 3 (1.6%) P-Value 0.708	Violation of Privacy	Pre-intervention No 185 (98.9%) Yes 2 (1.1%) Post-intervention No 181 (97.3%) Yes 5 (2.7%) P-Value 0.249

Violation of Confidentiality	Pre-intervention No 180 (96.3%) Yes 7 (3.7%) Post-intervention No 181 (97.3%) Yes 5 (2.7%) P-Value 0.564	Experience of non-consented care	Pre-intervention No 78 (41.7%) Yes 109 (58.3%) Post-intervention No 176 (94.6%) Yes 10 (5.4%) P-Value 0.000	Refused to provide pain relief	Pre-intervention No 167 (89.3%) Yes 20 (10.7%) Post-intervention No 171 (91.9%) Yes 15 (8.1%) P-Value 0.385	Experienced Abandonment	Pre-intervention No 177 (94.7%) Yes 180 (96.8%) Post-intervention No 10 (5.3%) Yes 6 (3.2% P-Value 0.312
Asked to share a bed with another patient	Pre-intervention No 181 (96.8) Yes 6 (3.2%) Post-intervention No 186 (100%) Yes 0 (0.0%) P-Value 0.014	Health provide answer questions and attended to women's concerns	Pre-intervention No 15 8.0%) Yes 172 (92.0%) Post-intervention No 10 (5.4%) Yes 176 (94.6%) P-Value 0.307	Denied a birth companion	Pre-intervention No 39 (2.9%) Yes 148 (79.1%) Post-intervention No 173 (93.0%) Yes 13 (7.0%) P-Value 0.000	Allowed to stay in preferred position during labor or childbirth	Pre-intervention No 165 (88.2%) Yes 22 (11.8%) Post-intervention No 81 (43.5%) Yes 105 (56.5%) P-Value 0.000
Experienced detainment	Pre-intervention No 186 (99.5%) Yes 1 (0.5%) Post-intervention No 184 (98.9%) Yes 2 (1.1%) P-Value 0.559	Previous experience of disrespect and abuse	Pre-intervention No 166 (88.8%) Yes 21 (11.2%) Post-intervention No 147 (79.0%) Yes 39 (21.0%) P-Value 0.010				

Change from Baseline in Overall Prevalence of Disrespect and Abuse in Both Health Facilities

There was no change in the overall prevalence of disrespect and abuse at the control site as it remained at 96.3% with a p-value of 0.5. Therefore, there is no significant difference in the prevalence of disrespect and abuse before and after the intervention. However, there is a significant decrease in the overall prevalence of disrespect and abuse in the intervention site from 88.2% to 46.8%. With this result, it can be concluded that a statistically and significant difference exists in the prevalence of disrespect and abuse before and after the intervention. (See Table 8 below).

Table 8: Change from baseline in experience of disrespect and abuse in both health facilities

	Pre-Intervention Karshi	Post – intervention Karshi	P-Value
Experience of Disrespect and abuse	N (%)	N (%)	
No	7 (3.7%)	7(3.7%)	0.500
Yes	184 (96.3%)	180 (96.3%)	
	Pre-Intervention Bwari	Post-Intervention Bwari	
Experience of Disrespect and abuse	N (%)	N (%)	
No	22 (11.8%)	99(53.2%)	0.000
Yes	165(88.2%)	87 (46.8%)	

Discussions

The study's objective was to evaluate the effect of an educational intervention targeted at health workers on the prevalence and types of self-reported disrespect and abuse experienced by women during pregnancy and child birth, in Abuja, Nigeria. Consequent to this, a baseline survey was conducted in the two health facilities. Furthermore, an educational intervention strategy was applied in one of the hospitals after which a post-intervention survey was conducted in the two health facilities. A high proportion of the women examined at baseline reported to have experienced one form of disrespect and abuse with the overall prevalence at the two facilities put at 92.25%. A prevalence of 88.2% was observed at the intervention site, and 96.3% at the control site. The difference in prevalence between these two sites is statistically significant with a p-value of 0.003. The results on overall prevalence shares similarity with the findings by Asefa and Bekele (2015) where it was found that a high proportion of Ethiopian women experienced one form of disrespect and abuse with figures ranging from 73.3% among women who gave birth in health centers and 81.8% among those who had their deliveries in hospitals. It is also in consonance with the empirical findings by Okafor et al. (2015) where cases of disrespect and abuse as high as (98%) were found among women in a tertiary health facility in South East Nigeria. Therefore, this is a pointer that further studies needs to be done in other areas in Nigeria to provide more evidence for country-wide prevalence since only these two studies have so far addressed this important public health issue.

Contrastingly, the findings seem to be slightly different from Kruk et al. (2014) where prevalence as low as (19.48%) and (28.21%) was found for both exit survey and post-natal survey respectively among women in eight health care facilities in North Eastern Tanzania. These large variations in prevalence might be due to two primary reasons: 1) Differences in the study population regarding factors associated with disrespect and abuse. 2) The differences in the type of instrument employed in eliciting responses from respondents, for example, the questionnaire. Hence it is critical that data on abuse should be reported by everyone using the same set of questionnaire to allow for comparison across studies and long-term monitor of the prevalence of abuse.

Overall, these findings at baseline suggests that the prevalence of disrespect and abuse is high in the area under focus in this study which mean that women might not seek to give birth at health facilities thereby putting their health and that of their babies at risk (Okafor et al 2015). As such, relevant intervention strategies must be urgently employed to enhance its reduction.

Furthermore, the post-intervention survey at the intervention site showed a decrease in the prevalence to 46.8% from the baseline figure of 88.2% while the prevalence at the control site remained significantly unchanged at 96.3% with some of the components of disrespect and abuse becoming even more pronounced. Overall, these results suggest the probable effectiveness of the intervention strategy employed in this study. While there was no significant change in the prevalence of abuse pre and post-intervention in the control group, there was a significant fall in the prevalence of abuse in the intervention group. Though, a significant difference was seen between the two sites in some of the socio-demographic characteristics of the respondents at baseline which implies that the two sites are not comparable. Nevertheless it might be inappropriate to conclude that the training program has not contributed to the reduction in the prevalence of disrespect and abuse post-intervention. It further shows that an effective implementation of intervention based training, rendered to health professionals might likely have a corresponding impact on their attitude, and consequently, their behavior during pregnancy and childbirth. This is absolutely in line with the studies by Bowser and Hill (2010) and Abuya et al. (2015) where it was suggested that when intervention strategies are targeted towards attitude change, such will likely lead to a change in behavior among health providers and therefore reducing the prevalence of abuse and disrespect in health care settings.

Of note is the fact that this study did not show association between disrespect and abuse in relation to age, parity and other socio-demographic characteristics. Though other studies, for instance Browser & Hill (2010) reported such associations while Abuya et al. (2015) reported in their study in Kenya that the prevalence of physical and verbal abuse were more common at night. This suggests that the conduct of delivery exercise by healthcare professionals at this time has a linear association with disrespect and abuse as a result of lower number of staff coupled with work related stress that may predispose them to abusive behavior (Abuya et al. 2015). However, this association was not noted in this study.

Parity also did not appear to influence the prevalence of disrespect and abuse as women's previous experience of disrespect and abuse in these or other health facilities may have 'normalize' abusive behaviors from health care providers and therefore underreport it. Also, since litigation for abusive care are uncommon in this environment and as a result of the fact that the joy of having delivered a baby may overwhelm some of the women, they may decide to put the abusive treatment behind them and go on to take care of their babies (Okafor et al. 2015). Furthermore, this study showed that there are still cases of detention in health facilities during maternal care due to the inability of these women to pay medical bills with a baseline prevalence of 8.2%. Health care services are costly and unaffordable for the majority of families in Nigeria as most health care services being out of pocket payments (Okafor et al. 2015). This can be a deterrent to future utilization of skilled maternal care services resulting in the use of unskilled birth attendants with the attendant increase in maternal morbidity and mortality (Kuwajaski 2015).

Conclusion

Maternal mortality is a global public health issue and more especially, in developing countries (Bohren et al. 2015). Poor utilization of maternal health care is a factor contributing to high maternal mortality and disrespect and abuse is a greater deterrent than cost in the decision to use facility-based maternal healthcare services (Jolivet, 2012). The pre-intervention prevalence of disrespect and abuse during childbirth in health facilities in Nigeria particularly in the areas under focus in this study is high (92.25%). Hence relevant and appropriate intervention strategies must be urgently employed to address this important public health issue. Overall, this study has contributed to the literature on disrespect and abuse because whilst there are studies that have shown the effectiveness of multi-component interventional strategies on the prevalence of disrespect and abuse no study has evaluated the effect of a single intervention. Reduction in the prevalence of disrespect and abuse requires a broader contribution from the society, robust policy design and implementation to community involvement and participation.

Implication for Theory

The study has theoretical implications in that it has validate the assumption behind the theory of planned behavior Fishbein and Ajzen (1975) that the behavior and attitude of health workers will change after the intervention, and the prevalence of disrespect and abuse will reduce. Thus, it has been validated by this study that beliefs, perceptions and assumptions can be learnt within the context of a given environment and can act as a predictor of certain behavior including that of health workers which is in line with the opinion offered by Hardeman et al. (2002) that behavior and subjective norms are products of social pressures acting on an individual as a consequence of societal expectations and their intention to comply with it.

Implication for Practice

The absolute reduction in the prevalence of disrespect and abuse of 41.6% (a fall from 88.2% to 46.8%) for this study shows that the intervention has most likely contributed to the reduction in the prevalence of disrespect and abuse in this setting. Though, there might be other contextual factors which have also influenced this reduction. Thus, it is important that efforts should be made by relevant stakeholders to promote intervention strategies that will reduce prevalence of disrespect and abuse. Generally, women assess the quality of maternal care services in terms of respect to patients, privacy and compassion (Asefa & Bekele 2015). Hence, a high level of the prevalence of disrespect and abuse in maternal healthcare services portends negative consequences on maternal service utilization and a deterrent to future uptake of skilled maternal care services (Kuwajaski, 2015).

Recommendations

Recommendations for Policy Makers and Government

There is need for the government to improve the quality of maternal healthcare facilities and the working environment for maternal healthcare workers. More evidence is needed on the prevalence of disrespect and abuse of women during childbirth and there is a need for evaluation of the effectiveness of other interventional measures on the reduction of disrespect and abuse in Nigeria (Okafor et al. 2015). Also, there is the need to include respectful maternity care in the curriculum of our maternal healthcare providers.

Recommendations for Maternal Health Care Providers

* There is the need to attract more women to health facilities by providing more women friendly services and by humanizing services (Asefa & Bekele, 2015).
* There is urgent need for training and retraining of maternal health care providers on respectful maternity care.

Recommendations for the Community and Stakeholders

* Enhancement of accountability through legal redress.
* Establishment of ethical codes of conduct for our health workers in maternal health care.
* Provision of more facilities for privacy and spaces in our maternal care services for birth companions.
* Recognition of respectful maternity care as critical component needed to improve maternal health.
* More awareness should be created among women, their families and maternal health care providers on the rights of women to respectful maternal care.

Suggestions for Further Research

* Considering the limitations of a quasi-experimental design, further studies like qualitative and quantitative (mixed) are needed to unravel the complexities of disrespect and abuse.
* Other interventional methods like advocacy and stakeholder's engagement and facility modifications needs to be evaluated and to compare their effect to educational intervention.
* Future researchers should widen the geographical areas of study and include private health care facilities to determine if the results in these facilities will be similar to the one seen here.
* Other studies should be conducted to determine the long term viability of an educational intervention program in respectful maternity care.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPHELS journal belongs to the authors.

Acknowledgements or Notes

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The Association between Epicardial Adipose Tissue and Coronary Artery Disease in Hemodialysis Patients Using a Systematic Review

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Abstract: The role of epicardial adipose tissue (EAT) may play in the pathogenesis of coronary vascular disease CVD in patients on hemodialysis and whether imaging of EAT may hold prognostic implications for CVD events and mortality within this patient group **.**This systematic review investigated the association between epicardial adipose tissue and developing coronary artery diseases in patients undergoing hemodialysis. A search strategy was developed to identify primary studies published until 2 November/2019. Studies were obtained from multiple electronic databases (PubMed, HINARI, Science Direct). Searches were supplemented by hand searching and checking the reference lists of included articles. After the removal of duplicates, the search identified 89 titles, following title and abstract review twenty–three publications were considered potentially relevant, of which 6 studies were retrieved plus two studies from references list. The eight studies were included in the current review. Epicardial Adipose tissue thickness or volume is correlated significantly with coronary artery calcification in hemodialysis patients regardless its long term or incident. This systematic review suggests the significant relationship between epicardial adipose tissue and developing coronary artery disease in this special cohort of patients, hemodialysis patients. Further research should consider more the availability of using EAT as a non-invasive method to assess cardiovascular risk in HD patients.

Keywords: Epicardial adipose tissue, Coronary artery disease, Dialysis patients, Systematic review.

Introduction

Epicardial adipose tissue (EAT) is the visceral fat covering the surface of the heart and coronary artery adventitia, located below the parietal pericardium and accounts for 20% of the heart weight, and shares the same embryological origin with abdominal fat, which are strongly correlated and appear to be in brown adipose tissue originally in infants. It is an active metabolic tissue, secretes cytokines, and pro-inflammatory mediators; which believed to contribute to atherosclerosis through paracrine and vasocrine effect (Iacobellis et al., 2003; Sacks & Fain, 2007). Physiologically, (Marchington & Pond, 1990) Pathologically, Adipokines play role in myocardial inflammation as an inflamed EAT, and because of its proximity from coronary arteries, it makes vaso vasorum proliferate till they reach the intima of coronaries, promoting atherosclerotic plaques (Subbotin, 2012). The biochemical proprieties of epicardial adipose tissue suggest its possible role as a cardiovascular and metabolic risk indicator (Iacobellis et al., 2003). Cardiovascular disease (CVD) is the major cause of death in patients with end-stage renal disease (ESRD). In the general population, CVD morbidity and mortality have declined substantially over the past three decades through risk factor identification and reduction and more effective treatment of coronary artery disease (CAD) (Levey et al., 1998).

Recent studies evaluated the association between EAT and atherosclerosis in dialysis patients by measuring carotid intima thickness (Altun et al., 2014; Turan et al., 2013; Ulusal Okyay et al., 2015), arterial stiffness, and coronary artery calcification. It is well established that Insulin Resistance, dyslipidemia, hypertension, hyperglycemia, and inflammation are highly associated with the development of the atherosclerotic disease, particularly CAD. Consistent with this is the observation that epicardial adipose volume correlates strongly with coronary calcium burden and coronary atherosclerotic plaques (Toth, 2012) EAT may serve as a new predictive marker for CAD. EAT thickness and volume may be an effective way to assess severe atherosclerosis and predict CAD (Xu et al., 2012). In Hemodialysis, However, data about epicardial fat in this patient group is very limited.

Measuring EAT has various imaging modalities, the three common ways are transthoracic echocardiography, computed axial tomography scanning, and cardiac MRI whereas echo two dimensional, CT, and cardiac MRI are three dimensional. However, echo is widely available and do not subject patients to radiations, CT can measure total EAT volume and simultaneously assess coronary artery calcification (CAC) (Graham-Brown et al., 2015). Moreover, echocardiographic calculation of epicardial adipose was easily reproducible and showed excellent reliability with the MRI epicardial and visceral adipose tissue measurements. Echocardiographic assessment of visceral fat could be an easy method to indicate patients with high cardiovascular risk (Iacobellis et al., 2003). The objective of this review is to write a proposal to convince our hospital to measure EAT thickness or volume in hemodialysis patients.

Methods

Eligibility Criteria

All eligible studies for the last ten years were included if they met the predetermined inclusion and exclusion criteria detailed in the PICO model, no filters applied to the search, except for language. The search restriction was limited to the English language. The inclusion and exclusion criteria were listed below as shown in (Table 1).

Table 1. Inclusion and exclusion criteria

Criteria	Inclusion Criteria	Exclusion Criteria
Population	Adult hemodialysis patients	Pediatric group
Intervention/Exposure	Epicardial adipose tissue thickness or volume	
Year of publication	2009-2019	
Outcomes	Coronary artery calcification	
Study types	Quantitative study and review	

Search Strategy and Selection

Potential studies were identified using Pubmed, HINARI, Science Direct, Cochrane for recent ten years, from 2009 until 2/11/2019. In addition, references of included articles by 2 reviewers, the search strategy included the following terms selected from medical subheadings medical subject headings (MeSH): (epicardial fat OR epicardial visceral fat OR epicardial adipose tissue OR epicardial visceral volume OR epicardial fat volume) AND(coronary artery calcification OR coronary artery disease OR coronary atherosclerosis OR coronary arteriosclerosis) AND(Hemodialysis OR peritoneal dialysis OR end-stage renal disease OR renal dialysis OR extracorporeal dialysis OR transplant kidney). This systematic review followed the PRISMA guidelines as showed in Figure (1). Two reviewers independently were assessed all retrieved articles and make the decision based on the inclusion and exclusion criteria.

Data Extraction and Quality Assessment

Two reviewers developed a template for data extraction, information extracted including, biographic details, appraisal tool score, and study design, characteristics of participants, data collection, sampling, findings, and implications on practice. Eligible articles were reviewed and relevant data was then extracted and organized as shown in table 2. The quality of studies was evaluated using the Hawkers assessment tool (Hawker et al., 2002), composed of 9 items: Abstract and title, Introduction and aims, Method and data, Sampling, Data analysis, Ethics and bias, Findings, Transferability, and Implications and usefulness. Score for each item ranged

from 1 to 4, 1 for "very poor", 2 for "poor", 3 for "Fair", 4 for "Good". The quality assessment was conducted independently by two authors and then compared as shown in Table (3). Regards the quality of studies included the score was accepted and ranged between 27-34. More half of them used Cross-sectional study and others were prospective, retrospective study and sub-analysis of RCT study.

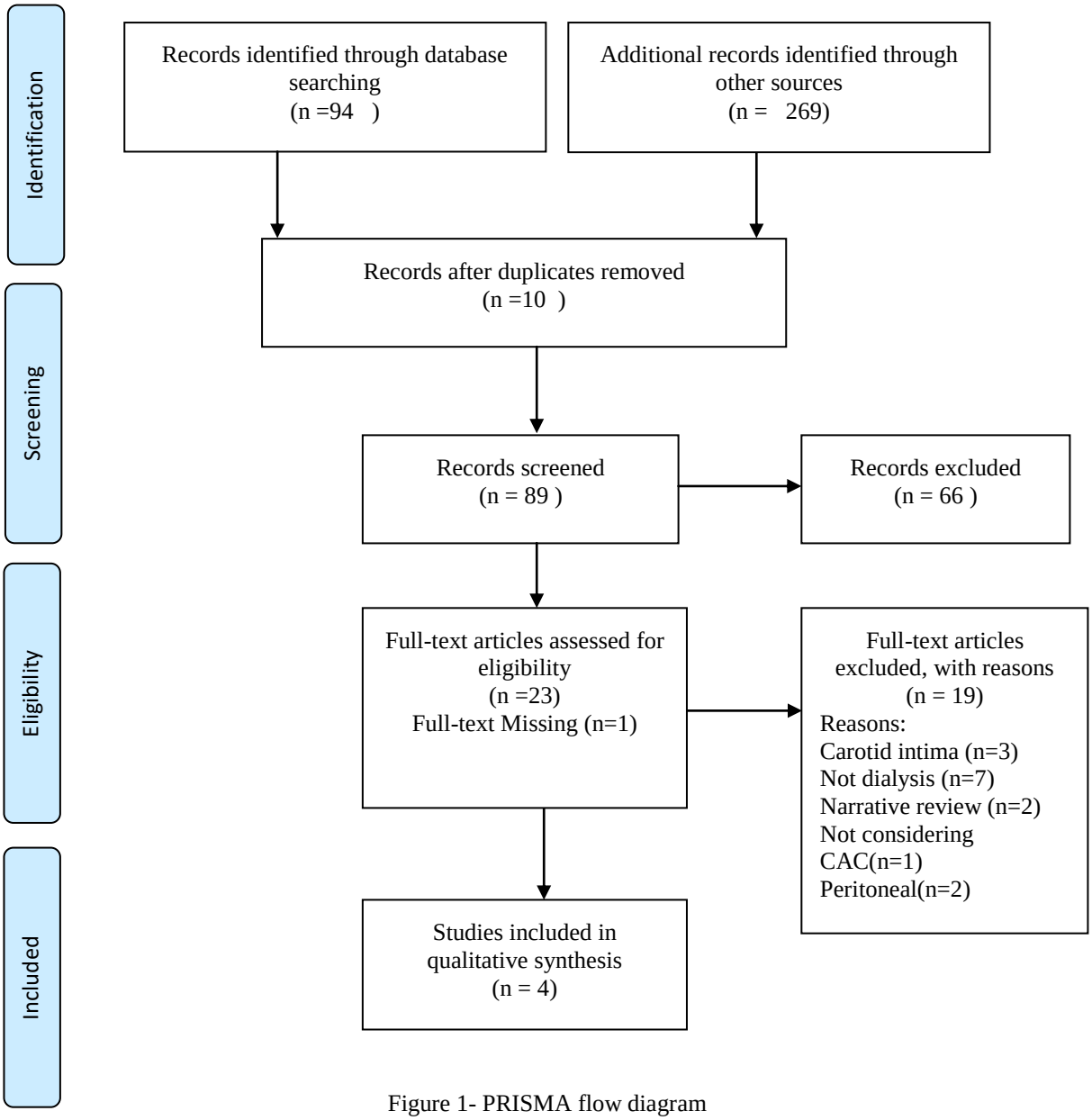

Figure 1- PRISMA flow diagram

Results

This systematic review was able to identify the association between epicardial adipose tissue thickness and coronary artery calcification. After title and abstract screening, the search resulted in 94 articles of which 23 were eligible for full text screening. The authors excluded 19 articles for one of the following reasons: not dialysis patients, carotid, peritoneal dialysis, renal transplant, pericardial adipose tissue, and narrative reviews. Thus 6 Articles were included in this review, plus 2 were included also from references, so the total of included studies were 8 studies, 5 of them were cross sectional studies (Abdallah et al., 2017; Atakan et al., 2014; Karatas et al., 2018; Macunluoglu et al., 2014; Ozcicek et al., 2017), two were cohort (Barros et al., 2016; Gaubeta et al., 2014) and one was a sub-analysis (D'Marco et al., 2013). Four articles of them were done in Turkey (Atakan et al., 2014; Karatas et al., 2018; Macunluoglu et al., 2014; Ozcicek et al., 2017); two in Germany (Barros et al., 2016; Gaubeta et al., 2014); one in USA (D'Marco et al., 2013) and one in Egypt (Abdallah et al., 2017).

General Specifications of Studies

The number of participants in a single study was ranged from 73 to 136, the mean age of participant varied between 44 and 64.1 years, male gender was predominant in four studies (Abdallah et al., 2017; Barros et al., 2016; D'Marco et al., 2013; Gaubeta et al., 2014) meanwhile, female gender was predominant in the other three (Atakan et al., 2014; Macunluoglu et al., 2014; Ozcicek et al., 2017) and Karats et al (Karatas et al., 2018) did not report the gender. Five studies measured EAT by transthoracic echocardiography (Abdallah et al., 2017; Atakan et al., 2014; Karatas et al., 2018; Macunluoglu et al., 2014; Ozcicek et al., 2017) while the other three used computed tomography (Barros et al., 2016; D'Marco et al., 2013; Gaubeta et al., 2014). All studies assessed the relationship between EAT and coronary artery calcification, five studies found a significant correlation. While, Gaubta et al (Gaubeta et al., 2014) reported that it was significant in 46 patients, who are younger than 55 years meanwhile, Abdullah et al (Abdallah et al., 2017) and Karatas et al (Karatas et al., 2018) did not assess it, but rather assessed other parameters contributes to CAD, EAT thickness and volume.

EAT Measurement

Five studies (Abdallah et al., 2017; Atakan et al., 2014; Karatas et al., 2018; Macunluoglu et al., 2014; Ozcicek et al., 2017) measured EAT using Transthoracic echocardiography, two of them performed it with a VIVID 7 (GE, General Electrics,Waukesha, WI, USA) while Ozcicek et al (Ozcicek et al., 2017) used GE-Vivid S5. The average value measured from three cardiac cycles in (Atakan et al., 2014; Gaubeta et al., 2014; Macunluoglu et al., 2014), while Karatas et al did not report it(Karatas et al., 2018), Abdullah et al used the average of five cardiac cycles (Abdallah et al., 2017). EFT was measured on the free wall of the right ventricle from the parasternal long-axis view. Epicardial fat tissue was defined as an echo-free space between pericardial layers on the two-dimensional echocardiography. Epicardial adipose tissue was measured perpendicularly on the free wall of right ventricle at end diastole for three cardiac cycles, reported thickness in (mm). Meanwhile, for the other studies, used Computed tomography each study put different definitions for CAC. Barros et al study (Barros et al., 2016) defined it as an area of more than 2 connected voxels with attenuation of more than 130 HU, while Gaubeta et al study (Gaubeta et al., 2014) determined a threshold of 130 HU in at least 2 consecutive pixels to identify a calcified lesion and D`Marco et al study (D'Marco et al., 2013) considered coronary artery calcification coronary artery calcification (CAC) present if three or more contiguous pixels with an attenuation of 130 HU. The CAC score was calculated according to the Agatston methodology. According to a systematic review, Betraso et al reported that EA thicknesses > 5 mm , or a volume > 125 mL or 68 mL/m² might be considered abnormal (Bertaso et al., 2013).

Predictors of Epicardial Adipose Tissue in Hemodialysis Patients

All studies reported older age as significantly a predictor of EAT in HD patients except Ozizcek et al (Ozcicek et al., 2017). Six studies reported higher BMI significantly correlated in the prediction of EFT thickness/volume while Ozizcek et al found no significance, and Karats et al did not report it. Total cholesterol was assessed in four studies, three of them reported that is significantly correlated with EAT (Abdallah et al., 2017; Atakan et al., 2014; Macunluoglu et al., 2014). The relation between EAT and duration of dialysis was found not significant in Guabta et al (Gaubeta et al., 2014) and Abdullah et al (Abdallah et al., 2017). C-reactive protein (CRP) was found to be not significant in Ozizcek et al (Ozcicek et al., 2017), while Marco et al (D'Marco et al., 2013) found that race, gender and total aortic calcification are correlated with EAT, Barros et al (Barros et al., 2016) found aortic valve calcification correlate to EAT , Karatas et al (Karatas et al., 2018) and Ozizcek et al (Ozcicek et al., 2017) found EAT positively correlated to Ferritin, Atakan et al (Atakan et al., 2014) found that coronary reserve flow (CRF)inversely correlated with EAT thickness, macunuglo et al (Macunluoglu et al., 2014) demonstrated that there is significant inverse correlation between EAT thickness and plasma Co-Q10 levels in HD patients, Abdullah et al found Paraoxonase-1 PON-1 activity inversely correlated with EAT thickness, Karatas et al demonstrated that ischemic modified albumin (IMA) and myeloperoxidase (MPO) statistically significant.

Discussion

This systematic review focused on the association between epicardial adipose tissue and coronary artery calcification in hemodialysis patients, as EAT has emerged to be a strong marker of cardiovascular risk and independent of traditional cardiovascular risk factors in the contributing in fatal and nonfatal coronary events in

the general population (Mahabadi et al., 2013) . The included eight studies and all of them found that epicardial adipose tissue volume was significantly higher in HD patients as compared to healthy controls (Abdallah et al., 2017; Atakan et al., 2014; Barros et al., 2016; Karatas et al., 2018; Macunluoglu et al., 2014; Ozcicek et al., 2017), or to the general population (D'Marco et al., 2013; Gaubeta et al., 2014) indicating that the metabolism of visceral fat is disturbed in HD patients as Barros et al (Barros et al., 2016) suggested. While all of them demonstrate the significant difference in EAT thickness/ volume, this review found just five studies assessed coronary artery calcification meanwhile Abdullah et al focused on assessing the relationship between PON-1 as it is an HDL-associated antioxidant enzyme and it will prevent LDL peroxidation and EAT as a marker of atherosclerosis, they demonstrated the inverse correlation, the rational of this that inflammation and oxidative stress are participating in developing CVD also in mortality and morbidity (Nusair et al., 2012). Atakan et al (Atakan et al., 2014) evaluated coronary reserve flow (CRF) as an early indicator of endothelial dysfunction in HD patients, this study could determine the relation between EAT and endothelial dysfunction as indicated by CRF which they reported that it can be used at the very beginning of the uremic state for assessing the atherosclerotic load. It is obviously clear that the study of Macunluoglu et al (Macunluoglu et al., 2014) focusing at the same principle of Atakan of oxidative stress and it is linkage to the development of CAD as they investigated plasma Co-enzyme Q10 levels which is an effective physiologic anti-oxidant. Ozizcek et al (Ozcicek et al., 2017) assessed neutrophil to lymphocyte ratio (NLR)as an inflammation parameter in HD patients and researchers divided HD group into two subgroups according to their NL ratio (NLR < 3.07, n=21, NLR ≥ 3.07, n= 22) and they reported a significant difference in EAT, CRP, Albumin and ferritin between these subgroups contributing this to the higher status of inflammation, but as predictors for EAT they assessed NLR, CRP, Albumin and body mass index (BMI) and only NLR was found to be an independent predictor of EAT , authors of this study stated that two dimensional echocardiography measurements may were not sufficient to assess the total epicardial adipose volume. Barros et al stated that EAT remained stable over 2 years as they follow up their HD patients, they reported only a modest , insignificant longitudinal increase, adding to that they report a subgroup in whom EAT volume decreased, who had higher baseline EAT levels, this observation was controversial as to what is already known regarding ESRD patients , the more at the baseline the more the increase in progression rate, they assessed a cohort of 59 HD patient, followed them for 23+- 4.7 months and reported a significant increase in CAC and aortic valve calcification, one more interesting finding that as 32 patients died during follow up, there was no association between EAT and all–cause mortality but a hazard ratio of 1.04 per 10 cm^3 increase in baseline EAT was reported.

This review found that seven studies assessed BMI correlation to EAT, one reported that BMI cannot be considered as a predictor for EAT (Ozcicek et al., 2017) furthermore, Ozizcek et al (2017) did not establish any differences in means of age, BMI, and gender between HD patients and healthy groups. Willens et al., (2007) reported in their study that, EAT thickness decreases in severely obese patients who undergone weight loss after bariatric surgery, and Measuring EAT using echocardiography may be useful to monitor visceral fat loss with weight reduction therapies (Willens et al., 2007). Reviewed showed that significant weight loss can be associated with significant reduction in the epicardial adipose thickness, marker of visceral adiposity in severely obese subjects. Another study described that during weight loss, Epicardial fat changes are significantly associated with obesity-related cardiac morphological and functional changes, and thus measuring may provide a better understanding of the metabolic risk associated with difference in fat distribution (Iacobellis et al., 2008).

One study reported no significance correlation between EAT and CAC, contributing this result to different mechanisms happen in HD patients, and it could be age as they demonstrated a significant correlation in a sub-group of 46 patients who are younger than 55 between EAT and CAC but they reported two interesting associations, first that there is no association between duration dialysis and EAT and this consistent with the follow up results of Barros et al but it was significantly correlated with age and diabetes mellitus type 2 as a cardiovascular risk factor.

One study considered assessing CRP and they reported no significant correlation with EAT, in CANTOS trial (Ridker et al., 2017) as they could significantly decrease CRP targeting it by Canakinomab and in light of the inflammation hypothesis and thus establishing CRP as a clinical risk marker for the cardiovascular marker. Ferritin was assessed and found to be an independent predictor of EAT in (Karatas et al., 2018; Ozcicek et al., 2017). Serum ferritin is an acute-phase reactant and marker of acute and chronic inflammation, and is nonspecifically increased in a wide range of inflammatory conditions, including chronic kidney disease (CKD)(Kalantar-Zadeh et al., 2006). It is noted also in light of inflammation hypothesis, Karatas et al in their study proposing, ischemia-modified albumin, myeloperoxidase and EAT as a follow up parameter in CKD patients. Introduction of low-density lipoprotein cholesterol (LDL-C) and high-density lipoprotein cholesterol (HDL-C) level measurements and the discovery of a positive association between LDL-C level and Chronic heart disease CHD risk, and a negative association between HDL-C level and CHD risk were of major

importance for CVD prevention as established by Framingham study (Rosito et al., 2008), in our review, four studies assessed total cholesterol (Abdallah et al., 2017; Atakan et al., 2014; D'Marco et al., 2013; Macunluoglu et al., 2014), one found it is not significant (D'Marco et al., 2013), three studies(Abdallah et al., 2017; D'Marco et al., 2013; Karatas et al., 2018) found HDL significantly correlated to EAT furthermore, Abdullah reported that LDL and triglycerides (TAG) are independent predictors of EAT.

MESA study (Ding et al., 2009) support the idea that pericardial fat is a better predictor of incident coronary heart disease than are more general measures of adiposity in community-based adults without a history of cardiovascular disease. If the hypothesis is confirmed, pericardial fat may serve as a more specific and sensitive marker of coronary heart disease risk than other fat measures.

None of the studies compared the imaging modalities or justify using one way over the another, but according to literature, MRI is the gold standard for measuring EAT, but it is high cost, less availability, and contraindications in patients with pacemakers and implants, and none of the studies used it ,while CT provides better EAT assessment with the highest specificity and sensitivity (Aeddula et al., 2019). Computed tomography (CT) and magnetic resonance imaging (MRI) have been traditionally used as adjuvants to echocardiography, but their role is increasing due to high spatial resolution and the possibility of volumetric assessment (Bertaso et al., 2013) while we see all studies used diastole to measure EAT it is a controversial point in the literature as Betrosa et al reported. Inconsistencies in the nomenclature and measurement methods are limitations to its implementation according to systematic review of Betraso et al (Bertaso et al., 2013). All studies reported that small size samples and the observational study designs as limitations for their work.

Limitations

The limitations of this systematic review were the accessibility for databases, and the geographical distribution of the studies as they were limited to Turkey (Atakan et al., 2014; Macunluoglu et al., 2014; Ozcicek et al., 2017), Germany (Barros et al., 2016; Gaubeta et al., 2014), Egypt (Abdallah et al., 2017) and USA (D'Marco et al., 2013) and thus more insights are needed to cover other regions. Another limitation was the restriction to English langue search.

Conclusions

In conclusion, the results of this systematic review suggest the significant relationship between epicardial adipose tissue and developing coronary artery disease in this special cohort of patients, hemodialysis patients as its metabolically active tissue, beside suggesting other less invasive, more available parameters, which significantly correlate with EAT thickness/volume and reflect the inflammatory progression in these patients, so guiding clinicians to assess coronary artery disease more efficiently and seriously. Further research should consider more the availability of using EAT as a non-invasive method to assess cardiovascular risk in HD patients. Therapeutic target either non-pharmacological or pharmacological methods. The current review suggests the need to do more detailed prospective study.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPHELS journal belongs to the authors.

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* The data used to support the finding of this study are included within the review, and any supporting literature has been referenced within the reference list. Authors declare that no conflict of interest. I would like to thank An Najah National University. Systematic reviewers typically do not have direct access to participants of primary research studies included in their review. This work was not funded by any persons or institutions

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